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# **TENDER SPECIFICATIONS**

**TENDER NO. BHEL:NR(SCT): KOTA:TG:440**

**FOR**

**TENDER FOR THE WORK OF “ERECTION, TESTING, COMMISSIONING AND TRIAL OPERATION OF TG SET WITH AUXILIARIES AND PIPING AT 1 X 195 MW (UNIT NO.7) KOTA TPP, RAJASTHAN**

**PART I – TECHNICAL BID**



**Bharat Heavy Electricals Limited**  
(A Govt. Of India Undertaking)  
**Power Sector – Northren Region,**  
**Plot No. 25 , Sector - 16A ,**  
**Distt. Gautam Budh Nagar, NOIDA – 201 301 (INDIA)**



ISO 9001-2000, ISO  
14001 and OHSAS  
18001 certified  
company  
SubContract and  
Purchase Deptt.

**Bharat Heavy Electricals Limited**  
(A Govt. Of India Undertaking)  
**Power Sector – Northren Region,**  
Plot No. 25 , Sector - 16A ,  
Distt. Gautam Budh Nagar, NOIDA – 201 301(INDIA)  
Phone: 0091-0120-2515476 / 2515464 / 2515479  
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**TENDER NO. BHEL:NR(SCT): KOTA:TG:440**

**IMPORTANT NOTE**

PURCHASER OF THIS TENDER DOCUMENT IS ADVISED TO CHECK AND ENSURE COMPLETION OF ALL PAGES OF TENDER DOCUMENT AND REPORT ANY DISCREPANCY TIMELY FOR CORRECTIVE ACTION, IF ANY, TO THE ISSUING AUTHORITY BEFORE THE BIDS ARE SUBMITTED. ORIGINAL COPY OF TENDER DOCUMENT COMPLETE IN ALL RESPECTS MUST BE SUBMITTED BACK AS PART OF THE BID WITHOUT WHICH THE SAME IS LIABLE TO BE REJECTED BY BHEL.

THIS TENDER SPECIFICATION ISSUED TO:

M/S-----

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### TENDER NOTICE

Sealed tenders are invited from the contractors fulfilling qualifying requirements for the work of **“Erection, testing, commissioning and trial operation of TG Set with auxiliaries and piping at 1X195 MW (Unit No.7) KOTA TPP, Rajasthan”**

#### TENDER NO. BHEL:NR(SCT): KOTA:TG:440

#### QUALIFYING REQUIREMENTS:

“Tenderers who wish to participate should fulfill following ‘Qualifying Requirements’;

1.1 “Should have executed similar nature of work, covered in this tender, for atleast one STG set of 100 MW Unit or higher rating units during last Seven years.

OR

“Should be executing works of similar nature, as covered in this tender, against direct BHEL’s order for a STG set of 195 MW Unit or above rating.”

1.2 Party should also have an average annual turnover of minimum of Rs. 150 lacs (Rupees One Hundred and Fifty Lacs Only) during preceding three years (2003-04, 2004-05 & 2005-06).”

#### **NOTES:**

(i) **The Tender Documents comprise of following;**

(a) General Conditions of Contract(GCC), Special Conditions of contract(SCC), Tender Notice, Project Synopsis, etc.—132 **Pages**

(b) Rate Schedule – **05 Pages**

(ii) Tender Documents with complete details are hosted on BHEL’s web page [www.bhel.com](http://www.bhel.com). Bidder(s) intending to participate may download the tender document

from the web site. Bidder(s) downloading the tender documents from the web site, shall remit Rs.1000/- (Rupees One thousand only) in the form of crossed demand draft (non-refundable), in favour of BHEL, NOIDA along with their offer

- (iii) Bidder(s) can also purchase hard copy of tender documents from this office. Tender documents (non transferable) will be issued on all working days between 09.30 Hrs. to 12.30 Hrs within the sale period i.e **upto 24.08.2007** on payment of Rs.1,000/- (non-refundable) either in cash or by crossed demand draft in favour of BHEL, NOIDA. Request for issue of tender document should clearly indicate Tender No. and work.
- (iv) Tenders must be submitted to the undersigned (Room No. 104) at the address given above **latest by 24.08.2007** before opening of technical bids commences. Technical bids shall **be opened at 15.30 Hrs. on 24.08.2007**. Tenders received after the due date & time shall be liable to be summarily rejected.
- (v) Earnest Money Deposit (EMD): Refundable, Non-interest bearing **EMD of Rs. 2,00,000/-** shall be deposited by Account Payee Pay Order 'OR' Demand Draft in favour of " Bharat Heavy Electricals Limited" payable at Delhi/NOIDA . Those bidders who have already deposited ' One Time 'EMD' of Rs. 2,00,000/- with BHEL, PSNR, NOIDA need not submit EMD with the present tender.
- (vi) Tenders not accompanied with Full Earnest Money Deposit, as indicated above, will not be considered.
- (vii) **All corrigenda, addenda, amendments and clarifications to this Tender will be hosted in this web page and not in the newspaper. Bidders shall keep themselves updated with all such amendments.**
- (viii) BHEL reserves the right to accept or reject any 'OR' all tenders without assigning any reason whatsoever.
- (ix) BHEL takes no responsibility for any delay/loss of documents or correspondences sent by courier/post.
- (x) **Tender shall be processed through Reverse Auction mode with the bidders whose Techno- Commercial offers are acceptable.**
- (xi) Unsolicited rebate/discount shall not be accepted after bid opening.
- (xii) Purchase Preference will be given to CPSUs as per Govt. Guidelines.

**Sr. DGM/SCP**



ISO 9001-2000,  
ISO 14001 and  
OHSAS 18001  
certified  
company  
SubContract and  
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## TENDER NOTICE - NEWSPAPER

LAST DATE OF SALE : 24.08.2007  
DATE OF OPENING : 24.08.2007

NIT NO. / NAME OF WORK
<p style="text-align: center;"><b>TENDER NO. BHEL:NR(SCT): KOTA:TG:440</b></p> <p>Sealed tenders are invited from the contractors fulfilling qualifying requirements for the work of "<b>Erection, testing, commissioning and trial operation of TG Set with auxiliaries and piping at 1X195 MW (Unit No.7) KOTA TPP, Rajasthan</b>".</p>

### NOTES:-

1. Purchase Preference will be given to CPSU as per Govt. Guidelines.
2. Please visit our website at [www.bhel.com](http://www.bhel.com) for complete details of the tender.
3. Bidder(s) can download complete tender documents from BHEL website. They can also purchase hard copy of tender documents from this office on payment of Rs.1,000/- (non-refundable) either in cash or by crossed demand draft in favour of BHEL, NOIDA.

Sr. DGM/SCP

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**PROCEDURE FOR SUBMISSION OF SEALED TENDERS:**

The tenderers must submit their tenders as required in **two parts** in separate sealed covers **prominently superscribed as Part-I Technical bid and Part-II ,Price bid** also indicating on each of the cover tender specification no., date and time as mentioned in tender notice.

**TECHNICAL BID (COVER-I)**

Except **Price bid Part-II**, complete set of tender document consisting of General conditions of Contract, “Technical specification & Special terms and condition” ( Part-I) issued by BHEL ‘OR’ Downloaded copy from website against this NIT shall be enclosed in **Part I Technical Bid only**. All schedules, data sheets and details called for in the specification shall also be submitted along with technical bid. All details / Data / Schedules including offer letter duly signed and stamped are to be **submitted in duplicate**.

**PRICE BID (COVER-II)**

Tenderers may please note that price bid is **to be submitted only in original copy** of Tender i.e. Price bid (Part-II) issued by BHEL ‘OR’ Downloaded copy from website.

These Two separate covers i.e. cover I & II shall together be enclosed in a **third envelope (Cover-III)** and this sealed cover shall be superscribed with tender specification No., due date, time and submitted to officer inviting tender as indicated in tender notice on or before due date as indicated.

## **PROJECT SYNOPSIS**

1. Name of the Owner : Rajasthan Rajya Vidyut Utpadan Nigam Ltd
2. Address : KOTA Thermal Power Station  
RRVUNL  
District KOTA  
Rajasthan
3. Installed capacity : Extention
4. New Installation : 1 x 195 MW
5. Nearest Railway station : KOTA -- 10 km
6. Nearest City : Kota -- 10 km  
Jaipur – 250 km  
Delhi – 475 km  
Bombay – 1000 km
7. Nearest Airport : Jaipur - 250 km
8. Maximum Temperture : 48 Deg C
9. Minimum temperture : Approx 4 Deg C

## SECTION- I

### GENERAL INSTRUCTIONS TO TENDERERS

- 1 This tender specification as a whole, furnishing all the details and other documents as required in the following pages, shall be duly signed and sent in a sealed cover (IN DUPLICATE) super-scribing the name of work as given in the tender notice.
- 2 The tender shall be addressed to : OFFICER INVITING TENDER AS INDICATED IN THE TENDER NOTICE.
3. Tenders submitted by post shall be sent as "**REGISTERED/ SPEED/ COURIER POST** " and shall be posted with due allowance for any postal delay. The tenders received after the due date and time of opening are liable to be rejected. Offers received by Telegram/telex/ Fax/ E-mail/ Internet may be considered as per terms of NIT.
- 4 Tenders shall be opened at the time and date as specified in the tender notice in the presence of such of those tenderers or their authorised representatives who may be present.
- 5 The tenderers shall closely peruse all the clauses, specifications and drawings indicated in the Tender Documents before quoting. Should the tenderer have any doubt about the meaning of any portion of the Tender Specifications or find discrepancies / omission in the Drawings or the tender documents issued are incomplete or shall require clarification on any of the technical aspect, scope of work etc., he shall atonce contact the authority inviting the tender for clarification before the submission of the tender.
- 6 Before tendering, the tenderers are advised to inspect the site of work and the environments and be acquainted with the actual working and other prevalent conditions, facilities available, position of material and labour. No claim will be entertained later on grounds of lack of knowledge.
- 7 Tenderer must fill up all the schedules and furnish all the required information as per the instructions given in various sections of the tender specification. Each and every page of the Tender Specification must be SIGNED, STAMPED AND SUBMITTED ALONG WITH THE OFFER by the Tenderer in token of complete acceptance thereof. The information furnished shall be complete by itself.
- 8 The tenderer shall quote the rates in English Language and international numerals. These rates shall be entered in figures as well as in words. In case of difference in rates between words and figures THE LESSER OF THE TWO will be treated as valid rate. For the purpose of tender, the metric system of units shall be used.

- 9 All entries in the tender shall either be typed or be written in ink. Erasure and over writings are not permitted and may render such tenders liable to summary rejection. All cancellations and insertions shall be duly attested by the tenderer.
- 10 **QUALIFICATIONS OF TENDERERS** : Only tenderers who have previous experience in the work of this nature and description detailed in this tender specification are expected to quote for this work. Offers from tenderers who do not have proven and established experience in the field are not likely to be considered.
- 11 **DATA TO BE ENCLOSED** : Full information shall be given by the tenderer in respect of the following. Non submission of these information may lead to rejection of the offer.
- 11.1 **FINANCIAL STATUS** : Financial viability as per proforma enclosed at *ANNEXURE-`A`*
- 11.2 **INCOME TAX CERTIFICATES** : A Certificate of Income tax clearance from the appropriate authority in the forms prescribed therefor duly indicating annual turnover. These certificates shall be valid for one year from the date of issue or for the period prescribed therein for all tenders submitted during the period.
- 11.3 **PREVIOUS EXPERIENCE** : A statement giving particulars (duly supported by documentary evidence) of the various service rendered in progress for each similar works by the tenderer indicating the particulars and value of each work, the site location, the duration, date of completion etc., strictly as per proforma enclosed at *ANNEXURE-B*.
- 11.4 **ORGANISATION CHART** : The organisation pattern that are totally available with him and that will be employed by the tenderer for this work in the form of monthwise and categorywise deployment plan duly indicating the number of Engineers, Supervisors, skilled and unskilled workers etc., as per proforma enclosed at *ANNEXURE-`C`*.
- 11.5 An attested copy of the **Power of Attorney**, in case the tender is signed by an individual other than the sole Proprietor, shall also be attached.
- 11.6 **IN CASE OF AN INDIVIDUAL** : His full name, experience, address and nature of business.

OR

**IN CASE OF PARTNERSHIP FIRMS** : The names of all the partners with addresses and their experience. A copy of the partnership deed/ instrument of Partnership duly certified by a Notary Public shall be enclosed.

OR

**IN CASE OF COMPANIES** : Date and place of registration including date of commencement certificate in case of public companies and the nature of business carried or by the Company. Certified copies of memorandum and

Articles of Association are also to be furnished. Also indicate names, addresses and experience of the Directors.

- 11.7 A list of tools and tackles (including cranes, tractor-trailers, winches, Derricks, welding sets etc., wherever applicable) that the tenderer is having and those that will be deployed on this job as per proforma enclosed at **ANNEXURE-`D`**.
- 11.8** Analysis of unit rate quoted as per proforma enclosed at **ANNEXURE-`E`**.
- 11.9 Declaration sheet as per proforma enclosed at **ANNEXURE-`F`**.
- 11.10 In addition to the above, the particulars required elsewhere in tender documents.
- 11.11 Checklist and schedule of general particulars duly filled in, signed and stamped as per **ANNEXURE-`G`**.

NOTE : In terms of clauses 11.1 to 11.11 above, all the data required to be enclosed with the tender need to be furnished neatly typed, signed and stamped in the given formats only (in the form of separate sheets ) failing which the tender may be considered as incomplete and is liable for rejection. Documentary proofs wherever necessary also need to be enclosed.

- 12 **EARNEST MONEY DEPOSIT** : Every tender must be accompanied by the prescribed amount of Earnest Money Deposit in any one of the following forms.

NOTE : Bank Guarantee, Cheques, Currency Notes, Money Orders or Postal Orders will not be accepted.

- 12.1 **Cash( As permissible under Income Tax Act )** : The amount should be remitted by the party to the Cashier of Bharat Heavy Electricals Limited and cash receipt issued by him shall be enclosed alongwith the tender.
- 12.2 Pay Order or Demand Draft in favour of Bharat Heavy Electricals Limited, Noida.
- 12.3 Tenders received without Earnest Money in full in the manner prescribed above will not be considered.
- 12.4 The Earnest Money Deposit of the successful tenderer will be retained towards part of Security Deposit.
- 12.5 In the case of unsuccessful tenderers, the Earnest Money will be refunded normally within fifteen days of acceptance of award of work by the successful tenderer.
- 12.6 BHEL reserves the right of **forfeiture of Earnest Money deposit** in case the successful tenderer,
- (a). After opening of Tender, revokes his tender within the validity period or increases his earlier quoted rates.

- (b) 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.
- 12.7 EMD shall not carry any interest.
- 12.8 Tenderers, who so ever desires, may deposit one time Earnest Money Deposit of Rs. 2,00,000/- in cash( *As permissible under Income Tax Act* ) /DD/pay order only with the cashier of BHEL. Tenderers who furnish one time EMD as above, will not be required to furnish EMD time and again alongwith their tenders submitted to BHEL/ PSNR. However they will be required to indicate the cash receipt No. and date of one time EMD in all their tenders.
- 13 **AUTHORISATION AND ATTESTATION** : Tenders shall be signed by persons duly authorised / empowered to do so. Certified copies of such authority and relevant documents shall be submitted alongwith the tenders.
- 14 **VALIDITY OF OFFER** : *THE OFFER SHALL BE KEPT OPEN FOR ACCEPTANCE FOR A MINIMUM PERIOD OF SIX MONTHS FROM THE DATE OF OPENING OF TENDERS.* In case Bharat Heavy Electricals Limited calls for negotiations, such negotiations shall not amount to cancellation or withdrawal of the original offer which shall be binding on the tenderers.
- 15 **EXECUTION OF CONTRACT** :The successful tenderer's responsibility under this contract commences from the date of issue of the Letter of Intent by Bharat Heavy Electricals Limited. The successful tenderer shall be required to execute an agreement in the prescribed form as per *ANNEXURE-'Y'* with the BHEL within a reasonable time after the acceptance of his tender and in any case before submitting the first bill for payment.
- 16 **SECURITY DEPOSIT** : Upon acceptance of tender, the successful tenderer must deposit the required amount of security deposit within the time specified in the Letter of Intent for satisfactory completion of work.
- 16.1 The total amount of Security Deposit shall be as follows :
- (a) In case of work costing upto 10 lakhs : 10% of the contract value.
- (b). In case of work costing above Rs 10 lakhs and upto Rs 50 lakhs : 1 Lakh + 7.5 % of the amount exceeding Rs. 10 Lakhs.
- (c). In case of work costing more than Rs 50 lakhs : 4 Lakhs + 5 % of the amount exceeding Rs. 50 Lakhs.
- 16.2 The Security Deposit will be deposited within 15 days from the date of issue of Letter of Intent but before start of work in any one of the following forms :-

- (a). The total Security Deposit as indicated in the Letter of Intent in **cash** ( As permissible under Income Tax Act).
- (b) Pay Order, Demand Draft in favour of BHEL.
- (c) Local cheques of scheduled banks, subject to realization.
- (d) 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).
- (e) 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.
- (f) 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.
- (g) Security deposit can also be recovered at the rate of 10% from the running bills. However in such cases at least 50% of the Security Deposit should be collected before start of the work and the balance 50% may be recovered from the running bills.
- (h) EMD of the successful tenderer shall be converted and adjusted against the security deposit.

16.3 The security deposit shall not carry any interest.

**NOTE:** Acceptance of Security Deposit against Sl. No. (d) and (f) 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.

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

16.5 The validity of the Bank Guarantee furnished towards Security Deposit under (e) above shall be upto the period of completion of work as stipulated in the Letter of Intent + 1 month and the same will be kept valid by proper renewal till the satisfactory completion of the Guarantee Period.

16.6 If the value of the work done at any time exceeds the accepted agreement value, the Security Deposit shall be correspondingly enhanced and the extra Security Deposit shall be immediately deposited by the Contractor or recovered from payments due to him.

16.7 Failure to deposit the Security Deposit within the stipulated time, may lead to forfeiture of Earnest Money Deposit and Cancellation of the award of work.

16.8 If any part of Security Deposit of the Contractor is held in the form of approved securities, it shall be kept transferred in the name of Bharat Heavy Electricals Limited, in such a manner that the same can be realised fully without referring

to the Contractor. BHEL shall not be responsible for any depreciation in the value of the Security while in BHEL's custody or for any loss of interest thereon.

- 16.9 BHEL reserves the right of *forfeiture of Security Deposit* in addition to other claims and penalties in the event of the contractor's failure to fulfil any of the contractual obligations or in the event of termination of contract as per terms and conditions of contract. BHEL reserves the right to set off the Security Deposit, against any claims of any other contracts with BHEL.
- 16.10 **RETURN OF SECURITY DEPOSIT** : If the contractor fully performs and completes the work in all respects to the entire satisfaction of BHEL and presents an absolute "*No Demand Certificate*" in the prescribed form and returns properties belonging to BHEL taken, borrowed or hired by him for carrying out the said works, half the amount of Security Deposit will be released to the contractor after deducting all costs, expenses and other amounts that are to be paid to BHEL under this or other contracts entered into with the Contractor. It may be noted that in no case the Security Deposit shall be refunded / released prior to passing of final bill. Balance half of the amount of Security Deposit will be released only after the Guarantee Period is over.

**NOTE : All the BGs are to be submitted as per BHEL/PSNR performa.**

- 17 **No interest** shall be payable by BHEL on Earnest Money Deposit, Security Deposit or on any moneys due to the contractor.
- 18 **REJECTION OF TENDER AND OTHER CONDITIONS** :
- 18.1 The acceptance of Tender will rest with BHEL which does not bind itself to accept the lowest tender or any tender and reserves to itself full rights for the following without assigning any reasons whatsoever.
- (a) To reject any or all of the tenders.
  - (b) To split up the work amongst two or more Tenderers.
  - (c) To award the work in part.
  - (d) In either of the contingencies stated in (b) and (c) above to modify the time for completion suitably.
- 18.2 Conditional and un-witnessed tenders, tenders containing absurd or unworkable rates and amounts, tenders which are incomplete or otherwise considered defective and tenders not in accordance with the tender conditions, specifications, etc., are liable to be rejected.
- 18.3 If a tenderer expires after the submission of his tender or after the acceptance of his tender, BHEL may at its discretion, cancel such tender. If a partner of a firm expires after the submission of the tender or after the acceptance of the tender,

- BHEL may cancel such tender at its discretion unless the firm retains its character.
- 18.4 BHEL will not be bound by any Power of Attorney granted by the tenderer or by changes in the composition of the firm made subsequent to the execution of the contract. BHEL may, however, recognise such Power of Attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the contractor concerned.
- 18.5 If the tenderer deliberately gives wrong information in his tender, BHEL reserves the right to reject such tender at any stage or to cancel the contract, if awarded and forfeit the Earnest Money/ Security Deposit/ any other moneys due.
- 18.6 Canvassing in any form in connection with the tender is strictly prohibited and the tenders submitted by the contractor who resorts to canvassing are liable to be rejected.
- 18.7 Should a tenderer or contractor or in the case of a firm or Company of contractors/ one or more of its Partners/ share holders / Directors have a relation or relations employed in BHEL, the authority inviting tender shall be informed to the fact alongwith the offer, failing this BHEL may, at its sole discretion reject the tender or cancel the contract and forfeit the Earnest Money/ Security Deposit
- 18.8 The successful tender should not sub-contract the part or complete work detailed in the tender specification without written permission of BHEL. The tenderer is solely responsible to BHEL for the work awarded to him.
- 18.9 **NO DEVIATIONS** to the tender conditions will normally be accepted. however, if the tenderer insists for certain deviations to the conditions, financial implication thereof shall be loaded to the quoted price for evaluating the tenderer's offer.

## SECTION - II

### GENERAL TERMS AND CONDITIONS

- 19.0 The following terms and expressions shall have the meaning hereby assigned to them except where the context otherwise requires.
- 19.1 **BHEL** (or B.H.E.Ltd.) shall mean Bharat Heavy Electricals Limited, a Company registered under the Indian Companies Act, 1956, with its Registered Office at BHEL HOUSE, SIRI FORT, NEW DELHI-110049 or its authorised officers or its Engineer or other employees authorised to deal with any matters with which these persons are concerned, on its behalf.
- 19.2 **'GENERAL MANAGER'** shall mean the Officer in Administrative charge of the contracting Unit of BHEL.
- 19.3 **'ENGINEER' or 'ENGINEER-IN-CHARGE'** shall mean Engineer deputed by BHEL. The terms includes Deputy General Manager, Construction Manager, Resident Manager, Site Engineer, Resident Engineer and Assistant Site Engineer of BHEL at the site as well as the officers in charge at Head Office.
- 19.4 **'SITE'** shall mean the place or places at which the plants/ equipment are to be erected and services are to be performed as per the specifications of this Tender.
- 19.5 **'CLIENTS OF BHEL' or 'CUSTOMER'** shall mean the project authorities to whom BHEL is supplying the equipment.
- 19.6 **'CONTRACTOR'** shall mean the individual, firm or company who enters into contract with BHEL and shall include their executors, administrators, successors and permitted assigns.
- 19.7 **'CONTRACT' or 'CONTRACT DOCUMENT'** shall mean and include the agreement, the work order, the accepted appendices of rates, Schedules of Quantities, if any, General Conditions of Contract, Special Conditions of Contract, Instructions to Tenderers, the drawings, the technical specifications, the special specifications, if any, the tender documents and the Letter of Intent/ Acceptance letter issued by BHEL. Any conditions or terms stipulated by the tenderer in the tender documents or subsequent letters shall not form part of the Contract unless specifically accepted in writing by BHEL in the Letter of Intent and incorporated in the Agreement.
- 19.8 **'GENERAL CONDITIONS OF CONTRACT'** shall mean the 'Instructions to Tenderers' and 'General Conditions of Contract' pertaining to the work detailed.
- 19.9 **'TENDER SPECIFICATIONS'** shall mean the Special Conditions, Technical Specifications, appendices, Site information and drawings pertaining to the work for which the tenderers are required to submit their offer. Individual Specifications Number will be assigned to each tender specifications.

- 19.10 **'TENDER DOCUMENTS'** shall mean the General Conditions of Contract (19.8) and Tender Specifications (19.9).
- 19.11 **'LETTER OF INTENT'** shall mean the intimation by a letter / telegram / telex / fax to the tenderer that the tender has been accepted in accordance with provisions contained in the letter. The responsibility of the contractor commences from the date of issue of this letter and all the terms and conditions of contract are applicable from this date.
- 19.12 **'COMPLETION TIME'** shall mean the period by date specified in the Letter of Intent or date mutually agreed upon for handing over the erected equipment/ plant which are found acceptable by the Engineer being of required standard and conforming to the specifications of the Contract.
- 19.13 **'PLANT'** shall mean and connote the entire assembly of the plant and equipment covered by the Contract.
- 19.14 **'EQUIPMENT'** shall mean all equipment, machineries, materials, structurals, electricals and other components of the plant covered by the Contract.
- 19.15 **'TESTS'** shall mean and include such test or tests to be carried out by the contractor as are prescribed in the Contract or considered necessary by BHEL in order to ascertain the quality, workmanship, performance and efficiency of the contracted work or part thereof.
- 19.16 **'APPROVED', 'DIRECTED' or 'INSTRUCTED'** shall mean approved, directed or instructed by BHEL.
- 19.17 **'WORK' or 'CONTRACT WORK'** shall mean and include supply of all categories of labour, specified consumables, tools and tackles required for complete and satisfactory site transportation, handling, stacking, storing, erecting, testing and commissioning of the equipment to the entire satisfaction of BHEL.
- 19.18 **'SINGULAR' and 'PLURAL'** etc. Words carrying singular number shall also include plural and vice versa where the context so requires. Words importing masculine gender shall be taken to include the feminine gender and words importing persons shall include any Company or Association or Body of Individuals, whether incorporated or not.
- 19.19 **'HEADINGS'** The headings in these General Conditions are solely for the purpose of facilitating reference and shall not be deemed to be part thereof or be taken into consideration in the interpretation or construction thereof or the contract.
- 19.20 **'MONTH'** shall mean calendar month.

- 19.21 **"WRITING'** shall include any manuscript, type written or printed statement under the signature or seal as the case may be.
- 20 **LAW GOVERNING THE CONTRACT AND COURT JURISDICTION:** The Contract shall be governed by the Law for the time being in force in the Republic of India. The Civil Court at Delhi/ New Delhi, having ordinary Original Civil Jurisdiction shall alone have exclusive jurisdiction in regard to all claims in respect of this Contract.
- 21 **ISSUE OF NOTICE** The Contractor shall furnish to the Engineer, the name, designation and address of his authorised agent and all complaints, notices, communications and references shall be deemed to have been duly given to the Contractor, if delivered to the Contractor or his authorised agent or left at or posted to the address either of the contractor or his authorised agent and shall be deemed to have been so given in the case of posting on the day on which they would have reached such address in the ordinary course of post or at which they were so delivered or left.
- 22 **USE OF LAND** No land belonging to BHEL or its customer under temporary possession of BHEL shall be occupied by the Contractor without the written permission of BHEL.
- 23 **COMMENCEMENT AND COMPLETION OF WORK**
- 23.1 The contractor shall commence the work within the time indicated in the Letter of Intent and shall proceed with the same with due expedition without delay.
- 23.2 If the successful tenderer fails to commence the work within the stipulated time, BHEL, at its sole discretion, will have the right to cancel the contract. His Earnest Money and/ or Security Deposit will stand forfeited without any further reference to him without prejudice to any and all of BHEL's other rights and remedies in this regard.
- 23.3 All the works shall be carried out under the direction and to the satisfaction of BHEL.
- 23.4 The transported equipment, erected /constructed plant or work performed under the Contract, as the case may be, shall be taken over when it has been completed in all respects and/or satisfactorily put into operation at site.
- 24 **MEASUREMENT OF WORK AND MODE OF PAYMENT**
- 24.1 All payments due to the contractor shall be made by `Account Payee' Cheques.
- 24.2 For progress/ running bill payments, the contractor shall present detailed measurement sheets in triplicate duly indicating all relevant details based on technical documents and connected drawings for the work done during the month/ period under different categories in line with terms of payment as per Letter of Intent. The basis of arriving at the quantities/ weights shall be the

relevant documents and drawings released by BHEL. These measurement sheets shall be prepared jointly with Engineer and signed by both the parties.

- 24.3 These measurement sheets will be checked by the Engineer and quantities and percentages eligible for payment under different groups shall be decided by him. The abstract of quantities and percentages so arrived at based on the terms of payment shall be entered in the **Measurement Book and signed by both the parties.**
- 24.4 Based on the above quantities, contractor shall prepare the bills in the prescribed proforma and work out the financial value. These will be entered in the Measurement Book and signed by both the parties. Payment shall be made by BHEL after effecting the recoveries due from the contractor.
- 24.5 All recoveries due from the contractor for the month / period shall be effected in full from corresponding running bills unless specific approval from Competent authority is obtained to the contrary.
- 24.6 Measurement shall be restricted to that quantity for which it is required to ascertain the financial liability of BHEL under this contract.
- 24.7 Measurement shall be taken jointly by persons duly authorised by BHEL and the Contractor.
- 24.8 The Contractor shall bear the expenditure involved, if any, in making the measurements and testing of materials to be used/ used in the work. The Contractor shall, without extra cost to BHEL, provide all the assistance with appliances and other things necessary for measurement.
- 24.9 If, at any time due to any reason whatsoever, it becomes necessary to re-measure the work done, in full or in part, the expenses towards such remeasurement shall be borne by the Contractor.
- 24.10 ***Passing of bills covered by such measurements does not amount to acceptance by BHEL of the completion of the work measured. Any left out work has to be completed by the Contractor, as directed.***
- 24.11 Final measurement bill shall be prepared in the proforma prescribed for the purpose, based on the certificate issued by the Engineer that the entire work as stipulated in the tender specifications has been completed in all respects to the entire satisfaction of BHEL. The Contractor shall give unqualified 'No Claim' and 'No Demand' certificates. All the tools and tackles loaned to him should be returned in condition satisfactory to BHEL. The abstract of final quantities and financial values shall also be entered in the Measurement Book and signed by both the parties. The final bill shall be paid within a reasonable time after completion of the work. After the payment of final bill, only the guarantee obligation percentage value shall remain unpaid which shall be released in accordance with clause 32.

## 25 RIGHTS OF BHEL

**BHEL** reserves to itself the following rights in respect of this contract without entitling the contractor to any compensation.

- 25.1 To get the work done through another agency at the risk and cost of the contractor, in the event of poor progress or the contractor's inability to progress the work for completion as stipulated in the contract, poor quality of work, persistent disregard of instructions of BHEL, assignment, transfer, subletting of the contracted work without written permission of BHEL, non-fulfillment of any contractual obligations etc. and to claim / recover compensation for such losses from the contractor including BHEL's supervision charges and overheads from Security Deposit/ other dues.
- 25.2 To withdraw any portion of work and / or to restrict / alter quantum of work as indicated in the contract during the progress of work and get it done through another agency and/ or by the departmental labour to suit BHEL's commitments to its customer or in case BHEL decides to advance the completion due to other emergent reasons/ BHEL's obligation to its customer.
- 25.3 To terminate the contract after due notice and forfeit the Security Deposit and recover the loss sustained in getting the balance work done through other agencies in addition to liquidated damages in the event of :
- (a) Contractor's continued poor progress.
  - (b) Withdrawal from or abandonment of the work before completion of the work.
  - (c) Corrupt act of the contractor.
  - (d) Insolvency of the contractor.
  - (e) Persistent disregard of the instructions of BHEL.
  - (f) Assignment, transfer, subletting of the contract work without BHEL's written permission.
  - (g) Non-fulfillment of any contractual obligations.
- 25.4 To recover any moneys due from the Contractor from out of any moneys due to the Contractor under this or any other Contract or from the Security Deposit.
- 25.5 To claim compensation for losses sustained including BHEL's supervision charges and overheads in case of termination of contract and to levy liquidated damages for delay in completion of work, at the rate of 1/2% of the contract value per week of delay or part thereof subject to a ceiling of **10% of the contract value**.

- 25.6 To determine the Contract or to restrict the quantum of work and pay for the portion of work done in case BHEL's contract with its customer is terminated for any reason.
- 25.7 To effect recoveries from any amounts due to the contractor under this or any other contract or in any other form the moneys which BHEL is forced to pay to anybody due to contractor's failure to fulfil any of his obligations.
- 25.8 To restrict or increase the quantity and nature of work to suit site requirements, since the tender specification is based on preliminary documents and quantities furnished therein are indicative and approximate and the rates quoted shall not be subject to revision.
- 25.9 To deploy BHEL's skilled and semiskilled workmen in case of emergency / poor progress/ deficiency in skill on the part of the employees of the contractor and to recover the expenditure on account of the same from the moneys due to the contractor.
- 25.10 While every endeavor will be made by BHEL to this end, BHEL can not guarantee uninterrupted work due to conditions beyond its control. The Contractor will not be entitled to any compensation/ extra payment on this account.
- 25.11 In the event of any dispute of technical nature, the decision of BHEL shall be final and binding on the Contractor.

**26 RESPONSIBILITIES OF CONTRACTOR IN RESPECT OF LOCAL LAWS, EMPLOYMENT OF WORKERS, ETC.**

The following are the responsibilities of the Contractor in respect of observance of local laws, employment of personnel, payment of taxes etc.:

- 26.1 As far as possible, unskilled workers shall be engaged from the local areas in which the work is being executed.
- 26.2 The contractor at all times during the continuance of this contract, shall in all his dealings with the local labour for the time being employed on or in connection with the work, have due regard to all local festivals, religious and other customs.
- 26.3 The Contractor shall comply with all State and Central Laws, Statutory Rules, Regulations, etc., such as The payment of wages Act, The Minimum Wages Act, The workmen's Compensation Act, The Employer's Liability Act, The industrial Disputes Act, The Employees' Provident Fund Act, Employees' State Insurance Scheme, the Contract Labour (Regulations and Abolition Act, 1970) and other Acts, Rules and Regulations for labour as may be enacted by the Government during the tenure of the Contract and having force or jurisdiction at site. The contractor shall give to the local Governing Body, Police and other concerned Authorities all such notice as may be required under law.

- 26.4 The Contractor, in the event of his engaging 20 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.
- 26.5 The contractor shall pay all taxes, fees, license charges, deposits, duties, tolls, royalty, commissions or other charges which may be leviable on account of any of his operations connected with this contract. In case BHEL is forced to make any such payment, BHEL shall recover the same from the contractor either from moneys due to him or otherwise as deemed fit.
- 26.6 While BHEL will pay the **inspection fees of the Boiler/ Electrical** Inspectorate, all other arrangements for the periodical visits of Boiler/ Electrical Inspector to site, inspection certificates etc. will have to be made by the contractor at his cost. The contractor will also meet all expenses in connection with his welder's qualification/ requalification tests etc.
- 26.7 The contractor shall be responsible for the provision of health and sanitary arrangements more particularly described in the Contract Labour (Regulations and Abolition Act, 1970) and safety precautions as may be required for safe and satisfactory execution of the contract.
- 26.8 The contractor shall be responsible for proper accommodation including adequate medical facilities for the personnel employed by him.
- 26.9 The contractor shall be responsible for the proper behavior and observance of all regulations by the staff employed by him.
- 26.10 The contractor shall ensure that no damage is caused to any person / property of other parties working at site. If any such damage is caused, it shall be the responsibility of the contractor to make good the losses and compensate them.
- 26.11 All the properties/ equipment/ components of BHEL/ its customer loaned with or without deposit, to the contractor shall remain the properties of BHEL/ its customer. The contractor shall use such properties for the purpose of execution of this contract. All such properties/ equipment/ components shall be taken to be in good condition unless notified to the contrary by the contractor within 48 hours. The contractor shall return them in good condition as and when required by BHEL/ its customer. In case of non-return, loss, damage, repairs etc., the cost thereof, as may be fixed by the Engineer, will be recovered from the contractor.
- 26.12 It shall not be obligatory on the part of BHEL to supply any tools and tackles or materials other than those specifically agreed to be given by BHEL. However, depending upon availability / possibility, BHEL/ its customer's equipment and other materials may be made available to the contractor on payment of hire charges as fixed by them , subject to the conditions laid down by BHEL/ its customer from time to time. Unless paid in advance, such hire and other charges

shall be recovered from out of dues to the contractor or security deposit in one installment.

- 26.13 The contractor shall fully indemnify and keep indemnified BHEL/ its customer against all claims of whatever nature arising during the course of execution of this contract.
- 26.14 In case the contractor is required to undertake any work outside the scope of this contract, the amount payable shall be as may be mutually agreed upon.
- 26.15 Any delay in completion of works or non-achievement of periodical targets, due to reasons attributable to the contractor, will have to be compensated by the contractor either by increased manpower and resources or by working extra hours or more than one shift at no extra cost to BHEL.
- 26.16 The contractor shall execute the work under the conditions usual to such power plant construction and in conjunction with numerous other operations at site. The contractor and his personnel shall cooperate and coordinate with other agencies at project site and proceed in a manner that shall help in the progress of work at site as a whole.
- 26.17 The contractor will be directly responsible for payment of wages to his workmen. A pay-roll sheet giving details of all payments made to the workmen duly signed by the contractor's representative should be furnished to BHEL, if called for.
- 26.18 In case of any class of work for which there is no specification laid down in the contract, such work shall be carried out in accordance with the instructions and requirements of the Engineer.
- 26.19 No levy, payment or charges made or imposed shall be impeached by reason of any clerical error or by reason of any mistake in the amount levied, demanded or charged.
- 26.20 ***No idle labour charges will be admissible in the event of any stoppage of work resulting in the contractor's workmen being rendered idle due to any reason at any time.***
- 26.21 The contractor shall take all reasonable care to protect the materials and the work till such time the plant / equipment has been taken over by BHEL / its customer.
- 26.22 Contractor shall not stop work or abandon the site for whatsoever reason or dispute, excepting for force majeure conditions. All problems / disputes shall be separately discussed and settled without effecting the progress of work. Stoppage or abandonment of work, other than under force majeure conditions, shall be treated as breach of work of contract and dealt with accordingly.
- 26.23 The contractor shall keep the area of work clean and shall remove the debris etc. while executing day-to-day work. Upon completion of work, the contractor shall remove from the vicinity of work, all scrap, packing materials, rubbish,

unused and other materials and deposit them in places specified by the Engineer. The contractor will also demolish all the hutments, sheds, offices, etc. constructed and used by him and shall clean the debris. In the event of his failure to do so, the same will be arranged to be done by the Engineer and the expenses recovered from the contractor.

26.24 The contractor shall execute the work in the most substantial and workman like manner in the stipulated time. Accuracy of work and timely execution shall be the essence of this contract. The contractor shall be responsible to ensure that the quality, assembly and workmanship conform to the dimensions and clearance given in the drawings and/ or as per the instructions of the Engineer.

26.25 The contractor shall furnish fortnightly labour deployment report indicating the classification and number of workmen engaged, date wise and category wise. Besides, the contractor shall also furnish progress reports on work at regular intervals as required by the Engineer.

**27 RESPONSIBILITIES OF CONTRACTOR IN RESPECT OF SAFETY OF MEN, EQUIPMENT, MATERIAL AND ENVIRONMENT.**

27.1 All safety rules and codes applied by BHEL and its customer at site shall be observed by the contractor and his workmen without exception. The contractor shall be responsible for the safety of the equipment / material and work to be performed by him and shall maintain all lights, fencing guards, signs etc. or other protections necessary for the purpose. Contractor shall also take such additional precautions as may be indicated from time to time by the Engineer, with a view to prevent pilferage, accidents, fire hazards etc. Suitable number of clerical staff, watch and ward, store keepers to take care of equipment, materials, construction tools and tackles shall be posted at site by the contractor till the completion of the work under this contract. The contractor shall arrange for such safety devices as are necessary for this type of work and carry out the requisite site tests of handling equipment, lifting tools, tackles etc. as per usual standards and practices.

27.2 The contractor shall provide to it's work force and ensure the use of the following personal protective equipment as found necessary and as directed by the authorized BHEL officials.

- (a) Safety Helmets conforming to IS-2925
- (b) Safety Belts conforming to IS-3521
- (c) Safety shoes conforming to IS-1989
- (d) Eye & Face Protection devices conforming to IS-8520 and IS-8940
- (e) Hand & body protection devices conforming to IS-2573, IS-6994, IS-8807 & IS-8519.

27.3 All tools, tackles, lifting appliances, material handling equipment, scaffolds, cradles, 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 authorized BHEL official who shall have the right to ban the use of any item.

- 27.4 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 carry out all types of electrical works. All electrical appliances including portable electric tools used by contractor shall have safe plugging system to source of power and be appropriately earthed.
- 27.5 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.
- 27.6 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 provision and/or storage in accordance with the rules and regulations laid down in 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. Prior approval of the authorised BHEL official at the site shall also be taken by the contractor in all such matters.
- 27.7 The contractor shall arrange at his cost (wherever not specified) appropriate illumination at all work spots for safe working, when natural daylight may not be adequate for clear visibility.
- 27.8 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.
- 27.9 In case of any damage to property due to lapses by the contractor, BHEL shall have the right to recover the cost of such damages from the payments due to the contractor after holding an appropriate enquiry.
- 27.10 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 the payments due to the contractor, after notifying the contractor suitably and giving him opportunity to present his case.
- 27.11 If the contractor fails to improve the standards of safety in its operation to the satisfaction of BHEL after being given 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 authorized BHEL official, BHEL shall have the right to take the 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.

- 27.12 The contractor shall submit report of all accidents, fires, property damage and dangerous occurrences to the authorized BHEL official immediately after such occurrence, but in any case not later than 12 hours of the occurrence. Such reports shall be furnished in the manner prescribed by BHEL. In addition, periodic reports on safety shall also be submitted by contractor to the authorized BHEL official from time to time as prescribed.
- 27.13 During the course of construction, alteration or repairs scrap lumbars with protruding nails, sharp edges etc., and all other debris including combustible scrap shall be kept cleared from working areas, passage ways and stairs in and around site.
- 27.14 Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be intentionally dropped, struck or permitted to strike each other violently. When cylinders are transported by powered vehicles, they shall be secured in a vertical position.
- 27.15 The contractor shall be responsible for the safe storage of his radioactive sources.
- 27.16 All the contractor's supervisory personnel and sufficient number of workers shall be trained for fire fighting and shall be assigned specific fire protection duties. Enough number of such trained personnel must be available during the tenure of the contract.
- 27.17 Contractor shall provide enough fire protecting equipment of the types and numbers at his office, stores, erection site, other temporary structures, labour colony area etc. Access to such fire protection equipment shall be easy and kept open at all times. Compliance of the above requirement under fire protection shall in no way relieve the contractor of any of his responsibility and liabilities to fire accident occurring. In the event fire safety measures are not to BHEL's satisfaction, BHEL shall have option to provide the same and recover the cost plus incidentals from contractor's bills and / or impose penalty as deemed fit by the Engineer.
- 27.18 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.
- 27.19 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 recognize the safety performance of the contractor may be considered by BHEL after completion of the job.

## 28.0 CONSEQUENCES OF CANCELLATION

- 28.1 Whenever BHEL exercises its authority to terminate the contract / withdraw a portion of work under clause 25, the work may be got completed by any other means at the contractor's risk and cost provided that in the event of the cost of completion (as certified by the Engineer which shall be final and binding on the contractor) being less than the contract value, the advantage shall accrue to BHEL. If the cost of completion exceeds the moneys due to the contractor under the contract, the contractor shall either pay the excess amount demanded by BHEL or the same shall be recovered from the contractor. This will be in addition to the forfeiture of Security Deposit and recovery of liquidated damages as per relevant clauses.
- 28.2 In case BHEL completes the work under the provisions of this clause, the cost of such completion to be taken into account for determining the excess cost to be charged to the contractor shall consist of cost of materials purchased and / or labour provided by BHEL with an addition of such percentage to cover supervision and establishment charges as may be decided by BHEL.

## 29.0 INSURANCE

- 29.1 BHEL / its customer shall arrange for insuring the materials / property of BHEL / its customer covering the risks during transit, storage, erection and commissioning.
- 29.2 It shall be the sole responsibility of the contractor to insure his workmen against risks of accidents and injury while at work as required by the relevant Rules and to pay compensation, if any, to them as per Workmen's Compensation Act. The contractor shall also insure his staff against accidents. The work will be carried out in a protected area and all the Rules and Regulations of BHEL / its client in the Project Area which are in force from time to time will be followed by the contractor.
- 29.3 If due to negligence and/or non-observance of safety and other precautions, any accident / injury occurs to any other persons/ public, the contractor shall pay necessary compensation and other expenses, if so decided by the appropriate authority.
- 29.4 The contractor will take necessary precautions and due care to protect the material, while in his custody from any damage/ loss till the same is taken over by BHEL or customer. For lodging / processing of insurance claim the tractor will submit necessary documents. BHEL will reserve the right to recover the loss from the contractor, in case the damage / loss is due to carelessness / negligence on the part of the contractor. In case of any theft of material under contractor's custody, matter shall be reported to police by the contractor immediately and copy of FIR and subsequently police investigation report shall be submitted to BHEL for taking up with insurance.
- 29.5 If due to negligence/ carelessness on the part of the contractor, any material/ equipment gets damaged, the contractor shall submit necessary documents for

lodging insurance claims as required by BHEL Engineer. BHEL shall however reserves the right to recover deductible franchise and also unsettled portion of insurance claim amount from the contractor.

- 29.6 If due to negligence/ carelessness on the part of the contractor, any surrounding properties also gets damaged, the contractor shall submit necessary documents for lodging insurance claims as required by BHEL Engineer. BHEL shall however reserves the right to recover deductible franchise and to unsettled portion of insurance claim amount from the contractor.
- 29.7 The contractor may note that BHEL T&Ps / IMTEs are not insured. The Contractor will take necessary precautions and due care to protect the same while in his custody from any damage/ loss till the same is handed over back to BHEL. In case the damage / loss is due to carelessness/ negligence on the part of the contractor, the Contractor is liable to get them repair/ replaced immediately and in case of his failure to do so within a reasonable time , BHEL will reserve the right to recover the loss from the contractor.

### **30.0 STRIKES AND LOCKOUTS**

- 30.1 The contractor will be solely responsible for all disputes and other issues connected with his workmen. In the event of contractor's workmen resorting to strike or the contractor resorting to lockout and if the strike or lockout so declared is not settled within a period of one month, BHEL shall have the right to get the erection work executed by employing its own men or through other agencies or both. The cost incurred by BHEL in this regard shall be recovered from the contractor.
- 30.2 For any purpose whatsoever, the employees of the contractor shall not be deemed to be in the employment of BHEL

### **31.0 FORCE MAJEURE**

- 31.1 The following shall amount to force majeure conditions. Acts of God, Act of any Government, War, Sabotage, Riots, Civil Commotion, Police Action, Revolution, Flood, Fire, Cyclone, Earthquake and Epidemic and other similar causes over which the contractor has no control.
- 31.2 If the contractor suffers delay in the due execution of the contract, due to delays caused by force majeure conditions, as defined above, the agreed time for completion of the work covered by this contract shall be extended by a period of time equal to the period of delay, provided that on the occurrence of any such contingency, the contractor immediately reports to BHEL in writing the causes for the delay but the Contractor shall not be eligible for any compensation on this account.
- 32.0 **GUARANTEE** Even though the work will be carried out under the supervision of the Engineer, the contractor will be responsible for the quality of the workmanship and shall guarantee the work done for a period of twelve

months from the date of completion of work as certified by the Engineer, and shall rectify, free of cost to BHEL, all defects arising out of faulty erection during the guarantee period starting from the date of completion of rectification. In the event of the contractor failing to repair the defective works within the time specified by the Engineer, BHEL may proceed to undertake the repairs of such defective works at the contractor's risk and cost, without prejudice to any other rights and recover the same from out of any moneys payable to the contractor or by other legal means.

- 33.0 **ARBITRATION** : All disputes between the parties to the contract arising out of or in relation to the contract, other than those for which the decision of the Engineer or any other person is by the contract expressed to be final and conclusive, shall after written notice by either party to the contract to the other party, be referred to sole arbitration of the General Manager or his nominee. The arbitration shall be conducted in accordance with the provisions of the Arbitration and Reconciliation Act, 1996. The parties to the contract understand and agree that it will be no objection that the General Manager or the person nominated as Arbitrator had earlier in his official capacity to deal directly or indirectly with the matters to which the contract relates or that in the course of his official duties had expressed views on all or any of the matters in dispute or difference. The award of the Arbitrator shall be final and binding on the parties to this contract. In the event of the Arbitrator dying, neglecting or refusing to act or resigning or being unable to act for any reason or his award being set aside by the Court for any reason, it shall be lawful for the General Manager or his successor, as the case may be, either to act himself as the Arbitrator or to appoint another Arbitrator in place of the outgoing Arbitrator in the manner aforesaid. The Arbitrator may, from time to time, with the consent of both the parties to the contract, enlarge the time for making the award. Work under the contract shall be continued during the arbitration proceedings. The venue of the arbitration shall be the place from which the contract is issued or such other place as the Arbitrator at his discretion may determine.

--X--X--

ANNEXURE-A

**FINANCIAL VIABILITY**

1. Owner's capital in the business (incase of Partnership, please mention percentage shares and amounts).
2. Quantum of business done during last three financial years.
  - i) Rs.
  - ii) Rs.
  - iii) Rs.
3. Value of fixed Assets of the business in last three years.
  - i) Rs.
  - ii) Rs.
  - iii) Rs.
4. Guarantee limits (if any) enjoyed by the firm.
5. Over draft limits (if any enjoyed by the firm).
6. Please enclose audited profit and loss account and balance sheet for last 3 years (indicate no. of sheets).
7. Certificate from Scheduled Bank to prove Contractor's financial capacity to undertake the work duly indicating the financial limits the tenderer enjoys.

(Signature of tenderer)  
With Stamp

NOTE:

All the above documents should be duly certified by auditors/ Bank as may be applicable.

## ANNEXURE – B

## ANALYSIS OF SIMILAR JOBS EXECUTED / IN PROGRESS

S.No.	Agency By whom Awarded	Location of project	Capacity & unit nos.	Scope of work and	Date of award	Contract value
1	2	3	4	5	6	7

%age work completed and due date for completion	Date of completion if job is already over	No. of skilled/ Super- visors deployed at peak	No. of Engrs. & Tractor Trailors, Winches, welding deployed at peak	Details of major T&P like cranes, by whom		Consumables M/cs supplied
				By Con- Tractor	By other Agency	
8	9	10	11	12	13	14

(SIGNATURE OF TENDERER)  
WITH STAMP

ANNEXURE – C

**MONTHWISE MANPOWER DEPLOYMENT PLAN**

S.No.	Category No. of	Person available on roll of the Organisation	Month (Indicate No. of persons to be deployed in each month)						
			Ist	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	and so on
1.									
2.									
3.									
		Total							

(SIGNATURE OF TENDERER)  
WITH STAMP

ANNEXURE – D

**(A) STATUS OF TOOLS & PLANTS**

S.No.	Name of Equipment	Quantity owned	Registration no. wherever Applicable	Documents enclosed for proof of Ownership	Present Location	Quantity proposed to be deployed for this job
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**(B) MONTHWISE T&P DEPLOYMENT PLAN**

S.No.	Description of T & P	Month (Indicate No. to be deployed in each month)							
		Ist	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup> and so on

(SIGNATURE OF TENDERER)  
WITH STAMP

## ANNEXURE - E

**ANALYSIS OF UNIT RATE QUOTED**

S.NO.	DESCRIPTION	PERCENTAGE OF THE UNIT RATE QUOTED	REMARKS
1.	Salary & wages for staff & workers		
2.	Consumables		
	(a) Gases		
	(b) Welding Electrodes		
	(c) P.O.L.		
	(d) Others		
3.	Depreciation & maintenance for T&P		
4.	Depreciation & Maintenance for other items		
5.	Establishment and Administration expenses of site		
6.	Overheads		
7.	Profit		

(SIGNATURE OF TENDERER)  
WITH STAMP

ANNEXURE - F

**DECLARATION SHEET**

I, -----hereby certify that, all the information and data furnished by me with regard to this Tender Specification No.- ----- are true and complete to the best of my knowledge. I have gone through the specification, conditions and stipulations in detail and agree to comply with the requirements and intent of specification.

I, further certify that I am the duly authorised representative of the under mentioned tenderer and a valid power of attorney to this effect is also enclosed.

Tenderer's Name & Address

Authorised representative's signature with name and address.

## ANNEXURE - 'G'

**CHECKLIST AND SCHEDULE OF GENERAL PARTICULARS**

NOTE : Tenderers are requested to fill in the following details and no column should be left blank

1. Name and address of the tenderer
2. Telegraphic/ telex address
3. Phone No. (Office)/ Fax No.
4. Name & designation of the official of the tenderer to whom all the references shall be made.
5. Tenderer's proposal No. & date
6. Whether EMD submitted (By cash/Pay order / bank draft) by.....
7. Validity of offer/ rates quoted for six months from the date of opening of tender Yes/No
8. Financial Status as per Clause 11.1 (in the format as per Annexure-A) Yes/No
9. Income tax Clearance certificate as per Clause 11.2 Yes/No
10. Details of experience as per clause 11.3 (in the format as per Annexure-B) Yes/No
11. Monthwise & Categorywise manpower deployment plan as per Clause 11.4 (in the format as per Annexure-C) Yes/No
12. Attested copy of power of attorney as per clause 11.5 Yes/No
13. Details about type of the firm as per clause 11.6 Yes/No
14. Status of T&P and monthwise deployment plan as per clause 11.7 (in the format as per Annexure-D) Yes/No

- |  |        |
|--|--------|
| 15. Analysis of unit rate quoted as per Clause 11.8<br>(in the format as per Annexure-E) | Yes/No |
| 16. Declaration sheet as per clause 11. 09<br>(in the format as per Annexure-F)          | Yes/No |

Date \_\_\_\_\_

(SIGNATURE OF TENDERER)  
WITH STAMP

WITNESS  
(SIGNATURES WITH FULL PARTICULARS)

1.

2.

**AGREEMENT**

Agreement No. and Date \_\_\_\_\_  
Name of the Work \_\_\_\_\_

\_\_\_\_\_  
Name of the Contractor with  
full address \_\_\_\_\_

Value of work awarded \_\_\_\_\_

Letter of Intent No. and Date \_\_\_\_\_

Scheduled Commencement Date \_\_\_\_\_  
Scheduled Completion Date \_\_\_\_\_

THIS AGREEMENT MADE THIS \_\_\_\_\_ DAY OF \_\_\_\_\_ 2000 between  
BHARAT HEAVY ELECTRICALS LIMITED (A Government of India  
Enterprise) a Company incorporated under the Companies Act, 1956, having its Registered  
Office at BHEL House, Siri Fort New Delhi- 110049 (herein after called BHEL) of the  
ONE PART.

AND

M/S \_\_\_\_\_  
\_\_\_\_\_ (hereinafter called the 'Contractor') of the  
SECOND PART.

WHEREAS M/s -----state that  
they have acquired and possess extensive experience in the field of -----  
-----

And Whereas in response to an Invitation to Tender No. ----- issued by  
BHEL for execution of ----- the contractor  
submitted their offer No.-----dated -----And  
whereas BHEL has accepted the offer of the Contractor on terms and conditions specified in  
the Letter of Intent No.-----dated -----read with the references  
cited therein.

THIS AGREEMENT WITNESSES AND it is hereby agreed by and between the parties as follows:

1. That the contractor shall execute the work of -----and  
more particularly described in Tender Specification No -----including  
Drawings and Specifications (hereinafter called the said works) in accordance with  
and subject to terms and conditions contained in these presents, instructions to  
Tenderers, General Conditions of Contract, Special Conditions, Annexures, Letter of  
Intent dated -----and such other instructions, Drawings, Specifications given to  
him from time to time by BHEL.

2. The Contractor is required to furnish to BHEL Security deposit in the form of cash/ approved securities/ Bank Guarantee valid upto ----- for a sum of Rs.----- --- towards satisfactory performance and completion of the Contract.
3. The Contractor has furnished a Bank Guarantee bearing no.-----dated ----- -----for a sum of Rs.-----executed by ----- ----- in favour of BHEL towards Security Deposit valid upto -----

OR

The Contractor has furnished to BHEL an initial Security Deposit of Rs.----- --in the form of cash / approved Securities/ B.G No.----- dated ----- for Rs.-----executed by ----- in favour of BHEL valid upto ----- and has agreed for recovery of the balance security deposit by BHEL @ 10% of the value of work done from each running bill till the entire Security Deposit is recovered.

OR

The contractor has furnished to BHEL an initial Security Deposit of Rs.-----(Rs.----- ----- vide Bank draft No.-----dated -----and by adjusting EMD of Rs.-----submitted vide Bank draft No.----- dt.-----) and has agreed for recovery of balance Security Deposit by BHEL @ 10% of the value of work done from each running bill till the entire security deposit is recovered.

4. The Contractor hereby agrees to extend the validity of the Bank Guarantee for such further period or periods as may be required by BHEL and if the Contractor fails to obtain such extension(s) from the Bank, the Contractor, shall pay forthwith or accept recovery of Rs.----- from the bills in one installment and the contractor further agrees that failure to extend the validity of the Bank Guarantee or failure to pay the aforesaid amount in the manner specified above shall constitute breach of contract. In addition to above, BHEL shall be entitled to take such action as deemed fit and proper for recovering the said sum of Rs.-----.

OR

In case the contractor furnishes the bank guarantee at a later date the contractor hereby agrees to extend the validity of bank guarantee for such further period or periods as may be required by BHEL and if the contractor fails to obtain such extension(s) from the bank, the contractor shall pay forthwith or accept recovery of the amount of bank guarantee given in lieu of security deposit from the bills in one installment and the contractor further agrees that failure to extend the validity of bank guarantee or failure to pay the aforesaid amount in the manner specified above shall constitute breach of contract. In addition to above, BHEL shall be entitled to take such action as deemed fit and proper for recovering the said sum.

5. That in consideration of the payments to be made to the Contractor by BHEL in accordance with this Agreement the Contractor hereby covenants and undertakes with BHEL that they shall execute, construct, complete the works in conformity, in all respects, with the terms and conditions specified in this Agreement and the documents governing the same.

6. That the Contractor shall be deemed to have carefully examined this Agreement and the documents governing the same and also to have satisfied himself as to the nature and character of the Works to be executed by him.
7. That the Contractor shall carry out and complete the execution of the said works to the entire satisfaction of the Engineer or such other officer authorised by BHEL, within the agreed time schedule, the time of completion being the essence of the Contract.
8. That BHEL shall, after proper scrutiny of the bills submitted by the Contractor, pay to him during the progress of the said works such sum as determined by BHEL in accordance with this Agreement.
9. That this Agreement shall be deemed to have come into force from ----- the date on which the letter of intent has been issued to the Contractor.
10. That whenever under this contract or otherwise, any sum of money shall be recoverable from or payable by the Contractor, the same may be deducted in the manner as set out in the General Conditions of Contract or other conditions governing this Agreement.
11. That all charges on account of Octroi, Terminal and other taxes including sales tax or other duties on material obtained for execution of the said works shall be borne and paid by the Contractor.
12. That BHEL shall be entitled to deduct from the Contractor's running bills or otherwise Income Tax under Section 194 (C) of the Income Tax Act, 1961.
13. That BHEL shall be further entitled to recover from the running bills of the Contractor or otherwise such sum as may be determined by BHEL from time to time in respect of consumables supplied by BHEL, hire charges for tools and plants issued (Where applicable) and any other dues owed by the Contractor.
14. That it is hereby agreed by and between the parties that non- exercise, forbearance or omission of any of the powers conferred on BHEL and /or any of its authorities will not in any manner constitute waiver of the conditions hereto contained in these presents and the liability of the Contractor with respect to compensation payable to BHEL or Contractor's obligations shall remain unaffected.
15. It is clearly understood by and between the parties that in the event of any conflict between the Letter of Intent and other documents governing this Agreement, the provisions in the Letter of Intent shall prevail.
16. The following documents
  1. Invitation to Tender No-----  
and the documents specified therein.
  2. Contractor's Offer No-----  
dated-----.

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. Letter of Intent No \_\_\_\_\_ dated \_\_\_\_\_.

7. \_\_\_\_\_

shall also form part of and govern this Agreement.

IN WITNESS HEREOF, the parties hereto have respectively set their signatures in the presence of

WITNESS

1.

2.

(CONTRACTOR)  
(to be signed by a person holding  
a valid Power of Attorney)

WITNESS

1.

2.

(For and on behalf of BHEL)

**BANK GUARANTEE FOR SECURITY DEPOSIT**

B.G. NO.

Date

This deed of Guarantee made this ----- day of -----two thousand by -----  
----- (Bank) hereinafter called the "The Guarantor" (which expression shall unless repugnant to the  
context or meaning thereof be deemed to include its successors and assigns) in favour of M/s Bharat Heavy  
Electrical Limited ( A Govt. of India Undertaking) a company incorporated under the Companies Act, 1956,  
having its registered office at BHEL House, Siri Fort, Asiad, New Delhi – 110049 through its unit at Power  
Sector – Northern Region, Noida, Distt. Gautam Budh Nagar, (UP) hereinafter called "The Company" (which  
expression shall unless repugnant to the context or meaning thereof by deemed to include its successors and  
assigns)

WHEREAS -----(hereinafter referred to as the Contractor)  
have entered into a contract arising out of Letter of Intent no.----- dt.----- (hereinafter  
referred to as "the contract") for the construction of ----- with the company.

AND WHEREAS the contract inter-alia provides that the contractor shall furnish to the  
company a sum of Rs.----- (Rupees-----) towards security  
deposit for due and faithful performance of the contract in the form and manner specified therein.

AND WHEREAS the contractor has approached the Guarantor and in consideration of the  
arrangement arrived at between the contractor and the Guarantor, the Guarantor has agreed to give  
the Guarantee as hereinafter mentioned in favour of the company.

The Guarantor do hereby guarantee to the company the due and faithful performance,  
observance or discharge of the Contract by the contractor and further unconditionally and  
irrevocably undertake to pay to the Company without demur and merely on a demand, to the extent  
of Rs.----- (Rupees-----) against any claim by the company on them for  
any loss, damage, costs, charges and expenses caused to or suffered by the company by reasons  
of the contractor making any default in the performance, observance or discharge of the terms,  
conditions, stipulations or undertakings or any of them as contained in the contract.

The decision of the company whether any default has occurred or has been committed by  
the contractor in the performance, observance or discharge of any of the terms, conditions,  
stipulations or undertakings or any one of them as contained in the contract and / or as to the extent  
of loss, damage, costs, charges and expenses caused to or suffered by the company by reason of  
the contractor making any default in the performance, observance or discharge of any of the terms,  
conditions, stipulations or undertakings or any one of them shall be conclusive and binding on the  
Guarantor irrespective of the fact whether the contractor admits or denies the default or questions  
the correctness of any demand made by the company in any Court, Tribunal or Arbitration  
proceedings or before any other Authority.

The company shall have the fullest liberty without affecting in any way the liability of the  
Guarantor under this Guarantee, from time to time to vary any of the terms and conditions of the  
contract or extend time of performance by the contractor or to postpone for any time and from time  
to time any of the powers exercisable by it against the contractor and either enforce or forebear from  
enforcing any of the terms and conditions governing the contract or securities available to the  
company and the Guarantor shall not be released from its liability under these presents by any  
exercise by the company of the liberty with reference to the matters aforesaid or by reasons of time

being given to the contractor or any other forbearance, act or commission on the part of the company or any indulgence by the company to the contractor or any other matter or thing whatsoever which under the law relating to sureties would, but for this provision have the effect of so releasing the Guarantor from its liability under this guarantee.

The Guarantor further agrees that the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the contract and its claim satisfied or discharged and till the company certifies that the terms and conditions of the contract have been fully and properly carried out by the contractor and accordingly discharges this Guarantee, subject however, that the company shall have no claim under this Guarantee after ----- i.e. (the present date of validity of Bank Guarantee unless the date of validity of this Bank Guarantee is further extended from time to time, as the case may be) unless a notice of the claim under this Guarantee has been served on the Guarantor before the expiry of the said period in which case the same shall be enforceable against the Guarantor notwithstanding the fact that the same is enforced after the expiry of the said period.

The Guarantor undertakes not to revoke this Guarantee during the period it is in force except with the previous consent of the Company in writing and agrees that any liquidation or winding up or insolvency or dissolution or any change in the constitution of the contractor or the Guarantor shall not discharge the Guarantor's liability hereunder.

It shall not be necessary for the company to proceed against the contractor before proceeding against the Guarantor and the Guarantee herein contained shall be enforceable against them notwithstanding any security which the Company may have obtained or obtain from the Contractor shall at the time when proceedings are taken against the Guarantor hereunder be outstanding or unrealized.

Notwithstanding anything contained herein before, our liability under the Guarantee is restricted to Rs.----- (Rupees-----). Our guarantee shall remain in force until -----, i.e. (the present date of validity of Bank Guarantee unless the date of validity of this Bank Guarantee is further extended from time to time) unless a claim or demand under this guarantee is made against us on or before ----- we shall be discharged from our liabilities under this Guarantee thereafter.

Any claim or dispute arising under the terms of this documents shall only be enforced or settled in the courts of at New Delhi / Delhi only.

The Guarantor hereby declares that it has power to execute this guarantee and the executant has full powers to do so on behalf of the Guarantor.

IN WITNESS whereof the ----- (Bank) has hereunto set and subscribed its hand the day, month and year first, above written.

Signed for and on behalf of the Bank

(Signatory No.-----)

WITNESSES

1. Name & Address
2. Name & Address

Notes :

1. The above BG shall be executed on the non-judicial stamp papers of adequate value procured in the name of the bank in the state where the bank is located.
2. The above BG is required to be sent by the executing bank directly to BHEL at the address where tender is submitted / accepted under seal cover.

**LIST OF MEMBER BANKS**

- |   |   |
|---|---|
| 1. State Bank of India<br>CAG Branch,<br>10 <sup>th</sup> Floor, Vijaya Building,<br>Barakhamba Road,<br>New Delhi – 110001.    | 9. HDFC Bank Ltd.,<br>5 <sup>th</sup> Floor, HT House,<br>K.G. Marg,<br>New Delhi – 110001.           |
| 2. Canara Bank<br>74, Janpath,<br>New Delhi – 110001.   | 10. Citi Bank N A<br>Jeevan Vihar Building,<br>Sansad Marg,<br>New Delhi – 110001.                    |
| 3. Punjab National Bank,<br>74, Janpath,<br>New Delhi – 110001.   | 11. Standard Chartered Bank,<br>H2 Block, Connaught Place,<br>New Delhi – 110001.                     |
| 4. Bank of Baroda,<br>Corporate Banking Branch,<br>11 <sup>th</sup> Floor, BOB Building,<br>Sansad Marg,<br>New Delhi – 110001. | 12. ICICI Bank Ltd.,<br>ICICI Tower,<br>Bisham Pitamah Marg,<br>Pragati Vihar,<br>New Delhi – 110003. |
| State Bank of Hyderabad,<br>Surya Kiran Building, K.G. Marg,<br>New Delhi – 110001.   | 13. IDBI Bank Ltd.,<br>19, K.G. Marg,<br>Surya Kiran Building,<br>New Delhi.                          |
| 5. State Bank of Mysore,<br>Antriksh Bhawan, K.G. Marg,<br>New Delhi – 110001.  | 14. HSBC Ltd.,<br>ECE House,<br>28 KG Marg,<br>New Delhi – 110001.                                    |
| 6. State Bank of Mysore,<br>Industrial Finance Branch,<br>18, Ramanashree Arcade,<br>M.G. Road, Bangaloe – 560001.              |   |
| 7. State Bank of Travancore,<br>Travancore House, IF Branch,<br>K.G. Marg, New Delhi – 110001.                                  |   |
| 8. Deutsche Bank,<br>Tolstoy Marg,<br>New Delhi – 110001.   |   |

**SECTION – I (a)**  
**SPECIFICATION**  
**FOR**  
**HEALTH, SAFETY AND ENVIRONMENT (HSE)**

**1.0 SCOPE**

This specification establishes the Health, Safety and Environment (HSE) management requirement to be complied with by the Contractors during construction.

Requirements stipulated in this specification shall supplement the requirements of HSE Management given in relevant Act (s) /legislations, General Condition Contract (GCC). Special Conditions of Contract (SCC) and job specification where different documents stipulates different requirements, the most stringent be adopted.

**2.0 REFERENCES**

This document should be read in conjunction with following :

- General Conditions of Contract (GCC)
- Special Conditions of Contract (SCC)
- Scope of work
- Relevant IS Codes (refer Annexure-I)
- Reporting Formats (refer Annexure-II)

**3.0 REQUIREMENTS OF HEALTH, SAFETY & ENVIRONMENT (HSE) MANAGEMENT SYSTEM TO BE COMPLIED BY CONTRACTORS.**

**3.1 MANAGEMENT RESPONSIBILITY**

- 3.1.1 The Contractor to comply with HSE requirement at Construction sites as enclosed to cover commitment of their organization to ensure health, safety and environment aspects in their line of operations.
- 3.1.2 The HSE management system shall cover the HSE requirements including but not limited to what is specified under Para 1.0 and para 2.0 above.
- 3.1.3 Contractor shall be fully responsible for planning and implementing HSE requirements. Contractor as a minimum requirement shall designate/deploy the following to co-ordinate the above :

No. of workers deployed upto 250 - Designate one safety Supervisor

Above 250 & upto 500 - Deploy one qualified and Experienced safety Engineer/ Officer

Above 500 - One additional safety engineer/  
(for every 500 or less) officer, as above.

Contractor shall indemnify & hold harmless Owner/BHEL & their representatives free from any and all liabilities arising out of non-fulfillment of HSE requirement.

- 3.1.4 The Contractor shall ensure that the Health, Safety and Environment (HSE) requirements are clearly understood & faithfully implemented at all levels at site.
- 3.1.5 BHEL shall promote and develop consciousness for Health, Safety and Environment among all personnel working for the Contractor. Regular awareness programmes and work site meetings shall be arranged on HSE activities to cover hazards involved in various operations during construction.
- 3.1.6 The Contractor shall arrange suitable first aid measures such as First Aid Box, trained personnel to give First Aid and install fire protection measures such as adequate number of steel buckets with sand and water to the satisfaction of BHEL/Owner.
- 3.1.7 Non-Conformance on HSE by Contractor (including his Sub-contractors) as brought out during review / audit by BHEL/Owner representative shall be resolved forthwith by Contractor. Compliance report shall be provided to BHEL.
- 3.1.8 The Contractor shall ensure participation of his Resident Engineer / Site-In-Charge in the Safety Committee / HSE Committees meetings arranged by BHEL / Owner. The compliance of any observations shall be arranged urgently. He shall assist BHEL / Owner to achieve the targets set by them on HSE during the project implementation.
- 3.1.9 The Contractor shall adhere consistently to all provisions of HSE requirements. In case of non-compliance or continuous failure in implementation of any of HSE provisions, BHEL / Owner may impose stoppage of work without any Cost & Time implication to BHEL / Owner and / or impose a suitable penalty for non-compliance with a notice of suitable period, upto a commulative limit of 1.0% (one percent) of Contract value. This penalty shall be in addition to all other penalties specified else where in the contract. The decision of imposing stoppage of work, its extent & minority penalty shall rest with BHEL / Owner & binding on the Contractor.
- 3.1.10 All fatal accidents and other personnel accidents shall be investigated by a team of Contractor's senior personnel for root cause & recommended corrective and preventive actions. Findings shall be documented and suitable actions taken to avoid recurrences shall be communicated to BHEL / Owner. BHEL / Owner shall have the liberty to independently investigate such occurrences and Contractor shall extend all necessary help and co-operation in this regard.

### **3.2 HOUSE KEEPING**

- 3.2.1 Contractor shall ensure that a high degree of house keeping is maintained and shall ensure interalia; the following :
- a) All surplus earth and debris are removed / disposed off from the working areas to identified locations (s).

- b) Unused/Surplus Cables, Steel items and steel scrap lying scattered at different places within the working areas are removed to identified locations (s).
- c) All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from work place to identified location(s).
- d) Roads shall be kept clear and materials like : pipes, steel, sand boulders, concrete, chips and brick etc., shall not be allowed on the roads to obstruct free movement of men & machineries.
- e) Fabricated steel structurals, pipes & piping materials shall be stacked properly for erection.
- f) Water logging on roads shall not be allowed.
- g) No parking of trucks/trolleys, cranes and trailers etc., shall be allowed on roads which may obstruct the traffic movement.
- h) Utmost care shall be taken to ensure over all cleanliness and proper upkeep of the working areas.
- i) Trucks carrying sand, earth and pulverized materials etc., shall be covered while moving within the plant area.

In case of non-compliance of any of above, BHEL shall have the liberty to get it done from some other agency at this risk and cost.

### **3.3 HEALTH, SAFETY AND ENVIRONMENT**

- 3.3.1 The Contractor shall provide safe means of access to any working place including provisions of suitable and sufficient scaffolding at various stages during all operations of the work for the safety of his workmen, and BHEL / Owner. Contractor shall ensure deployment of appropriate equipment and appliances for adequate safety and health of the workmen and protection of surrounding areas.
- 3.3.2 The contractor shall ensure that all their staff and workers wear Safety Helmet and Safety shoes. Contractor shall also ensure use of safety belt, protective goggles, gloves etc., by the personnel as per job requirements. All these gadgets shall conform to relevant IS specifications or equivalent.
- 3.3.3 The Contractor shall assign to his workmen, tasks commensurate with their qualification, experience and state of health for driving of vehicles, handling and erection of material and equipments. All lifting equipments shall be tested certified for its capacity before use. Adequate and suitable lighting at every work place and approach there to, shall be provided by the Contractor before starting the actual operations at night. It is mandatory for contractor to get his workmen medically examined / checked for fitness of work assigned once a year and furnish the certificate to that effect from RMP / Govt. Hospital.
- 3.3.4 Hazardous and / or toxic materials such as solvent, coating or thinners shall be stored in appropriate containers.

- 3.3.5 All hazardous materials shall be labeled with the name of the materials, the hazards associated with its use and necessary precautions to be taken.
- 3.3.6 Contractor shall ensure that during the performance of the work, all hazards of the health of personnel, have been identified, assessed and eliminated.
- 3.3.7 Chemical spills shall be contained and cleaned up immediately to prevent further contamination.
- 3.3.8 All personnel exposed to physical agents such as ionizing or non-ionizing radiation, ultraviolet rays or similar other physical agents shall be provided with adequate shielding or protection commensurate with the type of exposure involved.
- 3.3.9 Where contact or exposure of hazardous materials could exceed limits or could otherwise have harmful effects, appropriate personnel protective equipment such as gloves, goggles, aprons, chemicals resistant clothing and respirator shall be used.
- 3.3.10 All persons deployed at site shall be knowledgeable of and comply with the environmental laws, rules & regulations relating to the hazardous materials substances and wastes. Contractor shall not dump, release or otherwise discharge or dispose off any such materials without the express authorization of BHEL / Owner.

#### **4.0 DURING JOB EXECUTION**

- 4.1 Implement Health, Safety and Environment requirements including but not limited to as brought out under para 3.0. Contractor shall ensure to :
- arrange workmen compensation insurance, registration under ESI Act, third party liability insurance etc., as applicable.
  - arrange all HSE permits before start of activities (as applicable) like hot work, confined space, work at heights, storage of chemical / explosive materials and its use and implement all precautions mentioned therein.
  - Submit timely the completed checklist on HSE activities, Monthly HSE report, accident reports, investigation reports etc., as per BHEL / Owner requirements. Compliance of instructions on HSE shall be done by Contractor and informed urgently to BHEL / Owner.
  - Ensure the Resident Engineer / Site-Incharge of the Contractor shall attend all the Safety Committee / HSE meetings arranged by BHEL/Owner. In case of his absence from site that a second senior most person shall be nominated by him in advance and communicated to BHEL/Owner.
  - Display at site office and work locations caution boards, list of hospitals, emergency services available.
  - Display posters, banners made available by BHEL for safe working to promote safety consciousness.
  - Assist in HSE audits by BHEL / Owner and submit compliance report.

- Generate and submit HSE records / report as per HSE plan.
- Appraise BHEL / Owner on HSE activities at site.

## ANNEXURE - I

### RELEVANT IS – CODES FOR PERSONAL PROTECTION

IS: 2925-1984	Industrial Safety Helmets
IS: 4770-1968	Rubber gloves for electrical purposes
IS: 6994, 1973 (Part-I)	Industrial Safety Gloves (Leather & Cotton Gloves)
IS: 1989-1986 (Part I & III)	Leather safety boots and shoes
IS: 3738-1975	Rubber knee boots
IS: 5557-1969	Industrial and Safety rubber knee boots
IS: 6519-1971	Code of practice for selections, care and repair of Safety footwear
IS: 11226-1985	Leather Safety footwear having direct moulding sole
IS: 5983-1978	Eye protectors
IS: 9167-1979	Ear protectors
IS: 3521-1983	Industrial Safety belts and harness

ANNEXURE – II

1.0 HEALTH, SAFETY & ENVIRONMENT (HSE) PLAN

PROJECT: ----- CONTRACTOR :-----

DATE :----- OWNER :-----

(To be prepared by each construction Agency)

PROCEDURE/ DESCRIPTION	CODE OF W.I/ GUIDELIES	PERFORMING CONFOR- MANCE	FUNCTIONS			AUDIT APPRO- VER	ACTIVITY FUNCTION CUSTOMER REVIEW AUDIT REQUIREMENT
			PERFOR- MER	CHECK- ER			

PREPARED BY

REVIEWED BY

APPROVED BY  
(RESIDENT ENGINEER)

**2.0 MONTHLY HSE CHECKLIST CUM COMPLIANCE REPORT (1/6)**

PROJECT:----- CONTRACTOR:-----

DATE :----- OWNER:-----

INSPECTION BY:-----

Note: Write 'NA' wherever the item is not applicable.

ITEM	YES	NO	REMARKS	ACTION
------	-----	----	---------	--------

**HOUSING KEETING**

Waste containers provided and used

Sanitary facilities adequate and clean

Passageways and Walkways Clear

General neatness of working areas

Others

**PERSONNEL PROTECTIVE EQUIPMENT**

Goggles: Shelds

Face protection

Hearing protection

Safety Shoes provided

Hand protection

Safety Belts

Others

**EXCAVATIONS / OPENINGS**

Openings properly covered or barricaded

Excavations shored

Excavations barricaded

Overnight lighting provided

Other

**MONTHLY HSE CHECKLIST CUM COMPLIANCE REPORT (Contd.. 2/6)**

ITEM	YES	NO	REMARKS	ACTION
<b>WELDING, CUTTING</b>				
Gas cylinders chained upright				
Cables and hoses not obstructing				
Screens or shields used				
Flammable materials protected				
Fire extinguisher (s) accessible				
Other				
<b>SCAFFOLDING</b>				
Fully decked platforms				
Guard and intermediate rails in place				
Toe boards in place				
Adequate shoring				
Adequate access				
Other				
<b>LADDERS</b>				
Extension side rails 1 m above				
Top of landing				
Properly secured				
Angle + 70 from horizontal				
Other				

**MONTHLY HSE CHECKLIST CUM COMPLIANCE REPORT (Contd.3/6)**

ITEM	YES	NO	REMARKS	ACTION
<b>HOIST, CRANES AND DERRICKS</b>				
Condition of cables and sheaves OK				
Condition of slings, chains, hooks & eyes O.K.				
Inspection and maintenance logs maintained				
Outriggers used				
Signs/barricades provided				
Signals observed and understood				
Qualified operators				
Other				
<b>MACHINERY, TOOLS AND EQUIPMENT</b>				
Proper instruction				
Safety devices				
Proper cords				
Inspection and maintenance				
Other				
<b>VEHICLE AND TRAFFIC</b>				
Rules and regulations observed				
Inspection and maintenance				
Licensed drivers				
Other				

**MONTHLY HSE CHECKLIST CUM COMPLANCE REPORT (Contd.4/6)**

ITEM	YES	NO	REMARKS	ACTION
<b>TEMPORARY FACILITIES</b>				
Emergency instructions posted				
Fire extinguishers provided				
Fire-aid equipment available				
Secured against storm damage				
General neatness				
In accordance with electrical requirements				
Other				
<b>FIRE PREVENTION</b>				
Personnel instructed				
Fire extinguishers checked				
No smoking in Prohibited areas				
Hydrants Clear				
Other				
<b>ELECTRICAL</b>				
Proper wiring				
ELCB's provided				
Ground fault circuit interrupters				
Protection against damage				
Prevention of tripping hazards				
Other				

**MONTHLY HSE CHECKLIST CUM COMPLANCE REPORT (Contd.5/6)**

ITEM	YES	NO	REMARKS	ACTION
<b>HANDLING AND STORAGE OF MATERIALS</b>				
Properly stored or stacked				
Passageways clear				
Other				
<b>FLAMMABLE GASES AND LIQUIDS</b>				
Containers clearly identified				
Proper storage				
Fire extinguishers nearby				
Other				
<b>WORKING AT HEIGHT</b>				
Erection plan				
Safety belts and lanyards; chute lines				
Other				
<b>ENVIRONMENT</b>				
Chemical and other Effluents properly disposed				
Cleaning liquid of pipes disposed off properly				
Water used for hydrotesting disposed off as Per agreed procedure				
Lubricant Waste/Engine Oil properly disposed				
Waste from Canteen, offices, sanitation etc., Disposed properly				
Disposal of surplus earth, stripping materials, Oily rags and combustible materials done Properly				

**MONTHLY HSE CHECKLIST CUM COMPLIANCE REPORT (Contd.6/6)**

ITEM	YES	NO	REMARKS	ACTION
<u>Green belt protection</u>				
<u>Hygienic conditions at labour camps O.K?</u>				
<u>Availability of First Aid facilities</u>				
<u>Proper sanitation at site, office and Labour camps</u>				
<u>Arrangement of medical facilities</u>				
<u>Measures for dealing with illness</u>				
<u>Availability of Potable drinking water For workmen &amp; staff</u>				
<b><u>Signature of Resident Engineer with Seal</u></b>				

**3.0 ACCIDENT CUM FIRE REPORT**

(To be submitted by contractor after every accident within 24 hours of accident)

Report : \_\_\_\_\_

Name of Site: \_\_\_\_\_

Date: \_\_\_\_\_

CONTRACTOR \_\_\_\_\_

**NAME OF THE  
INJURED**

\_\_\_\_\_

**FATHER'S**

**NAME**

\_\_\_\_\_

**SUB-CONTRACTOR**

**M/S**

\_\_\_\_\_

**DATE & TIME OF ACCIDENT**

\_\_\_\_\_

**LOCATION**

\_\_\_\_\_

\_\_\_\_\_

**BRIEF DESCRIPTION OF ACCIDENT**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**CAUSE OF ACCIDENT**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**NATURE OF INJURY/DAMAGE**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**MEDICAL AID PROVIDED/ACTIONS TAKEN**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**DATE:**

\_\_\_\_\_

**SIGNATURE OF CONTRACTOR**

**WITH SEAL**

\_\_\_\_\_

**TO: SITE-IN-CHARGE/BHEL**

**1 COPY**

**4.0 SUPPLEMENTARY ACCIDENT & INVESTIGATION REPORT**

Project: \_\_\_\_\_ Supplementary to Report No. \_\_\_\_\_  
(Copy enclosed)

Site: \_\_\_\_\_ Date: \_\_\_\_\_

CONTRACTOR \_\_\_\_\_

**NAME OF THE INJURED** \_\_\_\_\_

**FATHER'S NAME** \_\_\_\_\_

**SUB-CONTRACTOR M/S** \_\_\_\_\_

**DATE & TIME OF ACCIDENT** \_\_\_\_\_

**LOCATION** \_\_\_\_\_

**BRIEF DESCRIPTION & CAUSE OF ACCIDENT**

**NATURE OF INJURY/DAMAGE**

**COMMENTS FROM MEDICAL PRCTICETIONER, WHO ATTENDED THE VICTIM / INJURED**

**SUGGESTED IMPROVEMENT IN THE WORKING CONDITION, IF ANY**

**LOSS OF MANHOURS AND IMPACT ON SITE WORKS**

**ANY OTHER COMMENT BY SAFETY OFFICER**

**DATE:** \_\_\_\_\_ **SIGNATURE OF CONTRACTOR WITH SEAL**

**TO: SITE-IN-CHARGE/BHEL 1 COPY**

**5.0 MONTHLY HEALTH, SAFETY & ENVIRONMENT (HSE) REPORT**

(To be submitted by each Contractor)

Actual work start Date: \_\_\_\_\_ For the month of \_\_\_\_\_

Project: \_\_\_\_\_ Report No. \_\_\_\_\_

Name of the Contractor: \_\_\_\_\_ Status as on: \_\_\_\_\_

Name of Work: \_\_\_\_\_ Name of safety officer \_\_\_\_\_

ITEM THIS MONTH CUMMULATIVE

Total Strength (Staff + Workmen)

Number of HSE meetings organized at site

Number of HSE awareness programmes Attended at site

Whether workmen compensation policy taken Y/N

Whether workmen compensation policy is valid Y/N

Whether workmen registered under ESI Act Y/N

Number of Fatal Accidents

Number of Loss Time Accidents (Other than Fatal)

Other accidents (Non Loss Time)

Total No. of Accidents

Total man-hours worked

Man-hour loss due to fire and accidents

Compensation cases raised with Insurance

Compensation cases resolved and paid to workmen

Remarks

\_\_\_\_\_  
Date \_\_\_\_\_ Safety Officer/Resident Engineer

(Signature & Name)

To: SITE-IN-CHARGE,BHEL 1 COPY

## **SECTION - III `A'**

### **SPECIAL CONDITIONS OF CONTRACT**

#### **INDEX**

<b>Clause</b>	<b>DESCRIPTION</b>
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35	Preliminary work
36	Civil works, foundation and grouting
37	Consumables
38	Tools & Plants/ IMTE's
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40	Material handling and storage
41	Preservation of components
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44	Welding, HT, RG & NDT
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## SECTION - III `A'

### SPECIAL CONDITIONS OF CONTRACT

#### 34.0 GENERAL

- 34.1** The intent of this specification is to provide services for execution of project according to most modern and proven techniques and codes. The omission of specific reference to any method, equipment or material necessary for the proper and efficient services towards installation of the plant shall not relieve the contractor of the responsibility of providing such services / facilities to complete the work or portion of work awarded to him. The quoted / accepted rates / lump sum price shall deem to be inclusive of all such contingencies.
- 34.2** The contractor shall carry out the work in accordance with standard practices / codes / instructions / drawings / documents / specification supplied by BHEL from time to time.
- 34.3** The work shall conform to dimensions and tolerances given in various drawings and documents that will be provided during execution. If any portion of work is found to be defective in workmanship, not conforming to drawings or other stipulations, the contractor shall dismantle and redo the work duly replacing the defective materials at his cost failing which the job will be carried out by BHEL by engaging other agencies / departmentally and recoveries will be affected from contractor's bills towards expenditure incurred including BHEL's usual overhead charges.
- 34.4** Following shall be the responsibility of contractor and have to be provided within finally accepted rates / prices.
- A** Provision as required of all types of labour, supervisors, engineers, watch and ward, tools & tackles, calibrated inspection, measuring and test equipments as specified and otherwise required for the work, consumables for erection, testing and commissioning including material handling.
  - B** Proper out-turn as per BHEL's plan and commitment
  - C** Completion of work as per BHEL Schedule.
  - D** Good quality and accurate workmanship for proper performances of equipment.
  - E** Repair and rectification
  - F** Preservation / Re-conservation of all components during storage / erection till handing over.

#### **34.5 Health, Safety & Environment management (HSE)**

**34.5.1** Besides provision with regard to SAFETY under Clause 27 of GCC, the contractor will be responsible for Health, Safety & Environment management at site for the construction activities to be carried out by them in accordance with requirements **given under section I(a) of GCC of this document**. The contractor shall continuously take special care to ensure the safety and prevention of human and equipment accidents and maintain good sanitary conditions in and around the site. All the construction work and

plant operation must be carried out in the safest possible manner. The Engineer reserves the right to stop any process which, in the Engineer's opinion, is being performed dangerously. In this case the contractor must immediately adhere the requisite safety precautions and any delays attributed to the work stoppage on this account shall not affect the agreed contractual finishing dates.

The contractor shall appoint dedicated full-time Qualified Safety Officers who shall have full authority to ensure that all necessary safety precautions are observed by the Contractor's employees and sub-contractors. These appointees shall have full responsibility for the safety of all personnel within the contractor's area of the works.

**34.5.2** Some of the common safety rules to be followed during working are as follows :-

- No body is allowed to enter at construction site without Safety Shoe.
- Never enter work area without Safety helmet & chin strap in place.
- No climbing/working allowed without proper safety belt above 2 m. height.
- Do not exceed the speed limit 25 Kmph within premises.
- No debris obstacles allowed on the roads & passages.
- Do not walk on pipelines or false ceiling.
- Maintain good Housekeeping at work site.
- No photography/ Videography allowed without permission
- All Site supervisors & engineers (including subcontractor's) must be imparted structured training on construction safety before start of the job & record to be maintained.
- Availability of qualified & trained Site Engineer at site during all working hours.
- Site Safety training to be imparted to all workers & plan to be made to cover every worker.
- Tools box talk (5-15 minutes) by supervisor prior to commencement of any job.
- All accident / incidents(Near Miss) to be reported & investigated.(formats & procedure should be finalized)
- Daily Safety Checking by Each Site Engineer along with Safety engineer.
- Weekly co-ordination meeting of all Safety engineers with BHEL safety officer.
- Monthly safety meeting with Site In-charges.
- All Safety equipment must be ISI marked & checked by Safety officer before use.
- Tag system for erection & use of scaffoldings.
- Bamboo/wooden Scaffolding material not allowed.
- LPG cylinders not allowed for gas cutting.
- Good House keeping. Separate waste bins to be used for flammable & non flammable material.
- Safety awareness programs for workers by display of boards, posters, competitions, talks etc.
- Deployment of Safety Supervisors for every 250 workers and part there of at work site.
- Display of List of First Aid trained persons.
- Testing certificates for lifting tools & tackle.
- Provision & maintenance of fire extinguishers at construction site & material stores.
- Display of emergency telephone numbers at various locations.

- For work in confined space use 24 V lamp fitting & use tools with air motors or electric tools with max. 24 V.
- For confined space entry Gas test must be done before & at regular intervals.
- Checking & tag of equipment like grinding machine, welding machine, gas cutting set etc. by supervisors before use.

**Further, the contractor is required to provide proper Safety Net System wherever the hazard of fall from height is present as per instructions of BHEL Engineer at site. The safety net shall be fire resistant, duly tested and shall be of ISI mark and the nets shall be located as per site requirement to arrest or to reduce the consequences of a possible fall of persons working at different heights.**

#### **34.5.3 Contractor shall ensure following:**

1. Contractor has to maintain contact with local hospital having ambulance facility , scanning & other ultra modern medical facilities required during emergency.
2. Contractor has to ensure pre employment medical check for all staff & workers.
3. Contractor has to ensure that adequate First Aid facilities with trained nurse are available at work site for emergency purpose. This emergency set-up should include, but not limited to, following
  - Male nurse (in shifts)
  - Oxygen set up
  - Breathing apparatus
  - Eye wash facility
  - Stretcher
  - Trauma blanket
  - Medicines.

In addition to above, BHEL (through its other contractor) has arranged ambulance at work site for emergency purpose, which can be utilized by contractor in case of emergency. In case , under unavoidable circumstances , if the ambulance is not available , the contractor will have to arrange for the same as [under clause 34.5.3 \(1\)](#).

**34.5.4** The Contractor shall be fully responsible for accidents caused due to him or his agents or workmen's negligence or carelessness in regard to the observance of the safety requirements and shall be liable to pay compensation for injuries. **It may be noted that non-compliance to HSE requirements will result in penal action. In case of violations of safety requirements, the Contractor shall be liable for a penalty of Rs. 200/- for the first violation and Rs. 500/- for the subsequent violations. For serious lapses, as decided by BHEL Engineer, fines upto Rs. 5000/- at a time can be imposed.**

The amount towards penalties as above will be deducted from running bills of the Contractor. The amount so collected above will be utilized for supporting the safety activities at site. The decision of BHEL on above will be final and binding on the Contractor.

**34.5.5 The contractor shall comply with following towards Social Accountability;**

- (a) The contractor shall not employ any employee less than 15 years of age in pursuant to ILO convention. If any child labour were found to have been engaged , the Contractor shall be levied with expenses of bearing his education expenditure which will include stipend to substantiate appropriate education or employ any other member of family enabling to bear the child education expenditure.
- (b) The contractor shall not engage Forced/Bonded Labour and shall abide by abolition of Bonded Labour System(Abolition) Act, 1976.
- (c) The contractor shall maintain Health & safety requirement as stipulated in the Contract and Contract Labour( Regulation & Abolition) Act,1970.
- (d) The Contractor shall abide by UN convention w.r.t Human Rights and shall be liable for Discrimination/Corporal punishment for failure in meeting with relevant requirements.
- (e) The Contractor shall abide the requirement of Contract Labour(Regulation & Abolition) Act,1970 for working hours.
- (f) The Contractor shall abide by the Statutory requirement of Minimum Wages Act 1948, payment of Wages Act 1936.
- (g) The Contractor shall arrange potable drinking water to its employees & workers.

**35.0 PRELIMINARY WORKS**

**35.1** The contractor shall, as a first field activity check the foundations for turbine, generator and all auxiliaries for the correctness of the same as per the drawings and satisfy himself in all aspects. He should ensure location of foundations, their consolidation, absence of voids, levels, correctness of boltholes, pockets levels and centerlines etc. All measurements should be recorded and submitted to Engineer for approval before erection

**35.2** Before starting erection job, contractor shall ensure that TG area is sufficiently enclosed against ingress of dust and water, and all debris have been cleared off from the floor to a designated area as per instruction of Engineer. The contractor shall arrange to get the working area and surroundings cleaned daily to ensure a dust free atmosphere for working.

Contractor shall first cover all openings on operating floor and put temporary hand railings on all sides of the floor to avoid any accident to the personal working. Material for above work, if available can be issued by BHEL on returnable basis.

**35.3** The contractor shall provide his tool stores for special tools and instruments at a convenient location near to the place of working in TG hall. Necessary area shall be provided to contractor by BHEL. This is to be cleared after completion of the work. If so required he will have shift the same if required to give fronts to other agencies engaged at site.

**35.4** The contractor shall set up longitudinal and transverse axes and two or more level bench marks accurately on TG floor. BHEL Engineer shall certify these. The certified TG-Center lines and datum level shall be the reference for TG and all auxiliaries' erection and alignment work. The contractor shall transfer these axes to all the floors to facilitate further execution.

- 35.5** All matching surfaces of components shall be well cleaned with cleaning agent and burrs shall be removed by filing and blue matched wherever required. Wherever necessary sealing / lubricating / anti-seize compounds shall be applied as per recommendation of Engineer. Machining / grinding required for fitting of keys, pins, packers & dowels etc. shall be carried out by contractor at his cost. The contractor is expected to have his own arrangements for machining activities.
- 35.6** The accuracy of all equipment / instruments and their functioning shall be established before they are permitted for use on the job. If the Engineer doubts the accuracy of the precision tools, any time during erection, the contractor shall arrange the checking / calibration of tools / equipment/ instruments at his cost.
- 36.0 CIVIL WORKS, FOUNDATIONS AND GROUTING.**
- 36.1** BHEL shall provide all equipment foundations. For the correctness of these foundations as per drawings, the contractor shall check the dimensions & locations of the foundations, pockets, anchor-bolt pitch. Further, top elevation of foundations shall be checked with respect to benchmark. All minor adjustments of foundation level, dressing and chipping of foundation surfaces up to 50 mm, enlarging the pockets in foundations etc., as may be required for the erection of equipment / plants shall be carried out by the contractor.
- 36.2** While on the job, care is essential to avoid too much chipping and resultant lowering of level. In case of excess chipping, contractor has to arrange additional packing plates as per requirements provided BHEL Engineer allows it. When required by manufacturers, the embedded sub-sole plates shall be scraped and checked with prussian blue to get the required contact with frames.
- 36.3** The contractor shall ensure perfect matching of packer plates including machining, scraping and blue matching with foundation by dressing the foundation, as well as perfect matching between the packer plates and the base plate of equipment to the satisfaction of BHEL Engineer. If required the packer plates may have to aligned and fixed on the foundations using special high strength, non-shrinking and quick-setting grouts. The minimum thickness below the packer plate should be 20 mm. The material required for this has to be arranged for by the contractor at his cost.
- 36.4** The grouting of all the equipments except TG and BFP will be carried out by the Civil Agency . In both the cases, the the contractor has to ensure that all the matching joints which are not to be grouted shall be kept free from the grouting mixture by applying tape or any other alternative method approved by Engineer. All assistance required has to be provided by the contractor.
- 36.5** The Grouting of BFP and TG will have to be carried out by the Contractor . The contractor has to arrange for all materials required for carrying out the grouting including supply of the Special Grout as indicated in the drawings and as approved by the Engineer. **Although supply and application of approximately 20 MT of approved Non- Shrink Grout per unit has been envisaged, the contractor will be required to supply and apply actual quantity as per the site requirement without any extra cost.**

- 36.6** The contractor shall check and verify the alignment of equipment, alignment of shafts of rotating machinery, the slopes of all bearing pedestals, centering of rotors with respect to their sealing bores, couplings etc. as applicable and the like items to ensure that no displacement had taken place during grouting. The values recorded prior to grouting shall be used during post grouting check up and verifications. Such pre and post grout records of alignment details shall be maintained by the contractor in a manner acceptable to the Engineer.
- 36.7** Besides grouting as above, any civil works required for safe and efficient operation of tools and tackles like grouting / excavation/ casting of foundation / anchor points for derricks, winches, guy ropes fastening, etc / foundations required for chemical cleaning pumps, tanks and any other temporary supports shall also be the contractor's responsibility. For these civil works all materials including cement and required facilities will have to be arranged by contractor at his own cost.

### **37.0 CONSUMABLES**

- 37.1** The contractor shall provide within finally accepted price, all consumables like all welding electrodes (including alloy steel and stainless steel), filler wires, TIG wires, all gases (inert, welding, cutting), soldering material, dye-penetrants, radiography films. Other erection consumables such as tapes, jointing compound, grease, mobile oil, M-seal, Araldite, petrol, CTC / other cleaning agents, grinding and cutting wheels are to be provided by the contractor. Steel, H&S, packers, shims, wooden planks, scaffolding materials hardware items etc required for temporary works such as supports, scaffoldings are to be arranged by him. Sealing compounds, gaskets, gland packing, wooden sleepers, for temporary work, required for completion of work except those which are specifically supplied by manufacturing unit are also to be arranged by him.
- 37.2** All the shims, gaskets and packing, which go finally as part of equipment, shall be supplied by BHEL free of cost.
- 37.3** It shall be the responsibility of the contractor to plan the activities and store sufficient quantity of consumables. Non-availability of any consumable materials or equivalent suggested by BHEL cannot be considered as reason for not attaining the required progress or for additional claim.
- 37.4** It shall be the responsibility of the contractor to obtain prior approval of BHEL, regarding suppliers, type of electrodes etc before procurement of welding electrodes / TIG Filler wire. On receipt of electrodes at site these shall be subjected to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch number, date of expiry etc and produce test certificate for each lot / batch with correlation of batch / lot number with respective test certificate. No electrode without a valid test certificate will be used.
- 37.5** BHEL reserves the right to reject the use of any consumable including electrodes, gases, lubricants / special consumables if it is not found to be of the required standard / make / purity or when shelf life has expired. Contractor shall ensure display of shelf life on consumable wherever required and records maintained.
- 37.6** Storage of all consumables including welding electrodes shall be done as per requirement / instruction of the Engineer by the contractor at his cost.

- 37.7** In case of improper arrangement for procurement of any consumable, BHEL reserves the right to procure the same from any source and recover the cost from the Contractor's first subsequent bill at market value plus the departmental charges of BHEL from time to time (30% at present). Postponement of such recovery is normally not permitted. The decision of Engineer in this regard shall be final and binding on the Contractor.
- 37.8** All lubricants and chemicals required for cleaning, pre-commissioning, commissioning, testing, preservation and lubricants for trial runs of the equipment shall be supplied by BHEL / BHEL's client. All services including labour and T&P will be provided by the contractor for handling, filling, emptying, refilling etc. the consumption of lubricants / chemicals shall be properly accounted for. Surplus material if any shall be properly stacked / packed and returned to stores.
- 37.9** Special consumables that are required for final box up like anti-seize compounds, jointing compound and sealing compound shall be provided by BHEL. However the contractor shall use them to the satisfaction of BHEL Engineer.
- 38.0 TOOLS AND PLANTS / IMTE's**
- 38.1** T&P being provided by BHEL to sub-contractor free of hire charges shall be shared by other subcontractors working for BHEL at site and the allotment done by BHEL Engineer shall be final and binding.
- 38.2** Besides the T&Ps and IMTEs being made available to contractor, free of hire charges by BHEL, all other T&Ps and IMTEs required for successful and timely execution of the work covered within the scope of this tender, shall be arranged and provided by the contractor. He should ensure that these are in good working condition. In the event of the failure of contractor to bring necessary and sufficient T&Ps/ and IMTEs, BHEL will be at liberty to arrange the same at the risk and cost of contractor and hire charges as applicable shall be deducted from contractor's bill. Decision of BHEL in this regard shall be final and binding on contractor.
- 38.3** All distribution boards, connecting cables, wire ropes, hoses, pipes etc, including temporary air / water / electrical connections etc shall have to be arranged by the contractor at his own cost.
- 38.4** In case of non-availability of the T&Ps to be provided by BHEL due to breakdown, major overhauls, distribution pattern or any other reason, the contractor shall plan / amend / alter his activities to meet erection / commissioning targets in consultation with BHEL.
- 38.5** The operation of all BHEL's T&P being provided free of hire charges shall be in the scope of the contractor. The contractor shall arrange, at his own cost, trained operators, fuel and other consumables for their operation. All lubricants shall be provided by BHEL free of cost. The contractor will give the requirement well in advance.
- 38.6** The contractor shall engage trained and experienced operators for the operation of BHEL's T&Ps. Their skill / performance will be checked by BHEL Engineer before they are allowed to operate the same. However checking of skills by BHEL does not absolve the contractor of his responsibilities for proper and safe handling of equipment, consistent good performance of operators and regular performance evaluation of operators.

- 38.7** The day to day and routine maintenance of BHEL's T&Ps should be carried out by contractor as per manufacturer's / BHEL's maintenance schedule at his cost. These shall be maintained in good working condition during the entire period of use. T&Ps in defective / damaged condition shall be rectified promptly to the full satisfaction of BHEL engineer. Contractor shall maintain records for maintenance of major T&Ps that shall be made available for Inspection whenever required. In case of any lapses on the part of the contractor BHEL at its own discretion get the servicing / repair of equipment done at the risk and cost of the contractor with BHEL overheads.
- 38.8** The contractor shall arrange at his cost all spares needed for upkeep of all T&Ps other than cranes and Hydraulic Test pumps supplied by BHEL. For cranes, repair / replacement of filter, batteries, self, dynamo, shall be the responsibility of the contractor. However, the charges of the replacement of the other damaged / worn out parts of BHEL cranes will be borne by BHEL, provided the damage is not due to the negligence of the contractor. However, if there are breakdowns / damages due to negligence of the contractor, the complete service / repair charges and cost of all the spares damaged with BHEL overheads shall be to the account of contractor and shall be recovered from his RA bills.
- 38.9** The contractor, at his own cost shall arrange all supervision and labour required for maintenance and attending breakdowns.
- 38.10** Increasing / shortening of the crane boom to suit work requirements shall have to be arranged by the indenting contractor at his cost. All necessary manpower tools, support, consumables, illumination etc. will have to be arranged by contractor at his cost. If required, contractor has to return the crane with original boom.
- 38.11** The area and infrastructure development of the area to be carried out by the customer. However in construction projects of this magnitude it is possible that all the areas / approaches may not be ready. In such cases consolidation of ground and arrangement of sleepers / sand bag filling etc for safe operation / movement of equipment including cranes / trailers etc shall be the responsibility of the contractor at his cost. No compensation on this account shall be payable.
- 38.12** In the event of contractor not using and maintaining BHEL T&Ps according to BHEL's instructions. BHEL will have the right to withdraw such item without any notice and no claim in this regard shall be entertained and contractor shall be responsible for delay in execution on this account.
- 38.13** The contractor shall furnish regular utilization report of the BHEL T&Ps, as per requirement of BHEL.
- 38.14** Any loss / damage to any part of BHEL T&Ps and IMTEs shall be to the contractor's account and any expenditure on these accounts by BHEL will be recovered from the contractor's bill in case the contractor fails to make good the loss.
- 38.15** It shall be responsibility of the contractor to take delivery of T&Ps from stores or place of use by other contractor at project site, transport the same to site and return the same to BHEL store / place as intimated by Engineer in project site in good working conditions after use.

- 38.16** The contractor shall return BHEL T&Ps and IMTEs issued to him in good working condition as and when desired by BHEL (on completion or reduction of workload). If contractor delays return of T&P and IMTE, hire charges as applicable shall be levied by BHEL from time, it was requisitioned till the time of actual return. *Hire charges shall also be charged on the T&Ps and IMTEs returned in damaged / unserviceable condition to BHEL till their satisfactory repair.* T&Ps & IMTEs returned in damaged / unserviceable condition shall be got repaired by BHEL at its own discretion and entire cost of repair with BHEL overheads shall be recovered from the contractor.
- 38.17** Replacement cost including BHEL overheads in respect of irreparable / completely damaged / non return of T&Ps and IMTEs shall be recovered from the contractor's running / final bills
- 38.18** EOT crane(s) as available in the TG hall shall be provided to the contractor. The crane may be provided with a trailing cable that has to be handled by the contractor till the charging of the down shop leads. **The contractor shall have to deploy his own operator for operating the crane under supervision of BHEL / RRVUNL.** The running / capital maintenance of the EOT cranes is excluded from the contractor's scope. Routine maintenance like cleaning and oil topping (oil will be provided by BHEL/ RRVUNL) will be carried out by the contractor.
- 38.19** 200/ 250 T capacity Crawler crane will be provided by BHEL free of hire charges and on sharing basis to the contractor for handling of feed storage tank and de-aerator. The operation & maintenance of BHEL 200/250 T crane shall be carried out by BHEL. The contractor shall ,however, provide required maintenance crew and fuel.
- 38.20** Contractor shall ensure deployment of serviced and healthy T&Ps including cranes, lifting tackles, wire ropes, Manila-ropes, winches and slings etc. History card and maintenance records for major T&Ps will be maintained by the contractor and will be made available to BHEL Engineer for inspection as and when required. Identification for such T&Ps will be done as per BHEL Engineer's advice.
- 38.21** Contractor shall ensure deployment of reliable and calibrated IMTEs (Inspection, Measuring and Test Equipment). The IMTEs shall have test/ calibration certificates from authorized/ Govt. approved / accredited agencies traceable to National / International standards. Each IMTE shall have a label indicating calibration status i.e. date of calibration, calibration agency and due date for calibration. A list of such instruments deployed by contractor at site with its calibration status is to be submitted to BHEL Engineer for control.
- 38.22** Retesting / re-calibration shall also be arranged at regular intervals during the period of use as advised by BHEL Engineer within the contract price. The contractor will also have alternate arrangements for such IMTE so that work does not suffer when the particular instrument is sent for calibration. Also if any IMTEs not found fit for use, BHEL shall have the right to stop the use of such item and instruct the contractor to deploy proper item and recall i.e. repeat the readings taken by that instrument, failing which BHEL may deploy IMTEs and retake the readings at contractor's cost.
- 38.23** BHEL shall have lien on all T&P, IMTEs & other equipment of the contractor brought to the site for the purpose of erection, testing and commissioning. BHEL

shall continue to hold the lien on all such items throughout the period of contract. The contractor and/ or his Sub-contractors without the prior written approval of the Engineer shall remove no material brought to the site.

- 38.24** The month wise T&P deployment plan to be submitted as per format (at Annexure-D to General Conditions of Contract) is only to assess the capability as well as understanding of the contractor to execute the work. It shall be the contractor's responsibility to deploy the required T&P, for timely and successful completion of the job, to any extent over and above those indicated in the above deployment plan (including those which are not covered in the plan submitted) without any compensation on this account.

### **39.0 SUPERVISORY STAFF AND WORKMEN**

- 39.1** The contractor shall deploy all the skilled workmen like millwright fitters, welders, crane-operators, drivers, gas cutters, riggers, sarangs, masons, carpenters, electricians, helpers and instrument technicians to carry out the works as per specifications. In addition to skilled, semi-skilled and unskilled workmen required for all the works, suitable workmen required for handling and transporting of equipment from site storage to erection site, erection, testing and commissioning as contemplated under this specification shall be deployed. Only fully trained and competent men with previous experience on the job shall be employed. They shall hold valid certificates wherever necessary.

BHEL reserves the right to decide on the suitability of the workers and other personnel who will be deployed by the contractor. BHEL reserves the right to insist on removal of any employee / workman of the contractor at any time, if they find him unsuitable. The contractor shall remove him forthwith.

- 39.2** The supervisory staff including qualified Engineers deployed 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. They should in general see and ensure that the works are carried out in a safe and proper manner and in coordination with other labour and staff deployed directly by BHEL or other contractors of BHEL or BHEL's client / other agency.
- 39.3** The work shall be executed under the usual conditions affecting major power plant construction and in conjunction with numerous other operations / activities at site. The contractor and his personnel shall cooperate with other personnel / contractors, coordinating his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.
- 39.4** The contractor's supervisory staff shall execute the work in the most substantial and workman like manner in the stipulated time. Accuracy of work and aesthetic finish are essential part of this contract. The contractor shall be responsible to ensure that assembly and workmanship conforms to the dimensions and tolerances given in the drawings / documents / instructions given by BHEL Engineer from time to time.
- 39.5** The contractor shall deploy the necessary number of qualified and approved full time electricians at his cost to maintain his temporary electrical installation till the completion of work.

- 39.6** It is the responsibility of the contractor to engage his workmen in shifts or on overtime basis for achieving the targets set by BHEL and also during the period of commissioning and testing of unit. The contractor's finally accepted rates / prices shall include all these contingencies.
- 39.7** During the course of erection,
- If the progress is found unsatisfactory,
  - If the target dates fixed from time to time for every mile stones are to be advanced / not being met,
  - if it is found that the skilled workmen like fitters, operators, technicians etc deployed are not sufficient,
- BHEL after giving reasonable opportunity to the contractor will induct on the work the required workmen in addition to contractor's workmen to improve the progress. The expenses so incurred will be recovered from the contractor's bills with overheads.
- 39.8** If the contractor or his workmen or employees shall break, deface, injure or destroy any part of a building, road kerbs, fence, enclosure, water pipes, cables, drains, electric / telephone poles, wire, trees or any other property or to any part of erected components, the contractor shall make the same good at his own expense. In default, BHEL may cause the same to be made good by other workmen or by other means and deduct the expenses from any money due to the contractor. BHEL's decision will be final and binding.
- 39.9** Though every endeavor shall be made to ensure that all plant materials are supplied as per schedule. However in a job of this kind it is possible that some materials may be delayed. In order to achieve the ultimate targets, the contractor may have to augment his manpower and resources. No compensation on this account shall be admissible.
- 39.10** The month wise manpower deployment plan to be submitted as per format (at Annexure-C to General Conditions of Contract) is only to assess the capability as well as understanding of the contractor to execute the work. It shall be the contractor's responsibility to deploy the required manpower, for timely and successful completion of the job, to any extent over and above those indicated in the above deployment plan (including those which are not covered in the plan submitted) without any compensation on this account. The contractor shall identify separate persons at site for quality control and safety.
- 39.11** The Contractor has to ensure deployment of qualified Level-2 NDT Engineer and Welding Engineer exclusively for the welding works envisaged under the Package works.

#### **40.0 MATERIAL HANDLING AND STORAGE**

- 40.1** All the equipment furnished under this contract shall be received from the project stores, sheds / storage yards and transported to pre assembly area / erection site and stored in the storage spaces in a manner so that they are easily retrievable till the contractor erects them. While drawing / lifting material from BHEL / customer stores, contractor shall ensure that the balance / other materials are stacked back immediately.

- 40.2** While BHEL will endeavor to store / stack / identify materials properly in their open / close / semi closed / tarpaulins covered storage yard / shed, it shall be contractor's responsibility to assist BHEL in identifying materials well in time for erection. They should take the delivery of the same, following the procedure indicated by BHEL, and transport the material safely to pre-assembly yard / erection site in time, according to program.
- 40.3** The contractor shall take delivery of components, equipment / consumables from storage area after getting the approval of BHEL Engineer on standard indent forms.
- 40.4** The contractor shall identify and deploy necessary Engineers / supervisors / workmen for the above work in sufficient number as may be needed by BHEL, for areas covering their scope.
- 40.5** All the equipment shall be handled very carefully to prevent any damage or loss. No untested wire ropes, slings, lifting equipment, d-shackles, dog-clamps, eyebolts shall be used for unloading / handling. The equipment shall be properly protected to prevent damage either to the equipment or to the floor where they are stored. The equipment from the stores shall be moved to the actual location at the appropriate time so as to avoid damage of such equipment at site.
- 40.6** Contractor shall ensure that while lifting slings shall be put over the points indicated on the equipment or as indicated in the manufacturer's drawings. Slings / shackles of proper size shall be used for all lifting and rigging purposes. All care shall be taken to safe guard the equipment against any damage. Dragging of piping / valves should be avoided. In case of any damage the cost shall be covered from the contractor.
- 40.7** Approach road conditions from the stores / yards to the erection site may not be equipped and ideal for smooth transportation of the equipment. Contractor may have to be adequately prepared to transport the materials under the above circumstances without any extra cost.
- 40.8** Contractor shall be responsible for examining all the plant and materials issued to him and notify the Engineer immediately of any damage, shortage, discrepancy etc before they are moved out of the stores / storage area. The contractor shall be solely responsible for any shortages or damages in transit, handling, storage and erection of the equipment once received by him. As the erection work will be spread in different areas / locations of the project, contractor has to arrange sufficient number of watch / ward personal to avoid any pilferage of material. As per General Conditions of contract under provisions of clause No 29 BHEL will reserve the right to recover the cost of repair / replacement, if any, to bring back the equipment in original order, in case the equipment / material is lost / damaged while in the custody of the contractor. BHEL's decision in this regard shall be final and binding on the contractor.
- 40.9** The contractor shall maintain an accurate and exhaustive record, detailing out the list of all equipment received by him for the purpose of erection and keep such record open for the inspection of the engineer at any time.
- 40.10** All the material in the custody of contractor and stored in the open or dusty locations must be covered with suitable weather proof / fire retardant covering material wherever applicable and shall be blocked up on raised level above ground.

All covering materials including blocks and sleeper shall be arranged by the contractor at his cost.

- 40.11** If the material belonging to the contractor are stored in area other than those earmarked for his operation the engineer will have the right to get it moved to the area earmarked for the contractor at the contractors risk and cost.
- 40.12** The contractor shall be responsible for making suitable indoor storage facilities to store all equipment (drawn by the contractor from BHEL / customer stores), which require indoor storage till the time of their installation. The Engineer will direct the contractor in this regard, which item in his opinion will require indoor storage, and the contractor shall comply with Engineer's decision.
- 40.13** The contractor shall ensure that all surplus / damaged / scrap / unused material, packing wood / containers/ special transporting frames etc are returned to BHEL at a place in project area identified by the Engineer. The contractor will maintain an account for all items received and returned to BHEL. Any shortage in returning such items shall be chargeable to the contractor except for a 5% allowable against wastage for packing wood only.
- 40.14** The contractor shall hand over all parts / materials remaining extra over the normal requirement with proper identification tags to the stores as directed by the concerned BHEL engineer.
- 40.15** The contractor shall ensure that all the packing materials and protective devices installed on equipment during transit and storage are removed before installation.
- 40.16** It shall be the responsibility of the contractor to keep the work / storage areas in neat, tidy and working conditions. All surplus / unusable packing and other materials shall be removed and deposited at location(s) specified by BHEL within the project premises. If required weighing of the same within the project premises will have to be carried out.
- 40.17** Contractor shall also ensure that for lifting rotors from the casing, only rotor lifting tackle supplied by the manufacturer is used as per the instruction given and on one side of the sling turn buckle of required size shall be used and rotor shall be lifted slowly only when it is in perfect level. Contractor shall ensure that the sling points on the rotor are as per the instructions of the manufacturer given in the drawings and he shall ensure that rubber or leather pads are given between the sling and rotor shaft to avoid any damage, scratches/ nicks on the rotor shaft. Under no circumstance shall the contractor put his slings around journal shaft or shall lift the rotor till it is fully balanced.

Contractor shall ensure that all rotors when removed from package / casing are placed over suitable stands and supported at the points as shown in the drawings. Contractor shall cover the journals of the rotors with grease and cloth, and also cover the rotor with cloth tarpaulin to avoid any damage to the rotor blades. The rotors shall be kept in a place, which is safe from falling objects and away from main passages.

- 40.18** For unloading, turning & lifting stator to the TG floor level and placing of stator on its foundation the contractor shall strictly comply with the instructions of the BHEL Engineers.

## **41.0 PRESERVATION OF COMPONENTS**

**41.1** After taking delivery from BHEL / customer's stores, plant materials storage shall be subjected to the following protection besides other provisions indicated in these specifications elsewhere.

Items stored outdoors shall be blocked up at least six inches (150mm) off the ground.

Motors, valves, electrical equipment, control equipment and instruments etc shall be stored indoors in a warehouse to be provided by the contractor. Motor windings shall be kept dry by use of external heat or space heaters.

Bearings and other wearing surfaces of plant materials shall be protected against corrosion and kept clean.

Insulation materials shall be stored indoors or otherwise protected against getting wet.

**41.2** It shall be the responsibility of the contractor to apply preservatives / touch up paints (primer) on equipment handled and erected by him till such time of final painting. It shall be contractor's responsibility to arrange for required paints (primer), thinners, labour, scaffolding materials, cleaning materials like wire brush, emery sheets, etc, cleaning of surface and provide one coat of preservatives / paints (primer) from time to time as decided by BHEL engineer. The accepted rate shall include this work also. It is to be noted that such painting may have to be done as and when required till such time the final painting is carried out.

**41.3** The contractor shall effectively protect the finished work from action of weather and from damage or defacement and shall cover the finished parts then and there for their protection.

**41.4** Any failure on the part of contractor to carry out works according to above clauses will entail BHEL to carry out the job from any other party and recover the cost from contractor.

## **42.0 CLEANING OF EQUIPMENTS**

**42.1** The contractor shall thoroughly clean all the components before installation. The components whose surfaces are coated with protective coating and sent to site are to be thoroughly cleaned by suitable mechanical / chemical means as per the approved procedures.

**42.2** Contractor shall ensure that turbine cylinders, rotors, pedestals, diaphragms, glands, packing rings, etc. shall be cleaned with kerosene, petrol, approved solvents or and carbon tetra chloride before assembly and erection of the equipment. For cleaning purposes he shall use only soft cotton cloth. Contractor shall never use cotton waste for cleaning any TG equipment. Generator and other electrical equipments before erection shall be cleaned with dry air / vacuum cleaner.

**42.3** The contractor shall clean inside of all pipes and fittings from dirt, sand and loose scales, mechanically and by air blowing before being erected. All pipelines shall be thoroughly blown and / or flushed. If necessary certain pipelines may have to be cleaned by acid pickling/chemical cleaning. The procedure for the same shall be

provided by BHEL. However, all chemicals and inhibitors shall be provided by BHEL free of cost. Disposal of chemical has to be carried out by the contractor at his own cost as per advice of the engineer

## **43.0 ERECTION**

**43.1** All normal erection and assembly techniques necessary for completion of works under this specification and magnitude have to be carried out. It is not possible to specifically list out all of them. Absence of any specific reference will not absolve the contractor of his responsibility for the particular operation. These would include,

- Scaffolding and rigging operations,
- Machine / flame / electric cutting, grinding, welding, radiography and stress relieving
- Fitting, fettling, filing, straightening, chamfering chipping, scrapping, reaming, as cleaning, checking, leveling, blue matching, aligning and assembly.
- Machining, surface grinding, drilling, doweling, shaping.
- Temporary erections for alignment, dismantling of certain equipment for checking, cleaning, servicing and site fabrication.

**43.2** Any fixtures, scaffolding materials, approach ladder, concrete block supports, steel structures required for temporary supporting, pre-assembly or checking, welding, lifting and handling during pre-assembly and erection shall be arranged by contractor at his cost.

**43.3** No members of any ladder / structure / platform should be cut without specific approval of BHEL. In case it is necessary to cut, the contractor shall rectify / repair in a manner acceptable to BHEL / customer without any additional cost.

**43.4** The contractor shall erect scaffolding / temporary platforms for erection. These should be of adequate capacity and shall never be over loaded. These should be replaced when not found suitable during erection work and dismantled on work completion & removed from work site.

**43.5** Corrections like straightening of ladders, tube support plates adjustment / removal of ovalates in pipes and opening or closing the fabricated bends of piping to suit the layout shall be considered part of the work and the contractor is required to carry out such work within finally accepted price / rate as per instructions of Engineer.

**43.6** The contractor shall carry out assembly and erection of condenser components normally on the condenser foundation directly. This includes

- Assembly and welding of bottom plate, side plates, hot well, springs and steam throw device.
- Complete fabrication and welding of shell out of loose side-walls dome walls, and stand pipes.
- Assembly and welding of water chambers and water-boxes.
- Assembly and welding of support plates, baffles and stiffening structure,
- Tubes insertion, expansion and cutting/ trimming.

Hydraulic test and water fill test and any other fitting/ assemblies required to complete the assembly.

**43.7** The contractor shall carry out the condenser tube insertion and expansion at site after the installation of condenser on its foundation. Condenser tubes shall be handled strictly as per instructions of BHEL Engineer. Before installation of tubes, the contractor shall check for any dents, mechanical damages or any other defects of tubes caused during storage. These should be thoroughly internally and externally cleaned for all extraneous matter as per the directions of the engineer.

**43.8** Before insertion of tubes, the contractor shall clean the surface of the holes in the main tube plates and tube support plates for paint, corrosion spots oxide scale etc. as per the instructions of the engineer. Even reaming of support plates if required for smooth insertion of tubes is to be carried out by contractor at his cost and reaming and its arrangement is to be arranged by contractor.

The contractor shall carry out the tube insertion & expansion of the condenser strictly in accordance with the instructions issued by the engineer. Tubes may require adjustment of length on both ends. The contractor shall ensure to provide covering above the top row of tubes to avoid any damage to the tubes prior to tube insertion as per instruction of BHEL Engineer at his cost.

**43.9** The contractor shall carry out the condenser neck welding with casing only after final installation of casing. However the contractor shall adjust the gap between condenser neck and LP exhaust hood uniformly by suitably lifting the condenser as directed by engineer. Also the makeup pieces required for this purpose shall be fabricated and welded to the dome walls by the contractor.

**43.10** Some of the rotating equipment and electrical motors are provided with protective greases only. Contractor shall arrange for cleaning of the same with petrol or some other reagent. If necessary, dismantling some of the parts of the equipment would be necessary. He shall arrange for re-greasing / lubricating them with recommended lubricants and for assembling back the dismantled parts, at quoted rate. Lubricants will, however, be supplied free of cost by BHEL.

**43.11** All rotating machines and equipment shall be cleaned, lubricated, checked for their smooth rotation, if necessary by dismantling and refitting before erection. If, in the opinion of Engineer, the equipment is to be checked for clearance, tolerance at any stage of work or during commissioning period, all such works are to be carried out by contractor at his cost.

**43.12** All the shafts of rotating equipment shall be properly aligned to those of the matching equipment to as perfect and as accurately as practicable. All bearings, shafts and other rotating parts shall be thoroughly cleaned and suitably lubricated before starting.

**43.13** All the motors and equipment shall be suitably doweled after alignment of shafts with tapered/parallel machined dowels. The contractor at his own cost shall arrange for the machining of dowel pins required for the same. However the materials for dowel pins shall be issued by BHEL free of cost.

**43.14** The bearings shells will be blue matched at site and checked for bearing clearances. The contractor shall carry out scraping of bearing housing, if required to any extent. No extra claim for blue matching of any two surfaces up to 1mm initial

gap will be entertained. The contractor shall also check air gap and adjustment of stator/ rotor to magnetic center shall be carried out as part of erection.

- 43.15** The contractor shall fabricate and weld pipes, special bends, as required for installing lube oil systems. The contractor shall also service the lube oil system, carry out the hydraulic test of oil coolers and piping systems as required.
- 43.16** The contractor as part of the scope of work if required or if directed by BHEL shall carry out the servicing and realignment of skid-mounted equipment.
- 43.17** All electrical panels, control gears, motors and such other devices shall be properly dried by heating to improve IR value, before they are installed and energized. Bearings, slip rings commutators and other exposed parts shall be protected against ingress of moisture and corrosion during storage and periodically inspected.
- 43.18** The contractor shall completely erect and test all the piping systems including their hangers, supports, valves, insulation, and accessories including sampling lines and coolers as per specifications and drawings. The services will include welding, pre-heating, stress relieving, bolting, testing, cleaning insulation and painting. System shall be demonstrated in condition to operate continuously in a manner acceptable to the Engineer. Welding shall be used throughout for joining pipes except where flanged screwed or other type joints are specified or shown on the drawings. All piping shall be erected true to the lines and elevation as indicated in the drawings
- 43.19** Pipes sent in standard length shall be cut to suit the site conditions and the layouts. Tubes or pipes wherever deemed to be convenient will be sent in running lengths with sufficient bends. Bends upto 80 mm nb will be fabricated at site wherever required.
- 43.20** Certain adjustments in length may be necessary while erecting high-pressure pipelines. The contractor should remove the extra lengths/ add extra lengths to suit the final layout after preparing edges a fresh by adopting specified heat treatment procedures, at no extra cost.
- 43.21** It is possible that a few flanges may not be matching. The contractor shall be required to cut and re-weld the same as and when required without any additional cost.
- 43.22** The contractor shall be responsible for any modifications of shop fabricated pipes prior to installation to accommodate minor site alteration in pipe routing at no extra cost
- 43.23** All vents and drains for piping equipment covered in the scope whether shown in the drawings or not, shall be terminated outside the TG hall in atmosphere and at sump-pit as directed by the engineer.
- 43.24** Wherever piping erected by the contractor is connected to equipment/ piping erected by the other agencies the joint at the connecting point shall be the responsibility of the contractor of this specification.
- 43.25** Normally the high-pressure valves will have prepared edges for welding. But, if it becomes necessary, the contractor will prepare new edges or recondition the edges by grinding or chamfering to match the corresponding tubes and pipes. All fittings like `T' pieces, weld neck flanges, reducers etc., shall be suitably matched with pipes/valves for welding.

- 43.26** The valves will have to be checked, cleaned or overhauled (including lapping of seat) in full or in part before erection and/or after chemical cleaning and during commissioning.
- 43.27** The contractor shall be responsible for correct orientation of all valves so that seats, stems & hand wheels are in desired direction. It is the responsibility of the contractor to obtain the information regarding orientation of valves not fully located on drawings before the same are installed.
- 43.28** Steel for suspensions for piping, will be supplied in running lengths. These are to be cut to suitable sizes and adjusted as per requirement.
- 43.29** No temporary supports should be welded on the piping. In case of absolute necessity prior approval should be taken from BHEL Engineer. In such cases heat treatment, if required, shall be carried out by the contractor
- 43.30** All hangers, supports and anchors shall be installed as per drawing to obtain safe and reliable and complete pipe installation as per instructions of Engineer. Any additional support as called for by Engineer shall have to be fabricated and erected by the contractor. The raw materials required for fabricating such supports shall be supplied by BHEL free of cost and contractor shall be eligible for payment of such additional supports as per applicable rate for item No 5 of rate schedule.
- 43.31** Spring suspensions/ constant load hangers may have to be pre-assembled for required load and erection carried out as per instructions of BHEL. Any adjustments, removal of temporary arrestors / lockers etc., have to be carried out as and when required.
- 43.32** Contractor shall install piping in such a way that no excessive or destructive expansion forces exist either in the cold condition or under conditions of maximum temperature and pressure. All bends, expansion joints and any other special fittings necessary to take care of proper expansion shall be incorporated as per the advice of Engineer. During installation of expansion joints, anchors, care must be taken to see that full design movement is available at all times from maximum and minimum temperature.
- 43.33** The contractor shall carry out the tightening of the field bolts on the equipment and piping covered under this specification by using either the calibrated torque wrench method or the turn of part method. The procedure to be followed, the tools and the equipment deployed shall be subject to the approval of Engineer. All the torque wrenches shall be calibrated as per requirement and before they are put in use on any job.
- 43.34** The contractor shall ensure that all supporting elements, anchors & restraint have been installed and adjusted in accordance with the drawings / sketches & other written instructions of the Engineer. The contractor shall inspect the hangers associated with the piping systems as follows:
- After hydraulic test, with the piping in the cold position, with all travel stops removed, with the pipe completely insulated and complete in all respect ready for start up.
  - Piping in the hot position with the unit operating at the maximum load.
  - Piping in the cold position during the first complete shut down.

- 43.35** The hanger assemblies shall not be used for attachment of rigging to hoist the pipes into position. Separate temporary supports shall be used to securely hold the pipe in position till pipe supports are completely assembled and attached to the building structure.
- 43.36** Layout of small bore piping as required shall be done as per site requirement. Necessary sketch for routing these lines should be got approved from BHEL by the contractor. There is a possibility of slight change in routing the above pipelines even after completion of erection or from aesthetic point of view. Contractor at no extra cost should carry this out.
- 43.37** Erection, testing and commissioning of power cylinders, electrically operated valves and their actuators etc. coming under various groups is covered under the scope of this specification
- 43.38** All valves, including valves, flap valves, dampers and actuators, shall be serviced and lubricated to the satisfaction of Engineer before erecting the same and during pre-commissioning also. Welding or jointing of extension spindle for valves to suit the site conditions and operational facility shall be part of erection work within the quoted rates
- 43.39** The contractor shall also or grind the valve seat, if required, to ensure satisfactory performance of valves at no extra cost. All parts such as gaskets, gland packing which form the permanent part of equipment shall be supplied by BHEL free of cost.
- 43.40** Erection and welding of necessary instrumentation tapping points, thermocouple pads, thermo-wells, valves, battery of first root valves, condensing vessels, flow nozzles and control valves to be provided on TG, auxiliaries and pipe lines covered within the scope of this specification, will also be the responsibility of the contractor. The welding of all the above items will be contractor's responsibility even if the:
- Product groups, under which these items are released, are not covered in the scope of this tender.
  - Items are supplied by any agency other than BHEL.

**NOTE: ADDITIONAL THERMOWELLS AS REQUIRED FOR CONDUCTANCE OF THE PERFORMANCE GUARANTEE TEST ARE TO BE INSTALLED BY THE CONTRACTOR.**

- 43.41** Erection of CO<sub>2</sub> and H<sub>2</sub> systems complete in all respects, including cylinders stands, connecting piping, valves, distribution headers, main control panels etc is in the scope of contractor. The delivery gas cylinders is to be taken from BHEL / its client stores, their handling and filling of gases in the system as and when required, till unit is commissioned and handed over, shall be the responsibility of the contractor. The empty cylinders are to be returned to BHEL/its client stores.
- 43.42** Additional platforms and ladders of permanent nature incidental to the job for approaching different equipment / valves as per site requirement, which may not be indicated in drawings, shall be fabricated and installed by the contractor. The materials required will be supplied by BHEL free of cost. The contractor will be eligible for payment for such additional platform and ladders at the rate applicable rate against item No. 5 of the rate schedule.

- 43.43** The contractor shall carry out Kerosene oil / dye penetration tests of all the bearing housing of turbine & generator. The Kerosene oil DPT kit for the tests shall also be arranged by the contractor at his cost.
- 43.44** All cabling work (system cabling i.e. cables from local control panel to system drives / instruments etc.) including laying of cable trays for oil centrifuge machine, gas drier and on load condenser tube cleaning system is in the scope of subject work.
- 43.45** Wherever cables are to be laid under the scope of subject work the same shall be laid in cable trays, dressed, properly glanded and terminated.
- 43.46** The contractor is strictly prohibited in using the TG / Aux. Components for any temporary supporting or scaffolding works etc. In case of such misuse a sum of determined by Engineer will be recovered from contractor's bills
- 43.47** Certain skid mounted instruments like pressure gauge, pressure transmitters, temperature gauges, flow switches, flow indicators, etc., are received in assembled condition as integral part of equipment. Contractor shall dismantle such instruments and hand over them to BHEL for calibration. Contractor shall re-erect them in position just before commissioning of the equipment or as and when directed by BHEL
- 43.48** The feed storage tank will be received in 3 pieces and is to be assembled, welded and tested at site. Besides the provisions under Clause No. 38.19, all other arrangements for erection of feed storage tank and deaerator has to be made by contractor with in their finally accepted price
- 43.49** The contractor shall assist BHEL in preparation of as built piping drawing.
- 44.0 WELDING, HEAT-TREATMENT, RADIOGRAPHY AND NON-DESTRUCTIVE TESTING**
- 44.1** The pressure parts, equipment and piping shall be erected in conformity with the provisions of Indian Boiler Regulation and as may be directed by BHEL as per any standard / specification in practice in BHEL. The method of welding (arc, gas, TIG or other method) may be indicated in the detailed drawings / schedules. BHEL Engineer will have the option of changing the method of welding as per site requirements.
- 44.2** Welding of pressure parts, equipment, piping, high tensile structural steel shall be done by certified high pressure welders who possess valid certificate of CIB of the State in which the equipment is erected as per provision of IBR. The H.P. welder who possesses necessary certificate shall ensure re-validation as per relevant provisions of IBR and keep the certificate valid till the completion of work. The services of such welders, the validity of whose certificates have expired shall not be utilized for high-pressure works.
- 44.3** All welders including tack welders, structural and high pressure welder shall be tested as per ASME section IX / IBR and approved by BHEL Engineer before they are actually engaged on work even though they may possess a valid IBR certificate. BHEL reserves the right to reject any welder if the welder's performance is not found to be satisfactory. The contractor shall maintain the records of qualification of welders. BHEL Engineer will issue all the welders qualified for the work, an identity card. The welder will keep the same with him at work place at all times. He may be stopped from work if he is not found in possession of the same.

- 44.4** Engineer may stop any welder from the work if his performance is unsatisfactory for any reason or if there is a high percentage of rejection in the joints welded by him. The welder having passed qualification tests does not absolve the contractor of contractual obligation to continuously check the welder's performance.
- 44.5** Faulty welds caused by the poor workmanship shall be cut and re-welded at the contractor's expense. The Engineer, prior to any repair being made, shall approve the procedure for the repair of defective welds. After the repair has been carried out, the compliance shall be submitted to the engineer.
- 44.6** The contractor shall carry out the root run welding of all HP / LP piping, valves by TIG welding method only. The contractor shall have to carry out full TIG welding of butt weld joints of tubes / pipes of lesser thickness if required. During the root runs of stainless steel joints, the contractor shall before and during welding have to purge the pipes with inert gas. All arrangements required for the above shall be the responsibility of the contractor at no additional cost.
- 44.7** All expenses for testing of contractor's welders including destructive and nondestructive tests conducted by BHEL at site or at laboratory shall have to be borne by the contractor only. Limited quantity of raw material required for making test pieces will be supplied by BHEL free of cost.
- 44.8** The regulators used on welding machines shall be calibrated before putting these into use for work. The Contractor at his cost shall also arrange periodic calibration for the same.
- 44.9** **Only BHEL approved electrodes and filler wire** will be used. All electrodes shall be baked and dried in the electric electrode-drying oven to the required temperature for the period specified by the Engineer before these are used in erection work. All welders shall have electrodes drying portable oven at the work spot. The electrodes brought to the site will have valid manufacturing test certificate. The test certificate should have a co-relation with the lot number / batch number given on electrode packets. No electrodes will be used in the absence of above requirement. The thermostat and thermometer of electrode drying oven will be also calibrated and test certificate from Govt. approved / accredited test house traceable to National / International standards will be submitted to BHEL before putting the oven in use. The contractor shall also arrange periodical calibration for the same.
- 44.10** All butt / fillet welds shall be subject to dye penetration test as per the instructions of the engineer at no additional cost.
- 44.11** The contractor shall maintain a record in the form as prescribed by BHEL of all operations carried out on each weld. He has to maintain a record indicating the number of welds, the names of welders who welded the same, date and time of start and completion, preheat temperature, radiographic results, rejection if any, percentage of rejection etc. and submit copies of the same to the BHEL Engineer as required. Interpretation of the BHEL Engineer regarding acceptability or other wise of the welds shall be final.
- 44.12** The contractor shall carry out the edge preparation of weld joints at site in accordance with the details acceptable to BHEL Engineer. Wherever possible machining or automatic flame cutting should be done. Gas cutting will be allowed only wherever edge preparation otherwise is impractical. All slag / burrs shall be

removed from the edge and all the hand cuts shall be ground smooth to the satisfaction of engineer.

- 44.13** All welds shall be painted with anticorrosive red oxide paint once radiography and stress relieving works are over. Necessary consumables and scaffolding etc including paints shall be provided by contractor at his own cost.
- 44.14** Pre-heating, radiography and other NDT tests, post heating and stress relieving after welding of tubes, pipes, including attachment welding wherever necessary, are part of erection work and shall be carried out by the contractor in accordance with the instructions of the Engineer. Contractor at his cost shall arrange all equipment and consumables essential for carrying out the above process.
- 44.15** Contractor shall arrange all necessary stress relieving equipment with automatic recording devices. The contractor arrange for labour, heating elements, thermocouples, thermo-chalks, temperature recorders, thermocouple attachment units, graphs, sheets insulating materials like asbestos cloth, ceramic beads, asbestos ropes etc. required for heat treatment/ stress relieving operations. The contractor should take a note of the following,
- Temperature shall be measured by thermocouple and recorded on a continuous printing type recorder. All the recorded graphs for heat treatment works shall be the property of BHEL.
  - All stress relieving equipment will be used after due calibration and submission of test certificate to BHEL. Periodic calibration from Govt. Approved / accredited Test Houses traceable to National / International standards will also be arranged by the contractor for such equipment at his cost.

The contractor shall obtain the signature of Engineer or his representative on the strip chart of the recorder prior to the starting of SR operations.

- 44.16** The contractor shall also be equipped for carrying out other NDT like LPI / MPI / Hardness test etc. as required as per welding schedules / drawings within the finally accepted price / rates. Ultrasonic testing, wherever required, will be arranged by BHEL. Necessary help in conducting the UT shall however be rendered by contractor.
- 44.17** The technical particulars, specification and other general details for radiography work shall be in accordance with ASME, IBR or ISO as specified by BHEL.
- 44.18** Contractor for radiography work shall use iridium-192. The geometric un-sharpness shall not exceed 1.5 mm. The contractor should take adequate safety precautions while carrying out radiography. Contractor at his cost shall arrange necessary safe guards required for radiography (including personnel from BARC).
- 44.19** Low speed high contrasts, fine grain films (D-7 or equivalent) in 10 cm width only be used for weld joint radiography. Film density shall be between 1.5 to 2.0.
- 44.20** All radiographs shall be free from mechanical, chemical or process marks, to the extent they should not confuse the radiographic image and defect finding. Penetrameter as per ASME or ISO must be used for each exposure.
- 44.21** Lead numbers and letters are to be used (generally 6mm size) for identification of radiographs. Contract number, joint identification, source used, welder's identification and SFD are to be noted down on paper cover of radiograph.

- 44.22** Lead intensifying screens for front and back of the film should be used as per the above-referred ASME specification.
- 44.23** The joint is to be marked with permanent mark A, B, C to identify the segments. For this a low stress stamp shall be used to stamp the pipe on the down streamside of the weld.
- 44.24** For multiple exposures on pipes, an overlap of about 25-mm of film should be provided.
- 44.25** Radiography personnel with sufficient experience and certified by M/s BARC for conducting radiographic tests in accordance with safety rules laid down by Division of Radiological protection only have to be deployed. These personnel should also be registered with DRP / BARC for film badge service.
- 44.26** All arrangements for carrying out radiography work including dark room and air conditioner and other accessories shall be provided by contractor within the space allotted for office at his cost. As an alternative the contractor may deploy an agency having all above facilities and who are duly approved / accredited by BARC and / or other Regulatory authorities. Detailed particulars of such agencies will be submitted and got approved by BHEL Engineer before the actual deployment of agency for radiography work.
- 44.27** The contractor shall have a dark room fully equipped with radiography equipment, film (un-exposed), chemicals and any other dark room accessories.
- 44.28** Contractor shall note that 100% radiography will be done at the initial stages on all the piping welding joints. Subsequently radiographic inspection will be done on the basis of quality of welding. However minimum percentage of joints to be radiographed shall not be less than the requirement of BHEL welding schedule / IBR / Customer's requirements. The percentage may be increased depending upon the quality of joints and at the discretion of BHEL. Radiography on LP piping joints is not envisaged. However other NDT test as called for in the FQP including LPI, MPI and HT will have to be carried out
- 44.29** All the Radiographs shall be properly preserved and shall become the property of BHEL. They are to be reconciled with the work done, joints radiographed and submitted to BHEL / customer.
- 44.30** Since radioisotopes are being used, all precautions and safety rules as prescribed by BHEL/BARC/ Customer shall be strictly followed. BARC / DRP certificate to be provided before taking up the work.
- 44.31** Radiography of joints shall be so planned after welding that the same is done either on the same day or next day of the welding to assess the performance of HP welders. If the performance of welder is unsatisfactory, he is to be replaced immediately.
- 44.32** Wherever radiographs are not accepted, on account of bad shot, joints shall be re-radiographed and re- submitted for evaluation.
- 44.33** However, if the defect persists after first repair, further repair work followed with radiography shall be repeated till the joint is made acceptable. In case the joint is not repairable, the same shall be cut, re-welded and re-radiographed at contractor's cost.

- 44.34** If the contractor does not carry out radiography work due to non-availability of source / film / chemical / operator etc., BHEL will get the work done departmentally or through some other agency at the risk and cost of the contractor.
- 44.35** Heat treatment and radiography may be required to be carried out at any time (day and night) to ensure the continuity of progress. The contractor shall make all necessary arrangements including labour, supervisors/ Engineer required for the work as per directions of BHEL.
- 44.36** The contractor shall assist BHEL Engineer in preparing complete field welding schedule for all the field welding activities to be carried out in respect of piping and equipment erected by him involving high pressure welding at least 30 days prior to the scheduled start of erection work at site. The contractor shall strictly adhere to such schedules.
- 44.37** The pressure parts, equipment and piping shall be erected in conformity with the provisions of Indian Boiler Regulation and as may be directed by BHEL as per any standard / specification in practice in BHEL. The method of welding (arc, gas, TIG or other method) may be indicated in the detailed drawings / schedules. BHEL Engineer will have the option of changing the method of welding as per site requirements.

#### **45.0 APPLICATION OF INSULATION**

- 45.1** All attachment welding, including welding of hooks / supports as per pitch both on equipment and piping shall be done as directed by Engineer. Attachment welding shall have to be done by certified welders. If necessary contractor may have to cut the hooks to correct length.

Application of red oxide paint including supply of paint on welded portions as directed by BHEL is also included in scope of work.

- 45.2** The mineral wool mattresses (bonded / un-bonded) / LRB mattresses are received at site in standard sizes. These are to be dressed / cut to suit site requirements by the contractor.
- 45.3** The number of layers / thickness of mineral wool / LRB mattresses for auxiliaries, pipe lines, valves and other vessels shall be as per various drawings and as directed by Engineer. For applying the mineral wool mattress, the required holding materials, if necessary by fabrication of rings/ hooks shall be fixed as directed and as per drawings and spec.
- 45.4** The contractor should ensure, proper finishing of surface of the insulation, sheeting and cementing.
- 45.5** The contractor should ensure that the finished surface of the insulation works conforms to the dimensions and tolerances given in the drawings. Aesthetic finish and accuracy of work are most important.
- 45.6** It is the responsibility of the contractor to ensure that the insulation materials and sheet metal covering issued to him for application are well protected against loss or damage from weather conditions. Closed / semi closed sheds or any other arrangements required for this will be by him at his cost. If any damage occurs to the material due to improper storage or due to any causes attributable to the contractor

except for normal breakage or damages allowed in such cases, the cost of such damaged material shall be to the account of the contractor.

- 45.7** Aluminum sheet cladding will be fabricated to the sizes and shapes specified in drawings. Beading, swaging, beveling of sheets, crowning the sheets if necessary will be carried out by him. Two coats of anti-corrosive black bituminous paint are to be applied on inner surfaces of the cladding. Bitumen sealing compound on the joints if necessary is included in the scope of this work. **Contractor may note that he will also supply anti-corrosive black bituminous paint & bituminous sealing compound required for above works at his cost.**
- 45.8** Aluminum sheet metal cladding over insulation will consists of plain / ribbed / corrugated sheets. The sheets will be supplied in standard sizes. Cutting them to required size, grooving, fabricating bends, boxes etc., for proper covering is contractors responsibility. Any cutting / bending / welding of fabricated skin casing sheets if required will also covered within the scope of this contract.
- 45.9** A logbook shall be maintained by the contractor to obtain clearance for application of insulation. If the contractor does the work on his own accord without prior permission the area may have to be redone at his cost.
- 45.10** Contractor is liable for the exact accounting of the material issued to him and he shall make any unaccountable losses good. Wastage allowance for the material issued are as below:
- |  |    |
|--|----|
| 1. Wool / LRB mattresses and cladding sheets | 2% |
| 2. Insulation bricks and mortar              | 2% |
| 3. Castable refractory                       | 1% |
- 45.11** The entire surplus, unused materials etc., supplied by BHEL shall be returned to BHEL after the work is over. Materials like gunny bags and packing materials, empty containers may be returned at periodical intervals.
- 45.12** The contractor shall leave certain gaps and opening while doing the work as per instructions of BHEL engineer to facilitate inspection during commissioning and to fix gauges, fittings and instruments. The gaps will have to be finished as per drawings at a later date by the contractor at his cost.
- 45.13** If during erection and commissioning any of the parts are to be insulated temporarily fixed and then replaced by permanent ones at a later date or if any of the parts are to be removed for modification, rectification, adjustment and then refitted or if some parts are to be opened for inspection and checking and for measurement of metal surface temperature the same may necessitate removal and re-application of insulation and sheet metal cladding, which shall be done by the contractor and the erection rate quoted shall be inclusive of such contingencies.
- 45.14** Removable type of insulation shall be provided for valves, fittings, expansion joints etc as per the drawings or as directed by BHEL Engineer.
- 45.15** All temporary pipelines required during testing, pre-commissioning and commissioning should be insulated as directed by BHEL at no extra cost to BHEL. However required insulation material shall be issued by BHEL free of cost.

**46.0 TESTING, PRE-COMMISSIONING, COMMISSIONING, AND POST-COMMISSIONING.**

- 46.1** The contractor shall carry out all the required tests and pre-commissioning and commissioning activities required for their successful and reliable operation. These would include hydraulic test of condenser, land flow test, chemical cleaning, alkali flushing and water flushing of piping, , oil flushing of oil system etc. as instructed by BHEL.

All the chemicals required for carrying out these activities will be supplied by BHEL free of cost.

All required tests (Mechanical and electrical) indicated by BHEL and their clients for successful commissioning are included in the scope of these specifications. These tests / activities may not have been listed in these specifications.

Specialized test equipment, if any, shall be provided by BHEL / its client free of hire charges. However contractor has to take proper care of the equipment issued to him.

- 46.2** The contractor shall carry out the air-tightness test on assembled generator to the satisfaction of BHEL Engineer. The necessary arrangement for testing with dry-clean air shall be made by the contractor at his cost. Compressed air for testing can be taken by the contractor from the existing system
- 46.3** All the tests may have to be repeated till all the equipment satisfy the requirement / obligation of BHEL at various stages. The contractor shall repairs all joints (shop welded or site welded) failed during testing.
- 46.4** All items / material required for conducting hydraulic test, Detergent flushing, oil flushing, steam blowing etc., will be supplied by BHEL / its customer.

**While the Detergent cleaning operation including the required looping in piping , draining and disposal will be carried out by another agency , the Contractor will have to ensure the readiness and availability of CEP , associated systems and the piping which is to be cleaned . Any work required on the permanent system will have to be carried out by the Contractor.**

**All temporary piping along with their supports for steam blowing in the systems erected by the Contractor, and the required loops for chemical cleaning of the piping erected by the contractor will have to be erected within the quoted rates.**

**The Contractor will also be responsible for their installation wherever required. He will dismantle the total system and return the same to BHEL / their customer store as directed. No separate payment will be released for erection & dismantling of the required equipment & piping.**

- 46.5** Thermal shocks will be required during oil flushing operations. The contractor is required to make all arrangements for the same. This would include fabrication of heating tank with nozzles and requisite piping with supports. Complete erection with pumps, tanks, electrical fittings including and other accessories is to be carried out. All material and equipment will be provided on returnable basis by BHEL.

- 46.6** The scope of pre-commissioning activities cover installation of all necessary temporary piping, supports, valves, blanking, pumps, tanks etc. and other accessories with access platforms valves, pressure gauges, electric cables, switches, cutting of some of existing valve, placing of rubber wedges in the valves etc., required for hydro test, chemical cleaning, steam blowing or for any other tests as the case may be and will carry out above activities under this scope of work as per instructions of BHEL. The scope also covers the off site disposal of effluents
- 46.7** All arrangement required for steam blowing including removal, reinstallation and welding of CRH NRV and installation of steam blowing arrangements including steam blow off piping is included in the scope of work.
- 46.8** It shall be the responsibility of the contractor to preserve the cleaned surface as per BHEL's requirement.
- 46.9** It shall be specifically noted that the employees of the contractor may have to work round the clock along with BHEL/Customer Engineers and hence overtime payment by the contractor may be involved. The contractor's finally accepted rates/ price shall be inclusive of all these factors also.
- 46.10** It shall be the responsibility of the contractor to provide various category of workmen in sufficient numbers along with supervisors with necessary consumables, T&P, IMTEs etc., along with any other assistance required during pre-commissioning, commissioning and post -commissioning of equipment and attending any problem in the equipment erected by the contractor till handing over.  
Association of BHEL's / Client's staff during above period will not absolve contractor from above responsibilities.
- 46.11** In case, any rework is required because of contractor's faulty erection that is noticed during pre-commissioning and commissioning, the same has to be rectified by the contractor at his cost. If any equipment / part is required to be inspected during pre-commissioning and commissioning, the contractor will dismantle/open up the equipment / part and reassemble / redo the work without any extra claim.
- 46.12** During commissioning, opening / closing of valves, changing of gaskets, realignment of rotating and other equipment, attending to leakage and adjustments of erected equipment may arise. This is included in the scope of work.
- 46.13** The contractor shall make all necessary arrangements including making of temporary closures on piping / equipment for carrying out the hydro-static testing on al piping equipment covered in the specification at no additional cost.
- 46.14** The water boxes of the condenser will be tested hydraulically to 1.5 times the design pressure after its assembly at site. The arrangement of all the blanking for carrying out the hydraulic test shall be the responsibility of the contractor at no additional cost. However only the main blanking flanges with fasteners for CW inlet and CW outlet of the condenser shall be provided by BHEL free of cost. Fabrication of blanks will be carried out by the contractor.
- 46.15** The water-fill test of the steam space shall be carried out by filling the water upto 1 Meter or as required above the top row of tubes to facilitate leak detection. Hydraulic testing shall be carried out on the condenser water boxes. Dummy plates shall be provided by BHEL.

- 46.16** The contractor shall fill the condenser upto the specified level as many times as called for by the Engineer for checking of the turbine at no additional cost
- 46.17** In case any defect is noticed during tests, trial runs and commissioning such as loose components, undue noise or vibration, strain on connected equipment etc., the contractor shall immediately attend to these defects and take necessary corrective measures. If any readjustment and realignment including repair, rectification and replacement work are necessary, the contractor shall carry out the same as per Engineer's instructions. The parts to be replaced shall be provided by BHEL.
- 46.18** During hydraulic testing of pipes, all piping having variable spring type supports shall be held securely in place by temporary means while constant spring type support hangers shall be pinned or blocked solid during the test.
- 46.19** The contractor shall carry out cleaning and servicing of valves and valve actuators prior to pre-commissioning tests and / or trial operations of the plant. A system for recording of such servicing operations shall be developed and maintained in a manner acceptable to BHEL Engineer to ensure that no valves and valve actuators are left un-serviced.
- 46.20** Cleaning & servicing of all the filters / strainers, toppings of oils coming in the system shall be done by the contractor till the completion of trial operation and handing over of the unit within the quoted price .

#### **47.0 CONDENSER PAINTING**

- 47.1** The condenser main tube plates will be dispatched to site from the works with surface protection only on water box side. The same shall be removed adopting one of the suitable methods indicated elsewhere in this specification. The contractor shall do the surface protection of these tube plates after the completion of the tube insertion and expansion activities. The surface shall be first painted with at least two or more coats of approved quality chemical resistant epoxy zinc chromate primer after thoroughly cleaning all such parts of all dirt, rust scales greases, oils and other foreign materials by adopting suitable methods as approved by BHEL. Afterwards the above parts shall be finished with two or more coats of approved quality high build black coal tar coating. Before the painting is taken up, the contractor shall plug all the holes with suitable tapered plastic / wooden plugs to avoid any damage to the tube ends. The plastic / wooden plugs and paints required for the above operations shall have to be arranged by the contractor at his cost. The above paints are also to be applied on water chamber / box. The thickness is to be confirmed by suitable measurement.
- 47.2** The condenser steam space shall be surface protected with at least two coats of suitable steam washable paint. Before the painting is taken up, the contractor shall clean the surfaces to be coated by adopting suitable methods. The contractor at no extra cost shall procure paint to BHEL.

#### **48.0 FINISH PAINTING**

- 48.1** All exposed metal parts of the equipment, structure, auxiliaries, piping, and other items (covered within the scope of this contract) after installations are to be painted. Mostly the equipment / components installed are with one coat each of primer paint and synthetic enamel / heat resistant paint. However, due to aging, the same may

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

- 48.2** After applying the primer paints all structure / equipment / items, shall be finish painted with two coats of alloyed resin machinery enamel paints as specified by BHEL engineer. In case proper finish is not obtained in two coats, the contractor shall apply additional coat (s) till proper finish is achieved. After completion of painting all bright spots shall be cleaned to the satisfaction of Engineer.
- 48.3** Certain equipment like control panels, valves etc. shall require spray painting. The contractor shall make arrangements of the required equipment for spray painting. Spray painting at the job site shall be permitted only at times and locations approved by Engineer.
- 48.4** Contractor at no extra cost to BHEL shall supply all paints, primers, tools and other consumables including scaffolding materials required for finish painting. Paint is to be BHEL approved make only and painting should be as per colour scheme and quality approved / specified by Engineer. Valid Test Certificate for the paint so supplied shall be made available before use of the same on work. No paint whose shelf life has expired should be used for painting.
- 48.5** The contractor may be required to fill up dents / marks by applying putty before final painting of equipment. All materials and arrangements have to be made within quoted lump sum price/rates.
- 48.6** The contractor shall provide legends with direction of flow on equipment and piping in size specified by Engineer. Letter writing shall be done in Hindi / English or in both languages.
- 48.7** The painters have to under go test on a mock plate of size 1m\*1m and only qualified painters will be allowed to work.
- 48.8** The contractor shall ensure availability of
- Ford Cup-4 to measure consistency of paint,
  - Automatic magnetic gauge to measure the dry film thickness and
  - SSPC Visual standards to assess degree of cleanliness of surfaces to be painted.
- 48.9** All paints should be stored in well-ventilated store. The painters and other personnel deployed should use proper protective equipment to avoid inhalation of fumes.

#### **49.0 PROGRESS REPORTING**

- 49.1** Contractor is required to draw mutually agreed monthly erection program in consultation with BHEL well in advance. Contractor shall ensure achievement of the program. He shall also timely arrange for additional resources considered necessary for the same at no extra cost to BHEL
- 49.2** Weekly progress review meetings will be held at site during which actual progress during the week vis-à-vis scheduled program shall be discussed for actions to be taken for achieving targets. Contractor during discussions shall also present the program for subsequent week. The contractor shall constantly update/revise his

work program to meet the overall requirement. All quality problems shall also be discussed during above review meetings. Necessary preventive and corrective action shall be discussed and decided upon in such review meetings and shall be implemented by the contractor in time bound manner so as to eliminate the cause of non-conformities.

- 49.3** The contractor shall submit daily, weekly and monthly progress reports, manpower reports, materials reports, consumables (gases / electrodes) report and other reports as per performa considered necessary by the Engineer.
- 49.4** The progress report shall indicate the progress achieved against planned, with reasons indicating delays, if any, and shall give the remedial actions which the contractor intends to take to make good the slippage or lost time, so that further works again proceed as per the original program and the slippage does not accumulate and affect the overall program.
- 49.5** The daily manpower reports shall clearly indicate the manpower deployed, category wise specifying also the activities in which they are engaged.

## **50.0 DRAWING AND DOCUMENTS**

- 50.1** The detailed drawings, specifications available with BHEL engineers will form part of this tender specification. These documents will be made available to the contractor during execution of work at site. The contractor will also ensure availability of all drawings / documents at work place.
- 50.2** Necessary drawings to carry out the erection work will be furnished to the contractor by BHEL on loan, which shall be returned to BHEL Engineer at site after completion of work. Contractor shall ensure safe storage and quick retrieval of these documents.
- 50.3** The contractor shall maintain a record of all drawings and documents available with him in a register as per format given by BHEL Engineer. Contractor shall ensure use of pertinent drawings/ data/ documents and removal of obsolete ones from work place and returning to BHEL.
- 50.4** The data furnished in various annexure enclosed with this tender specification are only approximate and for guidance. However, the change in the design and in the quantity may occur as is usual in any such large scale of work
- 50.5** Should any error or ambiguity be discovered in the specification or information the contractor shall forthwith bring the same to the notice of BHEL before commencement of work. BHEL's interpretation in such cases shall be final and binding on the contractor.
- 50.6** Deviation from design dimensions should not exceed permissible limit. The contractor shall not correct or alter any dimension / details, without specific approval of BHEL.

## **51.0 INCOME TAX , SERVICE TAX AND SALES TAX ETC**

- 51.1 Income tax & surcharge**, if any at prevailing rates shall be deducted on gross invoice value from the running bills unless Exemption Certificate from appropriate Income Tax Authority is furnished.

**51.2 Price quoted shall be inclusive of all taxes/duties except for service tax.** The service tax, as legally leviable & payable by the contractor under the provisions of applicable law/act, shall be paid by BHEL as per contractor's bill. However, contractor shall have to submit proof of service tax deposited by them immediately after the deposit but not later than the next bill submitted after the due date of deposit. The contractor shall furnish proof of Service Tax registration with Central Excise Division covering the services covered under this contract. Registration should also bear endorsement for the premises from where the billing shall be done by contractor on BHEL for this project. The contractor shall obtain prior approval of BHEL before billing the service tax amount

With introduction of Cenvat credit rules 2004 which came into force w.e.f. 10.09.2004, excise duty paid on input goods including capital goods used for providing the output service and service tax paid on input service can be taken credit of against the service tax payable on output service. **As such, while offering the rates, the contractors may take into account the benefit of above provisions as the cost of input to contractors will be the cost net of excise duty and service tax and adjust their offer price accordingly to make it more competitive.** In respect of Construction Services, the contractor should avail abatement of 67 % as per notification no. 15/2004-ST dated 10.09.2004 as & if applicable.

**51.3** 'TDS' for sales tax on Works contract at prevailing rates shall be deducted from the running bills as applicable unless Exemption Certificate from appropriate Authority is furnished. Reimbursement, if any, on account of Sales Tax on Works Contract as legally leviable and payable by the contractor shall be made on the production of requisite documents i.e. assessment order etc. of the 'Appropriate Authorities' by the contractors provided contractor has not opted for lump sum/composition scheme.

In VAT applicable States, "Tax Invoice" as required under the relevant State VAT law shall be submitted alongwith other compliances as per concerned VAT Act. In case of non civil contracts, reimbursement, if any, on account of VAT on Works contract as legally leviable and payable by the contractor shall be made on the production of requisite documents i.e. assessment order etc. of the 'Appropriate Authorities' by the contractors provided contractor has not opted for lump sum/composition scheme. In case of civil contracts the rate quoted should be inclusive of VAT. However "Tax Invoice" as required under the relevant State VAT law shall be submitted along with other compliances as per concerned VAT Act. However, 'TDS' for VAT on works contract will be applicable as per applicable law.

**51.4** Contractor shall get his organization registered with concerned Sales Tax/VAT authorities within 15 days of award of this contract. The delay on this account and delay in bringing the material shall be to contractor's account and no extension of time shall be allowed on this account. The Sales Tax/VAT registration for this contractor shall be forwarded to BHEL within 30 days from the date of LOI. In case the contractor is already registered for Sales Tax/VAT with Govt. Authorities he must quote his registration no, while submitting their tender.

**52.0 EXTRA WORK**

**52.1** BHEL may consider for payment of extra works on man hour basis @ Rs.30/- (Rupees thirty only) per man hour only for such of those works which:

- a Require major revamping or rework and which are totally unusual to normal erection work.
- b Require rectification / modification for improvement in the design during commissioning,
- c Requiring fresh fabrication of components in place of rejected / replaced components

**52.2** The rates indicated as above, shall include over time, if any, consumables, supervision, use of tools and tackles and other site expenses and incidentals.

**52.3** The extra works, if any, shall be carried out by a separate gang, which will be identified for certification of man-hours. This gang will not be utilized for any other work during the period that they are engaged in the extra-work. Logbook should be maintained and should be signed jointly by the contractor's representative and BHEL Engineer on day-to-day basis. However, signing of the logbook does not necessarily mean acceptance of the extra works, which would be identified by Engineer, whether work is covered in one of the above categories. Only those works and man-hours that are certified by the BHEL Engineer-in-charge will be considered for payment. The decision of BHEL in this regard shall be final and binding on the contractor.

**53.0 PRICE VARIATION**

**53.1** The finally accepted rates for scope of work as defined in this tender are subjected to price escalation provisions as per following formula:

$$P_1 = \frac{0.75 \times P_0 (F_1 - F_0)}{F_0}$$

P<sub>1</sub> = Increase/Decrease in billing amount (variation) for the particular month of billing.

P<sub>0</sub> = Billing amount calculated as per contract provisions.

F<sub>1</sub> = All India CPI published by Labour bureau, Simla, Govt. of India, for Industrial workers (Base 1982 =100) applicable for the month under consideration i.e. for which bill has been raised.

F<sub>0</sub> = All India CPI published by Labour bureau, Simla, Govt. of India, for Industrial workers (Base 1982 =100) applicable for [the month of opening of technical bid](#).

**53.2** The contractor will be required to raise the bills for price variation payments on a monthly basis irrespective of the facts whether any increase or decrease in CPI. Price variation as per above formula will be calculated and paid/deducted on the total contract value (excluding payments towards extra works and over run, if any)

on month-to-month basis from the date of award. BHEL however reserves the right to freeze variation for that much of duration of delays, from time to time, which are entirely attributable to the contractor. **Average of applicable price indexes paid shall be taken as index for PVC for final 5 % amount.**

- 53.3** With the provision of price variation as above NO CLAIM / COMPENSATION on account of any increase whatsoever, (irrespective of whether variation are steep / unanticipated or not compensated by the above escalation provisions in full towards minimum wages, consumables, electrodes, gases or any other item / reason) will be payable during the entire period of execution including extended period, if any.

## **54.0 RATE SCHEDULE**

- 54.1** Contractor shall fully understand equipment description and scope of work before quoting. The scope of work and responsibility of the contractor as mentioned under these specifications shall be covered within the quoted rates.

- 54.2 The tenderer shall quote the rates as per the rate schedule only, in part II price bid (Original).** Conditional price bids or price bids with any deviation / clarification etc. are liable to be rejected. No cutting / erasing / over writing shall be done.

- 54.3 Tender shall be processed through Reverse Auction (RA) mode with the bidders whose Techno- Commercial offers are acceptable. The "General terms and conditions" governing RA, are given as per Annexure-X of this SCC. The bidders are required to confirm their acceptance of these terms and conditions specifically in their technical bid.**

- (A)** Bidders are also required to furnish following details in their techno-commercial bid, for this purpose.

Authorization of representative who will participate in the on line Reverse Auction Process;

- a. Name and Designation of official
- b. Postal Address (Complete)
- c. Telephone Nos. (Land line & Mobile both)
- d. FAX No.
- e. E-mail address
- f. Name of Place/State/Country, wherefrom he will participate in the RA.

## **55.0 INSTRUCTIONS TO TENDERER**

- 55.1** Offers received without data / information required to be submitted under tender clauses-11.1 to 11.11 are liable to be rejected. All these data / information should be duly supported by documentary evidences (Refer note below clause-11)

- 55.2** No deviations to the tender conditions will normally be accepted.

- 55.3** The tenderer is advised to actually visit the site and fully acquaint themselves with site conditions, location of stores, transportation routes, quantum of work etc. before quoting their rates for this work. BHEL shall not be responsible in any way for non-familiarization of site conditions. Once the tenderer has quoted for the work, it is implied that he has ascertained various site condition and NO CLAIM whatsoever will be entertained by BHEL on any such account.
- 55.4** The contractor in the event of this work awarded to him, shall establish a site office at site and keep posted an authorized responsible officer who should hold a valid power of attorney for the purpose of the contract. Any order or instruction of the Engineer or his duly authorized representative shall be communicated to the contractor's representative at site office and the same will be deemed to have been communicated to the contractor at his legal address.

**55.5 LIQUIDATED DAMAGES (LD)**

For delay in completion of work attributable to the contractor, the LD shall be applicable at the rate of ½% of the contract value per week of delay or part thereof limited to a ceiling of 10% of the contract value as mentioned under clause no.25.5 of the GCC of the tender.

**55.6 SECURITY DEPOSIT**

**The contractor shall submit Security Deposit within 15 days from the date of issue of LOI as per clause no. 16.2 of the General Conditions of Contract (GCC). In case the contractor opts to furnish Bank Guarantee as a part of Security Deposit, the BG shall be issued as per the Performa enclosed as per Annexure-H of the GCC and also that the BG should be issued preferably through any of the Member Banks listed in GCC;**

For BG through any other Nationalized Bank (Not covered in the list of Member Banks of GCC), the discretion of its acceptance shall lie solely with BHEL.

**55.7 OTHERS**

- 55.7.1** In case of any contradiction between General Conditions of Contract (GCC) and Special Conditions of Contract (SCC), the latter shall prevail.
- 55.7.2** For reverse auction/ for Price Bid opening, only those bidders will be considered who will be qualified for the subject job on the basis of pre-qualification evaluation / Techno-commercial bids. BHEL reserves the right to reject the bidders with unsatisfactory past performance in the execution of a contract. BHEL's decision in this regard shall be final & binding.

**SECTION - III B**

**SPECIAL CONDITIONS OF CONTRACT**

**INDEX**

<b>Clause Number</b>	<b>DESCRIPTION</b>
56	Scope of work
57	Facilities to be provided by BHEL/Contractor
58	Time schedule
59	Over run
60	Terms of payment

## SECTION - III B

### SPECIAL CONDITIONS OF CONTRACT

#### 56.0 SCOPE OF WORK

**56.1** BHEL has been awarded the work of Design, Manufacture, supply, installation, erection & commissioning of BTG package of 1 X 195 MW unit at Unit-7 Kota TPS, Kota by RRVUNL. The equipment consists of boiler, Electro-static precipitator, Fans, milling systems, steam turbines, generators, boilers feed pumps, condensate extraction pumps and piping along with the associated auxiliary supports and controls.

The scope of work under this tender consists of

- Taking delivery of the Turbo-generator materials (consisting of condenser, turbine, generator along with their rotating & static auxiliaries like BFPs, CEPs, Deaerator, from the project storage yard / stores / sheds to erection site (approximately 2 to 3 Km),
- Their preservation, safe keeping, watch and ward.
- Checking, dressing, chipping and leveling of foundations.
- Pre-assembly, erection, alignment of various equipment, machining and grouting.
- Welding, heat treatment, radiography and other non-destructive tests wherever required
- Hydraulic testing, air leak test, and other pre commissioning tests,
- Insulation and finish painting including supply of paints etc.,
- Cleaning of Oil System
- Steam blowing including erection and dismantling of all temporary piping, valves etc. required for above operations and other commissioning activities including post commissioning operations and stabilization of the unit.
- Unit trial operation, resolving any deficiencies observed and handing over of 1x195 MW units at Kota TPS, Kota

**56.2 The contractor has to provide the following services exclusively for BHEL within the quoted price :**

- a) **Skilled computer operator – 30 manmonths**
- b) **Skilled worker - 30 manmonths**
- c) **UnSkilled worker - 60 manmonths**

Persons so deployed shall have to work in extended hours whenever required. Workmen provided as per the above provisions shall be fully trained and experienced in the nature of work for which they are deployed.

**In case these services are not utilized for any reason whatsoever, fully or partly, recovery at the rate of the prevailing minimum wages at KOTA for the categories given plus 10% will be made from the final bill of the contractor.**

**The scope of work will also include providing qualified Supervisors for direct supervision of various works other than the scope covered under this tender. These qualified Supervisors shall be provided for Fifteen man-months as per site conditions. The supervisors shall possess a minimum qualification of a mechanical / electrical engineering diploma. They shall be deployed in all areas covered under various specifications as well as other related areas as may be deemed essential based upon work requirements, though not specified. They shall be guided by BHEL Engineers to ensure smooth work progress as and when /where required /deployed. No separate payment shall be paid for providing the services as per this clause. The contractor shall provide these free of cost services within the quoted rates as per Rate Schedule.**

**In case BHEL is not able to utilize the man months as per provision , a lump sum of Rs 10,000/- ( Rupees ten thousand only ) per man month for the un-utilised man months will be recovered from the bills of the contractor.**

**56.3 Major equipment to be installed, tested and commissioned under this specification is given below.** However, changes in design may occur as is usual in any such large scale work for which no compensation will be payable and contractor shall complete the entire work as detailed in tender specifications within finally accepted rates / prices.

**(A) CONDENSER [ANNEXURE – III – ITEM-AA (A) ]**

Condenser complete with all accessories such as

- Hot-well, hinge assemblies, nozzles for various connections along with baffles.
- Steam throw off devices, air extraction piping,
- Stand pipes along with fittings including gauge glasses for level indication, hangers & supports to make the system complete in all respects.

**(B) STEAM TURBINE [ANNEXURE – III – ITEM-AA (B) ]**

- High Pressure, intermediate pressure and low pressure steam turbines complete with sole plates, foundation holding down bolts, bearing, bearing pedestals, rotors, couplings, main oil pumps, steam gland seals, hydraulic turning gear and hand barring gear.
- Combined main steam stop and control valves, combined reheat stop and control valves, steam strainers (including its housing & blanking

arrangement) for main and reheat steam lines etc., LP bypass stop and control valves along with their servomotors necessary supports for Integral piping and secondary structure if required.

- Cold reheat and extraction NRV along with their servomotors, necessary supports and secondary structure if required.
- Complete Installation of necessary blanking to protect the valves and turbine internals during hydraulic testing and steam blowing. If required CRH NRV may have to be dismantled and replace with a spool during steam blowing. It will be re-installed after completion of steam blowing.
- **Complete High Pressure governing system** for the turbine including governing control rack, LP bypass control, rack, valve test devices and racks, turbine gland sealing system complete with converters, associated piping, valves and fittings, specialties, fire protection valves and devices, hangers and supports to make the system complete in all respects.
- Complete cross around piping along with their supports from IP turbine to LP turbine.
- Complete extraction piping along with their supports and protective covers from LP turbine to condenser dome walls.

**(C) GENERATOR [ANNEXURE – III – ITEM-AA (C) ]**

- Generators complete with its auxiliary systems.
- **The generator stator shall be received by contractor in TG service bay and shall be unloaded using EOT cranes. He has to interact with the transporters for the same if required.**
- Installation of hydrogen and air coolers.
- Insertion of rotor, levelling, alignment & coupling with LPR.
- Erection of Bushings.
- Brush less excitation system along with PMG, placement, levelling, centering and coupling with generator rotor.
- End shields, Shaft seals, gas coolers, terminal bushings, connected piping, valves, fittings, hangers and supports etc.

**(D) STATIC AUXILLIARIES [ANNEXURE – III – ITEM-AA (D) ]**

- Flash tanks with drains & vents.
- Deaerator & feed storage tank (in three pieces), complete with ladders platform and other accessories.
- Condensate storage tank.
- Drain coolers along with fittings, piping, steam traps and gland steam condensers and air exhausters with motor and fittings, associated piping, hangers and supports etc. to make the system complete in all respects.

- LP and HP heaters, fittings, group protection device, stand pipes along with fittings including gauge glasses for level indication, safety valves etc. to make the equipment complete in all respects.
- RE Joints along with in built CW pipes, flanges and tie rods and spool pieces, H&S etc. to make system complete in all respect.
- Suction strainers for boiler feed and condensate extraction pumps along with supports and other fixtures.
- Turbine oil coolers, gland steam condenser, drain coolers, seal oil coolers, steam jet main ejectors, along with stand pipes and fittings including gauge glasses for level indication, safety valves etc. to make the equipment complete in all respects.
- Oil strippers, strainers, oil injectors and duplex oil filters.
- Main oil, drain oil and dirty oil tanks along with fittings including gauge glasses for level indication, to make the equipment complete in all respects.
- Coolers , Tank , Filters etc of Control Fluid System
- Hydraulic coupling, working oil and lubricating oil coolers of Boiler feed pumps.
- Seal oil storage tank, seal oil unit, pre-chambers, gauge glasses along with stand pipes, gauge glasses for level indication etc. etc. to make the system complete in all respects.
- Hydrogen cooling system, nitrogen and carbon dioxide systems including H<sub>2</sub> dryers, gas control units and gas stands, racks and distributors to make the system complete in all respects.
- Exciter air cooler.

**(E) ROTATING AUXILLIARIES [ANNEXURE – III – ITEM-AA (E) ]**

- AC motor driven boiler feed pumps mounted on common frames, hydraulic couplings, and BFP motors, BFP booster pumps, working oil and lube oil coolers including integral piping.
- AC Motor driven condensate extraction pumps complete with associated motor and its accessories including integral piping.
- Air evacuation pumps, including priming pumps for maintaining condenser vacuum, along with motors and its accessories, to make the equipments complete in all respects.
- A.C. and DC motor driven lubricating oil pumps including DC motors starters along with resistance box.
- AC & DC motor driven jacking oil pumps including DC motors starters along with resistance box.
- Unit oil centrifuging and purification equipment machines.

- Seal oil pumps with drives and fittings to make the system complete in all respects.
- Oil vapour and gland steam exhausters.
- Gas Driers.
- Pumps of Control Fluid System
- HP/LP dosing skids. Accessories
- Condenser on load tube cleaning system with drives and fittings to make the system complete in all respects.

**(F) COMMON SYSTEM [ANNEXURE – III – ITEM-BB ]**

- **Central lube oil storage & purifying system** consisting of clean oil storage tank, dirty oil storage tank, central oil purifier, dirty & clean oil transfer pumps, drain oil return pumps, oil unloading vessel & interconnecting piping.

**(G) PIPING [ANNEXURE – IV – ITEM-A ]**

Major PIPING SYSTEMS including LP Piping systems to be erected, tested and commissioned under this specification are given below. Indicative weights of **some of the major items are as per Annexure-IV**. Bidders are required to quote rate in per metric tonne for entire work as per tender specification for piping systems as per item no. 2 and 3 of rate schedule.

**INTEGRAL & SYSTEM PIPING (ANNEXURE – IV-ITEM-A)**

***i. INTEGRAL PIPING SYSTEMS***

- Turbine lube Oil system.
- Generator lube oil system.
- Seal steam system.
- Spray water system.
- Drains & vents.
- Control Fluid piping.
- Jacking oil system.
- Turbine water drainage system.

***ii. GENERATOR PIPING***

- Seal oil piping.
- H<sub>2</sub> & CO<sub>2</sub> gas piping.
- H<sub>2</sub> coolers and exciter cooler ACW piping

***iii. TG- CYCLE PIPING***

- Main condensate suction.

- Main condensate discharge including excess return and minimum re-circulation.
- Condensate supply for CEP sealing, L.P. dosing dilution, spray to LP BP valve / exhaust hood / turbine etc., spray to HP flash box, valve gland sealing.
- Condensate supply from condensate surge tank to CEP sealing and makeup to condenser and valve gland sealing.
- Steam extraction to HPH 5 & 6.
- Steam extraction to deaerator from turbine & CRH line.
- Steam extraction to LPH – 1, 2 & 3.
- Cascading piping between heaters to condenser and to deaerator.
- Drains from GSC, LPH-1 through drain cooler.
- Deaerator overflow and drain
- HP & LP flash box vent and drain.
- Steam from aux. Steam header to turbine sealing system and its drain to flash box.
- Condenser air piping to vacuum pumps.
- Aux. Steam for initial heating of FST and deaerator pegging.
- Vent pipes from HPH – 5 & 6 to flash box and start up vents.
- Vent pipes from LPH – 1, 2 & 3 to condenser.
- Vent pipe from CEP to condenser.
- Vent pipe from GSC to atmosphere.
- Drain & vents from above piping.
- Condenser hot well drain.
- Turbine wet steam-washing system.

**iv. MISCELLANOUS PIPING**

- HP/LP dosing skid piping including dressing drains to neutralizing pit.
- Impulse piping up to and including first battery of root valves.

**V. LP PIPING [ANNEXURE – IV – ITEM-B ]**

- CW Piping from 'A' row to condenser.
- ACW piping from header in TG area to TG Aux.
- Condenser air evacuation piping through vacuum pumps and steam jet air ejectors.
- Service and Instrument Air Piping from header in TG area.
- Misc. drains up to pits & vents to return to CST / atmosphere.

- DM water make-up line to condenser.

#### NOTES:-:-

- All the above systems of piping include the erection of pipes, bends, elbows, valves, fittings, impulse piping up to and including first root valve(s), sampling lines, drains, hangers and supports and other accessories so as to make the system complete in all respects.
- Above systems of piping can be regrouped / renamed or any addition or deletion in the system can be made in order to make system complete as per requirement. No extra claim shall be entertained on this account.
- The equipment and piping systems indicated above are only major items and does not cover all the equipment / piping system to be erected / commissioned. Contractors are however, required to erect / commission within the price quoted by them, all connected equipment / system shown in manufacturer's drawings / other documents which may be necessary for erection completion and overall commissioning of TG set.

#### **ADDITIONAL PLATFORM / STRUCTURES [ANNEXURE –IV – ITEM-C ]**

Additional platforms and approaches wherever required by the engineer to facilitate operation are to be fabricated and installed. Bidders are required to quote rate in Rs per MT against ITEM NO.-4 of RATE SCHEDULE for fabrication & erection of such platforms & approaches. This does not include those of de-aerator and FST. These are covered under the erection of static auxiliaries.

#### **INSULATION [ANNEXURE – IV – ITEM-D ]**

All piping and equipment, as per requirement / drawings are to be thermally insulated with bonded / unbounded mineral wool /LRB mineral wool and to be covered with aluminum cladding. Bidders are required to quote rate in Rs per MT against ITEM NO.-5 of RATE SCHEDULE for entire insulation work. Only spray insulation wherever applicable is not covered in this scope of work.

**56.4 Terminal points and Exclusions** as applicable to this specification have been given in Annexure I & II respectively.

#### **Approx. weight of major components has been indicated in Annexure III**

The contractor is required to erect actual tonnage (irrespective of any variation plus or minus) which may be necessary to complete their work and commission above system and complete the work in all respects as detailed in tender specifications, for which payments shall be released on finally accepted rates. The contractor undertakes to erect / commission actual quantities as per advice of BHEL Engineer and accordingly the final contract price shall be worked out on the basis of quantities actually erected at site and payments will also be regulated for the same. **However, in case of overall reduction in contract value beyond 30%, the contractor will be eligible for compensation as per the following provision:**

**“The actual executed value shall be raised by 10 % subject to the condition that the total value of work executed plus increase as above shall be limited to 70 % of the awarded contract value”**

Contractors shall take above into account while quoting the unit rates quoted as per Rate Schedule so as to take care of such variation during execution stage.

## **57.0 FACILITIES TO BE PROVIDED BY BHEL/CONTRACTOR**

**57.1** BHEL shall provide limited open space for office and labour colony at site on free of rent basis.

It is the responsibility of the contractor to construct sheds, provide all utilities like electricity, drinking water etc. He is to dismantle and clear the site after completion of work or as and when required within the accepted rates.

**57.2** The Contractor shall be responsible for providing all necessary facilities like residential accommodation, transport, electricity, water, medical facilities etc. at his own cost as required under various labour laws and statutory rules and regulations framed there under to the personnel employed by him.

**57.3** The contractor shall submit to the Engineer his electrical power requirements. **Construction power shall be provided free of charge at one point each for each unit near** erection site as required and to be decided by Engineer. Contractor at his cost shall do further distribution. **Electricity for labor colony will be supplied at one single point on chargeable basis at the rate as fixed by BHEL’s Customer M/s RRVUNL.** The Contractor at his cost shall do further distribution. All wiring must comply with local regulations and will be subject to Engineer's inspection and approval before connecting supply.

**57.4** **Water for construction purposes and the labour colony shall be provided free of charge at a one point.** Contractor shall arrange further distribution of water for construction purposes.

### **NOTES:**

- **BHEL IS GETTING THE CONSTRUCTION POWER AND WATER FROM THE CUSTOMER.**
- **THE CONTRACTOR WILL ENSURE THAT THERE IS NO WASTAGE. PERIODICAL AUDITS WILL BE HELD TO ENSURE THAT THESE RESOURCES ARE BEING OPTIMALLY USED.**
- **IN CASE ANY WASTAGE IS OBSERVED, BHEL RESERVES THE RIGHT TO RECOVER ANY CHARGES / PENALTY AS DEEMED FIT TO BE DECIDED BY BHEL ENGINEER**

**57.5** Permanent lighting inside the powerhouse is to be provided by the customer of BHEL. Till such time such arrangements are made, the contractor at his cost should arrange for temporary lighting in and around his work area.

**57.6** BHEL will not be responsible for any loss or damage to the contractor's equipment as a result of variation in voltage or frequency or interruptions in power supply.

- 57.7** Provision of distribution lines of both electrical power and water from the central points to the required place with proper distribution boards observing the safety rules laid down by the electrical authorities of the state shall be done by the contractor, supplying all the materials like cables, distribution board, switch boards, TPN, CBS, ELCBS/ MCCBS/ Copper / Brass clamps, copper conductor, change over switches pipes etc. at his own cost. If any failure is caused in supply of the power and water, it is the responsibility of the contractor to make alternate arrangements at his cost. The contractor shall adjust his working shifts / hours accordingly and deploy additional manpower if necessary so as to achieve the targets.
- 57.8** The contractor while drawing construction power supply from Distribution Board should strictly adhere to following points.
- a) All electrical installations should be as per Indian Electricity rules.
  - b) All distribution Boards installed by the contractor should be constructed with fireproof materials viz. Steel frames, Bakelite sheets etc.
  - c) Connection for single phase should be taken from phase and neutral. Nowhere the connection should be taken with earth as neutral.
  - d) All electrical connections should be made through connectors, nuts and bolts, switches, plug and sockets. Loose connections or hooking up of wires shall not be permitted.
  - e) Contractor have to make their own earthing arrangement for their equipment / DB earthing.
  - f) All electrical equipment / tools and plants should be properly earthed. DBs to be earthed diagonally opposite at two points.
  - g) Contractor should use "MCCB" and "ELCB" either on incoming or outgoing connections to the DBs.
  - h) Contractor should ensure that all the CBs / TPNs/ Fuses/ MCCB / ELCB cables etc. should be of adequate rating/ capacity.
  - i) For permission of supply connections contractor has to submit a test report of their installations with a single line diagram of connected/ proposed loads.
- 57.9** ELCB will be tested once in a week or as directed by BHEL by actually simulating the earth leakage for all installations and the same shall be recorded in the logbook to be maintained by the contractor.
- 57.10** In case of power cuts / load shedding no compensation for idle labour or extension of time for completion of work will be given to contractor.
- 57.11** Adequate lighting facilities such as floodlights, hand lamps and area lighting shall be arranged by the contractor at the site of construction, contractor's material storage area etc. Within finally accepted rates.
- 57.12** On completion of work or as and when required by BHEL, all the temporary buildings, structures, pipe lines, cables etc. shall be dismantled and levelled and debris shall be removed, as per instructions of BHEL, by the contractor at his cost. In the event of his failure to do so, the Engineer will get it done and expenses

incurred shall be recovered from the contractor along with prevailing overheads. The decision of BHEL Engineer in this regard shall be final.

## 58.0 TIME SCHEDULE

**58.1** The contractor is required to commence the work within 15 days from the date of issue of LOI unless BHEL decides to fix any other later date. However, the actual date of start of work, to fix up the zero date of the contract, will be certified by BHEL Engineer after adequate mobilisation of manpower AND T&Ps by the contractor.

**58.2** Entire work as detailed in the tender specifications shall be completed within 15 months from the Zero date as per programme / milestones indicated by BHEL Engineer. Contractor has to mobilize adequate resources to meet BHEL commitments to the customer as indicated from time to time.

**58.3** The various milestones as per present status of the contract with Customer are as under:

MILE STONES	MONTHS
a) Erection Start	ZERO
b) Box – up for oil flushing	NINE
c) Oil Flushing Completion.	TEN
d) Barring Gear	ELEVEN
e) Rolling & Synchronising	THIRTEEN
f) Trial operation & handing over	FOURTEEN

**Note:** Contractor has to mobilise all required resources including manpower to achieve schedule given from time to time for which no compensation will be payable. However in case of contractor discharges his contractual responsibility even before schedule contract period, he will be allowed to wind up his set up without any financial implications on either side.

**In order to meet the Customer schedule , the Contractor may have to mobilize additional resources to compress the schedule upto 1 month within the quoted price**

**58.4** The contractor has to ensure that work is completed in all respects leaving no pending points. However the punch list / pending points, which are possible to be attended at site, shall be fully liquidated within two months from successful trial operation of the unit.

**58.5** The work under the scope of this contract is deemed to be completed in all respects, only when the contractor has discharged all the responsibilities laid down in the

contract. The decision of BHEL on completion date shall be final and binding on the contractor.

## **59.0 OVER RUN**

**59.1** In case due to reasons not attributable to the contractor, the work gets delayed and the scheduled completion gets extended, the contractor shall not be entitled for any over run compensation for a period of first 3 (THREE) months after the contractual completion date. In case the scheduled completion time gets extended beyond 3 (THREE) months as stated above, the contractor shall be considered for payment of fixed over run charges, @ Rs.80, 000/- per month (Rupees eighty thousand only) on receipt of advance notice intending to claim over run and on fulfillment of following conditions: -

- 1) The reasons for delay in completion of work are not attributable to contractor but however subject to the provisions of clause – 31.
- 2) Contractor achieves the targets fixed during the over run period.

**59.2** Once the claim of over run charges is admitted no other compensation whatsoever (like for delays in receipt of materials, availability of fronts etc.) will be entertained.

**59.3** The contractor shall maintain sufficient workforce and other resources required for completion of the job expeditiously for the entire contractual period including total extended period.

## **60.0 TERMS OF PAYMENT**

**60.1** The 'Engineer' will certify regarding the actual work executed in the measurement books and bills, which shall be accepted by the contractor in measurement book.

**60.2** Contractor shall submit bills for the work completed under the specification, once in a month detailing work done during the month. The format for billing shall be approved by BHEL before raising invoices.

**60.3** Subject to any deduction, which BHEL may be authorised to make under the contract, the contractor on the certificate of the Engineer at site be entitled for payment as explained hereunder.

### **(I) PROGRESSIVE PAYMENT ON PRORATA BASIS**

**(AA)** An amount limited to **1.0 % of** the awarded contract value shall be payable in **one or more installments**, solely at the discretion of Construction Manager/ BHEL at different stages of the contract execution to facilitate resource augmentation or to meet any exigency of work. In case of its non-utilization 'OR' its part utilization, the entire/balance payment against this category shall be released along with commissioning of STG.

**(AB) PROGRESSIVE PAYMENT ON PRORATA BASIS****84% of Lump sum price (item No.1 of rate schedule )****(Applicable on items covered under ANNEXURE – III )**

1.	CONDENSER	16 %
2.	TURBINE	24 %
3.	GENERATOR	16 %
4.	STATIC AUXILIARIES	12 %
5.	ROTATING AUXILIARIES	15 %
6.	CENTRAL LUB OIL SYSTEM	1%

**(AC) 84% of UNIT RATE (item No.2 & 3 of rate schedule )****(Applicable on items covered under ANNEXURE – IV ITEM A & B )**

1.	On transportation, pre assembly wherever applicable, placement in position and rough alignment.	30 %
2.	On completion of alignment / fastening / welding / grouting along with proper supports.	40 %
3.	On completion of radiography / NDT / stress relieving / other quality checks.	10 %
4.	On system completion	4 %

**(AD) 84% of UNIT RATE (item No. 4 of rate schedule )****(Applicable on items covered under ANNEXURE – IV ITEM C )**

1.	On transportation and fabrication	50%
2.	On completion of erection alignment / fastening / welding / grouting along with proper supports.	34%

**(AE) 84% of UNIT RATE (item No. 5 of rate schedule )****(Applicable on items covered under ANNEXURE – IV ITEM D )**

1.	On transportation of required quantity of materials on locations and its proper protection.	10 %
2.	On fabrication / fixing of retainers, lagging & stitching of	40 %

	mattresses and welding of retainers,	
3.	On fixing of casing supports, fabrication, beading, sealing, bitumen painting, installation and screen fixing of cladding & completion of all jobs	30 %
4.	On system completion and area cleaning.	4 %

**NOTES :**

- Further break-up of above terms of payment, if required can be carried out at site entirely at the discretion of BHEL.
- The above break up is only for payment purposes and does not cover all equipment in the scope of the subject work. The total scope of work shall be as detailed in the tender specification.
- Pro-rata payments shall be made every month in proportion to the work carried out by the contractor during the month, which shall be measured on the basis of percentages fixed above. The engineer shall carry out the assessment of the work for payment within the above percentages and it shall be final and binding on contractor. However, further percentage break up for payment against above clauses, will be mutually discussed and finalised at site.

**(B) PRE-COMMISSIONING & COMMISSIONING (8% of CV)**

1.	Completion of Detergent Cleaning of pre-boiler system.	1 %
2.	Completion of Oil flushing.	1 %
3.	Completion of Generator gas tightness test	1 %
4.	Completion of Barring Gear	1 %
5.	Completion of Steam rolling and synchronising	2 %
6.	Completion of Trial operation	2 %

**NOTE:**

If the commissioning activities could not be carried out due to no fault of contractor, BHEL Site incharge, at his discretion, after recording reasons for exercising such option, can split and release payment up to 50% of milestone payment on completion of work, to the extent possible, required for carrying out that particular milestone / commissioning activity.

**(C) 2 % Payable on prorata basis for PAINTING**

- (II)** 2.5% of contract value will be payable on handing over of the unit to BHEL's Customer or 3 months after contractor has discharged his responsibilities as stipulated in this contract, whichever is earlier, if delay in handing over is not attributable to contractor. The unit shall be considered as handed over on completion of trial operation.

- (III) The balance 2.5% CV shall be payable on completion of all pending work, rework wherever required, area cleaning, reconciliation of materials and fulfillment of contractual obligations.**

**NOTE:**

**Payments at II & III shall be released after adjustment of the CV based on actual work carried out.**

**ANNEXURE-I****TERMINAL POINTS**

<b>SYSTEMS</b>	<b>TERMINAL POINTS</b>
Main Steam	Inlet / Outlet of strainers, ESV- CV
Hot Reheat	Inlet / Outlet of strainers, Inlet of IV
Cold reheat	Only CRH NRV including both sides welding joints (including spool piece for Steam Blowing)
Aux. Steam	Intlet of seal steam system.
Feed water	Feed discharge from BFP's to HP Heaters, between HP heaters and up to HP heaters outlet.
Electrical	Terminals of all drive motors junction boxes and panels to which owner's cables are to be connected.
Generator	Outlet end of generator terminal bushing.
DM Water	DM makeup line at terminal point.
CW system	Customer terminal point near A row
ACW piping	Inlet and outlet supply and return lines flanges on the RRVUNL's water cooling system
Instrument air	Terminal joint on the common air supply header being provided by the owner.
Service air	Terminal joint on the common air supply header being provided by the owner.

**ANNEXURE – II**

**EXCLUSIONS**

1. All civil works other than dressing and chipping of foundation surfaces, fixing of supports and hangers in trenches, walls and Grouting of TG and BFP
2. All cabling work other than those supplied by BHEL with the equipment.
3. Complete control and instrumentation work other than those specifically included in this specification.
4. All AC & DC motor starters, switchgears and associated controls center unless otherwise specifically mentioned in the specification.
5. Application of spray insulation for steam turbine and other equipment.
6. Supply of lubricants for TG set.
7. Supply of chemicals required for chemical cleaning.
8. Supply of H<sub>2</sub> and CO<sub>2</sub> gases for generator filling.
9. Supply of all shims and gaskets, which go finally as part of equipment.

**ANNEXURE-III****TENTATIVE WEIGHT SCHEDULE**

<b>SUMMARY OF WEIGHTS</b>		<b>Weight per set</b>
		<b>GROSS WEIGHT (MT)</b>
<b>AA</b>	<b>TURBINE , GENERATOR &amp; AUXILIARIES</b>	
A	CONDENSER	294
B	TURBINE	509
C	GENERATOR	308
D	STATIC AUXILIARIES	339
E	ROTATING AUX.	161
<b>TOTAL ( FOR ONE SET)</b>		<b>1612</b>

**AA****WEIGHT OF MAJOR COMPONENTS FOR TG SET.**

<b>PKG.NO</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>NET.WT / EACH</b>	<b>GROSS.WT IN KG.</b>
<b>A</b>	<b>CONDENSER</b>			
78001	CONDENSER (HOTWELL)		4312	4362
78004	BOTTOM PLATE		7981	8081
78005	BOTTOM PLATE		7981	8081
78010	BOTTOM PLATE		208	258
78012	CONDENSER SPRING ELEMENT		3800	3900
78013	CONDENSER SPRING ELEMENT		3800	3900
78018	CONDENSER SUPPORT		2118	2240
78020	FRONT WATER CHAMBER (GEN SIDE)		7369	7491
78022	FRONT WATER BOX (GEN SIDE)		16056	16256
78023	FRONTWATER CHAMBER(TS)		7369	7449
78024	FRONTWATER CHAMBER(TS) LOOSE ITEMS		215	215
78025	FRONT WATER BOX (TUR SIDE)		16056	16236
78026	REAR WATER CHAMBER (GEN )		7326	7406
78028	REAR WATER BOX (GEN SIDE)		12180	12360
78029	REAR WATER CHAMBER		7326	7406
78031	REAR WATER BOX (TUR SIDE)		12180	12360
78032	SIDE WALL(TUR.END)		5707	5707
78038	SIDE WALL(TUR.END)		950	1050
78040	SIDE WALL(GEN.END)		5707	5707
78048	SHELL INTERNAL DETAILS		3000	3337

78049	SHELL INTERNAL DETAILS	3000	3337
78055	SHELL INTERNAL DETAILS	1300	1637
78058	AIR EXTRACTION PIPING	750	830
78059	SHELL INTERNAL DETAILS	6700	6973
78060	SHELL INTERNAL DETAILS	6700	6973
78061	SHELL INTERNAL DETAILS	6700	6973
78062	SHELL INTERNAL DETAILS	6700	6973
78069	SHELL INTERNAL DETAILS	1882	2082
78070	SHELL INTERNAL DETAILS	2620	2820
78071	SHELL INTERNAL DETAILS	1705	1905
78075	LOWER DOME WALL (TUR.END)	3820	3820
78103	LOWER DOME WALL (GEN.SIDE)	3491	3491
78109	LOWER DOME WALL (F.W/B SIDE)	3733	3733
78115	LOWER DOME WALL (R.W/B SIDE)	4200	4200
78121	DOME INTERNAL STIFFENING	3056	3330
78122	DOME INTERNAL STIFFENING	3758	4060
78123	DOME INTERNAL STIFFENING	1244	1320
78136	UPPER DOME WALL(F/W/B SIDE)	2435	2435
78139	UPPER DOME WALL(RWB SIDE)	2440	2440
78142	W/BOX REMOVAL DEVICE	2477	2660
78143	W/B REMOVAL DEVICE	116	135
78144	W/B REMOVAL DEVICE	788	850
78149	W/B REMOVAL DEVICE	446	500
78150	W/B REMOVAL DEVICE	595	595
78151	W/B REMOVAL DEVICE	595	595
78154	STEAM THROW DEVICE	963	970
78155	STEAM THROW DEVICE	963	970
78157	CONDENSER (LOOSE ITEMS)	1050	1150
78158	CONDENSER (LOOSE ITEMS)	385	385
78159	CONDENSER LOOSE ITEMS	82.5	100.5
78160	CONDENSER LOOSE ITEMS	1540	1640
78161	CONDENSER LOOSE ITEMS	298	348
78164	PLATES	450	500
78165	STIFFENERS	310	410
78166	STAND PIPE NO.1	53	53
78169	STAND PIPE NO.2	53	53
	CONDENSER TUBES	79000	79000
		<u>288039.5</u>	<u>294048.5</u>

<b>B TURBINE</b>			
501	SOLE PLATE PEDESTAL ANCHOR	2716	3191
502/1	ANCHOR BOLTS FORN LPT	350	350
502/2	ANCHOR BOLTS FORN LPT	345	345
503	BASE PLATE ASSEMBLY	600	956
504	BASE PLATE ASSEMBLY	2360	2560
505	BASE PLATE L.P.CASING	2950	3400
507	LP CASING UPPER PARTS	5700	6000
508	LP CASING UPPER PARTS	5700	6000
509	LP CASING UPPER PARTS	2700	2800
510	LP CASING UPPER PARTS	2700	2800
511/1	LP CASING UPPER PARTS	360	420
511/2	LP CASING UPPER PARTS	460	560
512	ASSEMBLY DEVICES	590	920
513	INSPECTION SHAFT FOR IPC	425	625
514	SHAFT LIFTING DEVICE IP ( F+R)	545	845
515	COMPONENTS OF ASSY.FIXTURE FOR	4100	4550
516	COMPONENTS OF ASSEMBLY FIXTURE	910	1200
517	COMPONENTS OF ASSY.FIXTURE FOR	2310	2800
518	COMPONENTS OF ASSEMBLY FIXTURE	2566	2730
519	HP-IP BREARING PEDESTAL ASSLY.	20100	21035
520	HP/IP BRG.PED.PARTS	2653	2853
521	AUXILIARIES OF LP TURBINE	1000	1400
522	AUXILIARIES OF LP TURBINE	598	794
523	AUXILIARIES OF LP TURBINE	598	794
524	LP JOINT COVERING	955	1195
525	ASSEMBLY TOOLS	316	476
526	CAP UPPER IP REAR	365	415
527	CAP UPPER IP REAR	365	415
528	CAP LOWER IP REAR	365	400
529	CAP LOWER IP REAR	365	400
530	CAP LOWER IP FRONT	694	730
531	CAP LOWER IP FRONT	694	730
532	CAP INT PIPE UPPER	2997	3050
533	CAP INT PIPE UPPER	2997	3050
534	CAP INT PIPE LOWER	1920	2592
535/1	CAP INT PIPE LOWER	1920	2592
535/2	CAP INT PIPE LOWER	6	16
536	CAP CONNECTING PIECE	1967	2452

537	CAP CONNECTING PIECE	1967	2452
538	CAP (PIPE ASSLY)	2337	2390
539	CAP (PIPE ASSLY)	2337	2390
541	LONGITUDINAL GIRDER (LEFT)	11350	11380
542	LONGITUDINAL GIRDER (RIGHT)	11118	11150
543	LP FRONT WALL (TS)	8400	8500
544	LP FRONT WALL (GS)	8400	8700
545/1	LP SHAFT SEALING FRONT	1420	1525
545/2	LP SHAFT SEAL COMPENSATOR	1351	1456
546/1	LP SHAFT SEALING (REAR)	1420	1525
546/2	LP SHAFT SEAL COMPENSATOR	1351	1456
547	STEAM INLET PIPE (LPT)	1150	1550
550/1	LP CASING ASSEMBLY (FASTENERS)	2090	2553
550/2	LP CASING ASSEMBLY (PARTS)	4511	4900
550/3	LP CASING ASSEMBLY (PARTS)	81	87
551	EXTRACTION PIPE LINE (LPC)	460	570
552	EXTRACTION PIPE LINE (LPC)	460	570
553	EXTRACTION PIPE LINE (LPC)	285	405
554	EXTRACTION PIPE LINE (LPC)	865	990
555	EXTRACTION PIPE LINE (LPC)	460	590
556	EXTRACTION PIPE LINE (LPC)	285	405
557	EXTRACTION PIPE LINE (LPC)	210	290
558	EXTRACTION PIPE LINE (LPC)	360	550
559	EXTRACTION PIPE LINE (LPC)	363	540
560	EXTRACTION PIPE LINE (LPC)	380	530
561	EXTRACTION PIPE LINE(LPC)	385	475
562	L.P. EXTRACTION PIPE SHEATHING	925	1325
563	INNER GUIDE PLATE OF DIFFUSER	320	545
564	DIFFUSER (TS)	3300	3350
565	DIFFUSER (GS)	3300	3350
566	AUXILIARIES OF I.P. TURBINE	285	325
567	AUXILIARIES OF I.P. TURBINE	204	284
568	AUXILIARIES OF I.P. TURBINE	204	284
569	LP-GEN. PEDESTAL ASSEMBLY	8054	9100
570	IP-LP PEDESTAL ASSEMBLY	10300	11400
571	SPRING SUPPORT FOR C A P	1350	1550
572	CAP UPPER IP FRONT	612	650
573	CAP UPPER IP FRONT	612	650
574	LP INNER INNER CASING (U/H)	11200	14370

575/1	LP INNER OUTER CASING (L/H) &	23070	27230
575/2	LP INNER CASING ASSY.FASTENERS	820	925
576	LP INNER-INNER CASING (U/H)	6000	6700
578	L.P. ROTOR	45500	48962
579	BEARING PEDESTAL PARTS	609	799
581	STUD HEATING DEVICE AND BREECH	190	315
582	GROMMET SLINGS	50	70
583	IP TURBINE	43722	47558
584	HP TURBINE	47500	51850
585	HP INLET ASSEMBLY	3375	3802
586	H.P.EXHAUST ASSEMBLY	1260	1760
587	HPT RELATED PARTS	276	335
588/1	HP FRONT BEARING PEDESTAL	10175	11320
588/2	HP FRONT BRG. PEDESTAL PARTS	353	520
589	I.P TURBINE PARTS	2200	2450
591	RATING, COLLABORATION AND	25	50
592/1	IP INLET PIPE	983	1150
592/2	IP INLET PIPE	5700	5800
593	OIL FLUSHING AND PRESSURE TEST	102	130
594	HYDRAULIC TURNING GEAR	98	120
600	STEAM BLOWING & HYD. TEST DEV.	1744	2480
601/1	FRAME FOR SUSPENSION	745	755
601/2	FRAME FOR SUSPENSION	745	755
601/3	LOOSE ITEMS FOR SUSPENSION	274	300
602	TOOLS AND PACKING DEVICES	345	645
603/1	SUSPENSION OF VALVE ( IP )	1721	2100
603/2	SUSPENSION OF VALVE ( IP )	1721	2100
604/1	SUSPENSION OF VALVE ( EV )	1937	2537
604/2	SUSPENSION OF VALVE ( EV )	1937	2537
606	ASSEMBLY DEVICE FOR VALVES	123	213
607	CHANGEOVER VALVE	44	50
608	ATT SOLENOID VALVES	76	90
609/1	ESV & CV CASING WITH VALVES	6617	7700
609/2	ESV & CV CASING WITH VALVES	6614	7700
610/1	IV & CV CASING WITH VALVES.	9433	11315
610/2	IV & CV CASING WITH VALVES.	9433	11315
611	ESV SERVOMOTOR , LIMIT SWITCH	2806	3500
612	IV SERVOMOTOR , LIMIT SWITCH	2370	3000
614	HP CONTROL VALVE SERVOMOTOR , LIMIT SWITCH	2932	3800

615	IP CONTROL VALVE SERVOMOTOR , LIMIT SWITCH	2046	2600
616	NRV WITH ACCESSORIES	4900	6673
617	GOVERNING RACK , ACCESSORIES	2180	3000
624/1	FRAME FOR SUSPENSION ( IV)	736	746
624/2	FRAME FOR SUSPENSION ( IV)	736	746
624/3	LOOSE ITEMS FRAME FOR SUSPENSION ( IV)	310	315
709	HOUSING FOR MS STRAINER	2700	2700
710	HOUSING FOR M.S STRAINER	2700	2700
711	STEAM STRAINER ASSEMBLY DEVICE	528	628
714	HOUSING FOR HRH STEAM STRAINER	3200	3200
715	HOUSING FOR HRH STEAM STRAINER	3200	3200
716	STEAM STRAINER (MS)	184	374
717	STEAM STRAINER (HRH)	385	545
718/1	BLANKING ARRANGEMENT FOR MS	770	960
718/2	BLANKING ARRANGEMENT FOR HRH	981	1220
719	STEAM STRAINER HOUSING GASKETS	20	50
720	COMPENSATOR	27.44	50
729	INJECTOR FOR SUC. PIPE NB 400	472	922
<b>TOTAL</b>		<b>453424.44</b>	<b>508920</b>

### **C GENERATOR & EXCITER**

201	FOUNDATION ITEMS OF GENERATOR	3623	3908
202	FOUNDATION ITEMS OF GENERATOR	1975	2509
203	CONSUMABLES FOR FOUNDATION	3	13
204	GENERATOR STATOR	182000	182000
205	GENERATOR ROTOR	43380	47892
206	END SHIELD (TE) LOWER HALF	4763	5693
207	END SHIELD (EE) LOWER HALF	4763	5693
208	GENERATOR COVERS	431	931
209	H.V.BUSHING	480	590
209/1	LOOSE ITEMS OF WOUND STATOR	450	550
213	GENERATOR ACCESSORIES	661	817
214	GENERATOR ACCESSORIES	1166	1586
215	AIR GUIDE RING,INSERT COVER	1320	2940
216	BEARING SHELLS	782	953
217	END SHIELD (EE) UPPER HALF	4385	5315
218	END SHIELD (TE) UPPER HALF	4385	5315
219	SEAL RINGS	48	73
220	DEVICE FOR ROTOR INSERTION	678	1023

221	ERECTION DEVICES	605	1067
222	WIRE ROPES	102	201
223	DRY AIR BLOWER	40	190
224	TERMINAL CONNECTORS	186	506
226	CONSUMABLES	30	45
230	BRUSHLESS EXCITER SET	19864	22203
231	EXCITER FRONT COVER	1487	4122
231/1	RR WHL.COVER & SEALING WALL DE	770	1220
232	EXCITER REAR COVER	1881	3909
233	EXCITER BED PLATE ACCESSORIES	2430	3212
234	EXCITER ACCESSORIES	150	642
236	COOLER RACK ASSEMBLY	801	1551
78431	EXCITER AIR COOLER	772	900
78432	EXCITER AIR COOLER	772	900
		<b>285183</b>	<b>308469</b>
<b>D STATIC AUXILIARIES</b>			
250	SEAL OIL UNIT-I	7660	9160
251	SEAL OIL STORAGE TANK	1025	1460
252	GAS UNIT	572	1150
253	HYDROGEN DISTRIBUTOR	150	333
254	CO2 DISTRIBUTOR	116	247
255	SEAL OIL UNIT-II	2263	3263
256	LIQUID DETECTOR RACK	238	450
260	LOOSE VALVES	759	959
260	CO2 VAPOURISER	145	225
	H2 & CO2 DISTRUBUTORS	1 SET	274
	H2 CYLINDER	120 NOS	7000
	CO2 CYLINDER	63 NOS	3000
	DUPLEX OIL FILTER	1 SET	500
	JACKING OIL FILTER	1 SET	500
78301	GLAND STEAM CONDENSER	785	825
78302	STAND PIPE/LOOSE ITEM (GSC)	150	200
78304	LOOSE ITEMS OF GSC (FRAGILE)	50	100
78305	LOOSE ITEMS GSC(NON FRAGILE)	60	80
78310	DRAIN COOLER	3300	3500
78311	LOOSE ITEMS(DRAIN COOLER)	57	80
78312	DRAIN COOLER	14	24
78313	DRAIN COOLER	1	6
78315	LP HEATER NO.1	10310	10400

78316	LP HEATER NO.1STAND PIPES		56	56
78317	LOOSE ITEMS LP HEATER NO. 1		126	170
78318	LOOSE ITEMS LP HEATER NO. 1		206	230
78321	LP HEATER NO.2		10310	10400
78322	LP HEATER NO.2 STAND PIPES-1		45	45
78323	LP HEATER NO.2 STAND PIPES-2		55	55
78324	LOOSE ITEMS, LP HEATER NO.2		140	180
78325	LOOSE ITEMS, LP HEATER NO.2		280	320
78328	LP HEATER NO.3		10310	10400
78329	LP HEATER NO.3 STAND PIPES-1		45	45
78330	LP HEATER NO.3 STAND PIPES-2		55	55
78331	LOOSE ITEMS, LP HEATER NO.3		220	260
78332	LOOSE ITEMS, LP HEATER NO.3		280	320
605	FIRE PROTECTION VALVE, FILTER,		304	470
700	INJECTOR FOR SUC. PIPE NB350		378	728
701	INJECTOR NB300		455	955
702	MAIN OIL TANK & NOZZLE ARRGT.		9100	9100
703	MAIN OIL TANK & NOZZLE ARRANGE		390	550
705	OIL STRAINERS		168	468
708	VARIABLE ORIFICES THROTTLE VAL		100	115
704	OIL STRIPPER		83	133
78401	TUBRINE OIL COOLER		8100	8300
78402	TUBRINE OIL COOLER		7400	7600
78406	TOC (LOOSE ITEMS)		62	80
78407	TOC (LOOSE ITEMS)		40	60
	DEAERATORSTORAGE TANK( 3 PIECES)	1 SET		56000
	DEAERATOR HEADER	1 SET		14000
	RE JOINT ASSEMBLY	4 SET		45000
	BUTTERFLY VALVES	4 SET		15000
	HPHEATER 5	1 SET		28300
	HPHEATER 6	1 SET		34200
	CONDENSER FLASH TANK -1	1		5500
	CONDENSER FLASH TANK -2	1		9120
	CONDENSER FLASH TANK -3	1		1900
-	PLATFORMS FOR ACTUATER / EQUIPMENT / DEAERATOR		SET	25000
	LP DOSING SYSTEM SKID MOUNTED	2 nos		10000
			<b>TOTAL</b>	<b>338851</b>

**E ROTATING AUXILIARIES**

AUX. OIL PUMP WITH DRIVE	2 NOS	750	1500
EMERGENCY OIL PUMP	1 NOS	1000	1000
JACKING OIL PUMP WITH DRIVE (AC/DC)	1 EACH	1000	2000
VACUUM PUMPS	2 NOS	10500	21000
FAN EXHAUSTER WITH MOTOR FOR GSC	2 NOS	250	500
OIL VAPOUR EXHAUSTER	2 NOS	125	250
OIL CENTRIFUGE (SKID MOUNTED)	1	4500	4500
DUPLEX GAS DRIER WITH CONTROLS	2 SET	200	400
BFP Skid (Pump Assly + Base Plate +Tubing + Seal Coolers)	3 SETS	5775	17325
BP Skid (Pump Assly + Base Plate +Tubing)	3 SETS	2500	7500
BFP MOTORS WITH COOLERS & ACCESSORIES	3 SETS	14000	42000
Hydraulic Coupling	3 SETS	3600	10800
Hydraulic Coupling Working Oil Cooler	3 SETS	1475	4425
Hydraulic Coupling Lube Oil Cooler	3 SETS	775	2325
Suction Strainer at BP Suction	3 SETS	800	2400
BFP Recirculation Valve	3 SETS	350	900
BFP COMMON FOUNDATION FRAME	3 SETS	5000	15000
CEP Assly	2 SETS	5760	11520
CEP MOTORS WITH COOLERS & ACCESSORIES	2 SETS	5000	10000
Canister	2 SETS	1215	2430
CEP Foundation Ring	2 SETS	180	360
CEP Suction Strainer	2 SETS	850	1700
Condenser Hotwell Make Up Pump	2 SETS	800	1600
			<b>161435</b>

**ANNEXURE - IV (A,B,C &D)**  
**TENTATIVE WEIGHT SCHEDULE**  
**SUMMARY OF WEIGHTS (PER UNIT)**

	WEIGHT PER UNIT
<b>A INTEGRAL AND POWER CYCLE PIPING</b>	<b>327 MT</b>
<b>B LP PIPING</b>	<b>82 MT</b>
<b>C PLATFORMS / STRUCTURES</b>	<b>5 MT</b>
<b>D INSULATION (ON PPG &amp; EQP)</b>	<b>65 MT</b>

**A INTEGRAL AND POWER CYCLE PIPING.**

**WEIGHTS OF PIPING SYSTEMS INCLUDING SUPPORTS, VALVES AND FITTINGS.**

DESCRIPTION	APPROX WT. IN KG
LUB OIL	10000
CON.OIL	12000
COND.SPRAY	2000
TURBINE DRAINAGE	5000
SEAL STEAM	10000
SEAL OIL	5000
GAS SYS.	5000
WASTE GAS SYS	3000
DRAINS & VENTS	10015
BFP/CEP INTEGRAL PIPING	4734
METALLIC EXPANSION BELLOWS	2800
80-312 LPBP VALVE UPSTREAM AND DOWNSTREAM	23950
80-322 CRH PIPING TO DEAERATING HEATER	7650
80-330 EXTRACTION STEAM TO LP HEATER-1	3150
80-331 EXTRACTION STEAM TO LP HEATER-2	1100
80-332 EXTRACTION STEAM TO LP HEATER-3	750
80-335 EXTRACTION STEAM TO DEAERATING HEATER	5250
80-336 EXTRACTION STEAM TO HP HEATER NO.1	2200
80-337 EXTRACTION STEAM TO HP HEATER-2	1000
80-347 AUX STEAM TO SJAE - TG SCOPE	2100
80-349 AUX STEAM TO GLAND SEALS - TG SCOPE	23000
80-381 HP HEATER VENTS - TG SCOPE	1000
80-382 LP HEATER VENTS	1100
80-387 CONDENSATE PUMP VENT	700
80-388 CONDENSER AIR EVACUATION PIPING	8400

80-400	CONDENSATE SUCTION	2150
80-401	CD FROM PUMP TO LPH1/DC INLET TEE AND RE	8000
80-402	CD FROM LPH1/DC INLET TEE TO TG TP	15350
80-406	CD TO AND FROM GLAND STEAM COOLER	3150
80-407	CONDENSATE FOR SEALING OF VACUUM	1600
80-418	ERECTION MATERIALS FOR INSTRUMENTS	750
80-435	UNLISTED SPRAY WATER - TG SCOPE	2850
80-439	TURBINE FLASH TANK DRAIN TO CONDENSER	2050
80-441	STEAM JET AIR EJECTOR DRAINS	1300
80-442	GLAND STEAM COOLER DRAINS	400
80-444	LP HEATER-2/3/4/5 DRAINS AND DRIP PUMP I	3000
80-447	HP HEATER DRAINS	15650
80-449	TG CYCLE PIPING DRAINS AND VENTS	7550
80-922	H AND S FOR LIGHT UP - NON STEAM LINES	6250
80-923	H AND S FOR STEAM BLOWING	30000
80-928	H AND S FOR BOILER LIGHT UP - TG	37300
80-930	H AND S FOR SYNCHRONISATION - TG	39200

<b>TOTAL</b>	<b>327449</b>
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**B LP PIPING.**

80-464	TG AUX COOLING WATER - COMBINED SYSTEM	58850
80-468	MAIN CIRCULATION WATER PIPING	18600
80-612	SERVICE AIR FOR INDIVIDUAL UNITS	2900
80-616	INSTRUMENT AIR FOR INDIVIDUAL UNIT	1400
		<b>81750</b>

**C PLATFORM / STRUCTURES**

ADDITIONAL PLATFORM / STRUCTURES INCLUDING a FRAMES, BEAMS, LADDERS, STAIRS, HANDRAILS ETC.	<b>5000</b>
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**D INSULATION**

THERMAL INSULATION INCLUDING MINERAL WOOL, PIPE SECTIONS, IRON PARTS, CLAMPS, RETAINERS, BINDING WIRES, WIRE NETTING & CLADDING	<b>65000</b>
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**NOTES:**

Weights of piping systems include supports, valves and fittings.

1. All the above systems include pipe, bends, valves, fittings etc. to make the system complete in all respect.
2. Above system of piping can be re-grouped / renamed or any addition/deletion in the system can be made in order to make the system complete as per requirements.
3. Piping systems mentioned above are only indicative and does not cover all the systems to be erected / commissioned. Contractors are however are required to erect/commission all piping systems shown in the drawings and other document which may be necessary for erection, completion and overall commissioning of entire work.
4. During the course of fabrication and supply it is possible that similar materials of different codes can be used. No compensation is payable on this account.
5. Out of above pipings indicated, stainless steel piping is approx. 2 MT, Alloy steel piping is approx. 10 MT. The remaining pipings are of carbon steel.
6. The tonnages indicated are tentative only and may vary during execution of work. Payment shall be released on the basis of actual work executed as per final accepted rates.
7. The bidders may not quote/accepting tonnage rates for subject work.
8. In case weight for any item is not available the contractor shall submit the approx. weight based on physical dimensions and relevant standards, for approval of the Construction Manager. His decision in the matter shall be final.

**ANNEXURE-V**

<b>LIST OF T&amp;P and IMTEs being provided by BHEL for use of contractor free of hire charges on sharing basis.</b>			
<b>S.NO.</b>	<b>EQUIPMENT</b>	<b>CAPACITY</b>	<b>QTY</b>
<b>T&amp;Ps</b>			
1.	EOT Crane (in T.G. hall)	125T / 25T	2 Nos.
2.	Crawler crane (for lifting of FST & De-aerator)	200 / 250 T	1 No.
3.	Crawler crane	75 T	1 No.
4.	Motorised hydraulic test pump		One Set
5.	Bolt stretching device		One Set
6.	Chemical Cleaning Arrangement ###	By BHEL agency	1 set
<b>SPECIAL T&amp;Ps</b>			
7	Slings for lifting turbine rotors with lifting beam		One Set
8	Slings for lifting generator stator with lifting beam		One Set

**Notes:**

- Any other special T&P if supplied by the manufacturer and available with the customer will also be provided to the contractor free of hire charges as and when made available. Special tools and tackles are to be used only for the purpose for which these are meant and to be returned in good condition. However low height jack may not be made available and will have to be arranged for by the contractor.
- Other terms and conditions regarding above items shall be as per clause no. 38 (T&P/IMTEs)
- The Cranes at Sl No 2 , 3 will be provided as per requirement and for special package handling only at the discretion of the BHEL Engineer**
- ### Please refer to Clause No 46.4

## ANNEXURE-VI

<b>INDICATIVE LIST OF MAJOR T&amp;P TO BE PROVIDED BY CONTRACTOR AT HIS OWN COST.</b>			
<b>S.NO.</b>	<b>EQUIPMENT</b>	<b>CAPACITY</b>	<b>QTY</b>
1.	Welding Generators, Transformers, Rectifiers And Tig Welding Machine		Adequate numbers.
2.	Mobile crane	18 / 20 T	As per Requirement (APR)
3.	Low Bed Trailer	60 MT	APR
4.	Trailer with Pulling Unit	10 / 20 MT	1 no
5.	Hydra	10 / 15 MT	2 nos
6.	Hydraulic Jack (Low Height)	25/50/100T	Adequate numbers.
7.	Screw Jacks	5/10/25/50T	Adequate numbers.
8.	Hydraulic Pipe Bending Machine (Manual and Motorised )		1 number each .
9.	Stress Relieving Sets, including oil cooled transformers, heating coils, panels Recorders Etc.		Adequate numbers.
10.	Vacuum Cleaner (Industrial)		1 number.
11.	Surafce Grinder and other Workshop Equipment		1 set.
12.	Electric Winches		Adequate numbers.
13.	Torque Tension Meter/ Wrench Upto 1000ft Lbs Range		1 number.
14.	Electronic / Electrical Tube Expander (With Tools)		3 number.
15.	Air Compressor	140/210 CFM	1 number.
<b>NOTES:</b>			
1.	The above list specifies only major T&P (may not be complete to be deployed by the contractor. All additional / other tools and plants which are required for satisfactory & timely completion of work shall also be deployed by the contractor within finally accepted rate / price.		
2.	Other terms and conditions regarding above items please also refer clause 38 (T&P/ IMTEs).		

## ANNEXURE-VII

<b>TENTATIVE LIST OF MAJOR TESTING INSTRUMENTS / EQUIPMENT TO BE ARRANGED BY CONTRACTOR AT HIS OWN COST.</b>				
<b>SL. No.</b>	<b>DESCRIPTION</b>	<b>RANGE</b>	<b>ACCURACY</b>	<b>QTY</b>
1.	Hand operated Megger	Up to 200 M ohms 500V/ 1000V	$\pm 5\%$ at center scale $\pm 10\%$ at end of scale	2 No.
2.	Digital Multimeter 3½ digit	Voltage 200 mV to 1000V	$\pm 1\%+1$ digit	2 No.
		Current 200 mA to 10A DC	$\pm 0.8\%+1$ digit	
		Current 20 mA to 20A AC	$\pm 0.8\%+1$ digit	
		Resist 200 ohms to 20M ohms	$\pm 0.5\%+1$ digit	
3.	Dumpy level	0 to 350 mm	LC-0.01	1 No.
4.	Surface plate	Up to 1.0 Sq. Mtr	Grade 1,2,3	1 No
5.	Straight Edge	Up to 2 Mtr long	Grade 1,2,3	1 No.
6.	Temperature recorder for 0-1000C 6/12 points with thermo couples / rods and compensating cable			2 Sets
7.	Master pressure gauge	0 – 4 Kg/cm <sup>2</sup>	0.02	1 No.
<b>NOTES:</b>				
1.	The above list of testing instruments/equipment required for testing / commissioning is only for guidance to contractor and not complete. Any other / additional testing instruments / equipment required for timely and satisfactory completion of job will also be arranged by contractor at his own cost.			
2.	Contractor must re-ascertain / recheck range and accuracy of each IMTE from BHEL Engineer well in advance before arranging calibration / deployment.			
3.	Other terms and conditions regarding above items shall be as per clause no. 38 (tools & plants / testing & measuring instruments).			

**ANNEXURE-VIII**

**CERTIFICATE OF DECLARATION FOR CONFIRMING THE KNOWLEDGE OF SITE CONDITIONS**

We,.....  
..... Hereby declare and confirm that we have visited the project site under the subject namely, .....and acquired full knowledge and information about the *site conditions, wage structure, Industrial climate and total work involved*. We further confirm that the above information is true and correct and we will not raise any claim of any nature due to lack of knowledge of site condition.

Tenderers Name and Address

Place: (Signature of the Tenderer with stamp)

Date:

**ANNEXURE-IX**

**NON DISCLOSURE AGREEMENT  
Memorandum of Understanding**

BHEL PSNR is committed to Information Security Management System as per Information Security Policy.

M/s....., providing.....service to BHEL PSNR, Noida hereby undertake to comply with the following in line with Information Security Policy of BHEL PSNR;

- To maintain confidentiality of documents & information which shall be used during the execution of the Contract.
- The documents & information shall not be revealed to or shared with third party which shall not be in the business interest of BHEL PSNR.

(  
M/s. BHEL, PSNR )

(  
M/s..... )

**ANNEXURE-X****GENERAL TERMS AND CONDITIONS OF REVERSE AUCTION (RA)**

Against this NIT for the subject work, **tender shall be processed through Reverse Auction mode i.e., ON LINE BIDDING ON INTERNET. The General Terms and Conditions of the RA shall be as follows;**

1. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
2. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.
3. BHEL will inform to the vendor in writing, in case of reverse auction along with the details of Service Provider to enable them to contact & get trained.
4. **'Business rules'** like event date, time, Start price, bid decrement, extensions etc. also will be communicated through service provider for compliance.
5. Vendors have to fax the Compliance form in the prescribed format (provided by Service provider) before start of Reverse auction. Without this, the vendor will not be eligible to Participate in the event.
6. BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at "Total Contract Value (Tentative) Based on Rate Schedule/BOQ".
7. Reverse auction will be conducted on scheduled date & time.
8. At the end of Reverse Auction event, the lowest bidder value will be known on the network.
9. The lowest bidder has to Fax the duly signed Filled-in prescribed format as provided on case-to-case basis to BHEL through Service provider within 24 hours of Auction without fail.
10. During Reverse Auction, if no bid is received within the specified time, BHEL at its discretion, may decide to revise opening price/scrap the reverse auction process/proceed with conventional mode of tendering.
11. **Sealed bid Reverse Auction:** The opening bid (In the initial auction) of the bidders shall be same as that quoted in their Final Sealed price submitted to BHEL. **The bidders shall confirm in writing to BHEL that their opening bid (In both cases) shall be same as that quoted in their final sealed price bids submitted to BHEL against this NIT along with Technical Bid (Part-I).**
12. BHEL reserves the right to cancel Reverse Auction (RA) without assigning any reasons and resort to considering the sealed bids submitted by vendor for processing and finalizing the tender.
13. Any variation between the on-line bid value and the signed document will be considered as sabotaging the tender process and will invite disqualification of vendor to conduct business with BHEL as per prevailing procedure.
14. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL shall be opened as per BHEL's standard practice.
15. Bids-given by the bidders during the Reverse Auction process will be taken as an offer to execute the work. Bids once made by the bidder, can not be cancelled/withdrawn and bidders shall be bound to execute the work as mentioned above at the final bid price. Should be bidder (Lowest) back out and not execute the contract as per the rates quoted, BHEL shall take action as appropriate.

**ANNEXURE - XI**

**FORMAT OF UNDERTAKING**  
**(To be submitted in the bidder's letter head)**

**Bharat Heavy Electricals Limited**  
**Power Sector – Northren Region,**  
**Plot No. 25 , Sector - 16A ,**  
**Distt. Gautam Budh Nagar,**  
**NOIDA – 201 301.INDIA**

**Sub.:** Erection, testing, commissioning and trial operation of and handing over of 1 x 195 MW TG set with auxiliaries and piping at KOTA Thermal Project, Rajasthan .

Dear Sirs,

With reference to above, this is to confirm that as per tender conditions, we have visited [Kota site](#) before submission of our offer and noted the job content & site conditions etc.

We also confirm that we have not changed / modified the tender documents as appeared in the website and in case of observance at any stage, it shall be treated as null and void. We hereby confirm that we have not taken any deviation from tender clauses together with other references as enumerated in the above referred NIT and confirm our acceptance to reverse auctioning process and we hereby convey our unqualified acceptance to all terms and conditions as stipulated in the tender and NIT. In the event of observance of any deviation in any part of our offer at a later date whether implicit or explicit, the deviations shall stand null & void.

We confirm to have submitted offer strictly in accordance with tender instructions.

Thanking you,

Yours faithfully,

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

**ANNEXURE-VIII****RATE SCHEDULE**

<b>SL NO.</b>	<b>DESCRIPTION</b>	<b>LS PRICE/ RATE IN RUPEES</b>
<b>1.</b>	Lumpsum price for complete scope of work as per tender specification for items indicated under Annexure-III for 1X 195 MW TG sets including auxiliaries & common system equipments & auxiliaries.. <b>(Items as per Annexure- III.)</b>	
<b>2.</b>	Rate in Rs. / MT for complete scope of work as per tender specification for piping systems <b>indicated under Annexure- IV item- A.</b>	
	(a) Carbon steel piping system ( Approx. 315 MT)	
	(b) Alloy steel piping system ( Approx 10 MT)	
	(c) Stainless steel piping system ( Approx. 2 MT)	
<b>3.</b>	Rate in Rs / MT for complete scope of work as per tender specification for LP piping systems <b>indicated under Annexure-IV-Item B.</b>  (Approximately 82 MT)	
<b>4.</b>	Rate in Rs/MT for fabrication and installation of additional platforms, structures, ladders and H&S as per site requirement and which are not indicated in the drawing <b>indicated under Annexure-IV-Item-C.</b> (Approximately 5 MT )	
<b>5.</b>	Rate in Rs / MT for complete work as per tender specification for application of insulation of equipments, auxiliaries and piping etc <b>indicated under Annexure-IV-Item-D..</b> (Approximately 65 MT)	

(Seal and Signature of Tenderer)

**NOTES :**

1. The piping system include pipe, bends, fitting etc. To make the system complete in all respect & payment will be released for above items as per applicable rates against rates for Item No 2 or 3 of Rate schedule , as applicable. The structure, platforms & auxiliaries required for completion of piping systems will be payable as per rates against iten No. 4 of Rate schedule.
2. The rate shall be entered in figures as well as in words. In case of difference in rates between words and figures, the lesser of the two will be treated as valid rate.