

FOR OFFICIAL USE ONLY

TENDERER'S COPY

NOT FOR PUBLICATION

ORIGINAL COPY

# **TENDER SPECIFICATIONS**

**TENDER NO. BHEL:NR(SCT): MANGLAM:CMT:383**

**FOR**

**TENDER FOR THE “WORK OF MATERIALS HANDLING OF ALL ITEMS AND  
ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION & HANDING  
OVER OF 1X17.5 MW STG, ELECTRICAL & INSTRUMENTATION  
EQUIPMENTS AT MANGLAM CEMENT LTD, MORAK, 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  
Fax 091-0120-2515464 / 2515467  
Email: [sku@bhelsnr.co.in](mailto:sku@bhelsnr.co.in) / [msd@bhelsnr.co.in](mailto:msd@bhelsnr.co.in)

**TENDER NO. BHEL:NR(SCT): MANGLAM:CMT:383**

#### 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-----

-----

-----

-----

**INDEX**

<b>Sl. No.</b>	<b>CONTENTS</b>	<b>PAGE</b>
1.	Tender Notice	04-05
2.	Tender Notice- Newspaper	06
3.	Procedure for submission of tender	07
4.	Project Synopsis	08
5.	General Conditions of Contract (GCC)	09-60
6.	Special Conditions of Contract (SCC)- <b>Section-III "A"</b>	61-102
7.	Special Conditions of Contract (SCC )- <b>Section-III "B"</b> For Material Handling	103-111
8.	Special Conditions of Contract (SCC )- <b>Section-III "C"</b> For ETC of STG	112-118
9.	Special Conditions of Contract (SCC )- <b>Section-III "D"</b> For Electrical & Instrumentation	119-132
10.	<b>Annexure-IA</b> -Terminal Points	133
11.	<b>Annexure-IB</b> --Exclusions	134
12.	<b>Annexure-II A</b> --List of T&Ps being provided by BHEL for use of Contracor free of hire charges and on SHARING BASIS	135
13.	<b>Annexure-II B</b> -List of MAJOR T&Ps to be arranged by Contracor at his own cost	136
14.	<b>Annexure-IIC</b> --List of IMTEs to be arranged by Contracor at his own cost	137-138
15.	<b>Annexure-IID</b> -- T&Ps to be arranged by Contracor for electrical works.	139
16.	<b>Annexure-IIE</b> —List of IMTEs to be arranged by Contracor for electrical works.	140
17.	<b>Annexure-IIF</b> - List of IMTEs to be arranged by Contracor for C&I works	141-142
18.	<b>Annexure-III, IV, V &amp; VIIIA</b> (WT SCH, BILLING BREAK UP, HSE OF M/s MANGLAM)	Attached Separately
19.	<b>Annexure-VI</b> - Certificate of declaration for confirming the knowledge of the site condition	143
20.	<b>Annexure-VII</b> - NON DISCLOSURE AGREEMENT	144
21.	<b>Annexure-VIII</b> -RATE SCHEDULE "A","B"&"C"	145-150



**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  
Fax 091-0120-2515464 / 2515467

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

Email: [sku@bhelsnr.co.in](mailto:sku@bhelsnr.co.in) / [msd@bhelsnr.co.in](mailto:msd@bhelsnr.co.in)

### TENDER NOTICE

Sealed tenders are invited from the contractors fulfilling qualifying requirements for the “**Work of materials handling of all items and erection, testing, commissioning, trial operation & handing over of 1x17.5 MW STG, Electrical & Instrumentation Equipments at Manglam Cement Ltd, Morak, Rajasthan**”

**TENDER NO. BHEL:NR(SCT): MANGLAM:CMT:383**

#### QUALIFYING REQUIREMENTS:

1. “Tenderers who wish to participate should have executed during last five years works of erection, testing & commissioning of TG in power plant/ industrial unit, with one single contract valuing Rs. 35 Lacs (Approx) ‘OR’ Two contracts each valuing Rs. 22 Lacs (Approx)”
2. Party should also have an average annual turnover of minimum of Rs. 110 Lacs (Rupees One Hundred Ten Lacs only) during preceding three years(2003-04, 2004-05 and 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.—150 Pages
  - (b) ANNEXURE – III, IV, V & VIIIA--- 8 Pages
  - (c) Rate Schedule – 7 Pages (Rate Schedule-‘A’, ‘B’ & ‘C’)
- (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 17.01.2007** 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 17.01.2007** before opening of technical bids commences. Technical bids shall **be opened at 15.30 Hrs. on 17.01.2007**. 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 1,00,000/-** 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) Unsolicited rebate/discount shall not be accepted after bid opening.
- (xi) Purchase Preference will be given to CPSUs as per Govt. Guidelines.

**AGM/SCP**



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  
Fax 091-0120-2515464 / 2515467  
Email: [sku@bhelsnr.co.in](mailto:sku@bhelsnr.co.in) / [msd@bhelsnr.co.in](mailto:msd@bhelsnr.co.in)

## TENDER NOTICE - NEWSPAPER

LAST DATE OF SALE : 17.01.2007  
DATE OF OPENING : 17.01.2007

NIT NO. / NAME OF WORK
<p style="text-align: center;"><b>TENDER NO. BHEL:NR(SCT): MANGLAM:CMT:383</b></p> <p>Sealed tenders are invited from the contractors fulfilling qualifying requirements for the " <b>Work of materials handling of all items and erection, testing, commissioning, trial operation &amp; handing over of 1x17.5 MW STG, Electrical &amp; Instrumentation Equipments at Manglam Cement Ltd, Morak, 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.

**AGM/SCP**

**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**

**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. **Price bids for Part-A and Part-B of Works must be in separate sealed covers indicating clearly the respective “Part of Work ” and tender specification no. etc. on their covers.**

**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 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 and no duplicate copy of same is required.

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 : Mangalam Cement Ltd ,
2. Address : Captive Power Plant  
Mangalam Cement Ltd  
Morak , District Kota  
Rajasthan
3. Installed capacity : New project
4. New Installation : 1 x 17.5 MW
5. Nearest Railway station : Ramganj Mandi -- 10 km  
  
Kota - 70 km  
  
Morak - 4 KM
6. Nearest City : Kota ( 70 km by road on Kota – Jhalawar Highway  
  
NH-12 )  
  
Rawatbhata - 70 KM
7. Nearest Airport : Jaipur - 450 km
8. Maximum Temperature : 48 Deg C
9. Minimum temperature : 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-'I'** 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 its 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 tonnage	Contract value
1	2	3	4	5	6	7

%age work completed and due if date for completion	if job is already over	Date of completion unskilled workers	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 M/cs supplied ----- By Con- Tractor	Consumables by whom By other Agency
8	9	10	11	12	13	14

TENDERER)

(SIGNATURE OF

WITH STAMP

## ANNEXURE – C

## MONTHWISE MANPOWER DEPLOYMENT PLAN

S.No.	Category No. of	Person available on roll of the Orga- nisation	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 &amp; PLANTS

S.No.	Name of proposed Equipment deployed	Quantity owned	Registration no. wherever Applicable	Documents enclosed for proof of Ownership	Present Location	Quantity to be for this job
-------	-------------------------------------	----------------	--------------------------------------	---	------------------	-----------------------------

## (B) MONTHWISE T&amp;P DEPLOYMENT PLAN

S.No.	Description of T & P	Month (Indicate No. to be deployed in each month)							
		1st	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 REMARKS	PERCENTAGE OF THE UNIT RATE QUOTED
-----	-----	-----
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  
(in the format as per Annexure-E)  
Yes/No
16. Declaration sheet as per clause 11.09  
(in the format as per Annexure-F)  
Yes/No

Date \_\_\_\_\_

(SIGNATURE OF TENDERER)  
WITH STAMP

WITNESS  
(SIGNATURES WITH FULL PARTICULARS)

1.

2.

## ANNEXURE - I

**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

(CONTRACTOR)

(to be signed by a person

holding

a valid Power of Attorney)

1.

2.

WITNESS

(For and on behalf of BHEL)

1.

2.

## ANNEXURE – H

**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.<br>Place,   | 11. Standard Chartered Bank,<br>H2 Block, Connaught<br><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. |

- |  |  |
|--|--|
| 5. 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. |
| 6. 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.           |
| 7. State Bank of Mysore,<br>Industrial Finance Branch,<br>18, Ramanashree Arcade,<br>M.G. Road, Bangaloe – 560001. |  |
| 8. State Bank of Travancore,<br>Travancore House, IF Branch,<br>K.G. Marg, New Delhi – 110001.                     |  |
| 9. 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 :

- a. General Conditions of Contract (GCC)
- b. Special Conditions of Contract (SCC)
- c. Scope of work
- d. Relevant IS Codes (refer Annexure-I)
- e. Reporting Formats (refer Annexure-II)

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

**b. 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/ officer, as above.  
(for every 500 or less)

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 :
- i. All surplus earth and debris are removed / disposed off from the working areas to identified locations (s).
  - ii. Unused/Surplus Cables, Steel items and steel scrap lying scattered at different places within the working areas are removed to identified locations (s).
  - iii. All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from work place to identified location(s).
  - iv. 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.
  - v. Fabricated steel structurals, pipes & piping materials shall be stacked properly for erection.
  - vi. Water logging on roads shall not be allowed.
  - vii. No parking of trucks/trolleys, cranes and trailers etc., shall be allowed on roads which may obstruct the traffic movement.

- viii. Utmost care shall be taken to ensure over all cleanliness and proper upkeep of the working areas.
- ix. 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 :
- f. arrange workmen compensation insurance, registration under ESI Act, third party liability insurance etc., as applicable.
  - g. 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.
  - h. 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.
  - i. 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.
  - j. Display at site office and work locations caution boards, list of hospitals, emergency services available.
  - k. Display posters, banners made available by BHEL for safe working to promote safety consciousness.
  - l. Assist in HSE audits by BHEL / Owner and submit compliance report.
  - m. Generate and submit HSE records / report as per HSE plan.
  - n. 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) Cotton Gloves)	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 and repair	Code of practice for selections, care 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 &amp; ENVIRONMENT (HSE) PLAN

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

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

(To be prepared by each construction Agency)

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

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 COMPLANCE REPORT (Contd.3/6)**

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

**HOIST. CRANES AND DERRICKS**

Condition of cables and sheaves OK

Condition of slings, chains, hooks &amp; eyes O.K.

Inspection and maintenance logs maintained

Outriggers used

Signs/barricades provided

Signals observed and understood

Qualified operators

Other

**MACHINERY, TOOLS AND EQUIPMENT**

Proper instruction

Safety devices

Proper cords

Inspection and maintenance

Other

**VECHICLE AND TRAFFIC**

Rules and regulations observed

Inspection and maintenance

Licensed drivers

Other

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

ITEM ACTION	YES	NO	REMARKS
<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 COMPLIANCE REPORT (Contd.5/6)**

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

**HANDLING AND STORAGE OF MATERIALS**

Properly stored or stacked

Passageways clear

Other

**FLAMMABLE GASES AND LIQUIDS**

Containers clearly identified

Proper storage

Fire extinguishers nearby

Other

**WORKING AT HEIGHT**

Erection plan

Safety belts and lanyards; chute lines

Other

**ENVIRONMENT**

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 properlyDisposal of surplus earth, stripping materials,  
Oily rags and combustible materials done  
Properly



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

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

Green belt protection

Hygienic conditions at labour camps O.K?

Availability of First Aid facilities

Proper sanitation at site, office and  
Labour camps

Arrangement of medical facilities

Measures for dealing with illness

Availability of Potable drinking water  
For workmen & staff

_____	<b>Signature of</b>
<b><u>Resident</u></b>	<b><u>Engineer with</u></b>
_____	
<b><u>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**

**INTIMATION TO LOCAL AUTHORITIES**

**DATE:** \_\_\_\_\_ **SIGNATURE OF CONTRACTOR**  
**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 PRACTITIONER, 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 &amp; Name)

To: SITE-IN-CHARGE,BHEL 1 COPY

**SECTION - III `A'****SPECIAL CONDITIONS OF CONTRACT****INDEX**

<b>Clause</b>	<b>DESCRIPTION</b>
34	General
35	Preliminary work
36	Civil works, foundation and grouting
37	Consumables
38	Tools & Plants/ IMTE's
39	Supervisory staff & workmen
40	Material handling and storage
41	Preservation of components
42	Cleaning of equipment
43	Erection
44	Welding, HT, RG & NDT
45	Application of Insulation
46	Testing, Pre-Commissioning, Commissioning & Post-Commissioning
47	NOT APPLICABLE
48	Finish Painting
49	Progress reporting
50	Drawings & documents
51	Taxes, Duties & Octroi
52	Extra work
53	Price Variation
54	Rate schedule
55	Instructions to tenderers
56	Payment Terms
57	Time Schedule
58	Over run
59	Facilities to be provided by BHEL/Contractor

## 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 Scope under this contract consists of the following systems of the 17.5 MW STG set being supplied by BHEL:

- a) Material handling Work of the complete equipments being supplied under this contract .
- b) Receipt, Transportation, Installation, commissioning and Handing over of Mechanical Equipments being supplied under this contract .
- c) Receipt , Transportation, Installation, commissioning and Handing over of Electrical and Instrumentation Equipments being supplied under this contract

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 equipment 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.

**34-5A BHEL-Power Sector(NR) is ISO 9001-2000, ISO 14001-1996, OHSAS 18001-1999, BS 7799 and SA-8000 certified company. Quality of work, to customer's satisfaction and system requirements is the essence of these certifications. The contractor in all respects will organize his work, systems, environment, process control documentation, tools, plant, inspection, measuring and testing equipments etc. as per instructions of BHEL engineer.**

**The contractor shall also comply with applicable legislation and regulations with regards to Health, Safety and Environmental aspects for minimizing risk arising from occupational health & safety hazards, controlling pollution and wastage. The Contractor will be responsible for Health, Safety & Environment management (HSE) at site for the construction activities to be carried out by them in accordance with requirements given under section I (a) of GCC and elsewhere in this tender document. The contractor, who is awarded the work, shall have to sign an MOU w.r.t implementation of HSE conditions with BHEL (Safe Work Practices).**

**34.5B**

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.

**34.5C** 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.

**34.5D** The Specific HSE requirements of the Customer **indicated in Annexure-VIIIA** shall also to be complied by the Contractor.

**34.6** In order to meet the environmental concerns, it is expected that the contractor shall plant, protect and maintain at least 25 trees in the vicinity of the project as per advise of BHEL Engineer.

### **35.0 PRELIMINARY WORKS**

**35.1** The contractor shall, as a first field activity check the foundations for equipments e.g 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 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** For the TG works, 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 be 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.

- 36.4** Entire grouting work of foundation bolt grouting, base plate grouting etc. including materials will be carried out by another agency carrying out Civil work . Contractor for subject work has to offer neat & clean foundations to the Civil Contractor to ensure perfect grouting. While grouting will be carried out by other agency, 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.

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.

- 36.5** 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.

- 36.6** All 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 the Engineer .

- 36.7** For the Civil Works carried out by the Contractor , the contractor shall prepare the required test pieces / cubes to ensure the strength of the grout and get the same tested in the laboratory at his cost as directed by BHEL Engineer at his cost .

- 36.8** After grouting the Contractor shall check and verify the alignment of the equipment , alignment of shafts of rotating machinery , slopes of all bearing pedestals , centering of rotors with respect to their sealing bores , coupling etc , as applicable and the like items to ensure that no displacement has taken place during grouting . The values recorded prior to grouting shall be used during post grouting check and verification . Such pre and post grout records of alignment details shall be maintained by the contractor in a manner acceptable to the Engineer .

### **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 **(Annexure-IIA)** 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 **(Indicative lists given at Annexure- II B TO Annexure- IIF)** required for successful and timely execution of the works 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.

BHEL may be deploying separate group for the major maintenance of the cranes . Maintenance of other BHEL equipments shall be carried out by the contractor . The contractor should make available the equipment to the maintenance agency as per schedule . It is essential that the activities be so planned that the planned outage does not suffer on account of maintenance on critical construction equipment . The contractor will provide all assistance required by way of semi-skilled , labour and welders .

- 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 by the customer. The contractor has to submit his weekly requirement in advance . However slings etc are to be provided by the contractor .
- 38.19** Cranes and transport vehicles which will be normally required to be deployed by the contractor for the execution of this work is indicated **in the Annexure-IIB**. All the material handling equipment of the contractor shall have valid permit renewable from time to time for operation in working areas / project sites etc and transportation in respective states . All supervision and labour required for maintenance and attending breakdowns shall be arranged by the contractor at his own cost.
- 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.
- 38.20** All necessary lifting tackles , tools , wires ropes / slings of suitable capacities , distribution boards, connecting cables / welding cables, wire ropes, hoses etc. including temporary air/water/ electrical connections etc required for his operation, shall have to be arranged by the contractor at his own cost and in sufficient numbers . **Availability of Fitness certificates of all T&P and tools and tackles is essential before being put to use** .All such equipments shall be approved by the Engineer , before these are actually used for the works . However such approvals shall not relieve the contractor of his responsibilities .
- 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 It shall be the responsibility of the contractor to ensure safe lifting of the equipment, taking due precautions to avoid any accident and damage to other equipment and personnel. Contractor shall be liable for all accidents, damages etc. to personnel and equipment etc. during the execution of the work.**

**39.11** 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.

**39.12 The contractor under this contract will also provide free of cost** the services of ( for assistance of BHEL Engineer and Office ) 1 no Qualified Computer operator for 5 man months , Skilled worker and Unskilled worker for 10 man months in each category. **The persons so deployed will be required to work in extended hours .**

The computer operator should be fluent in English typing , have computer qualification / working knowledge equivalent to O-Level , and preferably have shorthand knowledge .

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

**40.1** The Receipt , Unloading , Verification , Storing and Stacking of all materials in this contract is in the scope of the Contractor . All the equipment for Erection 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** 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.

- a)** Items stored outdoors shall be blocked up at least six inches (150mm) off the ground.
- b)** 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.
- c)** Bearings and other wearing surfaces of plant materials shall be protected against corrosion and kept clean.
- d)** 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 EQUIPMENT**

**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**

Details and scope for Erection of Mechanical systems is described below. **For Electrical systems refer to clause 65.0 of this NIT**

- 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 including NDT / HR within finally accepted price / rate as per instructions of Engineer.

- 43.6** Not applicable
- 43.7** Nor Applicable
- 43.8** Not Applicable
- 43.9** The contractor shall carry out the ASSISTANCE FOR condenser neck welding with casing only after final installation of casing.
- 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

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 motorised 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> 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** Not Applicable

**43.45** Not Applicable .

**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** Not applicable

**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 Engineer shall prepare as per direction of BHEL Engineer the 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 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** Details and scope for Testing and commissioning of Mechanical systems is described below . **For Testing and commissioning of Electrical and Instrumentation , refer to the Clause No 66.0 of this NIT.**

**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 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, alkali flushing, oil flushing, steam blowing etc., will be supplied by BHEL / its customer.

**For carrying out the chemical cleaning of Piping erected under this contract , the contractor has to erect all equipment including tanks, chemical cleaning pumps, their filters and electrical switchgear along with their accessories as per the procedure approved by BHEL . Wherever required , the Contractor will be responsible for their servicing and their operation during the activities. He will also service the same before and after the completion of the activity. Fabrication of mixing tank is included in scope. Material for the same will be provided by BHEL.**

**All temporary piping along with their supports for steam blowing, chemical cleaning and effluent disposal are to be erected.**

**The contractor will service and overhaul the equipment being erected by him. He 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 all 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** Not applicable
- 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.
- 46.21** For Testing and commissioning of Electrical and Instrumentation , refer to the Clause No 65
- 47.0** Not applicable
- 48.0** **FINISH PAINTING**
- 48.1** All exposed metal parts of the Mechanical 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** All Electrical equipment within the scope of these specifications shall be received duly painted. However during storage and handling the same may get peeled off / damaged / deteriorate. All such surfaces are to be thoroughly cleaned and to be touch up painted with suitable approved primer / finish paint matching with shop paint / approved final colour. Besides above two coats of approved primer paint and at least two or more coats of approved finish paint to get the desired dry film thickness, is to be applied on unpainted surface various loose equipment, all impulse lines and structures fabricated and erected at site. All paints, tools and other consumables including scaffolding materials required for painting shall be arranged and provided by contractor within the quoted rates. Paint and other materials so purchased shall be ISI marked and painting should be as per colour scheme and quality approved / specified by Engineer. The contractor shall provide legend on equipment in size specified by Engineer. Letter writing shall be done in Hindi / English or in both language. The printer have to under go test and only qualified painters will be allowed to work.

Certain equipment shall require spray painting (touch up). The contractor shall make arrangements of the required equipment for spray painting of such equipment at his own cost. Spray painting at the job site shall be permitted only at times and locations approved by the BHEL's customer / BHEL 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 should use proper protective equipment to

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 TAXES , DUTIES AND OCTROI CHARGES**

- 51.1** **TDS under Income Tax, Sales Tax, Vat etc**, if any, shall be deducted at prevailing rates on gross invoice value from the running bills unless Exemption Certificate from appropriate Authority / Authorities is furnished.

- 51.2** **Price quoted shall be inclusive of all taxes, duties except 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.**

- 51.3** Contractor shall get his organization registered with concerned sales tax/VAT authorities within 15 days of award of this contract, if applicable. 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.
- 51.4** Contractor has to make his own arrangement at his cost for completing the formalities, if required, with Sales Tax Authorities, for bringing his materials, plants and equipment at site for the execution of the work under this contract. No road permit shall be issued by BHEL for contractor's materials/equipments.
- 51.5** OCTROI, if any, payable on BHEL's consignments will have to be initially paid by the contractor and necessary reimbursement claimed from BHEL.



paid by the contractor and necessary reimbursement claimed from BHEL duly supported by documentary proof. Whenever the amount payable in one particular case is more than Rs. 5000/-, the contractor may request BHEL well in time to issue cheque / draft in favor of authorities.

- 51.6** In VAT applicable States, "Tax Invoice" if required under the relevant State VAT law shall be submitted alongwith other compliances as per concerned VAT Act.

## **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**

- 53.1a** The finally accepted rates for scope of Electrical and Mechanical works as defined in this tender are subjected to price variation provisions as per following formula:

$$P_1 = 0.75 * P_0 (F_1 - F_0)/F_0$$

$P_1$  = Increase/decrease in billing amount (variation) for the particular month of billing.

$P_0$  = Billing amount calculated as per contract provisions.

$F_1$  = 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.

$F_0$  = All India CPI published by Labour bureau, Simla, Govt. of India, for Industrial workers (Base 1982 =100) applicable for the month of

award of work.

- 53.1b** The finally accepted rates for scope of material handling work as defined in this tender are subjected to price variation provisions as per following formula;

$$P_1 = [0.60 \times P_0 (F_1 - F_0) / F_0] + [0.10 \times P_0 (D_1 - D_0) / D_0]$$

$P_1$  = Increase / decrease in billed amount (variation) for the particular month of billing.

$P_0$  = Gross billed amount for the month as per contract provisions

$F_1$  = 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.

$F_0$  = All India CPI published by Labour bureau, Simla, Govt. of India, for Industrial workers (Base 1982 =100) applicable for the month of award of work.

$D_1$  = Rate of diesel as applicable at Ramganj mandi / Kota site on the last day of billing i.e. for which month bill has been raised.

$D_0$  = Rate of Diesel as applicable at Ramganj mandi / Kota site on the date of award of work (LOI)..

- 53.2** The contractor will be required to raise the bills for price variation payments on a monthly basis irrespective of any increase or decrease in CPI Price variation as per above formula will be calculated and paid on the total contract value on month-to-month basis from the date of award. BHEL however reserves the rights to freeze variation for that much of duration of delays, from time to time, which are entirely attributable to the contractor. **Price variation on last 5% of CV will be based on average index/ rates of diesel.**

- 53.3** With the provision of price variation as above NO CLAIM / COMPENSATION on account of any increase whatsoever, (irrespective of whether escalation 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** 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 over all variation in final executed value (w.r.t the awarded value indicated in the LOI) beyond (minus) 20% i.e in case of reduction in executed value w.r.t awarded value, the contractor will be eligible for compensation as per the following provision;**

**“The final executed value shall be raised by 10 % of the executed value subject to the condition that the total value of work executed plus increase as above shall be limited to 80 % 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

## **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 (SD)**

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 on Page No. 34(a) of the 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** In case of any contradiction between General Conditions of Contract (GCC) and Special Conditions of Contract (SCC), the latter shall prevail.

**55.8** The Price Bids of only those bidders will be opened 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.

**55.9** Unsolicited rebate/discount shall not be accepted after bid opening.

#### **56.0 PAYMENT TERMS**

**A** 95 % of the payment will be released as per the payment terms in the CI 61 for Material Handling Works

**B** 85% of the payment will be released as per the payment terms in the CI -63 and 67 for STG and Electrical & C+I works . The balance 10 % will be released as per the following Milestone payments given at 'C' below;

#### **C MILESTONES (10 % of CV)**

1.	Grouting of Pedestals	1%
2.	Reaming and Coupling of TG set	1%
3.	Completion of Oil flushing.	1%
4.	Completion of Steam rolling and synchronising	2 %
5.	Completion of Trial operation	2%
6.	On Submission IBR Certification	1%

7.	Painting	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.

- D** 2.5% of contract value will be payable on handing over of the unit to BHEL's Customer or 2 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.
- E** 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 D & E shall be released after adjustment of the CV based on actual work carried out.

**57.0 TIME SCHEDULE**

- 57.1** 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 & P by the contractor.
- 57.2** Entire work as detailed in the tender specifications shall be completed within **14 WEEKS** from the Zero date as per programme / milestones indicated by BHEL Engineer. Contractor has to mobilise adequate resources to meet BHEL commitments to the customer as indicated from time to time.
- 57.3** The various milestones as per present status of the contract with Customer are as under:

**MILE STONES for 17.5 MW Set****WEEKS**

- |                                   |                       |
|-----------------------------------|-----------------------|
| a) Erection Start                 | ZERO DATE             |
| b) Grouting of Pedestals          | 3 <sup>RD</sup> WEEK  |
| c) Oil Flushing Completion.       | 8 <sup>TH</sup> WEEK  |
| d) Barring Gear                   | 10 <sup>TH</sup> WEEK |
| e) Rolling & Synchronising        | 12 <sup>TH</sup> WEEK |
| f) Trial operation & handing over | 14 <sup>TH</sup> WEEK |

**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.

- 57.4** The contractor has to ensure that work is completed in all respects leaving no pending points..

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.

**58.0 OVER RUN**

- 58.1** 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 4 (FOUR) WEEKS after the contractual completion date. In case the scheduled completion time gets extended beyond 4 (FOUR) WEEKS as stated above, the contractor shall be considered for payment of fixed over run charges, @ Rs.40,000/- per month (Rupees FORTY 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.

- 58.2** 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. For The purpose of ORC , the actual date of start as specified under clause 58.1 will be considered .

- 58.3** The contractor shall maintain sufficient workforce and other resources required for completion of the job expeditiously / operation , maintenance lubrication of erected equipment till the actual commissioning of the unit for the entire contractual period including total extended period.

**59.0 FACILITIES TO BE PROVIDED BY BHEL/CONTRACTOR**

- 59.1** BHEL shall provide limited open space for office and store free of charge at site. The electricity and water will be provided free at erection site at one point within 200 m .
- 59.2** 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.

- 59.3** The contractor shall submit to the Engineer his electrical power requirements. Construction power shall be provided free of charge at one point near erection site as required and to be decided by Engineer. 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.
- 59.4** The Specific HSE requirements of the Customer **indicated in Annexure** is to be complied by the Contractor.
- 59.5** 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 such as flood lights , hand lamps at the site of construction , contractor's material storage area , etc within the finally accepted rates
- 59.6** 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.
- 59.7** 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.
- 59.8** 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.

- 59.9** 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.
- 59.10** 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.
- 59.11** 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.
- 59.12** All the employees of the contractor will wear identification badges while on site work .

**SECTION - III B**

**SPECIAL CONDITIONS OF CONTRACT FOR MATERIAL HANDLING**

**INDEX**

<b>Clause Number</b>	<b>DESCRIPTION</b>
60	Scope of work
61	Terms of payment

**SECTION: III B****SPECIAL CONDITIONS OF CONTRACT FOR MATERIAL HANDLING****60.0 GENERAL SCOPE OF WORK**

- 60.1 BHEL has been awarded the work of Design, Manufacture, supply, installation, erection & commissioning of 1 x 17.5 MW Condensing Turbine including Inter Connecting Piping , Electrical , C+I and Auxillaries at Captive Power Plant of Mangalam Cement Ltd at Adityanagar , Morak Dist , Rajasthan . The equipment consists of steam turbine, generator, HP, LP Heaters and piping along with the associated auxiliary supports, Electrical and Instrumentation

These materials will be supplied from our manufacturing units located all over the country as well as our vendors lubricate both in the country and abroad. The scope of work under this tender consists of taking delivery of the materials from transporters, unloading shifting to their designated locations, verification & stacking. The delivery of these materials will mostly be inside the project campus at the railway private siding or by the transporters. However, delivery of some items may also have to be taken from godowns of transporters and railways.

The EOT Crane of the Customer will be provided as a free issue , but the contractor has to ensure that the same is optimally used . Any charges arising out of time and resource mismanagement will be attributable to the contractor and recovered from him .

The contractor is to use his own equipment like suitable cranes / trucks / tractor trailers and other material handling equipment including all necessary small / major T&P required for the same for the above work of 1x17.5 MW Unit-V at Mangalam Cement

- 60.2 **Approx. weight to be handled , as indicated in Annexure-III is of the order of 300 MT.** The contractor has however to handle whatever actual materials are despatched for the project irrespective of variations and payments shall be released for the actual tonnage handled.

- 60.3 NOT APPLICABLE

- 60.4 **Annexure-III give the general idea for tenderer's information about the weights and dimensions of some major components / equipment.** The weights and dimensions shown are approximate and are liable to vary. No increase in quoted / accepted rates /prices shall be allowed due to change in weights and dimensions of the equipment / materials.

The Turbine and Generator Stator may come by trailor and will be brought to the unloading point at outside or inside TG Hall. It is normally envisaged that the Turbine and the Stator will be handled by the EOT Crane . In this case the Contractor will be paid as per the Rate in SI No 1 of the Rate Schedule . In case EOT Crane is not available , the contractor may have to unload the same using his own handling and transportation



equipment including sleepers, jacks , winches etc for which he will be paid per the Rate in SI No 2 of the Rate Schedule .

- 60.5 Some consignments mainly smalls / parcels may also be received at Kota / Ramganj-Mandi through road. The contractor shall have to handle such consignments also as per rates quoted / accepted.
- 60.6 BHEL will provide free of cost all necessary preservatives, paints, thinners, rust preventives, grease, lubricants and end caps to contractor for preservation of components. All tools & tackles and other consumables required for preservation of components including supervision shall however be provided by contractor at his own cost. Preservation of components includes applying preservatives, paints, rust preventives, greasing of threaded portions, fixing of end caps in position for pressure parts, repainting of work order / DU numbers, component codes etc. After preservation wherever necessary, components will be stacked properly as per original stacking for which no additional payment shall be made.
- 60.7 Not applicable
- 60.8 It shall be the responsibility of the contractor to keep in touch with Engineer at site and find out arrival of road consignments. The Contractor shall collect all the parcel way bills / lorry way bills from BHEL site office either personally or through an authorized representative. The contractor or his authorized representative shall, for the purpose, visit the said office every day and collect available GR, RR, LWB, PWB etc. While collecting the GR, RR, LWB, PWB, contractor or his authorized representative will sign the register maintained for the purpose indicating date and time of collection. The contractor shall keep in touch with Railway authorities, carriers and arrange to effect delivery of consignments immediately on their receipts. Delay may cause deterioration of goods apart from attracting demurrage charges. Contractor shall also maintain a register indicating date of RR, LWB, PWB, date of collection of the materials from Railways, road transport agencies / lorries and date of stacking them at storage yard of BHEL.
- 60.9 The Contractor is required to find out and follow up regularly with carriers, regarding arrival of consignments even prior to the receipt of GR, if any, and take delivery of the same on 'INDEMNITY BOND'. Indemnity Bonds would be executed by BHEL / Customer, when intimation regarding arrival of consignment is furnished by the Contractor.
- 60.10 It is possible that in certain cases, despatch documents may not be received in time but BHEL may receive Photostat copies of the same. It is, therefore, the responsibility of the contractor to collect these Photostat copies while obtaining indemnity bond from BHEL authorities at site.
- 60.11 Payment of all demurrage / wharfages that are due to contractor's fault, would be the responsibility of contractor and to his account. If BHEL has to make payment of demurrage / wharfages alongwith freight, the amount so

paid as demurrage / wharfages, for the reasons stated above, shall be paid by the contractor forthwith or would be recovered from bills of the contractor.

- 60.12 In any case contractor will pursue with concerned Carrier authorities at all level (local/HQ etc.) for waiver / reduction to the minimum of such demurrage/ wharfages charges. Whenever such demurrages/ wharfages become payable due to reasons not attributable to contractor, contractor will immediately bring it to the notice of BHEL with specific request to bear such charges. The decision of the Engineer in such case will be final and binding on the contractor.
- 60.13 Not applicable
- 60.14 Not applicable
- 60.15 Any discrepancy / shortage / damage found in the consignment after taking delivery from the carriers after giving clear receipt would be the responsibility of the contractor and the amount liable to be lost by BHEL on such accounts is recoverable from the contractor.
- 60.16 In case of apparent damages / shortages in consignments / packing noticed by the contractor, such cases shall be brought to the notice of BHEL and cleared only with their consent/approval.
- 60.17 It would be responsibility of the contractor to examine the packages, consignments, etc. on arrival and bring to the notice of carriers and BHEL Authorities regarding loss / damages, if any, observed in the consignments proposed to be taken delivery of. Before taking delivery, particularly of consignments in 'smalls' the weight of the package shall be checked with the invoiced weight / contents of the packages and any discrepancy shall be reported immediately to BHEL / carriers. In all case of loss / damages the contractor will take open delivery from the carriers. They are to forward such Open Delivery Certificates (ODC) to the Engineer within 15 days of retiring such consignments. All expenses connected therewith shall be to the account of contractor. BHEL reserves right to claim losses, if any, accrued to BHEL in the event of contractor's non-compliance to above.
- 60.18 Not applicable
- 60.19 In case of short delivery and non-delivery, immediate notice of loss shall be filed with the carriers at places of dispatch and destination as also at any intermediate station, if it is a different one, under intimation to BHEL authorities at site.
- 60.20 BHEL reserves the right to recover from the contractor any loss which arises out of undue delay / discrepancy / shortage / damage or any other cause during transit between the Road / carriers godowns / weigh bridges and BHEL storage yards / store sheds / project site or during stacking, when the custody of the equipment is with the contractor.

- 60.21 Unloading from Wagons / lorries, transportation, unloading at storage area / work site stacking and re-stacking of heavy sophisticated equipment like Turbine , generators, rotors electrical panels turbine components, pumps, panels etc. shall be done in the presence of or as per the directions of BHEL representative.
- 60.22 Not applicable
- 60.23 Since, the trucks / trailers are expected to arrive during any time of the day / night, the contractor shall have his workmen round the clock at site as well as other places as required to unload the materials.
- 60.24 Wagons / Consignments coming on Sundays and Holidays are also required to be handled by the contractor promptly. It will be the responsibility of the contractor to contact the site Engineer / his authorized representative of BHEL at their residence, if required, and obtain instructions to make suitable arrangements.
- 60.25 The detention charges, if any, in the event of delay in unloading from the carrier, will be to contractor's account.
- 60.26 It shall be the responsibility of the contractor, to provide all necessary facilities to open the packages, in the presence of the Engineer, verifying their contents, re-packing wherever and whenever necessary, properly stacking them as may be directed by the Engineer. These works should be so done so as to facilitate proper handling, periodical verification of materials, receipt position, stock taking etc. The contractor shall have experienced persons at site who can maintain the records of dispatch / receipt/ stacking / verification / shortage / damage / missing items etc. The verification of materials shall be carried out within ten days and report shall be submitted as a documentary proof.
- 60.27 All materials shall be stored 6" above ground level by use of concrete / wooden sleepers or on steel frames. No material shall be left to remain on ground at any time. Materials shall not be stacked in low-lying areas, where they are likely to get flooded during rains. Wooden sleepers / concrete blocks / steel frames and tarpaulins for this purpose wherever deemed necessary shall be issued by BHEL free of charges. However these items shall be stacked / stored properly at a location(s) specified by BHEL when not in use. The contractor is expected to use these most judiciously. In case it is observed that the contractor is not utilizing the, he could be asked to restack the same at his cost
- 60.28 The material / equipment requiring indoor storage will be handled and stacked inside the storage shed (provided by BHEL) by the contractor using own material handling equipment like Hydra crane, Fork Lift etc.
- 60.29 For checking / verification of the components / packages with packing slips GR/ LWB/ PWB / RR etc., sufficient experienced persons and other

facilities shall be provided by the contractor as and when required by the Engineer.

- 60.30 Stacking of the material shall be done as per the instructions and to the satisfaction of the Engineer. The materials shall be so stacked that the same should facilitate easy handling. In the event of any improper stacking BHEL may ask the contractor to re-stock the material properly or failing which BHEL may get the job done by any other agency at the risk and cost of the Contractor.
- 60.31 The contractor shall execute the work in the most substantial and workman like manner. The stores shall be handled with care and diligence. Any loss to BHEL due to contractor's lapse / negligence shall have to be made good by the contractor.
- 60.32 In case contractor is not able to unload, transport, stack the material at a pre-determined area, as per direction of the Engineer for any reason whatsoever (including non-availability of crane, tractor trailer and other T&P etc.), BHEL shall be at liberty to get the work done by engaging other agency / equipment / T&P etc. at the risk and cost of the contractor.
- 60.33 If the contractor or his workmen shall break, deface injure or destroy any part of a building, road, kerb, fenced enclosures, water pipes, cables, drains, electric or telephone posts or wires, trees, stored components or any other property or to any part of erected equipment etc. the contractor shall make the same good at his cost or in default the Engineer may cause the same to be made good by other workmen/agency or by other means and deduct the expense (of which the BHEL Engineer's decision is final) from any sum that may be then or at any time thereafter become due to the contractor or from his security deposit or any other money due.
- 60.34 It shall be the responsibility of the contractor to keep the storage areas (closed / semi-closed / open) in neat and tidy conditions. Any vegetation like grass, bushes, Sarkandas etc. shall be cut in open storage area & removed as per requirement & instructions of BHEL Engineer within the contractual value. All surplus / unusable packing materials shall be removed and deposited at location(s) specified by BHEL within the project premises (including weighing of the same within the project premises if required).
- 60.35 Normally the consignments from BHELs' manufacturing units / their sub-suppliers are sent on freight paid basis. In case any consignment is received at any place on freight to pay basis, it will be the responsibility of the contractor to pay the freight and take delivery of such consignments. The amount of freight paid by the contractor at any point of time in such cases will be limited to Rs. 5,000/-. However, the freight paid by the Contractor will be reimbursed by BHEL within a week's time on production of relevant receipts. In case of freight amounts exceeds Rs. 5,000/- contractor may request BHEL well in time to issue cheque /draft for such additional amounts in favor of carriers towards freight charges. Receipt of payment and proof of taking delivery of consignment shall be submitted to BHEL by

the contractor. Delay in issuance of cheque / drafts as above shall not in any case be taken as a cause of delay in taking delivery of consignment resulting in wharfages / demurrage leviable by carriers.

60.36 Not applicable

60.37 In case some materials are required to be dispatched from Mangalam Cement Ltd site to manufacturing units, other sites or any other place, the contractor may be asked by the Engineer to get the same packed, transport it to nearest Railway Station / Carrier's godowns and get the same booked. The contractors are therefore, required to quote their rate for this work in Rate schedule. In case of material is required to be booked as freight paid, the freight for the consignment limited to Rs.5,000/- shall be paid by the contractor. However, it shall be reimbursed by BHEL on submission of receipt within a week's time. The funds for freight charges exceeding Rs. 5,000/- shall be arranged by BHEL. Packing material required shall be provided by BHEL free of cost.

60.38 In case of consignments to be dispatched on full truck / trailer load basis, where the carriers will place their fleet inside the plant for loading, the contractor may be asked to collect them from different locations of store sheds/yard and load by using his crane and labour. Tenderers are required to quote rates for the work in rate schedule.

60.39 For any exigencies during execution of the contract, the contractor shall have to depute his personnel for collection/delivery of any material meant for site from/to out station if desired and instructed by the Engineer. The contractor will however be reimbursed expenses incurred for such work for person deputed, as below:-

- (a) Second class train fare with reservation / supplementary charges/bus fare subject to furnishing details regarding ticket numbers, journey details, amount of fare etc.
- (b) Local conveyance charges (Actual bus / cycle rickshaw/ auto rickshaw fare for local journeys at out station) as permitted by the Engineer.
- (c) Daily allowances @ RS. 100/- per day and @ RS. 200/- per day for lodging.
- (d) Postal / telegraphic / telephones charges, if any, subject to production of proof of having incurred such expenditure.
- (e) Freight and other charges, if any, paid on production of actual receipts.

Payment for the above will be made by BHEL within a month from the date of submission of bill along with details / desired documents by the contractor subject to completion of work assigned to

contractor personnel and to the entire satisfaction of the BHEL Engineer.

## **61.0 TERMS OF PAYMENT**

- 61.1 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.
- 61.2 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.
- 61.3 Shortage / damage reports on BHEL's standard materials management forms. No payment shall be released till these reports are submitted by the contractor and verified by the Engineer.
- 61.4 Subject to any deduction which BHEL may be authorized to make under the contract, the contractor on the certificate of the Engineer at site be entitled for payment as explained hereunder:
- I) **55 % (Fifty-five percent)** of the rate shall be paid after the materials are unloaded, transported to project stores and verified as per RR/ PWB / LWB / loading advice / box packing slip subject to furnishing of following information along with the bills as per above clause.
    - (a) Material transporting voucher stating work order and quantity of material for each consignment.
    - (b) Shortage report / open delivery taken w.r.t RR / LWB, if any and acceptance thereof by Railway authorities/ transporters.
    - (c) Proof of claim lodged with Railways/ transporters in respect of above shortage / open delivery.
    - (d) Material management forms duly filled and certified by the Engineer.
  - II) **40% (Forty percent)** of the rate shall be paid as soon as the materials are duly shifted to desired location, stacked and verified by opening of cases / re-packing, wherever necessary (with contractor's own labour and T&P). Payment will be released on submission of the information as per material management forms by the contractor immediately after verification of materials as certified by the Engineer. The requisite Performa would be supplied by the Engineer at site. Contractor must ensure the stacking and verification of materials within 15 (fifteen) days from the date of unloading the materials in store, otherwise the same shall be done by engaging

other agency on the risk and cost of contractor and decision of Engineer in this regard shall be final and binding on the contractor.

No payment shall be made for handling of sleepers, blocks and other items issued from BHEL stores for use and return for storing, stacking of main component.

**SECTION - III C**

**SPECIAL CONDITIONS OF CONTRACT FOR ETC Of STG**

**INDEX**

<b>Clause Number</b>	<b>DESCRIPTION</b>
62	Scope of work
63	Terms of payment



## SECTION - III C

### SPECIAL CONDITIONS OF CONTRACT FOR ETC Of STG

#### 62.0 SCOPE OF WORK

**62.1** BHEL has been awarded the work of Design, Manufacture, supply, installation, erection & commissioning of 1 x 17.5 MW Condensing Turbine including Inter Connecting Piping , Electrical , C+I and Auxillaries at Captive Power Plant of Mangalam Cement Ltd at Adityanagar , Morak Dist , Rajasthan . The equipment consists of steam turbine, generator, HP, LP Heaters and piping along with the associated auxiliary supports, Electrical and Instrumentation

The scope of work under this tender consists of

- Taking delivery and shifting of the Turbo-generator materials 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 equipments, matching , machining etc
- 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.,
- Chemical cleaning for the system erected
- Steam blowing , as applicable and assistance in case of interface areas , including erection and dismantling of all temporary piping, valves, pumps, tanks 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 unit

Major equipments to be installed, tested and commissioned under this specification are 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 STG SYSTEMS

**1.0 17.5 MW Steam Turbine**

- 1.1** Steam Turbine including Emergency Trip Cum Stop Valve, Turbine Steam Governing Valves, Steam Strainer; Coupling between Turbine & Generator ; Solenoid Valve for Remote Tripping ; Turbine Sole Plates / Foundation Bolts; Shaft Grounding Device; Mating Flanges for Turbine Inlet and all Extraction Flanges; Gland Sealing System (Automatic) including Inlet and Dump Control Valves; Exhaust-Hood spray system ;
- 1.2** Reduction Gearbox between Turbine & Generator including Coupling and Coupling Guard between Turbine & Gearbox; and Coupling and Coupling Guard between Gearbox & Generator
- 1.3** Manual Barring Device and Turning Device -Electric
- 1.4** Integral Piping Including Gland Steam Leak-off Piping ; Gland Steam Leak-off Piping; Turbine Drain Water Piping within TG Block ; Complete Lube Oil Piping (Stainless Steel Material after filter outlet); Complete Jacking Oil Piping including Throttle Valves, Relief Valves ; Complete Control Oil Piping ( Stainless Steel Material ); Overhead Lube Oil Tank Piping ( Stainless Steel );
- 1.5** Turbine Enclosure (To meet noise level requirements)
- 1.6** Turbine Insulation (Mineral Wool Mattresses) and Insulation of Integral Piping

**2.0 17.5 MW Turbine auxiliaries**

- 2.1 Main Oil Tank
- 2.2 Settling Oil tank
- 2.3 Main Oil Pump with AC Motor
- 2.4 Auxillary Oil Pump with AC Motor
- 2.2 Emergency Oil Pump with DC Motor
- 2.6 Jacking Oil Pump
- 2.7 Oil Transfer Pump
- 2.8 Duplex Filter for Lube Oil
- 2.9 Oil Vapour Extractor with AC Motor (2x100%)

- 2.10 Overhead Lube Oil Tank
- 2.11 Oil Accumulators
- 2.12 Oil Purification Unit
- 2.13 Governing Console
- 2.14 STEAM JET AIR EJECTOR
- 2.15 GLAND STEAM CONDENSER.
- 2.17 HP HEATER
- 2.18 LP HEATER
- 2.18 LUBE OIL COOLERS - 2X100%.
- 2.23 Flash tanks for HP Heater
- 2.22 Handling facilities for bigger size valves

### **3.0 17.5 MW GENERATOR AND AUXILIARIES.**

- 3.1 CLOSED circuit air cooled Generator (VPI)
- 3.2 Brush-less exciter and PMG.
- 3.3 CO2 fire extinguisher equipment for generator.
- 3.4 GENERATOR AIR COOLERS.

### **4.0 SYSTEM PIPING**

- 4.1 Extraction piping from turbine flanges to HP Heater , LP Heater and Deaerator.
- 4.2 HP Heaters normal drain piping to Deaerator.
- 4.3 GSC , LP Heaters normal drain piping to CST.
- 4.4 HP Heaters emergency drain piping to HP Flash Tank.
- 4.5 HP Heaters vent piping to Deaerator.
- 4.6 LP Heaters vent piping to Condenser
- 4.7 Auxiliary steam system for Ejector, GSC Ejector & Glands including PRDS and associated piping."
- 4.8 Cooling Water supply to generator and oil coolers & return piping from terminal points.
- 4.9 Vent piping locally/safe heights.

4.10 Drain piping to the nearest drain pit.

4.11 Instrument air piping from terminal point.

**4.12** E bellows, Steam Traps , Valves etc

- NOTES:**
- a) 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.
  - b) 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.
  - c) 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.
  - d) Pipe supports , hangers , Insulation etc will be considered as part of Piping Work

## **B**

### **ADDITIONAL PLATFORM / STRUCTURES**

**Additional smaller opening covers , 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.-3 of RATE SCHEDULE for fabrication & erection of such platforms & approaches.**

**62.2 Terminal points and Exclusions** as applicable to this specification have been given in **Annexure IA & IB** respectively.

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

### **63.0 TERMS OF PAYMENT**

**63.1** 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.

**63.2** 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.

**63.3** 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.

## **A PROGRESSIVE PAYMENT ON PRORATA BASIS**

**AA 85% of Lump sum price FOR EQUIPMENTS covered in ANNEXURE – III ( ITEM 1.0 TO 3.0 ) and ITEM 1 of Rate Schedule B**

Equipment wise Billing BreakUp for STG is indicated in Annx IV
--

**AB 85% of UNIT RATE FOR PIPING covered in ANNEXURE – III ( ITEM 4.0 ) and ITEM 2 of Rate Schedule 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	5 %

**AC 85% of UNIT RATE for Platforms and Structures as per ITEM 3 of Rate Schedule B**

1.	On transportation of required quantity of materials on locations and its proper protection.	10 %
2.	On fabrication / fixing of retainers, lagging & stitching of mattresses and welding of retainers,	40 %
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.	5 %

**NOTES :**

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 work 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.

**SPECIAL CONDITIONS OF CONTRACT  
FOR ELECTRICAL AND INSTRUMENTATION**

**SECTION: III D**

**INDEX**

Cl.. No.	Description
64.	Scope of work
65.	Erection
66.	Testing, Pre-Commg., Commg and Post Commissioning
67.	Payment terms

**SPECIAL CONDITIONS OF CONTRACT  
FOR ELECTRICAL AND INSTRUMENTATION  
SECTION-III D**

**64. SCOPE OF WORK**

- 64.1 BHEL has been awarded the work of Design, Manufacture, supply, installation, erection & commissioning of 1 x 17.5 MW Condensing Turbine including Inter Connecting Piping , Electrical , C+I and Auxillaries at Captive Power Plant of Mangalam Cement Ltd at Adityanagar , Morak Dist , Rajasthan . The equipment consists of steam turbine, generator, HP, LP Heaters and piping along with the associated auxiliary supports, Electrical and Instrumentation

**This part details the scope of work for the Electrical and instrumentation works under this tender**

- 64.2 The scope of work shall also include the following within the quoted item rates:

- i.) Re-rolling of cables on drums as required by site engineer.
- ii.) Providing missing hardware/ substitute hard wares and clamps.
- iii.) Providing supports for impulse lines, instruments, air lines, cable trays wherever required by fabricating at site. Required material for these will be provided by BHEL & all consumables including gas, welding electrodes etc. will be arranged by the contractor.
- iv.) Obtaining provisional and final approvals from Electricity Authorities.

- 64.3 Not applicable

- 64.4 The scope of work also covers all performance tests necessary to ensure that workmanship confirms to relevant standards and that such tests are adequate to demonstrate that the installations complies with the requirements of this specification. All arrangement for conducting tests are to be made by contractor within their quoted rates and tests may have to be repeated to satisfy BHEL / HIL.



64.5 Not applicable

64.6 The brief description of major equipment/ items to be erected, tested and commissioning under the scope of subject work are as described below. However change in design/specification may occur as is usual in any such large work for which no compensation will be payable. Contractor shall complete the entire work as detailed in tender specification within the contractual rates. In case during testing, commissioning, post commissioning, trial operation the IR valves of electrical equipment is found low, the contractor shall make arrangements and dry out the equipment within the quoted rates. Removing & reconnection of equipment will be the part of scope at no extra cost to BHEL.

64.7 Contractor shall erect, test, commission all the equipments, cabinets, panels, instruments etc. as per sequence prescribed by BHEL Engineer at site. The sequence of erection / commissioning methodology will be decided by the BHEL Engineer depending upon the availability of materials / work fronts etc. No claim for extra payment from the contractor will be entertained on the grounds of deviation from the methods of erection / commissioning adopted in erection / commissioning of similar jobs elsewhere or for any reasons whatsoever.

64.8 The customer HIL may depute their representative for checking and supervision of important stages of work. The contractor shall be required to provide all facilities for inspection of works, without any cost implications to the Engineer. Any defect in quality of work or deviations from drawings / specifications pointed out during such inspection shall be made good by the contractor in the same way if pointed out by the Engineer, without any cost implication to BHEL.

64.9 Contractor shall plan and transport equipment / components from storage yard sheds to erection site and erect them in such a manner and in a sequence that material accumulation at site should not lead to congestion. Contractor shall plan activities considering plying of his . Materials shall be stacked neatly, preserved and stored in the contractor's shed and work areas in an orderly manner. If required, the contractor shall arrange shifting of surplus material expeditiously failing which the same will be arranged by BHEL at contractor's risk and cost.

## **65.0 ERECTION**

65.1 All works such as cleaning, checking, leveling, aligning, assembling, temporary erection for alignment, dismantling of certain equipment for checking, cleaning, surface preparation, fabrication at site, cutting, grinding, straightening, blue matching, chamfering, filing, chipping, drilling, machining, surface grinding, shaping, fitting up etc. as may be applicable in such erection works are to be treated as incidental to erection and necessary to complete the work satisfactorily and shall be carried out by the contractor as part of the work.

- 65.2 Any fixtures, scaffolding materials, concrete block supports, steel structures required for temporary supporting, for pre-assembly or checking, welding, lifting and handling during pre-assembly and erection shall be arranged by contractor at his cost.
- 65.3 The following provisions cover the technical requirements for some of equipment installation. The brief idea about the work involved is indicated below however the work is to be carried out in accordance with the recommendations of the equipment manufacturer drawings, documents furnished to the contractor by BHEL or as directed by BHEL Engineer.

**(A) SEGREGATED PHASE BUSDUCT :**

6.6 kV , Copper Conductor , Al Alloy Enclosure Busduct for 17.5 MW STG connecting the STG with the 6.6 kV Station Switchgear and has Tap Off for LAVT and NG Cubicle . In the neutral side Star Formation is made and the Generator is earthed through the NGT and NGR .

The busduct is supplied in sections and is to be installed at site with loose supplied components eg Structure , Duct sections , CTs , VTs , SOB , Bellows , Earthing Strip , LAVT Cubicle, CT Junction Box etc . Jointing of various sections is by bolting as specified and installation includes wiring of CTs upto JB .

The appx dimensions of the Busduct is as follows :

1. Appx Length of Phase Side – 21 m
2. Appx Length of Neutral Side - 7 m
3. Appx Weight of Busduct and Supporting Structure -- 5 MT

**( B ) CONTROL PANELS , LT SWITCHGEAR , AVR etc.**

Erection at site / control room including chipping of floor, fabrication and fixing of base channel frame, levelling & alignment with spirit level, welding the base channel to the embedded plates / channels, grouting , fixing of anti-vibration pads , termination of inter panel connections, mounting /connections of loose instruments, inter panel bus bar connections, commissioning including loop checking, system checking, and putting necessary controls on automatics. *Tenderer may note that fabrication / fixing / painting of base channel / suitable steel stool, if required, will be included in quoted / accepted price of respective panel & no separate payment will be released for same. Contractor will be paid extra for fabrication / erection only for the weight in excess of 65 kg per square meter base of panel and this extra weight will be paid as per applicable rates for structural steel fabrication / erection.* Terminations of cables will be by conventional screwed connections, wire wrapping and maxi-termi point crimping connections. Checking of internal wiring, rectification, testing and calibration of equipment mounted inside is in the scope of contractor. The contractor may have to change / replace items found faulty without any extra cost, however materials for this shall be provided by BHEL. Mostly panels will be delivered fully wired. However wherever required

termination of loose wires , bus wires is to be done. The cleaning of panels have to be done with electrical vacuum cleaner, besides conventional cleaning with brush etc. The drilling of holes in the gland plates for cable entry shall be part of panel erection. All blank holes / gaps in the gland plates / boxes etc. shall be properly sealed. The base frames shall be painted suitably. The contractor shall carry out the plugging and sealing of left out holes in the gland plates and other openings at the bottom of panels at his own cost by using fire retardant mortar or good quality sealing material as advised by BHEL . ***Any minor alterations required in the bus bar arrangement, wiring in the panels/ cubicles shall also form part of the work. During testing, commissioning, some equipment / modules may need replacement / repairs. All such replacements / repairs and assistance during commissioning and running of the unit till handing over to the Customer are part of the scope as some of the test / commissioning will have to be done after the machine is running on various loads.***

#### (C) CABLE RACK AND TRAY

Cable trays shall be supplied either ladder, prefabricated, slotted or duct type. **Cost of cable tray erection as per BOQ Cum Rate Schedule shall include fabrication of supports to suit site requirement , fixing of support in position by welding as per Engineers instruction , erection and fixing of cable trays and racks by welding or by bolts and nuts.** Jointing of trays can be carried out by bolting / welding as per direction of Engineer. Contractor shall carryout cutting of tray only by Hacksaw for obtaining proper routing from standard lengths supplied. Materials for support fabrication like flats, channels, angles etc. shall be supplied by BHEL free of cost. The cutting & welding points on trays will be painted by primer & Al paint by the contractor including supply of paint within the erection price and no extra cost to BHEL. These cable trays may also be required for laying copper tubing, plica type / GI flexible conduits, local cabling and metal temp. thermocouples.

Beside above angels / channels of various sizes may have to be fabricated / erected, for use as cable trays, from structural steel to be supplied by BHEL free of cost. ***Payment for fabrication / erection of these type trays shall be released as per applicable rates for structural fabrication.***

In many cases, trays are supplied with tray covers. These covers have to be erected after completion of bottom cable tray and laying of cables tubes etc. The covers are to be properly secured on the bottom trays and no separate payment will be made for putting these covers. If required, GI / Al strip clamps to be used which shall be arranged by contractor at his own cost..

**(D) INSTRUMENTS (TRANSMITTERS / GAUGES / SWITCHES / TEMPERATURE SENSING ELEMENTS LIKE RTDs & THERMOCOUPLES)**

For instruments supplied loose, the scope includes issue from stores, calibration, erection (including fabrication and fixing of frames / stands by welding to steel structure or by chipping & grouting with RCC columns / floor) and charging / loop checking. The work includes installation of housing connecting manifold / PG valve on supports / racks to be suitably fabricated for the instruments being supplied loose.

For instruments supplied duly mounted on skids / racks / gauge boards , the scope includes erection of gauge board / rack, dismantling from skids / racks / gauge board, reinstallation after testing / calibration, restoring electrical connections, if any , pressure testing of connected piping and charging / loop checking. Servicing of manifolds PG valves shall also form part of erection job within the quoted prices.

Some instruments may need repeated calibration / replacement. The same will be carried out by the contractor at no extra cost to BHEL including calibration of instruments needed for replacement, which will be supplied by BHEL. Erection of thermoelements like RTDs & Thermocouples includes erection of thermowells, wherever required, at no extra cost to BHEL. Tags on all the instruments will be provided by the contractor as directed by BHEL Engineer at no extra cost to BHEL. **Tenderer may note that fabrication / fixing / painting of stands for instruments will be included in quoted / accepted price of respective instrument. No separate payment will be released for erection of gauge board as this will be included in item rates of instruments mounted on the gauge. Contractor will be paid extra for fabrication / erection of stand only for the weight in excess of 25 kg per instrument and this extra weight will be paid as per applicable rates for structural steel fabrication / erection.**

**(E) DETECTORS / VIBRATION , SPEED & OTHER TURBOVISORY PICK UPS:**

Blue matching with the assembly fixtures / main equipment surface, trial fixing, fixing by drilling / tapping, final doweling. Moreover some detectors may have piggy-backs signal detectors mounted on them as such these forms part of detectors assembly. The integral cables of the above shall be routed & dressed properly up to their JB / Proximeter. Erection of proximitors, proximator housings/ JB required for respective pick up and calibration / commissioning of pick ups will be included in quoted / accepted item rate of respective pickup.

**(F) PNEUMATIC TUBES (COPPER / SS TUBING) :**

Fabrication and erection of single angle supports / tray supports for single / multi run tube. Laying tubes in the angles / trays from the panel to the equipment, instrument to instrument, air supply line to drive / instrument, air line connections, clamping properly as per standard ferruling and termination at both ends. This includes all fittings and needle valves, stop valves etc. also. Proper tagging of valves and pneumatic tubes on both ends shall be done for proper identification. No extra charges will be claimed by contractor for any modification carried out after laying of pneumatic tubes / draft pipe lines due to site requirement in general.

**(G) IMPULSE LINE (AS / CS / SS)**

Fabrication and erection of channel / angle / slotted angle supports including painting, cleaning impulse pipe with wire brush and compressed air, edge preparation, cold bending, laying to the required slopes, clamping, welding (including supply of electrodes) of isolation / drain valves and fittings by butt / socket welding / sowe lock joints. Servicing of valves, erection of siphon & seal pots (as per requirement), connecting with the process end and to the instruments, NDT, Hydraulic testing the impulse lines, and painting the lines as per requirement of BHEL engineer. The impulse line may have to be cleaned chemically for removing grease/ rusting within the quoted rates. Proper tagging of valves and impulse lines on both ends shall be done for proper identification. No extra charges will be claimed by contractor for any modification carried out after laying of Impulse / draft pipe lines due to site requirement in general.

**(H) CABLE LAYING**

1. Laying, dressing & clamping ( by Nylon / PVC ties or Aluminium strips or any other method specified by BHEL Engineer ) of the cables in the cable trays / angles. The final dressing of cables on cable trays not erected by contractor shall also be done with Nylon Cord / Aluminium strip. **Cost of cable laying as per BOQ Cum Rate Schedule shall include the cost of Nylon / PVC ties & Aluminium strip required for dressing / clamping.**
2. The cable run number shall be provided by punching Aluminium Tag plates and tying suitably with nylon ties ( at both ends and at regular intervals as advised by BHEL Engineer ) which shall be arranged by contractor at his cost. However the tags provided alongwith cables etc. are to be arranged by contractor at no extra cost .
3. While laying cables, existing cable tray covers and false flooring may require to be removed and re-fixed. The same has to be done at no extra cost to BHEL

4. The Cost Of Cable Laying As Per BOQ Cum Rate Schedule Shall Also Include The Cost Of Termination With Suitable Lugs Including Supply of Ferrules. Only Cable Glands And Lugs Shall Be Issued By BHEL As Free Issue Item. Drilling of holes in gland plates of LT switchgear, control panels, JB's etc as per requirement shall also be part of cabling at no extra cost to BHEL.
5. The contractor shall carryout insulation testing, simulation testing etc. as per the instructions of Engineer at site.
6. Screen of signal cables shall run in insulated sleeve (to be arranged by contractor at no extra cost) and shall be terminated as per the instructions of the BHEL Engineer.

**(I) RIGID PIPE/CONDUITS**

Cutting / threading of standard lengths of conduits, laying on fabricated supports or on floor, using screwed fittings, clamping, sealing of open ends. Approved Good quality sealant shall be used to make the joint water proof.

**(J) PLICA FLEXIBLE CONDUIT**

Laying of conduits in cable trays, end connection with instrument / J.B / panel, using suitable connectors / unions etc. (which shall be supplied by BHEL). Suitable thread / Plica sealant shall be used to make the conduit system water proof. Aluminum painting, clamping and tagging in tray / angle forms part of erection job

**(K) COMPUTERS / PLC BASED EQUIPMENTS / CONSOLE INSERTS / TSI RACKS**

All computer related items / equipment like diagnostic station, CRT, monitors, printers, key boards, pre-fabricated connecting leads etc shall be installed in control room and control desk as per direction of BHEL Engineer. **Cost of PC set ( including printer, monitor, UPS, interconnecting leads etc) installation as per BOQ Cum Rate Schedule shall also include the cost of installation / placement of furniture ( to be issued by BHEL as free issue item) as per requirement / instruction of BHEL Engineer.** The Software installation and commissioning is not included in the scope of this contract. However, any assistance required for testing / commissioning have to be provided by the contractor within the quoted price. Hardware found defective during testing / commissioning and till handing over to Customer, have to be removed for repair / replacement and reinstalled within the quoted rates.

**(L) CALIBRATION OF CONTROL VALVES**

The work also includes minor rectification / alterations in tubing, servicing of accessories, setting of limit switches, calibration of Actuators and position feedback transmitters.

**(M) ERECTION OF JB's, PUSH BUTTONS ETC.**

Fabrication / fixing / painting of stands for junction boxes / push buttons / frame mounted panels etc will be included in quoted / accepted price of respective item. **Tenderer may note that fabrication / fixing / painting of stands for junction boxes / local push buttons / indication boxes etc. will be included in quoted / accepted price of respective item. No separate payment will be released for fabrication / erection of these stands. Contractor will be paid extra for fabrication / erection of stand only for the weight in excess of 25 kg per junction boxes / local push buttons / indication boxes etc. and this extra weight will be paid as per applicable rates for structural steel fabrication / erection.**

- 65.4 Any cutting of masonry work, which is necessary shall be done by the contractor at his own cost and shall be made good to match the original work. The Contractor shall obtain prior approval before cutting any masonry / concrete work.
- 65.5 Conduits shall be thoroughly cleaned before pulling in the cable.
- 65.6 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 have to be fabricated at site.
- 65.7 Calibration log-sheets / history cards of all the instruments, panels, drives, relay testing etc. under the scope shall be recorded and submitted on BHEL approved formats. Proper logging will form a part of calibration / erection activity for the purpose of monthly running bills payments.
- 65.8 For calibration of pneumatic valves / controllers / power cylinders etc., the contractor shall attend to minor leakages from the tubing etc., and prepare exact cam-profiles as part of the work, if required.
- 65.9 DRIP SHIELDS may be required to be fabricated for field mounted panels / instruments / instrument racks / JB Racks / control cabinets etc. The hardware / material required for same shall be supplied by BHEL & fabrication / erection weight will be paid as per applicable rates for structural steel fabrication / erection.



- 65.10 The contractor shall use only SHEARING machine or HACKSAW for cutting angles, flats, channels and trays. No gas cutting is permitted. Drill machine shall be used for drilling holes.
- 65.11 The contractor should note that after execution of work they will hand over marked up drawings "as erected" drawings to BHEL Engineer at site for preparation of firm "as built" drawings. "As erected" drawings will bear the signature of BHEL Engineer and contractor.
- 65.12 The contractor shall paint the name / put tag numbers on all the equipment / instruments / cables etc. erected by him. Materials for tagging shall be approved at site by BHEL and supplied by the contractor. The adhesive etc. shall be arranged by contractor at his cost.
- 65.13 Electrical and C&I commissioning of the power cylinders, control valve actuators, motorised valves actuators, solenoid valves etc, erected by other agency, is to be carried out by the agency within the subject scope of work. The staff earmarked for commissioning will carry out the work in association and guidance of BHEL Engineer as a part of system commissioning for which no extra cost will be paid by BHEL.
- 65.14 Certain instrumentation like gauges, transmitters, switches and indicators are received in assembled condition and will be erected along with main equipment by other agency. Contractor for subject work will get these equipment dismantled for calibration and will reinstall them in original location as and when directed by BHEL. Payment for above work shall be released as per respective items indicated in the price bid.
- 65.15 The contractor will fabricate and erect stands / supports for Junction Boxes, push buttons stations, fixing of push buttons and plugging holes in JB's. This is considered as inclusive in the item rate.

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

- 66.1 Site testing shall be required for all equipment installed by the contractor to ensure proper installation, setting, connection and functioning in accordance with drawings, specifications and manufacturer's recommendations.
- 66.2 Commissioning protocols are to be prepared as advised by BHEL Engineer for getting approved by customer/ Consultant.
- 66.3 Testing, and pre-commissioning checks shall be as per relevant codes / practices and BHEL drawings / specifications/ approved commissioning Protocols and same shall include, but not be limited to the following :

**(I) LT SWITCHGEAR, ACDB, DCDB, CONTROL PANELS:**



- (a) IR test of power and control circuits & High voltage test of Bus bar.
- (b) Checking of protections and interlocks of all related schemes.
- (c) Calibration of all indicating & metering instruments, relays, timers etc.
- (d) Checking of operation of all relays and other protective devices e.g. thermal overload relays, single phasing preventers etc.
- (e) Carrying out of suitable modifications as per system requirement.
- (f) Operation of all illumination, space heating circuits etc.

## **(II) INSTRUMENTATION**

- (a) All instruments shall be checked for proper installation, supports, impulse lines, cabling etc. and corrected, wherever required.
- (b) All instruments shall be calibrated before installation and proper calibration record shall be maintained to the satisfaction of BHEL Engineer. Instruments received in assembled condition in panels etc. shall also be dismantled, calibrated and re-assembled as per advise of BHEL Engineer.
- (c) All impulse and pneumatic lines shall be properly cleaned (oil flushed / chemical cleaned / air blown/ steam blown/ Hydraulic tested etc.) before being charged.
- (d) Some of the instruments may require re-calibration during commissioning. The contractor shall remove such instruments, recalibrate and install within the quoted rates.

## **(III) DRIVES AND CONTROLLERS**

- (a) All drives such as power cylinders, pneumatic / motorised valves / dampers etc. and controllers shall be checked for proper installation supports etc. before commissioning.
- (b) All transmitters shall be calibrated and limit switches shall be adjusted.
- (c) All pneumatic and impulse lines shall be cleaned as per instructions of BHEL Engineer.
- (d) All drives shall be operated by simulating various conditions to ensure healthiness of components of the system.

- (e) Re-calibration / rectification wherever required shall be carried out by the contractor within the quoted rates.
- (f) Remote operation of all drives, valves, dampers shall be checked from control room as per instruction of BHEL Engineer.

**(IV) CONTROL & PROTECTION PANELS**

- (a) Checking of complete wiring and insulation resistance.
- (b) IR test and loop checking of all field wiring in the panel.
- (c) Checking of all protection, metering and indicating schemes.
- (d) Calibration of all indicating and measuring instruments, relays, timers.
- (e) Checking of all auxiliary schemes e.g. space heating, illumination.
- (f) Checking of operation of all relays, switches and other indicators.
- (g) Commissioning of total scheme including relevant internal equipment.
- (h) Carrying out suitable modifications as per system requirement.
- (i) Carrying out primary injection, secondary injection, stability checks etc.

**(V) SEGREGATE D PHASE BUSDUCTS AND LINE /NUETRAL SIDE CUBICLES .**

- (a) Erection Of Busduct Structures after foundation checking
- (b) Erection and Alignment of Busduct
- (c) Erection of LAVT and NG Cubicle etc
- (d) Bolting of Ducts and Busbars, flexibles and joints
- (e) Testing of CTs , PTs , NGT etc and loop checks
- (f) Earth Bar fixing , Insulation Tests , fixing of JBs , Space heaters etc .

- 66.4 Contractor shall carry out air leak test, pressure drop test for pneumatic tubes, impulse and air lines to the satisfaction of BHEL's Engineer as per test procedures of manufacturing units or advised by BHEL Engineer.
- 66.5 In case any defect is noticed during tests, trial runs and commissioning such as loose components, undue noise or vibration, strain on connected equipment etc. the contractor shall immediately attend to these defects and take necessary corrective measures. If any readjustment and realignment are necessary, the same shall be done as per Engineer's instructions including repair, rectification and replacement

work by the contractor at his cost. The parts to be replaced shall be provided by BHEL.

- 66.6 During this period, though the BHEL's / Client's staff will also be associated in the work, the contractor's responsibility will be to arrange for the complete requirement of supervision, labour, consumable, T&P and IMTEs required till such time the commissioned units are taken over by the BHEL's customer.
- 66.7 During commissioning activities and for carrying out various tests, gauges, manometers etc. have to be temporarily erected and commissioned to suit the commissioning activities. Contractor will provide the necessary gauges and equipment. Contractor has to carry out the erection, calibration, dismantling of the same. After completion of activities the temporary systems have to be removed and to be taken back at no extra cost to BHEL.
- 66.8 During erection of various equipment, prior to commissioning and after commissioning, protocols have to be made with BHEL's customer. The proforma and formats as approved have to be printed by the contractor in adequate numbers. The pre-commissioning activities will start with various trials, commissioning operations shall continue till units are handed over to customer. Simultaneous commissioning activities will be progress in various areas, checking of equipment erected, making ready for trial runs, alkali flushing, chemical cleaning, mass flushing etc., all these works need specialised gangs including electricians / instrument technicians in each area to render assistance to BHEL commissioning staff. Contractor shall earmark separate manpower for various commissioning activities. The manpower shall not be disturbed or diverted.
- 66.9 It shall be the responsibility of the contractor to provide workmen of various categories in sufficient numbers along with Engineers/ Supervisors including necessary consumables, T&P etc. during pre-commissioning, commissioning and post commissioning period for commissioning of equipment and attending any problem in equipment erected by the contractor till handing over. The rates quoted shall include all these contingencies also.
- 66.10 It shall be specifically noted that the above employees of the contractor may have to work round the clock alongwith BHEL commissioning Engineer and hence overtime payment by the contractor to his employees may be involved. The contractor's accepted rates shall be inclusive of all these factors also.
- 66.11 In case, any rework is required because of contractor's faulty erection which is noticed during commissioning, the same has to be rectified by the contractor at his cost. If any equipment / part is required to be inspected

during commissioning, the contractor will dismantle / open up the equipment / part and reassemble/redo the work without any extra claim.

- 66.12 During commissioning, opening and closing of valves, attending to leakages, changing of gaskets, modifications in wiring, realigning of equipment, re-calibration of instrument, attending to leakages, minor adjustments of erected equipment may arise. The accepted rates shall include all such works.

## **67.0 TERMS OF PAYMENT**

- 67.1 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.
- 67.2 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.
- 67.3 Subject to any deduction which BHEL may be authorized to make under the contract, the contractor on the certificate of the Engineer at site be entitled for payment as explained hereunder:

### **I. 85 % of item rates will be on prorata basis as under:**

#### **(A) For Equipment / items such as Panels, Cable Trays, cable, JB, impulse pipe, tubing etc. where no calibration is required (as Per Rate Schedule C )**

- I. 10% of the item rate shall be payable on placement at site .
- II. 50% of item rate shall be payable on erection/ installation .
- III. 10% of item rate on testing, pre-commissioning etc.
- IV. 10% of item rate on testing, commissioning, charging etc.
- V. 05% of item rate on pending point clearance

#### **(B) For Instruments / item where calibration and testing is required (as Per Rate Schedule C )**

- I. 20% of the item rate on calibration and testing .
- II. 30% of item rate on erection / installation.
- III. 20% of item rates on individual device loop checking of instruments.
- IV. 10% of item rate on system loop checks, pre-commissioning checks by simulation / field calibration or with actual system operation.
- V. 05 % of item rate on pending points clearance.

**NOTE:-** Further percentage break up for payments against the above heads, if required, will be mutually discussed and finalized at site.

**ANNEXURE-IA****TERMINAL POINTS**

<b>SYSTEMS</b>	<b>TERMINAL POINTS</b>
Main Steam	At At inlet of Turbine ESV
Auxillary Steam	At Inlet of respective equipment headet ( Ejector / Gland Sealing )
Turbine Exhaust Steam	At outlet of exhaust steam flange
Bleed Steam	At inlet flange of Heater ( HP , MP, LP ) .
HP Heater Drain	At inlet of Deaerator
LP Heater drains	At inlet of Turbine Exhaust
HP Heater Vent	At inlet of Turbine Exhaust
GSC drains	At inlet of Turbine Exhaust
Feed Water	At inlet / Outlet flange of HP Heater
TG Condensate	At inlet / Outlet flange of LP Heater and GSC
ACW piping	Inlet flanges on the common water supply line and outlet flanges on the common water return line on the owner's water-cooling system supply & return headers.
Drains	To ACG Hotwell or nearest drain trench
Instrument air	Flange on the common air supply header being provided by the owner.
Service air	Flange on the common air supply header being provided by the owner.
Exhaust Hood	Near TG Deck
Spray Water	
LT Power cables	At equipment / Panel terminals
Generated Power	At terminals of HT Switchgear
Instrument Cables	At the Junction Box in Field except those for BHEL Panels

## **ANNEXURE – IB**

### **EXCLUSIONS**

1. All civil works other than dressing and chipping of foundation surfaces, fixing of supports and hangers , in trenches, walls
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 chemicals required for chemical cleaning.
7. Supply of all shims and gaskets, which go finally as part of equipment.

## ANNEXURE – IIA

<b><u>LIST OF T&amp;P and IMTEs being provided by BHEL for use of contractor free of hire charges on sharing basis.</u></b>			
<b>S.NO.</b>	<b>EQUIPMENT</b>	<b>CAPACITY</b>	<b>QTY</b>
<b>T&amp;P</b>			
1.	EOT Crane (in T.G. hall)	60 MT	1 No.
2.	Motorised hydraulic test pump		One Set
3.	Bolt stretching device		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)
- EOT crane(s) as available in the TG hall shall be provided by the customer . The contractor has to submit his weekly requirement in advance . However slings etc are to be provided by the contractor .

## ANNEXURE – IIB

<b>MINIMUM TENTATIVE LIST OF MAJOR T&amp;Ps TO BE PROVIDED BY CONTRACTOR AT HIS OWN COST FOR MATERIAL HANDLING AND STG WORK.</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.	Hydra / Mobile crane	10 /18 / 20 T	1 No
3.	Suitable trailer with Pulling Unit	20 T / 15 T	Adequate numbers.
4.	Hydraulic Jack (Low Height)	25/50/100T	Adequate numbers.
5.	Screw Jacks	5/10/25/50T	Adequate numbers.
6.	Hydraulic Pipe Bending Machine (Manual)		1 number.
7.	Stress Relieving Sets, including oil cooled transformers, heating coils, panels Recorders Etc.		Adequate numbers.
8.	Vacuum Cleaner (Industrial)		1 number.
9.	Surface Grinder		1 number.
10.	Electric Winches		Adequate numbers.
11.	Torque Tension Meter/ Wrench Upto 1000ft Lbs Range		1 number.
12.	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 – IIC

TENTATIVE LIST OF MAJOR TESTING INSTRUMENTS / EQUIPMENT TO BE ARRANGED BY CONTRACTOR AT HIS OWN COST FOR STG WORK.				
SL. No.	DESCRIPTION	RANGE	ACCURACY	QTY
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.	Motorised Megger 2.5 / 5 kV			1 no
3.	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	
4.	Dumpy level	0 to 350 mm	LC-0.01	1 No.
5.	Surface plate	Up to 1.0 Sq. Mtr	Grade 1,2,3	1 No
6.	Straight Edge	Up to 2 Mtr long	Grade 1,2,3	2 No.
7.	Temperature recorder for 0-1000C 6/12 points with thermo couples / rods and compensating cable			2 Sets
8.	Master pressure gauge	0 – 4 Kg/cm <sup>2</sup>	0.02	1 No.
9.	Inside Micrometer	50-1250 mm		2 nos
10.	Outside Micrometer	0-25-100-200-300-400-500 mm		1 each
11.	Dial Gauge with magnetic stand	0-10 mm	LC 0.01	12 no
12.	3 Point Inside Micrometer		LC 0.005 mm	1 no
13.	Vernier Caliper	Upto 600 mm	LC 0.02 mm	1 no
14.	Slip Gauges Set			1 no

15.	V Blocks			4 nos
16.	Micro Level		LC 0.01 mm / M	1 nos
17.	Master level		LC 0.02 mm / M	2 nos
18.	Feeler Gauges			4 sets

**NOTES:**

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-asertain / 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 – IID**

Indicative list of T&Ps to be arranged by the  
**CONTRACTOR for ELECTRICAL WORK**

Description of ITEM	QTY
Welding Transformers / Welding generators -----	2 Nos.
Portable air blower-----	1 No.
Hydraulic pipe bending machine-----	1 No.
Hole saw cutter device -----	1 No.
Pedestal mounted Drill Machine ( upto 36 mm ) -----	1 No.
Portable instrument air compressor for termination -----	1 Nos
Hand crimping tools -----	Adequate Nos.

## NOTES :

1. The above list specifies only major T&P (may not be complete to be deployed by the contractor). All additional / other tools and plants which are required for satisfactory & timely completion of work shall also be deployed by the contractor within finally accepted rates.
2. Other terms and conditions regarding above items please also refer clause 38 (T&P/IMTEs).

**ANNEXURE – IIE**

Indicative list of IMTEs to be arranged by the  
**CONTRACTOR for ELECTRICAL WORK**

Sl. No.	EQUIPMENT	QTY
1.	500 V / 1000V, (Hand operated ) megger -----	1
	No.	
2.	2.5 KV and 5 kV (Main operated megger) -----	1 No.
3.	HV Test Kit 0 to 60 KV (100mA leakage current) -----	1 Set
4.	Digital Multimeters with current probe-----	4 Nos
5.	Primary Injection Kit -----	1 Set
6.	Secondary Injection Kit -----	1 Set
7.	Relay Testing Kit -----	1 Set
8.	Tong Testers ( various ranges )including mA Range -----	3 Sets
9.	Micro ohm meter with 100Amps DC Source-----	1 Set
10.	Motor checker -----	1 No.
11.	KELVIN DOUBLE BRIDGE ( for low resistance measurement)--	1 No.
12.	Millivolt drop test kit with 100 Amps source -----	1 No.
13.	Analog Multimeters -----	2 Nos
14.	Single / three phase variac -----	1 Each

**Notes:**

- 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.
- Contractor must re-ascertain /recheck range and accuracy of each IMTE from BHEL Engineer well in advance before arranging calibration / deployment of IMTE's
- Other terms and conditions regarding above items shall be as per clause no. 38 (Tools & plants / IMTEs).

**ANNEXURE – IIF****INDICATIVE LIST OF IMTES TO BE ARRANGED  
BY THE CONTRACTOR FOR C & I WORK**

S.NO.	DESCRIPTION	RANGE	ACCURACY	QTY
1.	Dead Weight Tester	0-600Kg/cm <sup>2</sup>	LC-0.5Kg/cm <sup>2</sup>	01 Set
2.	Comparison test set (With Sub-standard Pressure gauges)	0-1 Kg/cm <sup>2</sup>	$\pm 0.25\%$ Lc-0.02Kg/cm <sup>2</sup>	! 01 Set ! !
		0-4 k g/cm <sup>2</sup>	-----do-----	!
		0-6 Kg/cm <sup>2</sup>	-----do-----	!
		0-10kg/cm <sup>2</sup>	-----do-----	!
		0-25Kg/cm <sup>2</sup>	+0.25%Lc-0.25 Kg/cm <sup>2</sup>	!
		0-60Kg/cm <sup>2</sup>	1 $\pm 0.25\%$ Lc-1.0 Kg/cm <sup>2</sup>	!
		0-250Kg/cm <sup>2</sup>	$\pm 0.25\%$ Lc-2.5 Kg/cm <sup>2</sup>	!
		0- 400Kg/cm <sup>2</sup>	$\pm 0.25\%$ Lc-2.5 Kg/cm <sup>2</sup>	!
3.	Variable DC regulated (Electronic voltage source with digital indication).	0-30V DC	0.2%	1 No
4.	Oil bath with thermostat, Stirrer and sub-standard Glass Thermometers in Multiple ranges	0-300 Degree Cel.		1 set.
5.	Glass U tube mercury mano-meter with standard steel Scale having leveling arrangement.	0-760 mm		As per requirement
6.	Glass U tube mercury mano-meter with standard steel Scale having leveling arrangement.	0-1000 mm		As per requirement
7.	Vacuum pump unit	0 to (-) 1 bar	lc – 0.02 bar	1 No.
8.	mA/mV source with Digital display.	0-200 mA/200mV		01 No.

S.NO.	DESCRIPTION	RANGE	ACCURACY	QTY
9.	Rehostat	100 Ohm , 10 A		03 Nos.
10.	Precision Digital Multimeter	4-1/2 Digits		01 No.
11.	Digital multimeters	3-1/2 Digits		04 Nos
12.	High temp. instrument Calibration kit	upto 600 deg.		1 No
13.	Decade Resistance box	upto 10 L ohms		1 No
14.	500 V / 1000V, (Hand operated ) megger			1 No
15.	Single phase variac	15 A		1 No.
16.	hydraulic test pump	upto 250 Kg/mm2	+0.25 %	1 No.
17.	Contunity testers		as per requirement.	
18.	Intercom / telephone set for loop checking			1 No.

**Notes:**

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 of IMTE's.
3. Other terms and conditions regarding above items shall be as per clause no. 38 (tools & plants / testing & measuring instruments).

**ANNEXURE-VI**

**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-VII**

**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.....



**RATE SCHEDULE -A**  
**RATE SCHEDULE FOR MATERIAL HANDLING**

**(A) MAIN RATES**

Sl. No	DESCRIPTION OF WORK	Rate in Rupees (In figures and words)
1	Rate in Rupees per MT for entire scope of work as defined in this tender specification in respect of all items from Trucks / Trailers and other vehicles directly coming to site / store sheds / storage yard.  <b>(Approx. tonnage to be handled 300 MT)</b>	
2	<b>Lump sum price</b> for entire scope of work as defined in this tender specification in respect of following items from Trailer directly coming to site and unloaded MANUALLY (by sleeper / jack method)	<b>LUMP SUM PRICE FOR EACH ITEM</b>
2.1	Turbine	
2.2	Generator	

**NOTES:**

- Quantity for items covered under Sl. No. 2.1, 2.2 will be one numbers each. It may be noted that for evaluation purposes and for arriving contract value BHEL will multiply these Lumpsum price with the quantity of each item.
- Rates applicable against item no 2.1, 2.2 will be applicable only when the subject equipment is unloaded Manually by sleeper / jack method. In case this material is unloaded using EOT crane, the payment shall be released as per quoted rate against Item no 2.

(Seal and signature of Tenderer)

**B. ADDITIONAL RATES:**

Sl. No.	DESCRIPTION OF WORK	Rate in Rupees (in figures and words)
<b>I</b>	Loading of materials including packing (if required) in their own Trucks / Trailers and transporting same to Carriers Godown / Railway Station at following locations & booking of the same to destination as per instructions of the Engineer.	
<b>I-A</b>	<b>KOTA</b>  Rate in Rs. Per MT	
<b>I-B</b>	<b>RAMGANJ MANDI</b>  Rate in Rs. Per MT	
<b>II</b>	Taking delivery of materials in their own Trucks / Trailers from Godowns of Carriers / Railways at following locations & bringing the same to BHEL store as per tender specifications.	
<b>II-A</b>	<b>KOTA</b>  Rate in Rs. Per MT	
<b>II-B</b>	<b>RAMGANJ MANDI</b>  Rate in Rs. Per MT	
<b>III</b>	<b>Rate in Rs. per MT</b> for collecting and loading of materials including packing (if required) in carriers Trucks / Trailers (to be placed by Carriers) at the plant stores/ project area.	

**NOTES:**

1. THE MINIMUM PAYMENT (FOR EACH TIME) IN ALL THESE CASES SHALL BE FOR TWO (2) TONNES OR ACTUAL WHICHEVER IS HIGHER FOR SL NO I , II , III.
2. FOR EVALUATION PURPOSE 15 MT WILL BE CONSIDERED AGAINST EACH ITEM.

(Seal and signature of tenderer)

[illegible]

**RATE SCHEDULE -B****RATE SCHEDULE FOR STG WORKS**

SL.NO.	DESCRIPTION	LS PRICE / RATE IN RUPEES
1.	<b>Lumpsum price</b> for complete scope of work as per tender specification for items indicated under Annexure-III for 17.5MW TG set (One Unit) including auxiliaries & common system equipments & auxiliaries.. <b>(Items as per Annexure- III &amp; Billing Break Up as per Annexure-IV.)</b>	
2.	<b>Rate in Rs./ MT</b> for complete scope of work as per tender specification for piping systems <b>indicated under Annexure- V</b>  (a) Carbon steel piping system ( Approx. 40 MT)  (b) Alloy steel piping system ( Approx. 6 MT)  (c ) Stainless steel piping system ( Approx. 4 MT)	
3.	<b>Rate in Rs/MT</b> for fabrication and installation of additional platforms, structures, ladders etc as per site requirement and which are not indicated in the drawing indicated under Annexure-III ( approx Tonnage 10 MT )	

(Seal and Signature of Tenderer)

**NOTE :**

The piping system include pipe, bends, fitting , hangers ,supports , insulation 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 of Rate schedule , as applicable. The structure, platforms & auxiliaries required for completion of piping systems will be payable as per rates against iten No. 3 of Rate schedule.

**RATE SCHEDULE -C****RATE SCHEDULE FOR ELECTRICAL AND C+I WORKS**

	ITEMS	UNIT	NOS	UNIT RATE ( RS )	TOTAL ( RS )
<b>A</b>	<b>PANELS</b>				
1	17.5 MW GEN RELAY PANEL	NO	2		
2	17.5 MW GEN CONTROL PANEL	NO	1		
3	TURBINE CONTROL PANEL	NO	1		
4	DC EOP STARTER BOX	NO	1		
5	AVR	NO	1		
6	LOCAL GAUGE BOARD	NO	1		
<b>B</b>	<b>BUSDUCTS</b>				
7	17.5 MW SPB	SET	1		
<b>C</b>	<b>INSTRUMENTS &amp; JBs</b>				
8	Pressure Gauges :	NO	59		
9	Temperature Gauges :	NO	45		
10	Level Gauges	NO	7		
11	Pressure Switches	NO	18		
12	Temperature Switches	NO	0		
13	Level Switches	NO	13		
14	Limit Switches	NO	0		
15	RTDs / Thermo Couples	NO	11		
16	Speed Sensors	NO	2		
17	I/P Converters ( AS PER THE CONTROL VALVES / ACTUATORS )	NO	4		
18	Flow Switches	NO	0		
19	Transmitters	NO	15		

	ITEMS	UNIT	NOS	UNIT RATE ( RS )	TOTAL ( RS )
20	Shaft / Absolute Vibration	NO	19		
21	Bearing Thermo Elements	NO	14		
22	JUNCTION BOXES	NO	18		
23	6mm / 8 mm Copper Tube	Mtr	50		
24	6mm / 8 mm SS Tube	Mtr	100		
25	1/2 " CS impulse Pipe	Mtr	200		
26	1/2 " AS / SS impulse Pipe	Mtr	50		
27	1/2 " SS impulse Tube	Mtr	600		
28	1 " CS impulse Pipe	Mtr	50		
29	Calibrating / Commg of Control Valves erected by other agencies	NO	4		
30	Calibrating / Commg of Motorised Actuators erected by other agencies	NO	5		
31	Fabrication / Erection of Structural Steel	MT	5		
<b>D</b>	<b>CABLES AND TRAYS</b>				
32	2 Core / 1 Pair Cable ( armoured / un-armoured)Core size upto 2.5 Sq. mm	M	2500		
33	3 Core / 1 Triad Cable ( armoured / un-armoured)Core size upto 2.5 Sq. mm	M	250		
34	4 Core / 2 Pair Cable ( armoured / un-armoured)Core size upto 2.5 Sq. mm	M	250		
35	5 Core Cable ( armoured / un-armoured)Core size upto 2.5 Sq. mm	M	2000		
36	7 / 8 Core / 4 Pair / 2 Triad Cable ( armoured / un-armoured) Core size upto 2.5 Sq. mm	M	200		
37	10 - 16 Core / 8 Pair Cable ( armoured / un-armoured) Core size upto 2.5 Sq. mm	M	800		
38	17 - 24 Core / 12 Pair Cable ( armoured / un-armoured) Core size upto 2.5 Sq. mm	M	200		

	ITEMS	UNIT	NOS	UNIT RATE ( RS )	TOTAL ( RS )
39	Pre-fabricated IPB / Signal cable ( upto 75 M length)	NOS	5		
40	3 Core size upto 10 Sq. mm	M	1400		
41	Cable Tray upto 100 mm	M	750		
42	Cable Tray from 150 mm to 300 mm	M	500		
	<b>TOTAL</b>				

(Seal and signature of Tenderer)

**COMMON NOTES FOR RATE SCHEDULE 'A', 'B' & 'C'**

1. 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.
2. In case of omission in quoting any rate, the evaluation will be done considering the highest quoted rate obtained against that item. But the work, if awarded, will be on the lowest quoted rate obtained against that item.
3. The bidders shall enter both 'Unit Rate' & 'Total'. In case of any mismatch between 'Total Amount based on Unit Rate' & 'Total Amount as quoted', the lower of the two shall be considered for evaluation and award.