



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

RESEARCH and DEVELOPMENT

ERECTION, TESTING AND COMMISSIONING OF SUPER CRITICAL TEST FACILITY AT R&D AT MHD COMPLEX, BHEL TIRUCHIRAPALLI-14	Phone: +91 431 257 86 21 Fax : +91 431 2520696 Email : sks@bheltry.co.in Web : www.bhel.com
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Reference Number: BHEL:TRY:R&D:2007-08	Date:07.02.08	Due date for submission of quotation: 05.03.2008
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You are requested to quote the Enquiry number date and due date in all your correspondences. This is only a request for quotation and not an order

BHEL/Trichy is looking for contractors for carrying out the Erection ,Testing and Commissioning of the Super Critical test facility being established at R&D at MHD complex at BHEL Tiruchirapalli. The detailed specification may please be down loaded from www.bhel.com. Bidders are also advised to visit the MHD complex to assess the extent of the work content with prior intimation.

S.Kalyanasundaram
SDGM/MM/ R&D/MHD complex
BHEL, Trichy-14.(620014)

Phone: 0431-2578621
Fax: 0431-2520696.
e-mail: sks@bheltry.co.in.

TENDER SPECIFICATION
FOR
ERECTION , TESTING & COMMISSIONING OF
SUPERCritical TEST FACILITY (SCTF)

REF:BHEL:TRY:R&D:2007-08 DATED 07.02.2008

Erection , testing and commissioning of the **SUPERCritical TEST FACILITY (SCTF)** involving material handling at site stores, transportation to site of work , fabrication of structures, installation of various equipments, welding of pressure part piping & structures at site including heat treatment, lining and insulation and lagging ,painting of various equipments and execution of electrical and instrumentation systems.

AT
R&D-MHD COMPLEX
BHEL TRICHY-14



BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
R&D-MHD COMPLEX
BHEL TRICHY-14

**TENDER SPECIFICATION
FOR
ERECTION, TESTING AND COMMISSIONING
OF
SUPERCRITICAL TEST FACILITY AT BHEL, TRICHY**

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SCTF ERECTION TESTING & COMMISSIONING
REVISION 01 DATED 07.02.08

BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPPALLI – 620 014

RESEARCH & DEVELOPMENT
MHD COMPLEX

SECTION 1

TENDER SPECIFICATION NO.: BHEL/R&D/SCTF/2007-2008- 02 DT. 07.02.08

**Name of the work: ERECTION, TESTING AND COMMISSIONING OF
SUPERCRITICAL TEST FACILITY AT BHEL, TRICHY – MECHANICAL,
ELECTRICAL, CONTROL AND INSTRUMENTATION COMPONENTS AND
SYSTEMS.**

TENDER DOCUMENTS

**(GENERAL TECHNICAL AND FINANCIAL CONDITIONS AND TENDER
SCHEDULE)**

The tender specification is also hosted in web: www.bhel.com
→ tender notifications

**SDGM(MM),
Research & Development
MHD COMPLEX
Bharat Heavy Electricals Limited,
Trichy – 620 014**

Issued to :

SECTION 2

SPECIAL INSTRUCTIONS TO BIDDERS

The Bidder must submit their bids as requested in a sealed cover prominently super scribing the tender specification number, due date and time of submission as mentioned in the **TENDER NOTICE**.

2.1 QUALIFICATION REQUIREMENT

The bidders should have carried out erection testing and commissioning of high-pressure jobs (or) fabrication of high-pressure jobs. The bidder shall have also the capability of executing electrical controls and instrumentation works.

In this regard bidder shall submit the experience list along with the bid.

A BHEL reserve the right to reject any tender or all the tenders for reasons whatsoever beyond control and the decision of BHEL is final.

2.2 CERTIFICATE OF NO DEVIATION

TENDERES HAVE TO FURNISH A DECLARATION SHEET INDICATING THAT THERE IS NO DEVIATION FROM THE TENDER DOCUMENTS.

TENDERES MAY FURTHER NOTE THAT THIS DECLARATION IS A PREREQUISITE FOR BHEL TO CONSIDER THEIR BIDS. BIDS SUBMITTED WITHOUT “**NO DEVIATION DECLARATION**” WILL BE REJECTED BY BHEL. **FORMAT FOR NO DEVIATION CERTIFICATE IS FURNISHED IN SECTION 3.**

2.3 SAFETY PLAN

Bidders may further note that the submission of safety plan is a prerequisite for BHEL to consider their bids.

2.4 TIME SCHEDULE:

The contractor has to mobilize in all respects and start the work within one week from the date of issue of the letter of Intent. **The entire work shall be completed within 45 days from the award of the work.**

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The erection work shall be commenced as may be stipulated in the letter of Intent and shall be deemed to have been completed in all respects only when the test facility is in operation. The decision of BHEL in this regard shall be final and binding on the contractor.

During the total period of the contract the contractor has to carry out the activities in a phased manner as required by BHEL and the programme of milestone events. Multiple teams shall be deployed for parallel working for meeting the completion schedule.

2.5 PAYMENT TERMS: Progressive payments will be made for the completed portion of the work totally in 3(three) stages. The bill shall be prepared for the 90% portion of the works as per the unit rates quoted for each category. However no single bill shall exceed 35% of the total contract value. Balance 10 % will be paid after completion of all works specified and handing over to BHEL after testing as per IBR.

The first bill will be cleared only after completion of the works as detailed in sl. no. 1 & 2 of Annexure C1 to section 5. The second bill will be cleared after the completion of the works specified in sl. no. 3 and 4 of the above document. The third bill will be cleared after completion of all the work specified.

2.6 PRICE ESCALATION: The quoted /accepted rate has to be kept **firm** for the entire contractual period including the total extended period if any and no claim for the revision of the rate is allowed under any circumstances.

2.7 SERVICE TAXES: Service tax as applicable to this contract shall be reimbursed by BHEL at the rate applicable as per the Service act/Rules. You may claim the service tax in your R.A bills and the same will be paid by BHEL. You may claim the first running bill along with the copy of the Service Tax Registration Certificate. Proof of Remittance of the service tax to the Service tax authorities has to be produced from the second bill onwards.

2.8 NEW LEVIES/TAXES In case Government imposes any new levies /taxes after the award of the work BHEL shall reimburse the same at actuals on submission of the documentary proof of the payment subject to the satisfaction of the BHEL.

2.9 PROCEDURE FOR SUBMISSION OF SEALED BIDS

Bidders shall submit the offer in **TWO INNER ENVELOPES** as indicated below which shall be sealed in one outer envelope.

Envelope I This sealed envelope should contain all the copies of technical bid together with **un-priced** commercial bid. This envelope should be clearly marked **“Part I - Technical and un-priced commercial bid”**, indicating Enquiry No., Due Date and Address & Reference of the Bidder.

Envelope II This sealed envelope should contain **price details**. This envelope should be clearly marked **“Part II - Price bid”**, indicating Enquiry No., Due Date and Address & Reference of the Bidder.

Both the envelopes (Part I & II) shall be put in one cover, duly sealed, super scribing as Part I and Part II of Enquiry No., due date of opening and the address and reference of the Bidder.

**The above offer should reach this office on or before 05.03.08 by 14.00 Hrs (IST).
Late offers will not be considered.**

Tender should not be addressed to any Individuals name but only by designation to:

SDGM /MM/ R&D
MHD Complex
BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPALLI - 620 014
TAMIL NADU, INDIA

Tenders should be free from **CORRECTION AND ERASURES**, Corrections if any, must be attested. All amounts shall be indicated both in words as well as in figures. Where there is difference between amount quoted in words and figures, amount quoted in words shall prevail.

Offers should be in **ENGLISH** and accompanied by detailed technical literature, catalogue and details of process facility in **ENGLISH**.

2.9.1 PART I (TECHNICAL & UNPRICED COMMERCIAL BID)

2.9.1.1 Technical

This part shall include / indicate the following :

Offer should contain complete scope of supply with all technical details, specifications, delivery and other commercial terms and conditions.

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2.9.1.2 Commercial

This part shall include / indicate the following :

Terms of payment, Taxes & duties applicable, Execution Schedule, Offer validity.

A copy of "Un-Priced Part II" i.e., a copy of the Price Bid without the price details to be enclosed.

2.9.2 PART II (PRICE- BID)

This part should contain the schedule of price particulars and to be co-related to the technical details provided in Part I.

Unit rates as per the annexure C1 section 5 of the tender documents shall be furnished. The total price shall be furnished as summary. Offers would be evaluated based on the total arrived at by the product of bill of quantity and unit rate. Billing will be as per unit rate for the portion of work completed restricted to total order value.

2.10 OPENING OF TENDERS

The Part I - Technical & commercial bid alone would be opened on the Tender opening date.

The Part II - **Price bid of Technically suitable Bidders alone would be opened.** The Technically suitable Bidders would be informed about the tender opening date. Clarifications if any required by BHEL for Technical evaluation would be sought from Bidders before opening of Part II - price bid.

2.11 GENERAL

Incomplete offers will not be considered.

Taxes and Duties: All Taxes and Duties payable as extra to the quoted price should be specifically stated in offers along with CST & TIN No etc., failing which the purchaser will not be liable for payment of such Taxes and Duties.

2.12. Liquidated damages: " Time is the essence of the contract ". Therefore, the completion of the work specified in the purchase order should be made within the time prescribed. Failure to complete the work in time as per the schedule quoted in our Purchase Order would make the supplier liable to an un-conditional penalty at the rate of **0.5% of the value of contract for each week of delay subject to a maximum of 15% of the order value.**

2.13. Test certificates: The Bidders shall clearly mention in their offer that Test Certificates as called for in the Technical Specification, in the required number of copies will be provided at no extra cost.

2.14 TENDER COVERING LETTER; The bidder shall submit the offers with the following covering letter.

BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPPALLI – 620 014
RESEARCH & DEVELOPMENT MHD COMPLEX
TENDER FORM

TENDER SPECIFICATION NO.: BHEL/R&D/SCTF/2007-2008- DT. 07.02.08

**Name of the work: SUPERCRITICAL TEST FACILITY AT BHEL, TRICHY –
ERECTION, TESTING AND COMMISSIONING OF MECHANICAL,
ELECTRICAL, CONTROL AND INSTRUMENTATION COMPONENTS.**

To

SDGM(MM)
Research & Development
MHD COMPLEX
Bharat Heavy Electricals Limited,
Trichy – 620 014

Dear Sir,

Having examined the above notification, together with the accompanying general conditions therein referred to, we hereby offer to provide and carry out the work described in the said tender notification according to the general conditions at the rates entered in the attached contract schedule of prices.

1. We hereby undertake the work specified in the schedule with the time specified in the tender notification.
2. We hereby guarantee the satisfactory fulfilment of the contract.
3. We confirm that the EMD as stated in the tender conditions is enclosed.
4. We agree with all clauses mentioned in the tender notification and with the general conditions of contract prescribed by the BHEL.

Yours faithfully,

Signature :

Name :

Date :

Witness with their address

Signature
Address

Name

2.15 CHECK LIST FOR SUBMISSION OF BIDS

Tenderers are required to fill in the following detail:

1. (a) Name of the Tenderer with address : YES / NO
- (b) Telegraphic/Telex address : YES / NO
- (c) Phone (Office/Residence) : YES / NO
- (d) Management structure of firm : YES / NO
(PVt Ltd/Public Ltd/Partnership/
Sole proprietorship) Documentary
proof for the same enclosed)
2. Whether EMD submitted as per tender : YES / NO
specification terms and conditions
3. Validity of offer (offer shall be kept open for: YES / NO
acceptance for a minimum of six months)
4. Whether tenderer visited the erection site : YES / NO
and acquainted with the site conditions
before quoting
5. Whether the following details are furnished
- (a) Previous experience : YES / NO
- (b) Present assignments : YES / NO
- (c) Organisation chart of the company : YES / NO
- (d) Company financial status : YES / NO
- (e) In case of company, proof of : YES / NO
registration of the company
- (f) Memorandum and articles of : YES / NO
association of company/copy of
partnership deed
- (g) Profit and loss account for the : YES / NO
last three years
- (h) Audited balance sheet for the : YES / NO
last three years

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- (i) Income tax clearance certificate (latest) : YES / NO
- (j) Solvency certificate from a nationalised bank : YES / NO
- (k) Power of attorney of the person signing the tender duly attested by a Notary Public : YES / NO
- (l) Manpower organisation chart with deployment plan at site for posting of engineer/supervisors/workers/labourers for satisfactory completion of work under this specification : YES / NO
6. Whether the tenderer is conversant with local labour laws and conditions : YES / NO
7. Whether the tenderer is aware of all safety rules and codes : YES / NO
8. Whether the no deviation certificate enclosed: YES / NO
9. Time required for mobilisation of site organisation and start of work :
10. Whether list of tools and plants available with the contractor and proposed to be deployed for this work enclosed : YES / NO
11. Whether all the pages are read, understood and signed : YES / NO

SIGNATURE OF THE TENDERER

TENDER SPECIFICATION:BHEL:TRICHY:SCTF

SECTION 3

CERTIFICATE OF NO DEVIATION

I.....OF
M/S.....
.....
.....

hereby certify that **there is no deviation** from the tender conditions either technical or commercial and I am agreeing to all the terms and conditions mentioned in the tender specifications.

Signature of the Tenderer

Date:

SECTION- 4
General Conditions of Contract
For Mechanical, Electrical ,Controls & Instrumentation works
of
Super Critical Test Facility

4. GENERAL INSTRUCTIONS TO TENDERERS :

4.1 DESPATCH INSTRUCTIONS :

- 4.1.1 This tender specification as a whole, duly furnishing all the details required and other documents as required in the following pages, shall be duly signed and sent in sealed cover duly super scribing the name of work as given in the tender notice.
- 4.1.2 The tender shall be addressed to : Officer inviting tender as indicated in the tender notice.
- 4.1.3 Tenders submitted by post shall be sent as “REGISTERED POST ACKNOWLEDGEMENT DUE” or by any mode 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. Telegraphic offers and offers received by telex, fax, electronic mail will not be considered.
- 4.1.4 Tenders shall be opened by authorized official of BHEL at his office at the time and date as specified in the tender notice in the presence of those tenderers or their authorized representatives who may be present.
- 4.1.5 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 or 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 at once contact the authority inviting the tender for clarification before the submission of the tender.
- 4.1.6 Before tendering, the **tenderers are advised to inspect the site of work and the environments and be well acquainted with the actual working and other prevalent conditions, facilities available, position of material and labour.** No claim will be entertained later on the ground of lack of knowledge. The tenderer should fill up and sign the form provided in the document without fail. The offer is liable for rejection by BHEL if the contractor is not fulfilling this requirement.
- 4.1.7 **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 OFFERS BY THE TENDERER IN TOKEN OF COMPLETE ACCEPTANCE THEREOF. THE INFORMATION FURNISHED SHALL BE COMPLETE BY ITSELF.

- 4.1.8 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 least of the two will be treated as valid rate. For the purpose of the tender, the metric system of units shall be used.
- 4.1.9 All entries in the tender shall either be typed or to be written in ink, including ballpoint pens. Erasers and overwriting are not permitted and may render such tenders be liable to summary rejection. All cancellations and insertions shall be duly attested by the tenderer, without fail.

4.2 QUALIFICATION 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 duly detailing their experience along with the offer. Offers from tenderers who do not have proven and established experience in the field are not likely to be considered. The tenderers are requested to refer to the Special Conditions of Contract for any specific requirement and the qualification requirement mentioned, if any.

4.3 DATA TO BE ENCLOSED :

Full information/documents shall be given by the tenderer in respect of the following. Non submission of these information may lead to rejection of the offer.

4.3.1 FINANCIAL STATUS :

A certificate from Scheduled Bank to prove his financial capacity to undertake the work duly indicating financial limits the tenderer enjoys or Solvency Certificate from the concerned Government authority. Information required in Section IV shall be furnished by the tenderer along with the offer.

4.3.2. INCOME – TAX CERTIFICATES :

A Certificate of Income –Tax clearance from the appropriate authority in the forms prescribed there for 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 that period.

4.3.3 PREVIOUS EXPERIENCE :

A statement giving particulars duly supported by documentary evidence of the various services rendered for each similar works by the tenderer indicating the particulars and value of each work, the site location,

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duration and date of completion. A list of site location, particulars and value of various services that are under progress. Information required in Section V shall be furnished by the tenderers along with the offer.

4.3.4 ORGANISATION CHART :

The organization pattern that is totally available with him and that will be employed by the tenderer for this work duly indicating the number of executives, the number of supervisors, the number of skilled and unskilled persons etc. as per the enclosed format to be furnished (Section IV & V)

4.3.5 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.

4.3.6 IN CASE OF AN INDIVIDUAL :

His full name, address and place and nature of business.

4.3.7 IN CASE OF PARTNERSHIP FIRMS:

The name of the partners and their addresses. A copy of the partnership deed/instrument of partnership certified by Notary Public shall be enclosed.

4.3.8 IN CASE OF COMPANIES:

Copy of Certificate of Registration giving date and place of registration including date of commencement. In case of public companies certified copies of Memorandum and Articles of Association are to be furnished.

4.3.9 Nature of business carried on by the Company and the provisions of the Memorandum relating thereof.

4.3.10 Names and particulars including addresses of all the Directors and their previous experience.

4.3.11 A list of tools and tackles that the tenderer is having and those that will be used on this job.

4.3.12 In addition to the above, the particulars required in various annexures/appendices.

4.4.0 EARNEST MONEY DEPOSIT :

Every tender must be accompanied by the prescribed amount of Earnest Money Deposit in the following forms .

4.4.1 Pay Order or Demand Draft duly drawn in favour of Bharat Heavy Electricals Limited Tiruchirapalli

Note:

1) Cheques, Currency Notes enclosed in covers, Money Orders or Postal Orders will not be accepted.

2) Bank Guarantee will not be accepted.

4.4.3 Tenders received without Earnest Money in full in the manner prescribed above are liable to be rejected.

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4.4.4 The Earnest Money Deposit of the successful tenderer paid in the form of DD/pay order will be retained towards cash portion of Security Deposit.

4.4.5 In the case of unsuccessful tenderers, the Earnest Money will be refunded to them within a reasonable time after finalisation of the tender

4.4.6 Earnest Money pertaining to the successful tenderer will be forfeited if the tenderer.

1. Fails to start the work as indicated in the Letter of Intent. In case the LOI is silent in this regard, then within 15 days after award of contract.

2. After opening of Tender, revokes/ withdraws his tender within the validity period, revises/alters his earlier quoted rates/conditions.

4.5 AUTHORISATION AND ATTESTATION:

4.5.1 Tenders shall be signed by persons duly authorized /employed to do so. Certified copies of such authority and relevant documents are to be enclosed.

4.6 VALIDITY OF OFFER:

The rates in the Tender 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 negotiation, such negotiation shall not amount to cancellation or withdrawal of the original offer which shall be binding on the tenderers.

4.7 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 tenderer shall submit an unqualified acceptance to the letter of Intent within the period stipulated therein. The text of acceptance of Letter of Intent should read as follows:

"We hereby acknowledge receipt of your Letter of Intent No.....dated..... and we convey our unqualified acceptance for the same.

The successful tenderer shall be required to execute an agreement in the prescribed form (Annexure 'D') with BHEL within a reasonable time after the acceptance of his tender and in any case before submitting the first bill for payment. The expenses for completion and stamping and registration of the agreement with prescribed authority, if necessary shall be borne by the contractor.

4.8 SECURITY DEPOSIT:

4.8.1 Upon acceptance of tender, the successful tenderer within the time specified in the Letter of Intent must deposit the required amount of Security Deposit for satisfactory completion of work.

4.8.2 The total amount of Security Deposit shall be as follows:

4.8.2.1 Upto Rs.10 lakhs 10 %

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4.8.2.2 Above Rs.10 lakhs (Upto Rs.50 lakhs) 1 lakh + 7.5% of the amount exceeding Rs.10 lakhs

4.8.2.3 Above Rs. 50 lakhs Rs 4. lakhs + 5% of the amount exceeding Rs.50 lakhs

4.8.3 The Security Deposit should be deposited before start of work. Security Deposit may be furnished in any one of the following forms :

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

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

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

iv) 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).

4.8.3.1 50% of Security Deposit as indicated in the letter of Intent can either be remitted in cash to the cashier of of BHEL or submitted in the form of Bank Guarantee in the prescribed proforma, the validity being up to completion of work as stipulated in Letter of Intent and the balance deposit can be remitted in cash or can be recovered by deduction from running bills at 10% of the value of each running bill till the full Security Deposit is made up. The bank Guarantee furnished towards Security Deposit should be kept valid by proper renewal till the said work is actually completed.

4.8.4 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.

4.8.5 Regarding adjustment of Earnest Money Deposit towards part of Security Deposit, refer clause 1.4.4 above.

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

4.8.7 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, Tiruchirappalli, 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.

4.8.8 BHEL reserves the right of forfeiture of Security Deposit in addition to the 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.

4.8.9 RETURN OF SECURITY DEPOSIT:

If the contractor fully performs and completes the work in all respects to the entire satisfaction of BHEL and present an absolute “ No Demand Certificate” in the prescribed form and returns properties belonging to BHEL handed over, lent or hired by him for carrying out the said works, Security Deposit will be released to the contractor after deducting all cost of expenses or other amounts that are to be paid to BHEL under this or other contracts entered into with the contractor. **The security deposit will be released after completion of guarantee/maintenance of 6 months from the handing over.**

4.9 REJECTION OF TENDER AND OTHER CONDITIONS:

- 4.9.1 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.
- 4.9.1.1. To reject any or all of the tenders.
- 4.9.1.2 Split of work is not permitted.
- 4.9.1.3 Either of the contingencies stated (1.9.1.1) and (1.9.1.2) above to modify the time for completion suitably.
- 4.9.2 Conditional tenders, tenders containing absurd or unworkable rates and amounts and tenders which are incomplete and otherwise considered defective and tenders not in accordance with the tender conditions, specifications etc, are liable to be rejected.
- 4.9.3 If a tenderer expires after the submission of his tender or after the acceptance of his tender, BHEL may at their 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 their discretion unless the firm retains its character.
- 4.9.4 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. They 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.
- 4.9.5 If 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 money due.
- 4.9.6 If the tenderers resort to canvassing in any form in connection with the tenders submitted by them, such tenders are liable to rejection.
- 4.9.7 Should a tenderer or Contractor or in the case of a firm of Company of contractors/ one or more of its partners/Shareholders/ Directors have a relation or relations employed in BHEL, the authority inviting tender

shall be informed of the fact along with the offer, failing this BHEL, may, at its sole discretion reject the tender or cancel the contract and forfeit the Earnest Money/Security Deposit.

4.9.8 The successful tenderer should not sub-contract part or complete work detailed in the tender specification undertaken by him without prior written permission of BHEL. The tenderer is solely responsible to BHEL for the work awarded to him.

4.9.9 No interest shall be payable by BHEL on Earnest Money, Security Deposit/ or on any money due to the Contractor by BHEL.

DEFINITIONS

4.10 DEFINITION:

The following terms shall have the meaning hereby assigned to them except where the context otherwise required.

4.10.1 BHEL (or B.H.E Ltd) shall mean Bharat Heavy Electricals Limited, a company registered under Indian companies Act 1956, with its Registered Office at BHEL House, Siri Fort, New Delhi –110 049, or its Authorised Officers or its Resident Engineer or other employees authorised to deal with any matters with which these persons are concerned on its behalf.

4.10.2 **“GENERAL MANAGER”** shall mean the Officer in Administrative charge of contracting unit of BHEL.

4.10.3 **“ENGINEER”** or **“ENGINEER IN CHARGE”** shall mean engineer deputed by BHEL. The term includes ‘AGM, ‘SDGM’, “DGM”, “PROJECT 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.

4.10.4 **“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 specification of this contract.

4.10.5 **“ CLIENT OF BHEL”** or **“ CUSTOMER”** shall mean the project authorities to whom BHEL is supplying the equipments/services.

4.10.6. **“CONTRACTOR”** shall mean the individual, firm or company who enters into contract with BHEL and shall include their executors, administrators, successors and permitted assignees.

4.10.7 **“CONTRACT”** or **“CONTRACT DOCUMENT”** shall mean/and include the agreement or work order, the accepted appendices of rates, Schedule of Quantities, if any and General Conditions of Contract, the Special Conditions of Contract, instructions to the tenderers, the drawings, the technical specifications, the special specifications, if any, the tender documents and the letter of Intent/Accepting letter issued by BHEL. Any conditions or terms stipulated by the contractor in the tender documents

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or subsequent letters shall not form part of the contract unless, specially accepted in writing by BHEL, in the Letter of Intent and incorporated in the agreement.

- 4.10.8 **“GENERAL AND SPECIAL CONDITIONS OF CONTRACT”** shall mean the “Instructions to Tenderers and General and Special conditions of contract pertaining to the work, for which the tenders are called for”
- 4.10.09 **“TENDER SPECIFICATION”** shall mean the specific conditions, Technical specifications, appendices, site information and drawing” pertaining to the work in which the tenderers are required to submit their offer. Individual specification number will be assigned to each tender specification.
- 4.10.10. **“TENDER DOCUMENTS”** shall mean the General and Special Conditions of Contract (2.1.8) and tender specification (2.1.9)
- 4.10.11. **“LETTER OF INTENT”** shall mean the intimation by a letter to the tenderer that the tender has been accepted in accordance with provisions contained in that letter. The responsibility of the contractor commences from the date of this letter and all the terms and conditions of contract are applicable from this date.
- 4.10.12. **“COMPLETION TIME”** shall mean the period by date specified in the acceptance of tender or date mutually agreed upon for handing over of the erected equipment/plant which are found acceptable by the Engineer being of required standard and confirming to the specifications of the contract.
- 4.10.13 **“PLANT”** shall mean and connote the assembly of the plant and equipment covered by the contract.
- 4.10.14 **“EQUIPMENT”** shall mean all equipments, machineries, materials, structurals, electricals and other components of the plant covered by the contract
- 4.10.15 **“TESTS”** shall mean and include such test or tests to be carried out on the part of 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 contract work or part thereof.
- 4.10.16 **“APPROVED” “DIRECTED” or “ INSTRUCTED”** shall mean approved, directed or instructed by BHEL.
- 4.10.17 **“WORK OR CONTRACT WORK”** shall mean and include supply of all categories of labours, 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.
- 4.10.18 **“SINGULAR AND PLURAL ETC”** Words carrying singular number shall also include plural and vice versa, where the context be required. Words imparting the masculine gender shall be taken to include the feminine gender and words

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imparting persons shall include any company or association or body of individuals, whether incorporated or not.

4.10.19 **“HEADING”** 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 of the contract.

4.10.20 **“MONTH:** shall mean calendar month, unless specified otherwise in the tender.

4.10.21 **“WRITING”** shall include any manuscript typewritten or printed statement under the signature of BHEL.

4.10.22. **‘TEMPORARY WORK’** shall mean all temporary works of every kind required in or for the execution, completion or maintenance of the works.

4.11.1 **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 having ordinary original Civil Jurisdiction at Tiruchiraplalli, Tamilnadu shall alone have exclusive jurisdiction in regard to all claims in respect of this contract. No other Civil Court have jurisdiction in case of any dispute, under this contract.

4.12 **ISSUE OF NOTICE:**

The contractor shall furnish to the BHEL Engineer, the name, designation and address of his authorised agent and all complaints, notices, communications and reference 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 of his representative 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 on which they were so delivered of /or left.

4.13 **USE OF LAND**

No land belonging to BHEL shall be occupied by the Contractor without the written permission of BHEL.

4.14 **COMMENCEMENT OF WORK**

4.14.1 The contractor shall commence the work within the time indicated in the Letter of Intent from BHEL and shall proceed with the same with due expedition without delay.

4.14.2 If the successful tenderer fails to start 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 deposited with BHEL 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.

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- 4.14.3 All the works shall be carried out under the direction and to the satisfaction of BHEL
- 4.14.4 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.
- 4.15 MODE OF PAYMENT AND MEASUREMENT OF THE WORK COMPLETED**
- 4.15.1 All payment due to the contractor shall be paid by “Account Payee Cheques”
- 4.15.2 For progress running bill payment, the contractor shall present detailed measurement sheets, in triplicate, duly indicating all relevant details based on technical documents and connected drawings for work done during the month/period under various categories in line with terms of payment as per Letter of Intent. The basis of arriving at the quantities/weights shall be relevant to documents and drawings released by BHEL. These measurement sheets shall be prepared jointly with BHEL Engineers and signed by both the parties.
- 4.15.3 These measurement sheets will be checked by BHEL Engineers and quantities and percentage eligible for payment under various groups shall be decided by BHEL Engineers. The abstract of quantities and percentage so arrived at based on the terms of payment shall be entered in measurement books and signed by both the parties.
- 4.15.4 Based on the above quantity, contractor shall prepare the bills in prescribed proforma and work out the financial value. These will be entered in M book and signed by both the parties and paid for after duly effecting recoveries due.
- 4.15.4 All recoveries due from the contractor for the month/period shall be effected in full from his corresponding running bills unless specific approval from the competent authorities is obtained otherwise.
- 4.15.5 Measurement shall be restricted to that for which it is required to ascertain the financial liability of BHEL under this contract.
- 4.15.6 The measurement shall be taken jointly by persons duly authorised on the part of BHEL and by the contractor.
- 4.15.7 The contractor shall bear the expenditure involved, if any, in making the measurement. The contractor shall without extra charges, provide all the assistance with appliances and other things necessary for measurement.
- 4.15.8 If at any time due to any reason whatsoever, it becomes necessary to remeasure the work done in full or in part, the expenses towards such measurements shall be borne by the contractors.

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4.15.9 Passing of measurement as per bills does not amount to acceptance of the completion of the work mentioned. Any left out work has to be completed by the contractor if pointed out at a later date by BHEL.

4.15.10 Final measurement bill shall be prepared in the final bill proforma prescribed for the purpose based on the certificate issued by BHEL Engineer that entire work as stipulated in the tender specification has been completed in all respects to the entire satisfaction of BHEL. Contractor shall give unqualified "No Due" and "No Demand" certificates. All the tools and tackles loaned to him should be returned in good condition, satisfactory to BHEL. Quantities/Weight erected shall be prepared and paid, within a reasonable time after completion of work. After payment of final bill, only guarantee obligation percentage shall remain unpaid which shall be released in accordance with clause 2.13. The final bill quantities and financial value shall also be entered in Measurement Book and signed by both the parties to the contract.

4.16 **RIGHTS OF BHEL**

BHEL reserves the following rights in respect of this contract without entitling the contractor for any compensation

4.16.1 To get the work done through other agency at the risk and cost of the contractor in the event of Contractor's poor progress or inability to progress the work for completion as stipulated in the contract, poor quality of the work, persistent disregard to instruction of BHEL, assignment transfer, subletting of the contract without permission of BHEL, nonfulfillment of any contractual obligation etc, and to claim, recover compensation for such losses from the contractor including BHEL's supervision charges and overheads from Security Deposit/ other dues.

4.16.2 To withdraw any portion of work and or to restrict/alter quantum of work as indicated in the contract during the progress of erection and get it done through other agency and / or by departmental labour to suit BHEL's commitment to its customer or in case decided to advance the date of completion due to other emergency reasons / BHEL's obligation to its customer.

4.16.3 To terminate the Contract after due notice of 21 days from the date of issue of the letter, recover the loss sustained in getting the balance work done through other agencies in addition to liquidated damages in the event of.

4.16.3.1 Contractor's continued poor progress.

4.16.3.2 Withdrawal from or abandonment of the work before completion of the work.

4.16.3.3 Corrupt act of Contractor.

4.16.3.4 Insolvency of the Contractor.

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- 4.16.3.5 Persistent disregard to the instructions of BHEL.
- 4.16.3.6 Assignment transfer, subletting of the contract without BHEL's permission.
- 4.16.3.7 Non-fulfilment of any contractual obligations.
- 4.16.4 To recover any money due from the contractor from any money due to the contractor under this contract or any other contract or from the Security Deposit.
- 4.16.5 To claim compensation for the total losses including BHEL's supervision charges, overheads, penalty/LD suffered by BHEL for completion of works, whenever the contract has to be terminated for the reasons attributable to the contractor. If the works are delayed beyond the stipulated time for the reasons attributable to the contractor, **LD/Penalty will be levied at the rate of 0.5 percent per week of delay or part thereof, subject to a ceiling of 10 percent of the contract value.**
- 4.16.6 To terminate the Contract or to restrict the quantum of work and pay for portion of work executed, in case BHEL's contract with their customers are terminated for any reason.
- 4.16.7 To effect recovery from any amounts due to the contractor under this or any other contract or in any other form the moneys BHEL is forced to pay to anybody, due to contractor's failure to fulfil any of his obligations.
- 4.16.8 To restrict or increase the quantity and nature of work to suit site requirement 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.
- 4.16.9 To deploy BHEL's fitters, welders, operators and technicians in case of emergency / poor progress/deficiency in skill on the part of employees of contractor and to recover the expenditure on account of the same from contractor's bills.
- 4.16.10 While every endeavour will be made by BHEL, they cannot guarantee un-interrupted work due to conditions beyond their control. Contractor will not be entitled for any compensation or extra payment on this account.
- 4.16.11 In the event of any dispute of any nature, the decision of BHEL shall be final and binding on the contractor.
- 4.17 **RESPONSIBILITIES OF THE CONTRACTOR IN RESPECT OF LOCAL LAWS, EMPLOYMENT OF WORKERS ETC.**
The following are the responsibilities of the contractor in respect of observation of local laws, employment of personnel, payment of taxes etc.
- 4.17.1 As far as possible, unskilled worker shall be engaged from the local areas in which the work is being executed.

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- 4.17.2 The contractor at all times during the continuance of this contract shall, in all his dealings with local labour for the time being employed on or in connection with the work, have due regard to all local festivals and religions and other customs.
- 4.17.3 The contractor shall comply with all State and Central Laws, Statutory Rules, Regulation etc., such as : The payment of Wages Act, Minimum Wages Act, Workmen Compensation Act, Employer's Liability Act, Industrial Disputes Act, Employees' Provident Fund Scheme, Employees' State Insurance Scheme, Contract Labour (Regulations and Abolition) Act, 1970 and other Acts, Rules & Regulations for labour as may be enacted by the Government during the tenure of the contract and having in force or jurisdiction at site. The Contractor shall give to the local governing body, Police and other relevant authorities all such notices as may be required by law. (Salient Provisions of the Contract Labour (Regulation & Abolition) Act 1970, Workmen Compensation Act 1923, Employees' State Insurance Act 1948, Minimum Wages Act 1948, Employees' Provident Fund and Miscellaneous Act 1952, which are reproduced in Section-III. However the contractor should take care of the latest amendments into consideration)
- 4.17.4 The Contractor shall pay all taxes , fees, licence, charges, deposits, duties, tools, royalty, commissions or other charges, which may be leviable on account of any of his operations in executing the contract. In case BHEL is forced to pay any of such taxes BHEL shall have the right to recover the same from the contractor either from his bills or otherwise as deemed fit.
- 4.17.5 While BHEL would pay the inspection fees of the Boiler Inspectorate, all other arrangements for the visits periodically by Boiler Inspector to site Inspection Certificates etc., will have to be made by the Contractor. However, BHEL will not make any payment to Boiler Inspector in connection with contractor's welders' qualification/requalification tests etc.
- 4.17.6 The contractor shall be responsible for provision of health and sanitary arrangements more particularly described in Contract Labour (Regulations & Abolition) Act, safety precautions etc., as may be required for safe and satisfactory execution of the contract. Please refer Clause 2.15.0 also.
- 4.17.7 The Contractor shall be responsible for proper accommodation including adequate medical facilities for the personnel employed by him.
- 4.17.8 The contractor shall be responsible for proper behaviour and observance of all regulations by the staff employed by him.
- 4.17.9 The contractor shall ensure that no damage is caused to any person/property of other parties working at site. If any such damage is

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caused, it is the responsibility of the contractor to make good the losses or compensate for the same.

- 4.17.10 All the properties/equipment/components of BHEL/ their client loaned with or without deposit to the contractor in connection with the contract shall remain the properties of BHEL /their client.

The contractor shall use such properties for the purpose of execution of this contract. All such properties/equipment/components shall be deemed to be in good conditions when received by the Contractor unless he notifies within 48 hours to the contrary. The contractor shall return them in good condition as and when required by BHEL/ their client. In case of non-return, loss, damage, repairs etc., the cost thereof, as may be fixed by the Site Engineer will be recovered from the contractor.

- 4.17.11 It is not obligatory on the part of BHEL to supply any tools and tackles or other materials other than those specifically agreed to do so by BHEL. However depending upon the availability/possibility BHEL's / customer's handling equipment and other plants may be made available to the Contractor on payment of the hire charges/free of charges, as fixed subject to the conditions laid down by BHEL/Customer from time to time. Unless paid in advance such hire charges if applicable, shall be recovered from contractor's bills / Security Deposit in one instalment.

- 4.17.12 The contractor shall fully indemnify BHEL against all claims of whatsoever nature arising during the course of erection/construction/performing work under the contract.

- 4.17.13 In case the Contractor is required to undertake any work outside the scope of this contract, the rates payable shall be those mutually agreed upon.

- 4.17.14 Any delay in completion of works/or non achievement of periodical targets, due to reasons attributable to the contractor, the same will have to be compensated by the contractor either by increasing manpower and resources or by working extra hours and/or by working more than a shift. All these are to be carried out by the contractor at no extra cost.

- 4.17.15 The contractor shall arrange and co-ordinate his work in such a manner as to cause no hindrance to other agencies working in the same premises.

- 4.17.16 All safety rules and codes applied by the client/BHEL at site shall be observed by the contractor without exception. The Contractor shall be responsible for the safety of the equipment/ material and works to be performed by him and shall maintain all lights, fencing guards, signs etc, or other protection 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 and due precautions shall be taken against fire hazards and Atmospheric conditions. Suitable number of clerical staff, watch and ward, store

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keepers to take care of equipment materials and construction tools and tackle 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 such type of work and carry out the requisite site tests of handling equipment, lifting tools, tackles, etc., as per prescribed standards and practices.

- 4.17.17 The contractor will be directly responsible for payment of wages to his workmen. A pay roll sheet giving all the payments given to the workers and duly signed by the contractor's representative should be furnished to BHEL site office for record purpose, if so called for.
- 4.17.18 In case of any class of work for which there is no such specification as laid down in the contract, such work shall be carried out in accordance with the instructions and requirements of the Engineer.
- 4.17.19 No levy or payment or charge made or imposed shall be impeached by reason of any clerical error or by reason of any mistake in the amount levied or demanded or charged.
- 4.17.20 Also no idle labour charges will be admissible in the event of any stoppage caused in the work resulting in contractor's labour being rendered idle due to any cause at any time.
- 4.17.21 The contractor shall take all reasonable care to protect the materials and work till such time the Plant/equipment has been taken over by BHEL / their client.
- 4.17.22 Contractor shall not stop the work or abandon the site for whatsoever reason or dispute, excepting for force majeure conditions. All such problems /dispute shall be separately discussed and settled without affecting the progress of work. Such stoppage or abandonment shall be treated as breach of contract and dealt with accordingly.
- 4.17.23 Contractor shall keep the area of work clean and shall remove the debris etc. while executing the work every day. 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.
- 4.17.24 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.

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4.17.25 The contractor shall furnish daily labour deployment report indicating the classification and number of workmen engaged. Besides the contractor also shall furnish progress reports on work every day as required by the Engineer.

4.18 CONSEQUENCES OF CANCELLATION:

Whenever BHEL exercises its authority to terminate the contract/withdraw a portion of work under clause 2.7, they may complete the work by any means at the contractor's risk and cost provided that in the event of the cost of completion as certified by the Site Engineer which is final and conclusive being less than contract cost, the advantage shall accrue to BHEL, and that if the cost of completion exceeds the moneys due to the contractor under the contract, the Contractor shall either pay the excess amount ordered by BHEL or the same shall be recovered from the contractor by any other means. This will be in addition to the forfeiture of Security Deposit and recovery of liquidated damages as per relevant clauses (2.7)

4.18.1 In case BHEL completes the work under the provision of this condition, the cost of such completion to be taken into account in determining the excess cost to be charged to the contract, shall consist of actual cost incurred in completion of work such as materials purchased and / or labour provided by BHEL, amounts paid to other agencies, etc. with an addition of such percentage to cover supervision and establishment charges as may be decided by BHEL.

4.19 INSURANCE:

4.19.1 BHEL shall arrange for insuring the materials/properties of BHEL covering the risks during transit, storage, erection and commissioning.

4.19.2 It is the sole responsibility of the contractor to insure his workmen against accidents and injury while at work as required by relevant Rules and to pay compensation, if any, to workmen as per Workmen's compensation Act. The work will be carried out in a protected area and all the rules and regulations of the client /BHEL in the area of project which are in force from time to time will have to be followed by the contractor.

4.19.3 If due to negligence and or non-observation of safety and other precautions, any accident/injury occurs to any other persons/public, the contractor shall have to pay necessary compensation and other expense, if so decided by the appropriate authorities.

4.19.4 If due to contractor's carelessness, negligence or non-observance of safety precautions, damage to BHEL's /Customer's property and personnel should occur and if BHEL is unable to recover in full, cost from the insurance Company, the same will be recovered from the contractor.

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4.19.5 It shall be the responsibility of the Contractor to provide security arrangement for the equipment/materials belonging to BHEL and handed over to the contractor for erection/transportation till the same are taken over by BHEL, after erection/returned to BHEL stores.

4.20 **STRIKES & LOCKOUTS:**

4.20.1 The contractor will be fully responsible for all the dispute and other issues connected with his labour. In the event of the contractor's labour resorting to strike or the contractor resorting to lockout and if the strike or the lockout declared is not settled within a period of one month, BHEL shall have the right to get the erection work executed employing its own labour or through any other agencies or both and the cost so incurred by BHEL shall be deducted from the Contractor's bills.

4.20.2 For all purposes whatsoever the employees of the Contractor shall not be deemed to be in the employment of BHEL.

4.21 **FORCE MAJEURE:**

4.21.1 The following shall amount to force majeure

Acts of God, Act of any Government, War, Sabotage, Riots, Civil commotion Police Action, Revolution, Flood, Fire , Cyclones, Earth quake and Epidemic and other similar causes over which the Contractor has no control.

4.21.2 If the Contractor suffers delay in the due execution of the contractual obligation due to delays caused by Force Majeure as defined above, the agreed time of completion of the job covered by this contract or the obligation of the contractor 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 of delay and the Contractor shall not be eligible for any compensation.

4.22 **GUARANTEE:**

Eventhough the work will be carried out under the supervision of BHEL Engineers 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 for good workmanship and shall rectify free of cost all defects due to faulty erection detected during the guarantee period starting from the date of the 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 security deposit/other dues or by other legal means.

4.23 **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 of any other person is by the contract expressed to be final

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and conclusive shall, after written notice by either party to the contract to other party be referred to sole arbitration of General Manager or his nominee. The arbitration shall be conducted in accordance with provisions of the Arbitration and Conciliation Act, 1996.

The parties to the contract understand and agree that it will have no objection than the General Manager or the person nominated as arbitrator had earlier in his official capacity dealt 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 of his award being set aside by the court for any reasons; 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 the 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 a place from which the contract is issued or such other place as the arbitrator at his discretion may determine.

4.24 SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE)

The contractor has to necessarily submit the safety plan while submitting the offer. The safety plan should indicate in detail the measures that would be taken by the contractor to ensure safety of men, equipment, material and environment during execution of the work. During negotiations before placing the work order and during execution of the contract, BHEL shall have right to review and suggest modifications in the safety plan. The contractor shall abide by BHEL decision in this respect . Tenders not accompanied with safety plan are liable for rejection.

4.24.1 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 Conditions of Contract (GCC). Special Conditions of Contract

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(SCC) and job specification. Where different documents stipulate different requirements, the most stringent be adopted.

4.24.2 REFERENCES

This document should be read in conjunction with following

- General Conditions of Contract(GCC)

- Special Conditions of Contract (SCC)
- Scope of work
- Relevant IS Codes
- Reporting Formats

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

4.24.3.1 MANAGEMENT RESPONSIBILITY

- a. 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.
- b. The HSE management system shall cover the HSE requirements including but not limited to what is specified under Para 2.15.1 and para 2.15.2 above.
- c. 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 (for every 500 or less) - One additional safety engineer/officer, as above.

- d. Contractor shall indemnify & hold harmless BHEL/Customer & their representatives free from any and all liabilities arising out of non-fulfillment of HSE requirements.
- e. The Contractor shall ensure that the Health, Safety and Environment (HSE) requirements are clearly understood & faithfully implemented at all levels at site.
- f. 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 hazard involved in various operations during construction.
- g. The contractor shall arrange suitable first-aid measures such as First Aid Box, trained personnel to give First Aid and install fire protection measures

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such as adequate number of steel buckets with sand and water to the satisfaction of BHEL/customer.

- h. Non-Conformance on HSE by Contractor (including his Sub-contractors) as brought out during review/audit by BHEL/customer representatives shall be resolved forthwith by Contractor. Compliance report shall be provided to BHEL.
- i. The contractor shall ensure participation of his Resident Engineer/Site-in-Charge in the Safety Committee/HSE Committees meetings arranged by BHEL/customer. The compliance of any observations shall be arranged urgently. He shall assist BHEL/customer to achieve the targets set by them on HSE during the project implementation.
- j. The Contractor shall adhere consistently to all provisions of HSE requirement In case of non-compliance or continuous failure in implementation of any of HSE provisions, BHEL/customer may impose stoppage of work without any cost & time implication to BHEL/customer and /or impose a suitable penalty for non-compliance with a notice of suitable period, upto a cumulative limit of 1.0% (one percent) of contract value. This penalty shall be in addition to all other penalties specified elsewhere in the contract. The decision of imposing stoppage of work, its extent & minor penalty shall rest with BHEL/customer & binding on the contractor.
- k. 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/customer. BHEL/customer shall have the liberty to independently investigate such occurrences and Contractor shall extend all necessary help and co-operation in this regard.

4.24.3.2. HOUSE KEEPING

4.24.3.2.1 Contractor shall ensure that a high degree of house keeping is maintained and shall ensure interalia, the following

- a) All surplus earth and debris are removed/disposed off from the working areas to identified location(s)
- b) Unused/Surplus Cables, Steel items and steel scrap lying scattered at different places within the working areas are removed to identified location(s).
- c) All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from work place to identified locations.
- d) Roads shall be kept clear and materials like pipes, steel, sand boulders, concrete, chips and brick etc., shall not be allowed on the roads to obstruct free movement of men & machinery.
- e) Fabricated steel structural, pipes & piping materials shall be stacked properly for erection.

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- f) Water logging on roads shall not be allowed.
- g) No parking of trucks/trolleys, cranes and trailers etc., shall be allowed on roads, which may obstruct the traffic movement.
- h) Utmost care shall be taken to ensure overall cleanliness and proper upkeep of the working areas.
- i) Trucks carrying sand, earth and pulverised materials etc, shall be covered while moving within the plant area.

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

4.24.3.3. HEALTH SAETY AND ENVIRONMENT

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/customer. Contractor shall ensure deployment of appropriate equipment and appliances for adequate safety and health of the workmen and protection of surrounding areas.

The contractor shall ensure that all their staff and workers wear Safety helmet and Safety shoes. Contractor shall 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.

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 materials and equipment. All lifting equipment shall be tested certified for its capacity before use. Adequate and suitable lighting at every work place and approach thereto, 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 a RMP/Govt. Hospital. Hazardous and / or toxic materials such as solvent, coating or thinners shall be stored in appropriate containers. All hazardous materials shall be labeled with the name of the materials, the hazards associated with its use and necessary precautions to be taken.

Contractor shall ensure that during the performance of the work, all hazard of the health of personnel have been identified, assessed and eliminated.

Chemical spills shall be contained & cleaned up immediately to prevent further contamination.

All personnel exposed to physical agents such as ionizing or non-ionizing radiation, or similar other physical agents shall be provided with adequate shielding or protection commensurate with the type of exposure involved.

Where contact or exposure of hazardous materials could exceed limits or could otherwise have harmful effects, appropriate **personnel**

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protective equipment such as gloves, goggles, aprons, chemicals resistant clothing and respirator shall be used.

All persons deployed at site shall be knowledgeable of and comply with 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 authorisation of BHEL/customer.

4.24.4 DURING JOB EXECUTION

Implement Health, Safety and Environment requirements including but not limited to as brought out under para 2.15.3. Contractor shall ensure to:

- Arrange workmen compensation insurance, registration under ESI Act, third party liability insurance etc., as applicable.
- Arrange all HSE permits before start of activities (as applicable) like hot work, confined space, work at heights, storage of chemical/explosive materials and its use and implement all precautions mentioned thereon.
- Submit timely the completed checklist on HSE activities, monthly HSE report, accident reports, investigation reports etc., as per BHEL/customer requirements. Compliance of instructions on HSE shall be done by Contractor and informed urgently to BHEL/customer.
- Ensure the Resident Engineer/Site in charge 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 personnel shall be nominated by him in advance and communicated to BHEL/customer.
- Display at site office and work locations caution boards, list of hospitals, emergency services available.
- Display posters, banners made available by BHEL for safe working to promote safety consciousness.
- Assist in HSE audits by BHEL/Customer and submit compliance report.
- Generate & submit HSE records/report as per HSE plan.
- Appraise BHEL/Owner on HSE activities at site.

4.24.4.1 RELEVANT IS CODES FOR PERSONAL PROTECTION (suggested)

IS 2925 - 1984 Industrial Safety helmets

IS 4770 - 1968 Rubber gloves for electrical purposes

IS 6994 - 1973 (Part I) Industrial Safety Gloves (Leather & cotton Gloves) &

IS 8807 - 1978 Body protection devices

IS 8519 - 1977

IS 1989 - 1986 (Part I & III) Leather safety boots and shoes

IS 3738 - 1975 Rubber knee boots

IS 5557 - 1969 Industrial and knee boots

IS 6519 - 1971 Code of practice for selection, care and repair of safety

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Foot wear

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

4.24.5 MONTHLY CHECKLIST CUM COMPLIANCE REPORT

(for compliance during execution)

PROJECT : CONTRACTOR :

DATE : OWNER :

INSPECTION BY

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

ITEM YES NO REMARKS ACTION

HOUSE KEEPING

Waste containers provided and Used

Sanitary facilities adequate and clean

Passageways and Walkways clear

General neatness of working areas

Other PERSONALPROTECTIVE EQUPT.

Goggles: Shields

Face protection

Hearing protection

Safety shoes provided

Hand protection

Safety Belts

Other EXCAVATIONS/ OPENINGS

Openings properly covered or barricaded

Excavations shored

Excavations barricaded

Overnight lighting provided

Others

WELDING, CUTTING

Gas cylinders chained

ITEM YES NO REMARKS ACTION

Upright Cables and hoses not obstructing

Screens or shields used

Flammable materials protected

Fire extinguisher(s) Accessible

SCAFFOLDING

Fully decked platforms

Guard and intermediate rails in place

Toe boards in place

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Adequate shoring

Adequate access

LADDERS

Extension side rails 1 m above

Top of landing Properly secured

Angle ± 70 from horizontal

HOIST, CRANES AND DERRICKS

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

Inspection and maintenance logs maintained

Outriggers used

Signs/barricades provided

Signals observed and understood

Qualified operators

MACHINERY, TOOLS AND EQUIPMENT

Proper instruction

Safety devices

ITEM YES NO REMARKS ACTION

Proper cords

Inspection and maintenance

VEHICLE AND TRAFFIC Rules and regulations observed

Inspection and maintenance

Licensed drivers

TEMPORARY FACILITIES

Emergency instructions posted

Fire extinguishers provided

Fire-aid equipment available

Secured against storm damage

General Neatness

In accordance with electrical requirements

FIRE PREVENTION

Personnel instructed

Fire extinguishers checked

No smoking in prohibited areas

Hydrants clear

Other

ELECTRICAL

Proper wiring

ELCB'S provided

Ground fault circuit interrupters

Protection against damage

Prevention of tripping hazards

HANDLING AND STORAGE OF MATERIALS

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ITEM YES NO REMARKS ACTION

Properly stored or stacked

Passageways clear

FLAMMABLE GASES AND LIQUIDS

Containers clearly identified

Proper storage

Fire extinguisher nearby

WORKING AT HEIGHT

Erection plan

Safety belts and lanyards;

chute lines

ENVIRONMENT

Chemical and other Effluents properly disposed

Cleaning liquid of pipes disposed off properly

Water used for hydro testing as per agreed procedure

Lubricant waste/engine oils properly disposed

Waste from Canteen, offices, sanitation etc., disposed properly

Disposal of surplus earth, stripping materials, Oily rags and combustible materials done properly

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

ITEM YES NO REMARKS ACTION

Availability of Potable drinking water for Workmen & staff.

Signature of Resident Engineer with seal

4.24.6 ACCIDENT CUM FIRE REPORT

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

Name of the site :..... Report No

Contractor :

Name of the injured &

Age :.....

Father's Name :

Sub Contractor M/s :

Date and Time of accident :

Location :

Brief Description of the accident :

Cause of the Accident :

Nature of Injury / Damage :

Medical aid provided / action taken :

Intimation to the local authorities :

Signature of the contractor with seal

Date :

To

Site Incharge / BHEL

4.24.7 SUPPLEMENTARY ACCIDENT & INVESTIGATION REPORT

Project : Supplementary to Report No:

Site : Date :

Contractor :

Name of the Injured :

Age :

Father's Name :

Subcontractor M/s :

Date and time of accident :

Location :

Brief Description and cause of accident :

Nature of injury / damage

Comments from the Medical Practitioner, who attended the victim/injured:

Suggested improvement in the working condition if any:

Loss of man hours and impact on site works:

Any other comment by the safety Officer:

Signature of the contractor

With seal

Date :

To :

4.24.8 MONTHLY HEALTH, SAFETY AND 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 the work Name of the Safety Officer:

Item This month Cumulative

Total strength (staff + workmen)

Number of HSE meetings organised at site

Number of HSE awareness programmes attended at site

Whether Workmen Compensation Policy taken Yes / No

Whether Workmen Compensation Policy is valid Yes / No

Whether workmen registered under ESI Act Yes / No

Number of fatal accidents

Number of loss time accidents (other than fatal)

Other accidents (non-loss time)

Total number of accidents

Total manhours worked

Manhour loss due to fire and accidents

Compensation cases raised with Insurance

Compensation cases resolved and paid to workmen

Remarks

Date Safety Officer / Resident Engineer

(Signature & Name)

To

Site Incharge, BHEL

4.25 SALIENT PROVISIONS OF CONTRACT LABOUR (REGULATION & ABOLITION) ACT 1970

A. The Act applies to every establishment in which twenty or more workmen are employed or were employed any day in the preceeding twelve months, as contract labour.

B. CONTRACTOR

1. In relation to an establishment, means a person who undertakes to produce a given result for the establishment, other than a mere supply of goods or articles of manufacture to such establishment, through contract labour
(OR)

2. Who supplies contract labour for any work of the establishment and includes a subcontractor.

C. “ Establishment” means:

i. any office or department of the Government or a local authority, or

ii. any place where any industry, trade, business, manufacture or occupation is carried on

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D. “Principal Employer” means:

In any other establishment, any person responsible for the supervision and control of the establishment.

E. “Workmen” means:

Any person employed in or in connection with the work of any establishment to do any skilled, semi-skilled or unskilled manual, supervisory, technical or clerical work for hire or reward, whether the terms of employment be expressed or implied.

F. Notes – “Contractor” – The definition of the expression “Contractor” has two wings. One is in relation to the establishment in which he contracts to supply labour on contract and another in relation to the contractor himself. Any contractor whose work is to supply contract labour for any work in any establishment, including a sub-contractor will be governed by the Act, provided he is employing twenty or more persons.

G. An establishment engaged in construction work or manufacturing process might either employ labour through a contractor or it might entrust the execution of the work itself to a contractor who will employ his own workmen.

H. The usual test is whether the employer has control over the labour and actual execution of the work.

I. In all other establishment the person in the control of the establishment will be the principal employer. The importance of the definition of the principal employer lies in the fact that it is he who engages the contract labour and who is made responsible for due observance and discharge by the contractor of the duties and obligations enjoyed on him by the Act.

J. Liability of principal employer in certain cases (Section – 20)

I. If any amenity required to be provided under Section 16, Section 17, Section 18, or Section 19 for the benefit of the contractor within the time prescribed therefor such amenity shall be provided by the principal employer within such time as may be prescribed.

II. Responsibility for payment of wages.

- a) Contractor is responsible for payment of wages to each worker employed by him as contract labour and wages shall be paid before the expiry of such period as may be prescribed.
- b) Principal employer will nominate a representative to be present at the time of disbursement of wages by the contractor and certify the amount paid as wages.
- c) It is the duty of the contractor to ensure disbursement of wages in the presence of authorized representative of principle employer.
- d) In case the contractor fails to make payment of wages within the prescribed period or make short payment, then the Principal Employer shall be liable to make payment of wages in full or the unpaid balance due as the

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case may be to the contract labour employed by the contractor and recover the amount so paid from the contractor either by reduction from any amount payable or as a debt payable by the contractor.

K. Registers and other records maintained by the contractor (Sec.29)

1. Form – 13 (Rule 75) – Register of workmen employed by the contractor
2. Form – 14 (Rule 76) – Employment Card –
3. Form – 15 (Rule 77) – Service Certificate
4. Form – 16 (Rule 78) (1) (a) (I) – Muster Roll
5. Form – 17 (Rule 78) (1) (a) (I) – Register of Wages
6. Form – 18 (Rule (1) (a) (I) – Register of Wages cum Muster Roll
7. Form – 19 (Rule 78 (1) (b) – Wage Slip
8. Form – 20 (Rule 78) (1) (a) (ii) –Register of deductions for damage or loss
9. Form – 21 (Rule 78) (1) (a) (ii) – Register of Fines
10. Form – 22 (Rule 78) (1) (a) (ii) – Register of Advances
11. Form – 23 (Rule 78) (1) (a) (iii) – Register of Overtime
12. Form – 24 (Rule 82) (1) – Half yearly return to be sent by the Contractor to the Licensing Officer.
13. Display of Notice Board with details of work, No. of workers engaged, Rate of wages paid, date of payment of wages, date of payment of unpaid wages, name of the Principle employer, Name and address of the Inspecting Officer in Hindi, English and local languages at a prominent place.
14. Display of Labour Licence obtained from the Licencing officer
15. Display of Extract of Contract Labour (Regulation and Abolition) Act 1970 in Hindi, English and local languages.

L. Compliance by the contractor on commencement of work and completion of work.

1. Application for licence in Form – IV (Rule 21 (1) to be submitted to the Licensing Authority along with Form – V – Form of Certificate by the Principle Employer for obtaining labour License.
2. On obtaining labour licence, Form VI – A rule 25 (2) (viii) to be submitted by the contractor regarding commencement / completion of contract work to the Licensing Officer /Inspecting Authority.
3. Form – VII Rule 29 (2) to be submitted by the contractor for application of renewal of license.

S.17 Rest Rooms

(1) In every place wherein contract labour is required to halt at night in connection with the work of an establishment.

- a. to which this Act applies and
- b. in which work requiring employment on contract labour is likely to continue for such period as may be prescribed.

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These shall be provided and maintained by the contractor for the use of contract labour such number of rest rooms or such other suitable alternative accommodation within such time as may be prescribed.

- (2) The rest rooms or the alternative accommodation to be provided under subsection (1) shall be sufficiently lighted and ventilated and shall be maintained in a clean and comfortable condition.

S.18 Other facilities

It shall be the duty of every contractor employing contract labour in connection with the work of an establishment to which this Act applies, to provide and maintain:

- a. sufficient supply of wholesome drinking water for the contract labour at convenient places;
- b. sufficient number of latrines and urinals of the prescribed specification so situated as to be convenient and accessible to the contract labour in the establishment; and
- c. Washing facilities:

S.19 First aid facilities:

1. These shall be provided and maintained by the contractor so as to be readily accessible during all working hours and a first aid box equipped with the prescribed contents at every place where contract labour is employed by him.
2. Every principal employer shall nominate a representative duly authorized by him to be present at the time of disbursement of wages by the contractor and it shall be the duty of such representative to certify the amounts paid as wages in such manner as may be prescribed.
3. It shall be the duty of the contractor to ensure the disbursement of wages in the presence of the authorized representative of the principal employer.
3. In case the contractor fails to make payment of wages within the prescribed period or makes short payment then the principal employer shall be liable to make payment of wages in full or the unpaid balance due, as the case may be, to the contract labour employed by the contractor and recover the amounts so paid from the contractor either by deduction from any amount payable to the contractor under the contract or as a debt payable by the contractor.

**4.26 SALIENT PROVISIONS AND COMPLIANCE OF WORKMEN'S
COMPENSATION ACT 1923**

- A An Act which provides for payment by certain Classes of employers to the workmen compensation for the injury by accident.
- B. Employer's liability for compensation – Sec 3 – If personal injury is caused to a workmen by accident arising out of and in the course of employment, his

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- employer shall be liable to pay compensation in accordance with the provisions of this Act.
- C. Compensation to be paid when due and for default, penalty will be levied from the contractor.
- D. For the purpose of calculation of compensation as per the Act,
- 1) the monthly wages means average amount payable for a month of service to the workmen, during the twelve months preceding the accident.
 - 2) Employee who is drawing monthly wages of more than Rs.4000/- would be treated as four thousand.
 - 3) Employees who are drawing monthly wages of less than Rs.4000/- the monthly wages would be the actual wage drawn.
- E. Where temporary settlement – whether total or partial results from the injury, a half monthly payment of the sum equivalent to 25% of monthly wages of the workmen is to be paid by the employer to the workmen.
- F No payment of compensation in respect of a workmen whose injury has resulted in death, and no payment of lump sum as compensation to a women or a person under legal disability shall be made otherwise by depositing to the Commissioner and no such payment made directly by an employer shall be deemed to be a payment of compensation.
- G In case of fatal accident , the employer is to submit Form EE Rule – 11 – Report of Fatal Accident to the workmen’s compensation Commissioner within 72 hours from the date of occurrence of accident.
- H. Employer should deposit the compensation for fatal accident in Form ‘A’ to the workmen Commissioner.
- I. In case of partial permanent disablement, memorandum of agreement in Form K,L,M are to be registered with Workmen Compensation Commissioner before disbursing the compensation amount to the Workmen.

4.27 SALIENT PROVISIONS AND COMPLIANCE OF EMPLOYEES’ STATE INSURANCE ACT 1948

- A. An Act to provide for certain benefits to employees in case of sickness, maternity and employment injury and to make provision for certain other matters in relation thereto.
- B. An employee means any person employed for wages in or in connection with the work of a factory or establishment to which this Act applies and
1. Who is directly employed by the Principal employer or on any work of, incidental or preliminary to or connected with the work of, the factory or establishment whether such work is done by the employee in the factory or establishment or elsewhere or
 2. Who is employed or through and immediate employer on the premises of the factory or establishment or under the supervision of the principle employer or his agent on work which is ordinarily part of the work of

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the factory or establishment or which is preliminary to the work carried on in or incidental to the purpose of the factory or establishment ; or

3. Whose services are temporarily lent on hire to the principal employer by the person with whom the person whose services are so lent or let on hire has entered into a contract of service; and includes any person employed for wages on any work connected with the administration of the factory or establishment or any part, department or branch thereof or with the purchase of raw materials for, or the distribution or sale of the products of, the factory or establishment;

1. (or any person engaged as an apprentice, not being an apprentice engaged under the Apprentices' Act, 1961 (52 of 1961), or under the standing orders of the establishment: but does not include)

2. (a) any member of the Indian naval, military or air forces; (or)

(b) any person so employed whose wages(excluding remuneration for overtime work) exceed (Such wages as may be prescribed by the Central Government) a month:

Provided that an employee whose wages (excluding remuneration for overtime work) exceed (such wages as may be prescribed by the Central Government) a month at any time after (and not before) the beginning of the contribution period, shall continue to be an employee until the end of that period;

C. 'Principal employer 'mean'

(i) in a factory, the owner or occupier of the factory and includes the managing agent of such owner or occupier, the legal representative of a deceased owner or occupier, and where a person has been named as the

manager of the factory under the Factories' Act 1948 (63 of 1948), the person so named;

(ii) in any establishment under the control of any department of any Government in India, the authority appointed by such Government in this behalf or where no authority is so appointed, the head of the department;

(iii) in any other establishment, any person responsible for the supervision and control of the establishment.

D. Compliance by the Contractors:

(i) To open ESI Code No. for remitting the contribution both employer and employee every month for the workmen engaged by them.

(ii) Remitting the contributions in the prescribed format in Form – 6 regularly every month.

(iii) Submission of Form – 1, Form – 1 A, Form – 1B, Form –4, Form – 4A, Form –1 6 (Accident Report) and Form – 17.

(iv) Monthly details of remittance along with salary should be submitted to BHEL.

(v) Yearly return of details of Wages, details of ESI recovery, details of remittance to be submitted to BHEL.

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- (vi) On completion of the work ESI clearance certificate obtained from local ESI authorities is to be submitted to BHEL for enabling to release the final bill.
- E. Wherever ESI Act is not applicable, the contractors shall have to cover their employees under Workmen Compensation Act 1923 by availing an insurance policy under the scheme of WC Insurance.
- F. All Government owned Insurance companies issue Workmen Compensation Insurance Policies as per term applicable. Insurance shall cover all Workmen employed by the contractor on any given date.

4.28 MINIMUM WAGES ACT 1948 Salient features

- A. An Act to provide minimum statutory wages for scheduled employment and to provide maximum daily working hours, weekly rest and overtime.
- B. It applies to all establishments employing one or more persons in any scheduled employment
- C. Compliance by the contractor
 - (i) To pay the prescribed minimum wages or more to the Workmen engaged by them.
 - (ii) Displaying abstract of the Act in English and local language in Form 9-A
 - (iii) Submission of Annual Return in Form – 3 to the statutory authorities.

4.29 EMPLOYEES' PROVIDENT FUND AND MISCELLANEOUS PROVISION

ACT 1952 (Salient features)

- A. An Act to provide for the institution of Provident Funds, Pension and Depositing in Linked Insurance Fund.
- B. It applies to all Contract Labour employed by the Contractor even for casual labour since the Principal Employer's establishment where the contractor is executing a job has already employed more than 20 workmen.
- C. The Act includes the contract labour as an employee who is employed for Wages in any kind of work and who gets his wages directly or indirectly from the employer and includes any person employed by or through a Contractor in or in connection with the work of the establishment.
- D. Compliance by the Contractor:-
 - (i) The contractor should apply for PF Code while submitting his Annual Balance Sheet and other documents required to the Regional provident Fund Commissioner.
 - (ii) If not, the contractor should get an additional code number from the Principal employer's code number and deposit the PF remittances regularly.
 - (iii) Copies of monthly remittances on the prescribed forms should be submitted to BHEL as a proof of compliance along with wage sheet.
 - (iv) Yearly submission of return indicating month wise salary, recoveries of PF and employers contribution and total reconciliation of the above in Form – 3A

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- (v) On joining the above scheme, Membership form, Nomination forms and other related forms are to be submitted to PF authorities by the contractor.
- (vi) On completion of the works, the contractor should obtain a clearance certificate from PF authorities with total reconciliation of wages paid, PF recovered and remitted as per extant rules of the above Act for further processing of final bills by BHEL.
- (vii) The contractor shall also arrange to obtain yearly statements of PF remittances from PF authorities in respect of each employee for whom he has remitted PF Monthly and issue the same to concerned workmen periodically.

SECTION 5

TECHNICAL SPECIFICATION FOR ERECTION, TESTING & COMMISSIONING OF SUPERCRITICAL TEST FACILITY (SCTF)

This specification is meant for erection testing and commissioning of the Supercritical Test Facility (SCTF) including fabrication, material handling at site stores, transportation to site of work, installation of various equipments, welding at site, carrying out the lining and insulation and lagging /painting of various equipments ,testing to hydro pressure as per specification and commissioning.

Detailed scope of work and material quantity are furnished in annexure C1

5.1 Brief Scope of Work

- 5.1.1 Handling of Erection materials and equipment from the storage yard (with in 1,000 metres) to erection site.
- 5.1.2 Lifting, positioning, leveling, aligning, fixing /erecting the materials /equipment by fastening or welding as per the drawing / instruction from BHEL.
- 5.1.3 Cutting / modification of raw materials / existing equipment / structure to suit new equipment.
- 5.1.4 Fabrication of structural and pipe line supports
- 5.1.5 Erection of piping with appropriate supports (The pipe materials include GI , PVC, Carbon steel, alloy steel and Stainless steel). The weld joints need to be of IBR acceptable quality
- 5.1.6 Painting of steel surfaces including marking flow directions and writing of pipeline names with colours as specified by BHEL.
- 5.1.7 Thermal insulation and lagging of pipe lines
- 5.1.8 Meeting IBR and factory inspectorate requirements for all pressure parts including radiography of weld joints
- 5.1.9 Heat treatment of the weld joints including pre and post weld heat treatment.
- 5.1.10 Installation of electrical, electronics & instrumentation panels and instruments .

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5.1.11 Laying power and instrumentation cables from field instruments/equipment to control room/control panel.

5.1.12 Commissioning of the test facility and handing over the facility to BHEL.

5.2 Type of materials to be handled

Bought out and fabricated components, steel columns, bracings, platform beams and plates, stair case and hand rails, runners and girders, pumps, cooling towers, cable trays, control panels, air/water /steam pipe lines and components, cables, instruments, valves and other fittings, GI pipes and fittings, PVC pipes and fittings, SS, carbon and alloy steel pipes and fittings

5.3 Responsibility of Contractor

5.3.1 Contractor has to bring sufficient quality and quantity of the following

- a. Material handling and lifting devices.
- b. Welding generators and consumables (including SS347H, S304, F22, P22, SA106 Gr B of IBR quality , GI and PVC)
- c. Metal cutting sets and consumables.
- d. Portable grinding equipment
- e. Paint as per BHEL's specification
- f. All required tools and tackles.
- g. All safety equipment for the personnel employed namely safety shoes, belt, helmet, goggles, gloves, first aid medicines etc.
- h. Equipment and personnel for the radiographic examination of weld joints
- i. Electrical utilities required for the work.
- j. Tools and plant

5.3.2 It is the responsibility of the contractor to arrange for required scaffolding

5.3.3 Transportation should be arranged by the contractor for transportation of erection materials from Stores/ Storage yard to Erection site.

5.3.4 For storing contractor's materials as well as the materials drawn by him from our stores, the contractor should make suitable arrangements at their own risk.

5.4 Work Location and content

Location: STF building in MHD Complex of BHEL, Tiruchirappalli.

Site elevation:+80m from MSL

Maximum work elevation: + 13 m from ground level.

Maximum weight of a single component: 4 tons

Maximum size of a single component: 2mX2mX4m

Maximum height of a single column to be handled: 10 m

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5.5 Inspection:

Inspection of the erection, modification work will be carried out by BHEL site In-charge (or) his authorized persons at site.

5.6 QUALITY CONTROL PROCEDURE FOR ERECTION:

5.6.1 General standard adopted by BHEL or Quality checks shall be guidelines for erection. However, in some cases, the site Engineer shall decide the tolerance for checks and the same will be informed to the contractor in advance. **All weld joints must qualify IBR and ASME requirements.**

5.6.2 Should any error or ambiguity be discovered in the specification or information, the contractor shall clarify the same with the ScTF site in-charge of Bharat Heavy Electricals Ltd, Trichy before commencement of work. The BHEL Engineer's interpretation in such cases shall be final and binding on the contractor.

5.7 Charges For Modification And Rectification

5.7.1 If any modification or rectification in the erection work that has been completed is needed due to any change in or deviation from the design of the equipment, extra charge at agreed rates shall be paid, provided the same has not arisen directly or indirectly on account of the contractor's fault.

5.7.2 For the purpose of the extra payment for which the contractor is eligible, the tenderer shall indicate in his tender the single man-hour rate applicable to all categories of his workmen. The consumables used if any for the modification and rectification as approved by the Engineer-in-charge shall be in contractor's scope.

5.7.3 All other modification and rectification shall be carried out by the contractor at his own cost. The decision of the engineer whether the modification or rectification is of major nature or not shall be final and binding on the contractor.

5.7.4 All works such as cleaning, leveling, aligning, assembly, temporary erection for checking, dismantling surface preparation, edge preparation of pipes and plates for welding, fitting, welding, cutting, grouting straightening at which in the Engineers opinion are incidental to the final satisfactory erection shall be carried out by the contractor for which no extra claim shall be allowed.

5.8 Foundation Of Civil Work

14. Machine foundation and other necessary civil works will be provided by BHEL. However all minor adjustments of foundation levels, dressing and chipping of foundation surface etc as may be required for the erection of equipment will have to be carried out by the contractor at his own cost. Any civil work shall have to be made to the full satisfaction of BHEL.

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5.9 Erection

5.9.1 The scope of erection includes the transporting the material from the storage yard, alignment, welding, leveling, adjusting etc till the equipments are finally tested and approved for acceptance and are taken over by BHEL for putting into operation. The contractor shall provide himself all consumables in sufficient quantities like electrodes, oxygen and acetylene gas, kerosene, grease, sleepers, scaffolding materials, etc, required for the erection work. The materials supplied and used shall be the best quality and has the approval of BHEL.

5.9.2 Erection by contractor includes the following items of work among the other things.

- a) Taking a proper inventory of all the equipment, machinery and other materials collected and stored at the work site for erection.
- b) Checking up the equipment, machinery and other materials to ensure that they conform to the specifications laid down in the contract and drawings & also to make sure that they are in proper condition to be taken up for erection.
- c) Arranging for the overhaul of any defective or unsuitable items of equipment, machinery of material.
- d) Arranging for the procurement and ensure availability at site at the time of erection work all consumable construction materials for erection work such as welding electrode including special alloy electrodes, oxygen, acetylene, argon gas and other stores, etc and such other materials as may be needed to execute the handling and erection work.
- e) Checking up each individual item of the equipment as also each individual lines to ensure that the erection of these items have been properly carried out in conformity with the erection drawing and instruction as given by the contractor.

5.9.3 After all the installation and assembly work is completed, the entire plant assembly including the pipe lines shall be checked for leak test, to ensure that individual items of equipment including pipe lines have been properly installed. The pipe lines shall be checked up by tests to make sure that all the fittings, etc have been properly fitted up and that there are no leakage's or wrong connection of interconnecting pipes etc. The testing shall be in accordance with Indian standards or accepted international standard. In the absence of either, the work shall conform to the best prevalent practice.

5.9.4 It is only after the entire plant assembly has been thoroughly checked up on the lines indicated above and found satisfactory that the erection work shall be deemed to be completed and the equipment considered ready for commissioning. The authorized representatives of the contractor shall issue a certificate regarding the completion of the erection work to the effect that the whole plant has been tested properly.

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5.9.5 The contractor will get allotted a suitable open space within a reasonable distance from the actual site of work for the storage of the equipment, materials required for the erection work of the plant. BHEL accepts no responsibility for the loss or damage to the contractor's materials arising from any reason. The responsibility of safeguarding against any such possible losses or damages rests with the contractor.

5.9.6 BHEL does not accept any liability for any payment towards the reimbursement of loss or damage to the contractor's materials, for payment of any compensation for injuries including the loss of life to their workmen & staff, resulting from causes of circumstances which are not of contractor's making at any time during the period of erection.

5.9.7 The contractor shall bear all loss, expense and damage in connection with and agrees to indemnify and save BHEL harmless of, from and against all claims, demands, losses, expenses and judgments made or recovered by reason of liability imposed by law upon the contractor for damages because of personal injury, including death at any time resulting there from, sustained by any employee of the contractor or its sub contractor(s) and whether or not arising out of or in consequence of the performance of this contract, whether such injuries are due or claimed to be due to any negligence of the contractor, the contractor or his employees, agents, subcontractors or any other person.

5.9.8 The contractor shall take all reasonable care to protect the work under erection till such time the erected equipment are taken over by Bharat Heavy Electricals Ltd. Caution notices shall be displayed by the contractor to give warning to the person working at site or access to any part which may deem to be unsafe or hazardous.

5.9.9 In case of damage or loss to any equipment of any property there of BHEL caused by the contractor 's men, while handling and erecting the same due to negligence and carelessness on the part of the contractor's men, the responsibility of loss together with overhead will be recovered from the contractor's bill. The decision of the BHEL regarding the cause as well as the extent of cost of damage is final and conclusive.

5.9.10 Until the plant and equipment are deemed to have been taken over, the contractor shall be liable and shall deem to have agreed to identify BHEL the section of negligence of the fault of the contractor or his personnel.

5.9.11 The entire surplus unused materials supplied (by Bharat Heavy Electricals Ltd) if any, shall be returned to BHEL in the condition in which they were received. The contractor shall, during the progress of work provide, erect and maintain necessary stores, office and temporary workshops required for the proper and efficient execution of the work at his own cost. The planning and layout of temporary building shall have the approval of BHEL Engineer.

5.9.12 The contractor shall execute the work in a most substantial and good workmanship. The contractor shall be responsible to ensure that the workmanship conform to dimensions

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and tolerances given in the drawings. If any dimension of the work is found to be defective the contractor shall rectify the same at his own cost.

5.9.13 Progress Report: Contractor shall provide daily progress report as required by site in-charge indicating the major activities and the stages of completion.

5.10 Cleaning Equipment:

5.10.1 The contractor shall clean thoroughly the internal surface of all equipment, ducts and piping before erection by wire brush & air blowing as per the instructions of BHEL Engineer.

5.10.2 The contractor shall provide all labour, materials and instruments required for the test inspection. Defects arising out of faulty workmanship or faulty materials supplied by the contractor shall be replaced free of cost by the contractor.

5.10.3 From the time the materials are handed over to the contractor up to the time of completing the erection work and acceptance by BHEL all materials are under the custody and responsibility of the contractor.

5.11 Drawing And Documents:

5.11.1 Upon award of contract, detailed drawings shall be issued to the contractor by BHEL. All the drawing notes, which will be available with the site engineer and shall form an integral part of the contract.

5.11.2 Any documents, drawings, supplied by BHEL to the contractor in pursuance of this contract shall remain the property of BHEL and any information derived shall be regarded as secret and confidential and shall not without consent in writing of BHEL, be published or disclosed either in full or part to any third party or made use of by the contractor, except for the purpose of implementation of this contract. On completion of the work, the documents drawings etc shall be returned to BHEL in good condition.

5.12 Facilities Provided By BHEL:

5.12.1 BHEL will provide all guidance and clarifications for erection; supply all materials and equipment (other than paint), power, water and compressed air. In case of non-availability of power, water and compressed air under unforeseen causes, it is the responsibility of the contractor to arrange for the same at his own cost in order to meet the erection schedule

5.12.2 Area in open ground will be provided for storage of materials and equipments.

Water including drinking water required for the labour will be supplied free of cost.

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Permission for erection of temporary work sheds etc, at site will have to be obtained from BHEL in writing in advance. Subject to availability, electrical energy required for the work may be provided by BHEL free of cost at any one point at the

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- site as decided by the Engineer In-charge. BHEL does not accept any liability whatsoever for non-supply, delay in supply, that there is no wastage of electrical energy, otherwise supply is liable to be stopped at contractor's risk and cost.
- 5.12.2 The general instructions to tenderers shall be deemed to form an integral part of the contract for the work to be entered into.

5.13 SCOPE OF ELECTRICAL /C & I WORKS

Scope Of Work In General:

- 5.13.1.1 The scope of electrical/c&I work covers, identification of equipment at stores/storage yard, technical assistance for checking and making the shortage/damage reports, taking delivery at stores/storage yard and pre assembly of equipment required, checking, calibration, erection, testing, commissioning, trouble shooting, trial operation and maintenance of complete equipment and materials enumerated in the rate schedule of this tender till handing over to customer or till completion of contract period which ever is earlier along with the supply of all consumables tools tackles and testing instrument as per BHEL engineer's instruction/supervision in the with the terms and condition covered in the main package.
- 5.13.1.2 It is not the intent to specify herein all details of equipment and material. Any C&I/ Electrical item related to this work, that is necessary to complete the system shall be deemed to have been included in the scope of the Job, even if not covered by this.
- 5.13.1.3 The contractor shall take full responsibility for satisfactory testing, pre-commissioning, commissioning that shall also include any additional tests which the Engineer feels necessary because of site conditions, customer requirement, and also to meet system specification
- 5.13.1.4 All the work shall be carried out as per the instructions of BHEL engineer. BHEL engineer's decision regarding the correctness of the work and method of working shall be final and binding on the contractor.
- 5.13.1.5 Contractor shall erect all items/materials etc. as per sequence prescribed by BHEL at site. BHEL engineer depending upon the availability of materials/work fronts etc will decide the sequence of erection/commissioning methodology. No claims 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 job or for any reasons whatsoever.
- 5.13.1.6 All suitable material handling equipment in line with mechanical works that required for C&I/ Electrical Works and other tools, measuring instruments, calibrating equipment etc shall be arranged by the contractor. He shall also

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have adequate trained, qualified and experienced C&I/Electrical engineers, supervisory staff and skilled personnel. Contractor shall have valid **ELECTRICAL LICENSE** to carry out the Electrical works. The manpower deployed by contractor shall match with above scope of works, and shall not be mixed up with Mechanical Works.

5.13.1.7 On completion of erection works, the contractor shall arrange for joint inspection for the erection completion with minimum seven (7) days advance notice. Any defect pointed out during such inspection shall be promptly rectified by the contractor.

5.13.1.8 All other general terms and conditions shall be in line with main equipment erection – contract.

5.13.2 SCOPE OF WORK FOR ELECTRICAL WORKS IN GENERAL

5.13.2.1 Installation of epoxy painted /GI supporting structure for cable trays, cable racks, etc., using standard mild steel section like channels, angles, flats etc.

5.13.2.2 Installation of GI materials for clamping the multi core LT power and control cables.

5.13.2.3 Installation of GI/pipe conduits in various size, and RCC Hume pipes and fitting for cable installation, wherever required.

5.13.2.4 Installation of painted steel support structure for mounting push button station for local starting of motors.

5.13.2.5 Supply (if applicable) and Installation of danger board, first aid box.

5.13.2.6 Supply (if applicable) and Installation of rubber floor mats for LT panels.

5.13.2.7 Arranging all scaffolding and platforms for erection cables, panels etc.

5.13.3 BUSDUCT SUPPORTING STRUCTURE:

Each set of busduct supporting structure shall be fabricated from standard steel sections welded/bolted and hot dip galvanized. All structure hardware shall be HTS hot dipped/electro-galvanized.

5.13.4 SCOPE OF WORKS FOR ERECTION & COMMISSIONING
OF BUSDUCTS

- 5.13.4.1 Receipt from BHEL stores/yards, unloading all the busduct materials and accessories and equipment at the area where the busducts are to be erected, inspection, installation of all the materials as indicated in the BOM and relevant drawings, testing and commissioning of total busduct items, painting and handing over, as detailed below.
- 5.13.4.2 Transport of Busducts and associated items and accessories from BHEL Stores to erection site
- 5.13.4.3 Cleaning of enclosure and conductors, insulators and other panels before assembly/erection.
- 5.13.4.4 Placement of embedment and erection and alignment of steel support structures.
- 5.13.4.5 Carrying out final painting as per the standard color codes recommended by **BHEL for all the items covered in the scope including supply of paints, thinner** and other consumables etc. as required as part of erection. (For more details, refer scope of painting).
- 5.13.4.6 Grouting of busduct support structures.
- 5.13.4.7 Running of earth flats and earthing of busducts, cubicles, Marshalling boxes and structures, as detailed in the relevant bus duct drawings.

5.13.5 LT SWITCHGEARS, POWER DISTRIBUTION BOARDS, OTHER CONTROL PANELS.

5.13.5.1 SCOPE OF LT SWITCHBOARD, AC/DC DB

- 5.13.5.1.1 LT MCCs are simple module type with isolators and fuses. However,. Some of the MCCs are Double Front draw out type consisting of circuit breakers unit, contactors/starter fuse switch units, MCB etc. arranged in multi-tier construction. These MCCs and AC DBs are mainly supplied to cater the requirement of drives, valves, etc. All the L T Switchgear, AC DB shall be located in STF building.
- 5.13.5.1.2 The base frames shall normally be supplied along with the boards. These shall be aligned, leveled and grouted in position as per approved drawings.

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Wherever' the base channels are not available, the same shall be fabricated, erected and painted at site. The material for this shall be supplied by BHEL. Base channels shall be grouted on the opening of the floor. All minor concrete chipping and finishing works are deemed to be included in the scope of the job. If base frame is to be fabricated/ erected, separate rate shall be paid on Tonnage basis. This is applicable for local start/stop push button box also. if any grouting bolts are required for the panels, the same shall be supplied at free of cost.

5.13.5.1.3 For the panels to be mounted on the trenches, channel supports have to be provided across the cable trenches over which the base frames of the panels shall be mounted. The contractor shall carry out fabrication and erection of these support structures and separate rate shall be paid on Tonnage basis.

5.13.5.1.4 The contractor shall set each section of equipment on its foundation or supporting structures and assemble the panels as required. Skilled manpower shall be engaged for installation of panels with parallel, horizontal and vertical alignment.

5.13.5.1.5 The commissioning of Switchgear shall also involve the trial runs and commissioning of all connected equipment like servomotors and drives etc. The contractor will have to keep his people round the clock, if necessary during the trial runs and promptly take action for any repair, checks and rectification etc. required in the equipment erected by him. No separate rate shall be paid for commissioning of associated electrical drives.

5.13.5.1.6 **The contractor shall carryout touch up painting for panels wherever required and this includes supply of paints also.**

5.13.5.1.7 MCC incomer bus shall be connected to PCC of customer. The contractor shall co-Ordinate for proper connection at PCC.

5.13.5.1.8 Contractor shall co-ordinate with other cable-laying agency for proper cable termination.

5.13.5.1.9 Contractor shall put his watch and ward for the equipment under his custody and erected in location against theft and damage by other agencies working on the same area.

5.13.5.1.10 Contractor shall close unused opening at the panel bottom plate with suitable material. In consultation with Site Engineer at free of cost as part of panel erection.

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5.13.5.1.11 Scope of work shall also cover drilling of bottom gland plates for cable entry as required.

5.13.5.2 SCOPE OF ALL CONTROL PANELS AND DCS

5.13.5.2.1 The scope of work will be generally in line with Electrical MCC panels as detailed under above clause.

5.13.5.2.2 Panels are normally supplied in suite of one / two / three/ four cubicles with bottom base frame and these panels are to be mounted on separate site fabricated base frames as per site condition and if necessary base frame to be properly grouted to the concrete floor or to be tag welded to the embedded insert plates.

5.13.5.3 SCOPE OF C&I WORKS IN GENERAL

The Scope of C&I work covered in the above packages shall be as follows:

5.13.5.3.1 Erection and commissioning of All Types of Field Instruments like Temperature, Pressure and Flow instruments (local & remote) and special instruments like EWLI, SWAS System, Gas analyzer etc.

5.13.5.3.2 Erection and commissioning of DCS/PLC system and its accessories like microprocessor based system panels, PC, printers, furniture etc.

5.13.5.3.3 Commissioning of all Types of Pneumatic operated Valves/Actuators/ Controllers and Relief Valves.

5.13.5.3.4 Erection of all types of Hardware like impulse pipes, trays & tray supports, instrument airline, etc.

5.13.5.3.5 Erection & Testing of all types of control/instrumentation cables etc.

5.13.5.3.6 Erection and commissioning of UPS, Battery, Battery Charger and DCDB.

5.13.5.3.7 Erection and commissioning of control panels etc.

5.13.5.4 SCOPE OF WORK FOR C&I CONTROL PANELS:

5.13.5.4.1 The panels, which are supplied for various control systems, have to be erected at different places like unit control room/ near the equipment! Various operating floors as per site layout. The contractor shall take the panels to the desired locations either through floor openings or temporary openings. No claims will be entertained for taking the panels to the location owing to change of route or non-availability of openings as per nearest route.

5.13.5.4.2 The base frames will be supplied normally along with the boards. Wherever the base channels are not available, the same shall be fabricated installed and

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Painted at site. The material for the above will be supplied by BHEL. Minor concrete chipping and grouting works are deemed to be included in the scope of works. For fabrication and erection of frame, unit rate shall be paid on tonnage basis.

- 5.13.5.4.3 If any minor grinding is to be carried out on the cutouts provided in the panels for mounting instruments like recorders, indicators, console etc., the same shall be carried out by the contractor at no extra cost.
- 5.13.5.4.4 All the panels shall be earthed to the nearest Electronic earth grid by means of Copper flat /wire as per standard.
- 5.13.5.4.5 Painting of fabricated parts and earthing conductors of panels shall be part of the work. Touch up paints for panels if required shall be carried out by the contractor at free of cost.
- 5.13.5.4.6 Closing the Panel openings and unused drilled holes with non-flammable sealant Materials, including supply of above material, shall be part of erection work.

5.13.6 SCOPE OF WORK FOR DCS/PLC AND SYSTEMS WITH RELATED FIELD INSTRUMENTS

- 5.13.6.1 As these are microprocessor based system panels, experienced personnel shall be deployed in erection and commissioning of these panels and laying and termination of ether net (Intra-Plant Bus -IPB) cable Le. Data Highway between DCS and PLC and Mark VI systems by skilled personnel.
- 5.13.6.2 The instrumentation part includes transmitters, gauges, switches, valves and erection materials like pipes, cables, trays, junction boxes etc. and the erection of these shall be carried out by the contractor as described elsewhere in this section.

5.13.7 SCOPE OF WORK FOR INSTRUMENTS:

- 5.13.7.1 All types of transmitters like temperature, pressure, flow, level transmitters.
- 5.13.7.2 Local mounted pressure gauges, DP gauges, thermocouples, RTDs, temperature gauges, temperature switches, pressure switches, DP switches, flow switches and limit switches and flow indicator level switches etc.
- 5.13.7.3 Air filter regulators, Air lock off valves etc.
- 5.13.7.4 Panels / Control desk mounted Instruments like indicators, recorder, console and electronic modules etc.
- 5.13.7.5 I / P converters and local controllers.
- 5.13.7.6 Pneumatic operated control valves trip valves, solenoid valves, power cylinders, etc. and electrically operated valves.
- 5.13.7.7 Special instrument like vibration sensors, electronic water level indicator, gas analyser,pc based instrument,etc.
- 5.13.7.8 All instruments and control equipment shall be calibrated to read correctly to

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the satisfaction of equipment supplier/ customer.

- 5.13.7.9 All switches shall be tested for the actuation of both normally open and normally closed contacts at the desired set points and also for the fixed/ differential settings.
- 5.13.7.10 Unit rates have been asked item-wise for instruments, gauges, switches, indicators, recorders etc. as indicated in BOQ. The rates quoted by the contractor shall be uniform as far as possible for similar items of work of the rate schedule.
- 5.13.7.11 If any instrument is to be relocated for reasons not attributable to the contractor, but required for satisfactory performance, the same shall be carried out at extra works basis. This activity is to be coordinated by contractor separately and the manpower for the above activities shall not be availed from commissioning manpower.
- 5.13.7.12 Unit rate quoted for erection of pressure/differential pressure transmitters, gauges, switches, shall include fixing the instruments on the racks / supports along with manifolds, and associated fittings and clamps. No separate rate shall be paid for each item. However, for fabrication and installation of racks and supports, rates shall be paid on tonnage basis. Steel materials required for fabrication of Racks and supports shall be supplied by BHEL.
- 5.13.7.13 Unit rate quoted for Temperature transmitters, I/P converters, Air filter/Air lock off valves, Purge meters, Rot meters, position transmitter, probes etc shall include fixing the instruments on the racks / supports along with associated fittings and clamps. No separate rate shall be paid for each item. However, for fabrication and installation of racks and supports, rates shall be paid on tonnage basis.
- 5.13.7.14 Unit rate quoted for erection and checking of thermocouple, RTD etc. shall include cleaning of thermo well stubs threads using tap sets, fixing of thermo wells, seal welding of thermo well, wherever required as per BHEL, directive of site engineers.
- 5.13.7.15 Unit rate quoted for erection and commissioning of Electronic type Level switches include fixing of Electrode standpipe, Electrodes, Electronic unit, integration of all loose supplied items etc Any minor modification require to match Float chamber/ Electrode standpipe with tapping point same shall be carried out at no extra cost.
- 5.13.7.16 All instruments are generally covered in rate schedule. However, if any instruments not covered, but requires being erected/commissioned, same shall be carried out by the contractor. Equivalent unit rate for those instruments shall be considered wherever possible from the BOQ.
- 5.13.7.17 For field mounted instruments, pre-fabricated canopies shall be provided by BHEL the mounting of canopies shall be done at no extra cost.

5.13.8 **SCOPE OF WORK FOR IMPULSE PIPES**

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- 5.13.8.1 Different types Of impulse pipes, like alloy steel, carbon steel, stainless, steel of different sizes and thickness shall be supplied with suitable fittings like coupling sockets, root valves, drain valves, manifold, condensing pots, syphons, tees, bends, nut and tail piece.
- 5.13.8.2 Unit rate quoted for impulse piping shall include site routing, cold bending welding of unions, connector Nuts and tail pieces, sockets, nipples, e couplings, condensing pots, syphons, root valves, isolation valves etc. manifolds and supporting with suitable fixtures and 'U' clamps at a interval OF 200 - 300 mm gap and painting as per BHEL/CPCL specification and site instructions. No separate rate shall be paid for fixing /welding of Impulse fittings. The unit rate also includes supply of U clamps, fasteners, paints impulse pipe support materials viz. Angles/ Channels, the rate shall b tonnage basis. The above support materials shall be supplied by BHEL.of painting, refer Scope of Painting clause. Welding of impulse pipe Pressure Lines shall be carried out by High Pressure welder.
- 5.13.8.3 Suitable root valves will be provided by BHEL on the tapping point required. Wherever the dia of the impulse piping is not matching with *dia.*, reducers to be provided and necessary welding to the same to be done at site as part of impulse pipe erection. The reducers will be supplied by BHEL contractor shall carry out the welding. No separate rate will be paid for welding reducers.
- 5.13.8.4 TIG-welding sets, welding transformer/generator rectifier, Hydraulic machines, DPT kits, Hydraulic testing pumps required for pressure testing I pipes shall be arranged by the contractor. Similarly, consumables such as electrodes, gas, Tungsten rods etc., filler wire shall be arranged by the contractor free of cost.
- 5.13.8.5 The contractor shall obtain necessary approval for welding electrodes, filler BHEL welding engineer at site.
- 5.13.8.6 Impulse pipes Welder shall undergo test and get approval from BHEL welding Engineer according to the nature of welding.
- 5.13.8.7 For longer route lengths of impulse pipes, the contractor shall provide Tag at appropriate locations as directed by SHEL site engineer at no extra cost.
- 5.13.8.8 Hydro test shall be performed for all other impulse lines/ sampling lines. Equipment such as hydro test pumps and temporary piping to the required point, fill pump etc., materials such as temporary gaskets, miscellaneous fasteners etc,tools and tackles including test pressure gauges etc. are to be provided by the (as part of impulse line works).

5.13.9 SCOPE OF WORK FOR COPPER FOR SS TUBES

- 5.13.9.1 Different sizes of copper tubes of different thickness with or without PVC coating shall be supplied in standard lengths of 15 Mtr Coils and SS tube shall be supplied in standard length of 6 meter. The connectors and tees will be of

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brass/SS of different sizes as per site requirement.

5.13.9.2 The unit rate quoted on meter basis includes site routing, bending, providing supports, fixing of connectors, unions, valves, tees, etc. and connecting to the instrument air line instruments. The unit rate also includes providing tag plates on instruments / power cylinders.

5.13.9.3 If copper/SS tube length is more than Y2 mtr, suitable support shall be provided either by angle or trays. Protective angles to be used for copper tube routing. The support materials shall be supplied by BHEL. Separate Rate shall be paid for fabrication and erection of supports as per rate quoted in the BOQ.

5.13.9.4 Copper/SS tubes shall be clamped with suitable clamping materials. Supply of suitable Aluminium clamps and tag plates are under contractor's scope. The unit rate quoted for laying of copper tube shall cover the supply of clamping materials also. Leak test shall be carried out after completion of tubing works as per guidelines.

5.13.10 **SCOPE OF WORK FOR INSTRUMENT AIR LINE**

5.13.10.1. Different type of GI pipes of different thickness class shall be supplied along with GI fitting accessories like union, coupling, tee, reducers, elbow, valves, etc.

5.13.10.2. Unit rates on length basis for erection of instrument air lines includes site routing, providing supports, fixing "U" clamps, fixing of loose supplied GI accessories mentioned as above as per the drawings, providing fresh threading as required for jointing with unions, valves and all type of other fittings as required in the system. Unit rate also shall include supply of U clamps, Teflon tapes and bolts, etc.

5.13.10.3. Teflon tapes shall be used for tightening all the joints. No bending, welding etc. is allowed. No separate rate shall be paid for erection of GI fittings / accessories and U clamps.

5.13.10.4. After installation of instrument airlines, the line shall be blown and leak test shall be conducted for all the joints as per the guidelines given in section VII at free of cost.

5.13.11 **SCOPE OF WORK FOR ELECTRIC & PNEUMATIC ACTUATORS:**

For all electrical actuators of the valves, functioning, setting and performance of limit switches/torque switches of various positions shall be checked before and after installation of the actuators. The position transmitters for inching applications shall also be calibrated.

5.13.12 SCOPE OF WORKS COMMON FOR ELECTRICAL/C&I
SCOPE OF WORK FOR CABLES

- 5.13.12.1 The scope includes laying & termination of cables, drilling of gland holes on, gland plates of the panels/JBs, fixing of glands, ferrules, tag plates with necessary numbering and dressing of cable, as per BHEL specification and BHEL engineer's instructions.
- 5.13.12.2 Unit rates shall be on meter basis. The unit rate quoted for the cabling apart from above shall also include supply of clamping materials, ferrules, tag plates, lugs up to 2.5 sq. mm. Contractor scope of supply of materials shall be as per BHEL'S specification as detailed in Section VI.
- 5.13.12.3 Cables shall generally be laid on cable trays. However, if the cables are to be routed through or laid in duct bank, conduits, cable shafts etc, the same unit rate shall be paid.
- 5.13.12.3**All the dressing material such as Aluminum/GI strips, PVC ties etc.required for cable shall be arranged by the contractor at free of cost.** The contractor shall carry out cable dressing and clamping for all the cables laid by the contractor. However, if cables like illumination cables or any cables of lesser quantity for which no separate trays have been allotted are laid on the same trays, the contractor shall do clamping along with the cables laid by others.
- 5.13.12.4 The unit rate quoted for cable laying shall also cover the following works.
- a) Modification such as rotating the terminal box through 900 or 1800 as required.
 - b) Enlargement of cable entry holes, if necessary, by chipping/tapping or any
 - c) Modification required fixing of cable glands.
 - d) Drilling of gland plates of equipment if not done already.
 - e) Reaming and relocating holes at actual point of entry of cable or conduit in terminal boxes, outlet boxes, pull boxes etc. cleaning off the debris/trapped material from conduiducts.
 - f) Computer cables shall be laid in conduit pipes. conduit pipes for shorted Length shall be threaded and fixed with fittings.Unit rate shall paid on running meter basis.

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5.13.13 CABLE TERMINATION

- 5.13.13.1 The scope of termination shall include, termination of cables on various equipment installed by others. The contractor shall work in co-operation with other agencies in obtaining correct direction of rotation and commissioning of the equipment.
- 5.13.13.2 The insulating sleeves shall be of fire resistant and be long enough to over pass Conductor insulation and shall be properly sized.
- 5.13.13.3 Termination of all the cables laid by the contractor is included in his scope. Then work of testing and reconnecting, changing of connectors, the tendered without additional cost shall carry out rearrangements of leads if required.
- 5.13.13.4 The contractor shall provide Tools/ equipment required for the connections and termination of cable wherever necessary.
- 5.13.13.5 All lugs shall be supplied by BHEL.
- 5.13.13.6 After cable terminations, the debris shall be removed then & there.

5.13.14 SCOPE OF WORK FOR CABLE TRAYS SUPPORTS CONDUITS FLEXIBLE CONDUITS:

- 5.13.14.1 Scope of cable tray works covers erection various sizes of ladder & perforated trays with accessories such as coupler plates/fixing plates, anchor bolts, Fasteners etc.
- 5.13.14.2 The unit rate for erection of trays shall be on meter basis, which includes erection of trays and accessories, fabrication and erection of trays accessories and modification of straight trays.
- 5.13.14.3 No separate rate shall be paid for any fabrication of trays accessories or any modification on straight trays.
- 5.13.14.4 If trays covers are supplied same shall be erected after completion of cable lying and no separate payment will be made for fixing these covers. GI strip clamps are to be used for fixing the tray covers.
- 5.13.14.5 Welded Joints of trays shall be painted with red lead and aluminium paint in turn with bitumen as per IS 3043. The unit rate shall also include supply of paints, thinner, other consumables and brush etc.
- 5.13.14.6 Cable tray mounting structure shall be welded to the plate inserts or to steel structural beams/ members. Welding of cable tray mounting structure to steel structural beams/ members shall be done with prior approval of BHEL Engineer.
- 5.13.14.7 Wherever embedded plates or steel structural beams/members are not available for welding the cable tray mounting structure, the contractor shall fix M.S. plate to floor slab by four anchor fasteners of minimum 16 mm dia. with holding power of at least 5000 kg.

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5.13.15 SCOPE OF WORK FOR JUNCTION BOXES/ PUSH BUTTON BOXES

Different type of Junction boxes/Bush button boxes shall be supplied. The scope of installation of Junction boxes/Bush button boxes shall be as follows:

- 5.13.15.1** The unit rate quoted for erection of junction boxes/push button boxes shall include providing necessary supports, drilling of bottom gland plates for cable glands as required, Painting the tag No of JB or fixing a separate tag plate as required on junction boxes/push button boxes, minor chipping, grouting as required for mounting the JBs/PB and supply of all bolts and nuts (Fasteners) including grouting bolts as required for mounting the junction box/push button.
- 5.13.15.2** Fabrication and fixing of supports shall be on tonnage basis.
- 5.13.15.3** The contractor shall close all unused holes on the gland plates using grommet or other suitable material issued by BHEL, at free of cost.
- 5.13.15.4** If any intermediate JBs are required to terminate power cables for drives, the same shall be installed and also any modification like replacement of terminals, enlarging gland holes etc. required to accommodate power cables shall be carried out as part of this works. Equivalent Unit rate shall be paid for installation of such JBs. Decision of site engineer will be final regarding the equivalent rate.

5.13.16 SCOPE OF WORK FOR FABRICATION & INSTALLATION OF MATERIALS

- 5.13.16.1** Scopes of steel fabrication and installation covers, fabrication and installation of various type trays supports and supports for cable tray, GI pipes, JB, Control Box/Panel, local push Buttons, busducts etc. with angles and channels of different size
- 5.13.16.2** The fabrication steel materials such as angles, channels, plates, etc shall be supplied as standard lengths of supply item.
- 5.13.16.3** For fabrication, the rate shall be paid on tonnage basis and no separate rate shall be paid for erection of the same. Le. the rate quoted shall include fabrication and installation. However, for earthing materials the rates shall be paid on meter basis.
- 5.13.16.4** Fabrication shall be carried out as per schemes in consultation with site engineers.
- 5.13.16.5** **All site fabricated items, all supports or brackets needed for installation shall be fabricated and painted by the contractors with two coats of red chromate Zinc primer or two coats of epoxy based paint and the paint shade shall be approved by BHEL Site in charge. Immediately after fabrication, primer shall be applied to prevent corrosion. The installation shall be carried out only after applying the primer as detailed in painting clause.**
- 5.13.16.6** For fixing frames or supports if any minor grouting is required the same shall

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be Carried out at free of cost. After installation of frames, grouting of the same is in the scope of contractor.

- 5.13.16.7 Supply of all cement, sand etc. required for grouting of supports are in the scope of contractor.

5.13.17 SCOPE OF ABOVE GROUND EARTHING

- 5.13.17.1 The scope of work shall includes installation of earthing and lightning protection System materials and associated fittings. Others will provide earthing system comprising of main earthing conductor buried in soil, embedded in concrete inside the building. Installation of earthing conductors for connecting equipment pertaining to super critical test facility area to the plant main earth grid shall be carried out by the contractor.
- 5.13.17.2 The unit rate shall be quoted for earthing on meter basis shall covers supply of fasteners, Saddles, Spacers, lugs, minor civil works etc. Different type of earthing materials shall be supplied as supply items and the contractor shall lay and connect the earthing materials as per site requirement. Unit rate for earthing material shall be paid on running meter basis.
- 5.13.17.3 Unit rate for test pit shall be on Nos. basis. The unit rate quoted for Test pit will cover casing of test pit chambers, supply of earth electrodes and all other materials including earth electrodes, cement, brick, sand etc.,
- 5.13.17.4 Earthing System Installation scope covers, earthing of all cable trays in inside/outside plant building as well as inside the trenches at an interval as' detailed in section VII metallic frames of all current carrying equipment, supporting structures adjacent to current carrying conductors, lightning protection system conductors and neutral points of various systems/equipment, panels, motors, JB, push button boxes etc. as listed in various drawings.
- 5.13.17.5 The connection between earthing pads/ terminal to the earth grid shall be made Short and direct and shall be free from kinks and splices.
- 5.13.17.6 Equipment bolted connection after checking and testing shall be painted with anti- corrosive paint/ compound. Connection between the equipment earth lead and the grid conductor shall be welded. For rust protection, the welds shall be treated with zinc chromate primer and coated with zinc rich paint.
- 5.13.17.7 All electrical equipment operating above 250V shall have two separate and distinct connections to the earth pit.

5.13.18 SCOPE OF PAINTING

- 5.13.18.1 The scope of painting generally includes for all the steel works such as Supports, racks, frames, canopy, impulse pipes, Transformer, Bus ducts, as detailed in Scope of work of respective equipment besides touch up paints

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wherever required.

5.13.18.2 The scope also includes supply of tools/consumables like rushes, rollers, emery papers, thinner etc., at no additional cost.

5.13.18.3 Touch up painting only is generally required for trays, control panels, junction Boxes and full painting shall be required only for specific equipments as per the Scope of erection.

5.13.18.4 For any bare copper material requirement, painting as desired by the site shall be carried out by the contractor at free of cost.

5.13.18.5 All damaged painted surfaces shall be cleaned and as detailed above.

5.13.18.6 All damaged galvanized surfaces including cable trays shall be coated with Cold galvanizing paint.

5.13.18.7 No separate rate shall be paid for painting and supply of paints, and other consumables. Painting shall be accommodated in the unit rate quoted for items, which calls for painting as per scope of work.

5.13.19 SCOPE OF COMMISSIONING OF EQUIPMENT ERECTED AS PART OF THE MAIN EQUIPMENT

5.13.19.1 The commissioning of the Electrical/C&I items erected as part of Mechanical Works like pumps, cooling tower, test section accumulator, pressuriser, heat exchanger, air drier, compressor, Control Valves, Solenoid Valves, etc.- shall be part of the scope of work.

5.13.19.2 Separate group shall be identified for commissioning. The above group shall be available right from Trial run to full load operation including shift operation.

5.13.19.3 The scope of work covered herein also includes collecting the replacement instruments/parts from BHEL customer stores, stockyard etc.

5.13.20 ELECTRICAL (ALL TYPE OF DRIVES AND MOTOR OPERATED VALVES)

5.13.20.1 Cable identification, checking and meggering.

5.13.20.2 IR value of motor, measurement of winding resistance etc

5.13.20.3 Dryout all the motors if required to improve IR value.

5.13.20.4 Limit switch and torque switch setting.

5.13.20.5 Calibration of Electronic cards, modules etc. and fixing the same if supplied as loose item.

5.13.20.6 Checking direction of rotation of motors and testing and commissioning from local as well as remote.

5.13.20.7 Attending to any defects till the completion of contract period.

5.13.20.8 Replacing defective components like limit switches, electronic cards etc.

5.13.21 LIMIT SWITCHES & LEVEL SWITCHES

5.13.21.1 Checking the operation.

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5.13.21.2 Replacing defective components if required.

5.13.22 TEMPERATURE ELEMENTS (MOTORS AND SCTF AREA EQUIPMENTS)

5.13.22.1 Checking the healthiness.

5.13.22.2 Replacement of defective element (only for bearing).

5.14 SCOPE OF PRE-COMMISSIONING/COMMISSIONING AND POST COMMISSIONING WORKS:

5.14.1 The scope of commissioning works covers commissioning of all Instruments/ equipments/systems covered in the bill of quantities (BOQ) including loop checking and establishing the operation of instruments/equipments/systems to meet plant commissioning/operation. BHEL will provide vendor supports for special or proprietary type instruments/systems and contractor engineers/supervisors shall associate with the vendors and provide necessary manpower, T&P etc. The contractor shall be responsible for overall commissioning of all the instruments and systems covered in the BOQ.

5.14.2. Scope of commissioning starts with the commissioning of various equipment instruments/ systems erected by the contractor and making them available, as required, for the various commissioning activities of the main plants. The commissioning activities of the main plant shall be as below:

- i. Trial run of various equipment.
- ii. Detergent of the water circuits.
- iii. Water filling and steam generation .
- iv. Steam blowing of piping
- v. Nitrogen filling and Pressuring the system
- vi. Safety valve floating.
- vii. Establishing electrical heating pre heater and test section.
- viii. Establishing reliable operation of the test facility at rated pressure and temperature.

The above commissioning activities, tests, trial runs may have to be repeated till satisfactory results are obtained to the satisfaction of customer / consultant / statutory authorities like boiler inspector, electrical inspector etc.

The contractor shall co-ordinate with other contractor's during the above main plant

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commissioning activities to ensure successful commissioning of total plant.

5.14.3 The pre commissioning activities of the test facility will start with run of various equipments prior to start up of test facility and commissioning operations shall continue till the unit is handed over to BHEL. The contractor shall simultaneously start commissioning activities for the equipment erected to match with the various milestone activities of commissioning programmed of the project.

5.14.4 Contractor shall arrange specialized commissioning engineers, supervisors, electricians, instrument mechanics in each area to be associated with BHEL commissioning staff. Contractor shall earmark separate manpower for various commissioning activities. The manpower shall not be disturbed or diverted. It shall be specifically noted that above employees of the contractor may have to work round the clock along with BHEL commissioning engineers involving considerable payment of overtime, which forms part of Contractors Scope

5.14.5. The mobilization of these commissioning groups shall be such that planned activities are taken up in time and also completed as per schedule and the work\undertaken round the clock if required. It is the responsibility of contractor to discuss on day to day / weekly / monthly basis the requirement of manpower, consumables, tools and tackles with BHEL engineer and arrange for the same.

5.14.6. If at any time the requisite manpower, consumables, Tools and Plant (T & P) are not arranged by the contractor to meet the schedule, BHEL shall make alternate arrangements; and recover the cost with overhead from the running bills of the contractor.

5.14.7. After erection of various equipment prior to commissioning and after commissioning, protocols have to be made with BHEL's customer. The formats will be given by BHEL and have to be printed by the contractor in adequate numbers.

5.14.8. For electrical works, 415 volts and above, the contractor has to bring qualified electricians and the total work has to be certified by electrical license holder.

5.14.9. In case any rework/repair/rectification/modification/fabrication etc. is required because of contractor's faulty erection which is noticed during commissioning at any stage, the same has to be rectified by the contractor at his cost. If during commissioning, any improvement / repair / rework / rectification / fabrication / modification due to design improvement / requirement is involved, the same shall be carried out by the contractor promptly and expeditiously. Claims if any, for such works from the contractor shall be governed by clauses covered elsewhere.

5.14.10. During commissioning activities and carrying out various tests, if any of the instruments has to be temporarily erected and commissioned to suit the commissioning activities, the contractor have to carry out the erection of the same. After completion of activities the temporary systems have to be removed and returned to stores and no extra rate shall be paid for this.

5.14.11. Minimum requirement of Man Power for commissioning works per unit shall be as follows:

Engineer (Mechanical-1no., Electrical-1no.)

Supervisor (Mechanical-1no., Electrical-1no.)

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Technician(Electrician-1no.,Fitter-2no.,Instrumentmechanic-1no.,Welder-1no.,Semi skilled-4no.)

The above commissioning group shall be identified at the Pre-commissioning and commissioning time. The above commissioning group shall have the knowledge of various systems referred in the tender and also should have adequate experience. The above manpower for commissioning is only tentative and for any additional manpower as per site requirement the same shall be arranged by the contractor. the above commissioning manpower is part of this contact for which no extra payment will made by BHEL.

If the contractor fails to deploy the above Engineer/Supervisor/ Technician at appropriate time of commissioning, proportionat deduction as decided by BHEL engineer will be made from the contractors running well no payment shall be made against commissioning activities as per terms of payment.

5.14.12. All the T&P instruments required for commissioning are to be arranged by the contractor. (However, any special instruments, which are of proprietary nature, shall be arranged by BHEL.)

5.14.13. It shall be the responsibility of the contractor to arrange and complete all the testing, pre-commissioning and commissioning activities for the particular equipment as per relevant standard, code of practice, manufacturer's instructions and BHEL norms. All the above will be witnessed by the BHEL engineers and reports signed shortly. Contractor shall follow checklist of BHEL and testing & commissioning activities shall be carried out in accordance with the checklist.

5.14.14. **The scope of commissioning shall also cover the commissioning of the equipment/ drives erected as part of the test facility.**

5.15.00 ANNEXURES TO TECHNICAL SPECIFICATION

The above specification has to be read along with the following documents for carrying out the erection & commissioning.

S.No	Description	Annexure
01	Scope of work and BOQ	C1 (7 pages)
02	List of erection joints	C2 (one page)
03	Welding schedule	C3 (64 pages)
04	Painting schedule	C4 (4 pages)
05	GA drawing-mechanical	2-02-323-00049
06	GA-drawing E&I	2-02-323-00050

IMPORTANT NOTE

**Bidders are requested to furnish the
Informations as required in the enclosed
formats**

**Attach separate sheet if necessary
Bids with incomplete particulars
Will be summarily Rejected**

FORM 1

FINANCIAL VIABILITY

- | | | | |
|----|--|------|-----|
| 1. | Owner's capital in the business (in case of Partnership please mention percentage shares and amounts) | Rs. | |
| 2. | Quantum of business done during | 1. | Rs. |
| | Last three financial years (only in | 2. | Rs. |
| | Construction of Power Plants) | 3. | Rs. |
| 3. | Value of fixed assets of the | 1. | Rs. |
| | Business in last three years | 2. | Rs. |
| | | 3. | Rs. |
| 4. | Guarantee limits (if any enjoyed by the firm) | | |
| 5. | Overdraft limits (if any enjoyed by the firm) | | |
| 6. | Income Tax paid during the last | 1. | Rs. |
| | Three years | 2. | Rs. |
| | | 3. | Rs. |
| . | Please state whether Audited profit & Loss Account and Balance Sheet for the last 3 Years are enclosed | YES/ | No |

Signature of the Tenderer

Note: All the documents should be duly certified by auditor/Bank as may be applicable.

FORM 2

LIST OF QUALIFIED MANPOWER AVAILABLE

(A) List of Qualified Manpower available with the Tenderer:

Sl.No.	Name	Qualification	No. of years of Experience (ref.note 2)
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(B) List of Qualified Manpower to be deployed exclusively for this Contract:

Sl.No.	Name	Qualification	No.of years of Experience(ref.note 2)
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Signature of the Tenderer

Note:

- 1.The Manpower indicated against paragraph(B) above shall be further augmented with additional category/number of Tools and plants as and when required and as directed by the Engineer in charge to complete work as per the time of completion accepted.
2. The experience may be indicated fieldwise (Attach separate sheets if necessary)

FORM 3

DETAILS REGARDING SIMILAR JOBS EXECUTED/IN PROGRESS

Sl.No.	Details of jobs Executed/in Progress with Location of Project/site In the last 5 years	Financial value of the contract	No. of skilled/ unskilled Workers deployed at the project/ site for the job	No. of staff deployed at the project site for execution of the job	Remarks
1	2	3	4	5	6

Signature of the Tenderer

DECLARATION SHEET

The Bidders are requested to furnish the following information while quoting, failing which their offer will be summarily rejected.

1. Whether any relative(s) is presently employed in BHEL? If so, his connection with the Firm : YES/ NO
(If yes, please give particulars)
2. Whether any ex-BHEL employee Is associated /working with the Firm? : YES/NO (If Yes, please give particulars)
3. Whether any BHEL employee is Holding any share in Firm? : YES/NO (If yes, please give particulars)

Signature of the Tenderer

Note:

1. Attach separate sheet, if necessary.
2. If the BHEL Management comes to know, at a later date, that the information furnished by the Bidder is false, suitable action will be taken according to law against the contractor.

CONTRACTOR'S SAFETY PLAN

The Bidder should submit a suitable safety plan along with their offer. The safety plan shall indicate in detail the measures that would be taken by the contractor to ensure the work safely. Submission of a written safety plan by the bidder along with their offer is expected to make them clearly understand their responsibility towards safety plan by the parties before they assist BHEL Engineers in enforcing safety measures.

The Safety Plan aims at the contract's.

- Engaging qualified full time safety personnel at site particularly when the total manpower deployed is more than 500.
- Organising suitable motivation/educational programme for all workers in their control.
- Deploying T&Ps of acceptable quality only
- Towards this specific details/confirmations in respect of the following must be obtained among other things.
- Contractor's Safety Organisation with Name, Designation and qualification of full time engineer.
- Max. No. workmen likely to be employed with breakup, trade level of experience and qualifications wise.
- Motivation/training programme proposed for the workers.
- Personal protective equipment to be provided for workmen and system for ensuring usage.
- Confirmation regarding acceptance of fines for non-compliance of safety norms
- List of T&Ps proposed to be deployed with full particulars
- Fire Safety Measures proposed
- Records and reporting system
- Deviations from BHEL Safety conditions/Code of Safety norms.

A proforma for the safety plan is placed vide Annexure I.

SAFETY PLAN

Name of Project

Description of Work

Tender No.W.O.No.

1.0 DETAILS OF PROPOSED WORK

1.1 Scope

1.2 Total tonnage to be erected (appx.)

1.3 Period of completion (months)

1.4 Max.No.of personnel to be
Deployed (Nos.)

2.0 SAFETY ORGANISATION

2.1 Furnish details of atleast 3 major
Jobs executed in the past

2.2 How many sites you are operating
Presently

2.3 Furnish details of safety
Organisation at HQ and project Sites

2.4 Furnish Name, Qualification and
Designation of Safety Engineer

2.5 Is he a full time safety engineer

2.6 If not furnish details of additional
Work assigned to him

2.7 Details of Personnel
Qualified in administering First Aid

2.8 Details of Personnel trained
In Fire Fighting operation

3.0 CONTRACTOR'S PERSONNEL

3.1 Furnish details of Max.

Manpower likely to be deployed	:
a. Executive	:
b. Supervisors	:
c. Workers	:
d. Others	:
TOTAL	:

3.2 Please indicate details of workmen based on experience in identical work

a. With more than 5 years experience	:
b. Upto 5 years experience	:
c. No.previous experience	:
TOTAL	:

3.3 Please indicate details of Workmen qualification wise

a. Graduates	:
b. I.T.I.	:
c. Metric	:
d. VIII Std	:
e. Others	:
TOTAL	:

3.4 Please furnish trade-wise Breakup of workmen

a. Fitter	:
b. Welder	:
c. Rigger	:
d. Electrician	:
e. Helpers	:
f. Others	:
TOTAL	:

4.0 SAFETY AWARENESS/ TRAINING PROGRAMME

4.1 Furnish details of safety programmes :
Organised by you in the past

4.2 Safety organised programmer proposed :
During the course of execution of the job

5.0 PERSONAL PROTECTIVE EQUIPMENT:

5.1 List down the 'PPE' provided to workmen :

APPLIANCES

a. Safety Helmet :

b. Safety belt :

c. Eye and Face protection device :

d. Hand and Body protection device :

e. Safety shoes :

f. Other :

6.0 FIRE SAFETY MEASURES :

6.1 Furnish No. of Personnel :
Trained in fire fighting operation

6.2 Portable fire extinguishers to be provided :

a. Number :

b. Type/Make :

c. Location :

6.3 Fire resistant covers to be provided for :
Coverage of materials

a. Number :

b. Type/Make :

c. Size :

7.0 TOOLS AND PLANTS

7.1 Furnish details as per proforma

Sl.No.	Equipment with Capacity	Year of Mfg.	Date of last Major Overhaul	Remarks
1.				
2.				
3.				
4.				

8.0 GENERAL

8.1 Furnish deviation/comments if any on BHEL code of Safety management :

8.2 Indicate Safety reporting system proposed

a. Monthly Safety reports :

b. Accident reports :

c. Others :

8.3 Indicate Safety records to be maintained :

a. Accidents Investigation records :

b. Safety appliance issue register :

c. T&P Repair & Maintenance Register :

d. Others

Signature of Tenderer

FORM 7

ANALYSIS OF UNIT RATE QUOTED

S.No.	Description	Percentage of the unit rate quoted	Remarks, if any. Ref. Note 2
1.	Site facilities Viz. Electricity, water , workshop and other infrastructure facilities.		
2.	Salary & Wages for staff and workers		
3.	Consumables		
	a) Gases		
	b) Electrodes		
	c) Steel materials		
	d) Others		
4.	Depreciation & Maintenance for T&P and other items		
5.	Establishment & Admn. Expenses of site		
6.	Retrenchment benefit		
7.	Overheads		
8.	Profit		
9.	Extra work incidental to Erection		

Note:

- 1.All tenderers are requested to note, the rates quoted by them are not disclosed in any way while furnishing the above details.
- 2.Bidders are requested to indicate the type of accommodation he is planning to provide for staff & workers and the details of medical, conveyance and other amenities he is planning to provide for staff & workers in a separate sheet.

Signature of the Tenderer

List of Equipments/ machinery / T& P Owned by the Contractor & Proposed to be Deployed by the Contractor for this work

Note: The Tenderers are required to furnish the details as desired below with regard to the Equipments, machinery, Tools & Tackles, Consumables and Workshop facilities owned by them along with documentary proof for the same.

Sl No.	Name of the Equipment	Total Quantity Available with the Company	Quantity Proposed to be deployed for this job	Type capacity, Specifications	Year of Make	Date of purchase	Registration No.	Present Location of the equipment	Utility Factor	Remarks If any
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.

Signature of the Tenderer

ANALYSIS OF SIMILAR JOBS EXECUTED /IN PROGRESS

Sl. No.	Details of jobs executed/in progress with location of projects	Fin.value of the contract	Extra claims received Nature Amount	No.of skilled/unskilled workers deployed at site for this job	No.of staff deployed at site for execution of job, Engr/Supervisor	No.of strikes, work stoppages with duration & mandays lost during execution of job	Brief description of negotiations held & settlement reached	No.of accidents (fatal/minor/major)	Amt.of compensations paid for accident	Details of insurance provided for the workers for accident/Death	Details of safety equipments provided for workers
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 Signatutre of the Tenderer

ORGANISATION STRUCTURE

1. Management Structure of the firm
Whether Public Limited/Private Limited / sole Proprietorship / Partnership.
2. Details of the Staff presently on permanent rolls of the Organisation.

A) ENGINEERING STAFF:

Sl. No.	Name and Designation	Qualification	Erection Experience and Specialisation	State if proposed to be deployed at site for this job	Remarks
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Signature of the Tenderer

B) DETAILS OF TECHNICAL STAFF

Category	Total No on rolls	No. proposed to be deployed at site for this job
Supervisors / Foreman		
Storekeepers		
Crane Operators		
Compressor Operator		
Mill Wright Fitter		
Pipe Fitters		
Instrument Fitter		
General Fitter		
Electrician		
Sarang		
Rigger		
Carpenter		
Painter		
Tinsmith		
Sheet Metal Fabricator		
Pipe Fabricator		
Cable Jointer		
Heavy Vehicle Driver		
Light Vehicle Driver		
Mason		
Refractory Mason		
Semi-skilled Worker		
Unskilled Worker		
Helpers		

Signature of the Tenderer

C) WELDERS

Sl.No	Name	Specialisation (Tig/Alloy/ Arc/Carbon arc/structural	Period of Experience	Average No.of Joints per day	% age rejection	Whether holding IBR Certificate & Period of validity	State if proposed to be deployed at site for this job	Remarks if any
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1. Please indicate how you propose to ensure quality of work at site.

Signature of the Tenderer

FORM 10

DETAILS OF MAJOR MILESTONES ACHIEVED

Sl.No.	Name of Project with capacity	Date of L.O.I (Telex/Fax/Telegram)	Date of start of Erection	Date of Boxing up	Date of Oil Flushing	Date of Barring gear	Date of Steam Rolling	Date of Synchronisation	Remarks if any
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(ATTACH SEPARATE SHEET)

Name of Project with Capacity	Date of L.O.I (Telex/Fax/Telegram)	Date of start of Erection	Date of Drum lifting	Date of Hydraulic test	Date of Light up	Date of steam blowing	Date of Safety valve Floating	Remarks If any

(ATTACH SEPARATE SHEET)

Signature of the Tenderer

BANK GUARANTEE FOR SECURITY DEPOSIT (PROFORMA)

In consideration of the Bharat Heavy Electricals Limited, having its registered office at BHEL House, Siri Fort, New Dehi – 110 049 the concerned division being

Bharat Heavy Electricals Limited Trichirapalli-620014

Tamil Nadu (hereinafter called BHEL) having agreed to exempt

(hereinafter called “the said contractor(s)” from the demand, under terms and conditions of agreement datedmade

between BHEL andfor(hereinafter called “ the said Agreement) of security deposit for the due fulfillment by said

contractors of the terms and condition contained in the said agreement, or production of bank guarantee for Rs.....

(Rupeesonly).

We(hereinafter referred to as “the

(indicate the name of Bank)

Bank”) at the request of Contractor(s) do hereby undertake to pay to BHEL an amount not exceeding Rs..... against any loss or damage caused to

or suffered or would be caused to or suffered by BHEL, by reasons of any breach by the said contractor(s) of any of the terms or conditions contained in the said

Agreement.

2. We do hereby
(indicate the name of Bank)

undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from BHEL stating that the amount claimed is due by way of loss / damage caused to or would to or suffered by BHEL by reason of breach by the said contractor's of any of the terms and conditions contained in the said Agreement or by reason of the contractor's failure to perform the said Agreement. Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs.....

3. Weundertake to pay to BHEL any money so
(indicate the name of the bank)

demanded not withstanding any dispute or disputes raised by contractor(s) / supplier(s) in any suit or proceeding pending before any Court or Tribunal relating thereto our liability under these presents being absolute and unequivocal. The payment so made by under this bond shall be valid discharge of our liability for payment thereunder and the contractor(s) shall have no claim against us for making such payment.

4. We.....further agree that the guarantee
herein
(indicate of the name of Bank)

contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of BHEL under or by virtue of the said Agreement have been fully paid and its claim satisfied or discharged or till BHEL certifies that the terms and

conditions of the said Agreement have been fully and properly carried out by the said contractor(s) and accordingly discharge this guarantee, unless a demand or claim under this guarantee is made on us in writing on or before

We shall be discharged from all liability under this guarantee thereafter.

5. We.....further agree with BHEL, that BHEL shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder, to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said contractor(s) from time to time or to postpone any time, from time to time any of the powers exercisable by the BHEL against the said Contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reasons of any such variation, or extension being granted to the said Contractor(s) or for any forbearance, act, or commission on the part of BHEL or any indulgence BHEL to the said contractor or by any such matter or thing whatsoever which under the law relating to sureties would but for this provisions, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s) / Supplier(s).

7. Welastly undertake not to revoke

(indicate the name of bank)

this guarantee during its currency except with the previous consent of BHEL in writing.

8. The address of BHEL of services, correspondence in respect of matters relating to this guarantee shall be

BHARAT HEAVY ELECTRICAL LIMITED

TRICHY-620 014

Address of the Bank in full

Dated theday of20.....

Pincode :

Telegraphic Code :

For
(indicate the name of bank)

Telex No :

Fax No :

Witness :

PROFORMA OF PERFORMANCE BANK GUARANTEE

1. This deed of guarantee made thisday of20
byBank Ltd.....
.....in favour of Bharat Heavy Electricals Limited,
Tiruchirapalli having its Registered Office at
BHEL House, Siri Fort, New Delhi – 110 049 (hereinafter called the principal)

2. Whereas Messrs(with full contractor's
address) (hereinafter called the contractor) have entered into a contract (contract
No.....dated.....) for (name of work
.....with the Principal (hereinafter called the said agreement).

3. AND WHEREAS the said contractor shall execute a performance bank guarantee for
indemnifying the principal to the extent to
.....and whereas the said Messrs.....
have approachedBank Ltd. and at the request and
in consideration of the arrangement arrived between the said Messrs.....
.....and the said Bank as hereinafter mentioned to
the aforesaid Principal.

4. Now, therefore these present witness that we
Bank Ltd. by the hand of Shriits, lawfully and duly
constituted attorney, do hereby undertake to pay without demur to the aforesaid company a
sum of Rs.....(Rupees.....
.....only) on demand being made by the said Principal and to
keep the said Principal indemnified by virtue of this guarantee against any loss or damage
caused to or suffered by the said Principal by reason of any parts that may develop defects,
fails or show signs of failure in the equipment arising from faulty workmanship thereby
impairing the serviceableness under the proper use as per instructions provided by the
contractor for a period of 12 months from the date of receipt of payment and also for breach
of the terms and conditions of contract. We therefore undertake to pay the said amount in a
lump sum on demand or such part thereof as the Principal may demand from time to time,
irrespective of the fact whether the said contractor admits or denies in any Court, Tribunal or
Arbitration proceedings or before any authority.

5. The aforesaid Guarantee will remain in force and we shall be liable under the same irrespective of any concession of time granted by the said company to Messrsin or fulfilling the said contract between Messrs..... and the principal and the guarantee will remain in force irrespective of any change of terms, conditions or stipulations or any variation in the terms of the said agreement irrespective of whether notice of such change and /or variation, is given to us or not and claim to receive such notice of any change and / or variation if the terms and/or conditions to said agreement is hereby specifically waived by us. Further, we shall not be released from this guarantee by any forbearance, or the exercise or non-exercise of any of the power of rights under the said Agreement by the said Principal against the Messrs..... irrespective of whether notice of such forbearance or enforcement or non-enforcement of any powers or rights, modification or changes made in the said agreement or concession shown to Messrs.....by the Principal is given to us or not.

6. The guarantee herein contained shall not be determined or affected by the liquidation or winding up or insolvency or changes in the composition of firm/company of the said Messrs.....and shall in all respects and for all purposes be binding and operative until the payment of all moneys due or that may hereinafter become due to the said Principal is made to the Principal irrespective of any liability or obligations of the said Agreement.

7. We, the said Bank, further agree that the guarantee herein contained shall remain in force and effect during the period that would be taken for the performance of the aforesaid agreement and that it shall continue to be enforceable till all the dues of the Principal under or by virtue of the said agreement have been fully paid and its claim satisfied and discharged or till the Principal certified that the terms and conditions of the said agreement have been fully and properly carried out by the said Messrs.....and accordingly discharge the guarantee subject however that the Principal shall have the right under this guarantee after the expiry offrom the date of its execution. Any claim, or dispute arising under the terms of this documents shall only be enforced or settled in the Courts at Chennai only.

8. The Bank hereby declares that it has power to issue this Guarantee under the Bank's Memorandum and Articles of Association and the undersigned has full power to do so under the Power of Attorney dated granted by proper authorities of the Bank.

9. The guarantee is valid up to and unless a demand is made under this guarantee within six months fromall the rights of the Principal under the guarantee shall be forfeited and we the Bank shall be released and discharged from all liability thereunder.

DATED

THE

Bank by its constituted Attorney

(Signature of the person duly
authorized to sign on behalf
of the Bank)

Bank Address in full.

BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking)

Tiruchirapalli-14

CONTRACT AGREEMENT

AGREEMENT NO: BHEL::SCTF

DATE:

Name of work

Name of the Contractor with full Address :

Amount of Tender Accepted :

Letter of Intent No :

Time allotted for completing the work :

(Date of completion) :

Contractor
(To be Signed by a Person holding
Valid Power of Attorney)

(Officer authorized to sign
the agreement)

CONTRACT AGREEMENT**AGREEMENT NO: BHEL:SCTF:****DATE :**

This agreement made this day, thebetween the Bharat Heavy Electricals Limited, Tiruchirapalli-14 having its Registered Office at BHEL House, Siri Fort, New Delhi-110 049 (hereinafter called the FIRST PARTY) of one part and M/s. (hereinafter called the "CONTRACTOR) of the SECOND PART.

2. WHEREAS the first party is desirous of executing the work of more particularly described in the appendices including drawings and specifications attached herewith:

3. WHEREAS IN PURSUANCE of the said Contractor's Tender having been accepted, the first party has decided to give the above said work to the Contractor.

4. WHEREAS the said Contractor has agreed to do the aforesaid work of the first party subject to the conditions herein contained in these presents, instructions to tenderers, general conditions and special conditions, schedules, appendices, Letter of intent and specifications (hereinafter referred as the said Contract schedule) at the approved rates (hereinafter referred as the said Contract rate)

5. AND WHEREAS the said Contractor has furnished a Bank Guarantee for a sum of Rs.....(Rupees.....) bearing nodt.....fromBankvalid uptotowards initial 50% Security Deposit and has further agreed for balance 50% Security Deposit being recovered at 10% of value each running bill till the full Security Deposit is made up for the satisfactory completion and performance of the work and whereas the validity of the said Guarantee has to be extended by the Contractor, if so required before for the balance of contract period and in the event of his failure to do so the contractor shall pay or accept recovery of this amount of Rs.....(Rupees.....only) from the bills forthwith in one instalment and it has further been agreed that the failure to extend the validity of Bank Guarantee or failure to pay the aforesaid amount in the manner specified above shall constitute the breach of contract, and first party reserves the right to take any legal action deemed fit for recovering the said sum of Rs.....(Rupees.....)

This amount of Rs..... (Rupees.....) will be refunded and the Bank Guarantee will be returned to the Contractor on satisfactory completion of the work as specified in the Contract documents.

6. NOW THESE PRESENTS WITNESS that in consideration of the said contract schedule and said Contract rate, as also of agreement of good and faithful service to be rendered and performed by the Contractor in the execution of the said work, subject to the stipulation hereinafter expressed.

7. That the said Contractor will perform the aforesaid work subject to the conditions contained in these presents, instructions to tenderers, general and special conditions of contract and contract documents attached herewith including the said schedules, specifications, Letter of Intent, drawings attached and also such other drawings and instructions as may from time to time be given by the first party. And that the said contractor shall be deemed to have carefully examined the specifications and conditions of contract, appendices, schedules, Letter of Intent, drawings, etc as aforesaid and also to have satisfied himself as to the nature and character of the work to be executed.

8. That the said Contractor shall carry out and complete the executions of the said work to the entire satisfaction of the engineer within the agreed time schedule.

9. That the first Party after proper scrutiny of the bills submitted by the said contractor will pay him during progress of the said work, at said contract and agreed terms of payment, a sum as determined by the first party in respect of the work executed by the Contractor.

10. That the contract shall come into force with retrospective effect from the date on which letter accepting the tender (Letter of Intent) has been issued to the said contractor.

11. 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 conditions of contract as aforesaid.

12. That all charges on account of Octroi, terminal and Sales – Tax or other duties on material obtained for the works shall be borne by the said contractor.

13. That is agreed between the parties that the non-exercise of any powers conferred on the authorities of the first party will not in any manner constitute waiver of the conditions hereto contained in these presents and the liability of the said Contractor either of past or future compensation shall remain unaffected.

14. That the expression BHEL wherever occurring means the BHARAT HEAVY ELECTRICALS LIMITED, Tiruchirapalli-14

15. The documents hereto attached viz.,
shall also form part of this agreement.

16. In witness hereof the parties have respectively set their signature in the presence of :

WITNESSES:
(With full address)

1.

2.

Date :

Signature of the Contractor
(To be signed by a person
holding valid power of Attorney
of the company)

WITNESSES:

For and on behalf of the
BHARAT HEVY ELECTRICALS LTD.

1.

2.

Erection, Testing and commissioning of supercritical test facility Rev 01 dated 07.02.08

Detailed scope of work with bill of materials

Sl.No.	DESCRIPTION	Unit	Bill of Qty	Unit rate	Total	Remarks
1	Handling, Placing in position over civil foundation, leveling /aligning, minor grouting and painting as per schedule of fabricated and SD Items, assembling of sub components and supporting loose items supplied by BHEL/sub-vendor.					
1.1	Feed Water Tank (~ 1.83 m dia and 5m length)	MT	2.00			
1.2	Reciprocating Pump	MT	3.00			
1.3	Pressuriser	MT	1.50			
1.4	Accumulator	MT	1.50			
1.5	Circulation Pump	MT	4.80			
1.6	Regenerative Heat Exchanger	MT	1.50			
1.7	Preheater Coil - 2 Sets	MT	1.30			
1.8	Test section	MT	0.30			
1.9	Test section power terminal in 16 sections	MT	0.30			
1.10	Ambient Heat Exchanger	MT	5.00			
1.11	Cooling Water Pump - 2 Nos	MT	0.50			
1.12	Compressor -Scope includes dismantling, providing minor foundation holes, bolts and grouting	MT	1.00			
1.13	Air Drier-Scope includes fixing accessories, providing minor foundation holes, bolts and grouting	MT	0.50			
1.14	Nitrogen cylinders including fixing of regulator - 8 nos.	MT	0.80			
	Total Weight	MT	24.00			
2	Fabrication, erection and painting as per schedule of Carbon Steel structure, Pipe End supports, Columns, Nitrogen Cylinder rack, Panel supports, Structure for Platform between cooling tower and Feed water Tank, Cooling water Headers, floor grills, hand rails including bending, toe plates and pipe line supports					
2.1	Test section and Feed water tank area carbon steel structure, platform material, staircase, monkey ladder, floor grills, hand rails and toe plate	MT	14.00			
2.3	Pipeline Supporting Columns - 10 Nos	MT	1.80			
2.3	Pipe supports and clamps	MT	2.50			
2.4	Flash tank	MT	1.50			
2.5	Nitrogen Cylinder Rack	MT	0.50			
2.6	Cooling water Header - 2 Nos.	MT	0.50			
2.7	Panels, instruments, Junction boxes, control boxes and cable tray supports includes providing minor foundation holes, bolts and grouting	MT	1.80			
	Total	MT	22.60			

Erection, Testing and commissioning of supercritical test facility Rev 01 dated 07.02.08

Detailed scope of work with bill of materials

Sl.No.	DESCRIPTION	Unit	Bill of Qty	Unit rate	Total	Remarks
3	Erection and Welding of SS High Pressure Piping (IBR Quality)-(304 & 347H) including welding of Carbon, SS and alloy steel valves, threaded, welded and flanged connections and fittings – 100% radiography testing and IBR coordination shall be carried out for all welds by the vendor. WPS and PQR as applicable shall be carried out by the vendor. Test certificates for the above shall be furnished before the start of work. Pipe bending, Pre and post heating, Post weld heat treatment shall also be carried out by the vendor. The number of weld joints would be around 1018					
3.1	SS 347H Piping	MT	2.00			
3.2	Alloy Steel piping of P22, T22 and T91	MT	1.50			
3.3	Carbon and alloy steel valves (242 nos.) - Manual/Motorised/Control/Pressure regulating/ safety valves	MT	4.00			
3.4	SS and Alloy steel Fittings, flanges, flow elements and thermocouple assembly and providing 1/2" SS fittings for 40 instruments involving 320 numbers of SS fittings-Ells, Tees, siphons, gauge connectors, adaptors, nipples	MT	2.00			
	Total	MT	9.50			
4	Erection of Low Pressure IBR Carbon Steel Piping including supporting, making pipe bends and painting (Number of weld joints around 301)					
4.1	Erection of Carbon Steel piping with valves and fittings involving flanges, flow elements and instrumentation fittings involving threaded / welded connections	MT	1.50			
4.2	Control valves	MT	0.20			
4.3	LP carbon steel valves – 45 nos.	MT	0.75			
4.4	Providing additional tapping points, welding SS stubs and fixing tees, ells and fittings of size 0.5"/1.5", dosing pipe assy, ball valves and 3 piece unions in SS tank of ~ 1.83 m dia and 5m length	MT	0.20			
	Total	MT	2.65			
5	Erection of GI pipeline involving threading, supporting and distributing to various equipments/ instruments of ¾"/1"/1½"/ 2"- Total length – 160 m. including valves and fittings	MT	0.60			

Erection, Testing and commissioning of supercritical test facility Rev 01 dated 07.02.08

Detailed scope of work with bill of materials

Sl.No.	DESCRIPTION	Unit	Bill of Qty	Unit rate	Total	Remarks
6	Erection of Electrical and C&I items – Panels/control desk, Junction boxes, Field instruments, Cable trays, conduit pipes, pneumatic tubing, Carbon steel / SS impulse lines, Low pressure/High pressure threaded/welded fittings, Laying of armored power/instrumentation/computer cables, providing end termination and lugs including minor foundation holes, bolts and grouting					
6.1	Erection of power / control / instrumentation panels / Power supply panels / Control desks at control room./ in the field. Providing support channels/angles cut to required size, drilling, welding and fixing on the the existing steel member in the cable trench / columns/ platforms in the test facility from the raw material supplied. Panel/Desks supplied in multi part shall be assembled after moving to the location. Minor foundation holes, bolts and grouting at the floor for erecting these Panel/desk are also in the scope of the contract.					
6.1.1	UPS in 3 parts (Total weight-1000 Kg) Size 1200 x 600 x 1000 mm- 2 nos Battery stand with batteries Size 1200 x 800 x 600 mm-1 no	set	1.00			
6.1.2	Thyristor rectifier panel Size 2200 x 3400 x 1200 mm-1no Total weight-2000Kg	set	1.00			
6.1.3	Variable Frequency drive panel Size-2200 X1600 X600mm Totalweight-500Kg	Set	1.00			
6.1.4	Motorised control valve panel Size-2200 X2500 X600mm Total weight-750 Kg	Set	1.00			
6.1.5	MCB distribution box for UPS Power Supply Size-600 X450 X150mm Total weight-50Kg	Set	1.00			

BHARAT HEAVY ELECTRICALS LIMITED TRICHY-14 SUPER CRITICAL TEST FACILITY

Annexure C1 to Section 5

Erection, Testing and commissioning of supercritical test facility Rev 01 dated 07.02.08

Detailed scope of work with bill of materials

Sl.No.	DESCRIPTION	Unit	Bill of Qty	Unit rate	Total	Remarks
6.1.6	Copper bus duct of shape I_I or U shaped duct of total length 5350x600x600mm	set	1.00			
	Total weight-500Kg					
	One end of the bus duct shall be connected with fasteners at the 485KVA transformer bus at a height of 1200mm above the floor level.					
6.1.7	Data acquisition system	Nos	4.00			
	Size- 2000 X700 X700mm					
	Total weight- 500Kg					
6.1.8	Control desk in 3 parts will be assembled after moving to the control room at STF building.	set	1.00			
	Size- 700 X 1250 X 2900 mm					
	Total weight 750Kg					
6.2	Earth shall be excavated outside the STF building to a depth of 3000mm for earth pit and 150mm dia X 2500mm length cast iron pipe with small holes drilled all along the length shall be inserted in the pit. Alternate layer of salt and charcoal powder shall be sprinkled to a thickness of 25mm x 50mm (w) around the Cast Iron pipe outer up to the ground level. Above the ground level masonry wall of size 500(L) x500 (W) X 300(H) mm shall be constructed and covered pit with suitable size masonry slab. Suitable GI clamp shall be fabricated and fixed around the neck of the Cast Iron pipe for taking main earth to the test facility.	nos	2.00			
6.3	Erecting cable trays at various locations of type ladder / perforated with cover, Size 400 x 50, 2.5m length each with accessories. Suitable channel / angle shall be provided for fixing the trays. The tray shall be fixed using bolts & nuts and GI strip clamps.	MT	0.20			
	Total nos.20					
	GI Binding strip 25 x 3, 40m length					
	Total wt ~200 Kg					

Erection, Testing and commissioning of supercritical test facility Rev 01 dated 07.02.08

Detailed scope of work with bill of materials

Sl.No.	DESCRIPTION	Unit	Bill of Qty	Unit rate	Total	Remarks
6.4	Mounting field instruments					
6.4.1	Thermocouple assembly with thermo well - Total weight 44Kg	nos	44.00			
6.4.2	Pressure /Flow/Level/DP transmitters including 3way/5way manifolds - Total weight 400 Kg	nos	28.00			
6.4.3	Pressure gauges including 3way valve and threaded gauge connections - Total weight 25 Kg	nos	16.00			
6.4.4	Pressure switches - Total weight 5 Kg.	nos	5.00			
6.5	Mounting of Junction boxes - 12/48 ways and 6 way mini JBs at various locations					
6.5.1	6 way mini JB, 110x83x65, Total weight 60 Kg	nos	45.00			
6.5.2	12 way JB, 300x200x150, Total weight 20Kg	nos	10.00			
6.5.3	48 way JB, 360x620x150, Total weight 25kg	nos	3.00			
6.5.4	Motor JB, 600x400x250, Total weight 32Kg	nos	4.00			
6.6	Laying of Conduit pipes and drilling & welding the GI strip for supporting the conduit pipes in the existing support for trays at various places inside cable trench/ pipe racks/ test plant. GI supporting stripping shall be welded to the existing structure - 1 set					
6.6.1	3/4" Conduit pipe, 3 m length, 30 nos., with 20 Nos. of fittings, 100nos of saddle clamps, screws and 90 nos. of supporting GI strip, Total weight- 75Kg	m	90.00			
6.7	Laying of Low Pressure SS pneumatic lines, SS impulse lines with fittings					
6.7.1	Laying of SS 1/4" / 3/8" tube for air and water system including 150 nos. of threaded SS fittings. Total length	m	75.00			
6.8	Laying of High pressure impulse lines, threaded type with ferrules and sealing paste					
6.8.1	Laying of SS 1/4" / 3/8" tube including threaded ferruled SS fittings of size 1/4" / 3/8"/ 1/2" and threaded instrument isolation valves (330 nos) for various instruments(40 nos.), Total length	m	140.00			

Erection, Testing and commissioning of supercritical test facility Rev 01 dated 07.02.08

Detailed scope of work with bill of materials

Sl.No.	DESCRIPTION	Unit	Bill of Qty	Unit rate	Total	Remarks
6.9	Laying of armoured power/ control/ instrumentation, computer cables thro, trays/ trenches/conduits/ GI pipes at various elevations in test rig and control room. All cables should be clamped in supports by suitably drilling and clamping with 25x3 GI strips at every 750mm interval including end termination cables, connecting to terminal blocks of TC, transmitters, JBs, all panels, using single / double compression type cable glands by suitably drilling in gland plates. Crimping heavy duty copper lugs and wire identification ferrules/cable tag plates/ nylon cable lock ties					
	2P x 0.5	m	1000.00			
	6P x 0.5	m	670.00			
	12P x 0.5	m	510.00			
	3 1/2 C x 185	m	1000.00			
	1 C x 185	m	600.00			
	4 C x 2.5	m	1000.00			
	3 C x 35	m	200.00			
	4 C x 1.5	m	3000.00			
	Compensating cables	m	1200.00			
	Computer cable, unarmoured	m	200.00			
6.10	Laying of 2 runs of 50x6mm GI flats all around the cable trenches in STF building test area and connecting to the earth pit provided – tag welding shall be provided in the cable tray supported for cable laying					
	GI flats, 50x6, Weight - 960 Kg	m	400.00			
	Earthing panels/JBs/Motors at various locations in test section area	m	200.00			
	GI flats 25x3 Weight – 120 Kg					
7	Laying of PVC water pipe line 2” ID from the pump outlet at Water treatment plant to inlet of feed water tank at super critical facility. The pipeline shall be laid in the ground at a depth of 600mm, laying sand and brick over the pipe, laying MS pipe wherever road crossing / trench/ building crossing required. PVC pipe with fittings and MS pipe will be provided by BHEL. Consumables are in the scope of contractors. The adhesives for PVC line shall be of reputed make and should be acceptable by BHEL PVC pipe/fittings will be supplied by BHEL	m	200.00			

Erection, Testing and commissioning of supercritical test facility Rev 01 dated 07.02.08

Detailed scope of work with bill of materials

Sl.No.	DESCRIPTION	Unit	Bill of Qty	Unit rate	Total	Remarks
7.1	Laying of power cable in the ground at a depth of 600mm, laying sand and brick over the cable, and burying	m	25.00			
8	Insulation work- scope of work for ceramic/mineral wool - Welding and fixing of fins, tying with binding wires and stitching wires and wrapping with Aluminium sheet with fixing self tapping screws. Maximum layers of insulation – 4. Scope of work for asbestos packing rope – closely winding with rope and fixing with shellock paste. Maximum layers of insulation – 2					
8.1	Fixing materials	MT	0.5			
8.2	Ceramic/Mineral wool	MT	2.35			
8.3	Aluminium sheet	MT	0.50			
8.4	Asbestos packing rope-10X10 mm,10000 running meter	MT	1.00			
9	Removal of pipelines connecting existing tank, approach platform for the existing tank and other hurdles for dismantling feed water tank from existing location (Total weight of material to be cleared is approximately 1.00 ton. Bidder to visit the site to asses the work content)	Set	1.00			
	Total (Rs.)					
	Taxes and duties (to be specified by vendor)					
	Total including taxes and duties Rs.					

Note: 1) The bidders are advised to visit the MHD complex in BHEL Tiruchirapalli-14 to assess the quantum of work. 2)Supply of paints and welding consumables, tools and tackles including cranes, radiography and IBR coordination, preparing the required bends, local heat treatment, pre and post weld heating are also included under contractors scope. Any clarification required shall be taken up with BHEL before the bidding itself. Any price increase after the award of the contract is not permissible. 3)The unit rates shall be filled by the bidders in the above schedule 4)The total price quoted (sum of the multiplication of unit quantity and unit rate) alone will be considered for evaluation of the bids. Unit rate quoted will be used for the billing purposes subject to the maximum of the price quoted.

SCTF ERECTION TESTING & COMMISSIONING- REV 01 DATED 07.02.08

LIST OF HP and LP JOINTS

HP JOINTS						
S No	OD	t	MATERIAL COMBINATIONS		No OF JOINT	sub total
	mm	mm				
1	14	2.9	347H	347H	11	
2	51	12	347H	347H	83	
3	54	9.5	347H	347H	58	
4	48	3	347H	347H	31	183
5	21.3	4.78	P22	P22/F22	504	
6	88.9	21	P22	P22/F22	20	524
7	48.3		F304/F22	F304/F22	33	
8	60.3		F304/F22	F304/F22	21	
9	114.3		F304/F22	F/304/F22	1	55
10	21.3	2.77	CARBON STEEL	CARBON STEEL	103	103
11	88.9	21	ALLOY STEEL-P22	ALLOY STEEL/F304 (F22)	40	
12	21.3	4.78	ALLOY STEEL	ALLOY STEEL/F304 (F22)	65	
13	51	12	347H	F22/F304	14	
14	54	9.5	347H	F22/F304	90	104
16	63.5	12	T91	F22/F304	49	49
18	33.4	3.38	CS	F22/F304	4	4
TOTAL HP JOINTS						1018
LP JOINTS						
1	114	6.02	CARBON STEEL	CARBON STEEL	40	
2	88.9	6.3	CARBON STEEL	CARBON STEEL	95	
3	60.3	3.9	CARBON STEEL	CARBON STEEL	60	
4	48.3	5.08	CARBON STEEL	CARBON STEEL	67	
5	33.4	3.38	CARBON STEEL	CARBON STEEL	20	
6	27.3	2.65	CARBON STEEL	CARBON STEEL	3	
7	219.1	6.35	CARBON STEEL	CARBON STEEL	16	
TOTAL LP JOINTS					301	301
<p>Note: The above list is only tentative and the variation upto 10 % may be allowed in the actual site execution</p>						

APPENDIX – C 4 TO SECTION 5

PAINTING SCHEDULE

1.0 SCOPE

- 1.1 This section covers the painting requirements for the power plant equipment, structures, piping etc. and any other surface required to be painted.

2.0 CODES AND STANDARDS

Painting of equipment shall be carried out as per the specifications indicated below and shall conform to the relevant IS specification for the material and workmanship.

The following Indian Standards may be referred to for carrying out the painting job:

IS: 5	: Colours for ready mixed paints and enamels
IS:1303	: Glossary of terms relating to paints
IS:2379	: Colour code for identification of pipelines
IS:1477	: Code of practice for painting of ferrous metals in buildings (Parts I & II)
IS:2524	: Code of practice for painting of non-ferrous metals in buildings (Parts I & II)
IS:2395	: Code of practice for painting of concrete, masonry and plaster surfaces (Parts I & II)
IS:2338	: Code of practice for finishing of wood and wood based materials (Parts I & II)
IS: 6278	: Code of practice for white washing and colour Washing
IS: 3140	: Code of practice for painting asbestos cement building

Products

IS: 158	: Ready mixed paint, brushing, bituminous, black, leadfree, acid, alkali, water and heat resisting
IS: 2074	: Ready mixed paint, air drying, red Oxide Zinc Chrome, priming
IS:101	: Ready mixed paint, brushing, Zinc Chrome, priming
IS: 2932	: Enamel, synthetic, exterior (a) undercoating (b) finishing

3.0 PREPARTION OF SURFACES

All surfaces to be painted shall be thoroughly cleaned of all grease, oil, loose mill scale, dust, rust and any other foreign matter. Mechanical cleaning by power tool and scrapping with steel wire brushes shall be adopted to clear the surfaces. However, in certain locations where power tool cleaning cannot be carried out, sand scrapping may be permitted with steel wire brushes and/or abrasive paper. Cleaning with solvents shall be resorted to only in such areas where other methods specified above have not achieved the desired results. Cleaning with solvents shall be adopted only after written approval of the OWNER / OWNER REPRESENTATIVE.

4.0 PRIMER PAINT

After the surface is prepared, one coat of Zinc Phosphate primer conforming to IS: 2074 shall be applied. After this first coat is dried up completely, second coat of red oxide primer shall be applied. Primer shall be applied by brushing to ensure a continuous film without 'holidays'. The dry film thickness of each coat shall be minimum 30 microns.

5.0 FINISH PAINT

Synthetic enamel paint conforming to IS:2932 shall be used for finish coats. The colour/shade shall be as approved by the OWNER. After cleaning the dust on the dried up primer, first coat of synthetic enamel shall be applied. After this first coat dries up hard, the surface is wet scrubbed cutting down to a smooth finish and ensuring that at no place the first coat is completely removed. After allowing the water to get evaporated completely, the second finish coat of synthetic enamel paint shall be applied.

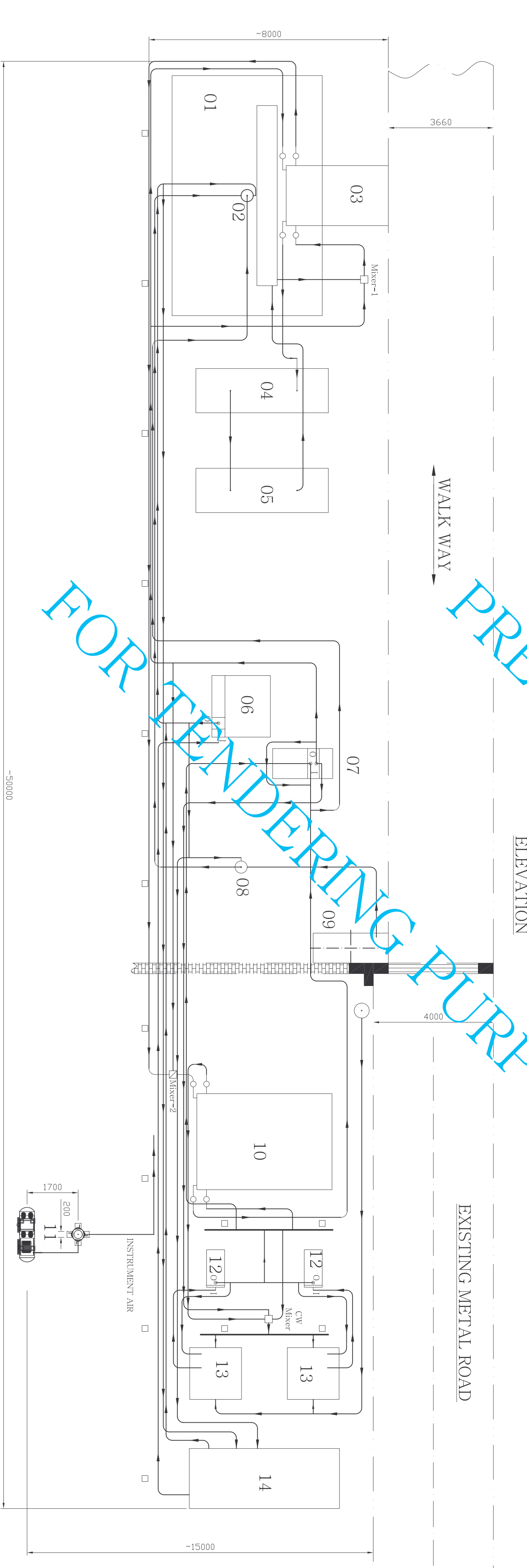
6.0 SUGGESTED COLOUR CODES FOR PAINTING

SL. NO	ITEM/SERVICE	COLOUR	IS-5 Grade	COLOUR (BAND)	IS-5
1.0	Structures, platforms, galleries, ladders and handrails	Dark Admiralty Grey	632	-	-
2.0	Boiler casing, ESP and ducting	Nut Brown	413	-	-
3.0	Crane				
3.1	Crane structure	Golden Yellow	356	-	-
3.2	Trolley and hook	Crimson	540	-	-
4.0	Fans, pumps, motors, compressors	Light Grey	631	-	-
5.0	Tanks (without insulation and cladding)				
5.1	Outdoor	Aluminium	-	-	-
5.2	Indoor	Light grey	631	-	-
6.0	Vessels & all other proprietary equipment (without insulation & cladding)	Light grey	631	-	-
7.0	Switchgear	Light grey	631	-	-
8.0	Control & relay panels	Light grey	631/7078 of IS 1650	-	-
9.0	Turbine	Golden Yellow	356	-	-
10.0	Generator & exciter	Light grey	631	-	-
11.0	Transformers	Aluminium	-	-	-
12.0	Machinery guards	Signal red	537	-	-
13.0	Piping (without insulation and cladding)				
13.1	Water System				
	Boiler feed	Sea green	217	-	-
	Condensate	Sea green	217	Light brown	410
	D M Water	Sea green	217	Light orange	557

SL. NO	ITEM/SERVICE	COLOUR	IS-5 Grade	COLOUR (BAND)	IS-5
	Soft water	Sea green	217	French blue	166
	Bearing cooling water	Sea green	217	French blue	166
	Potable & filtered water	Sea green	217	French blue	166
	Service & clarified water	Sea green	217	French blue	166
	Raw water	Sea green	217	White	-
	Cooling water	Sea green	217	French blue	166
13.2	Air system				
	Station air	Sky blue	101	-	-
	Control air	Sky blue	101	White	-
13.3	Oil system				
	Fuel oil	Light brown	410	French	166
	Light oil	Light brown	410	Brilliant green	221
	Lubricating oil	Light brown	410	Light grey	631
	Transformer oil	Light brown	410	Light orange	557
13.4	Gas system				
	Carbon dioxide	Canary yellow	309	Light grey	631
	Hydrogen	Canary yellow	309	Signal red	537
13.5	Fire services	Fire red	536	-	
13.6	Ash slurry pipes	Black	-	-	
13.7	Vaccum pipes	Sky blue	101	Black	
13.8	Fuel pipes (Pulverised coal)	Light brown	410	-	
13.9	Drainage	Black	-	-	

Notes:

1. This colour code basically refers to IS 2379 for piping with necessary modifications.
2. Where band colour is specified, same shall be provided at 30 metre intervals on long uninterrupted lines and also adjacent to valves and junctions.

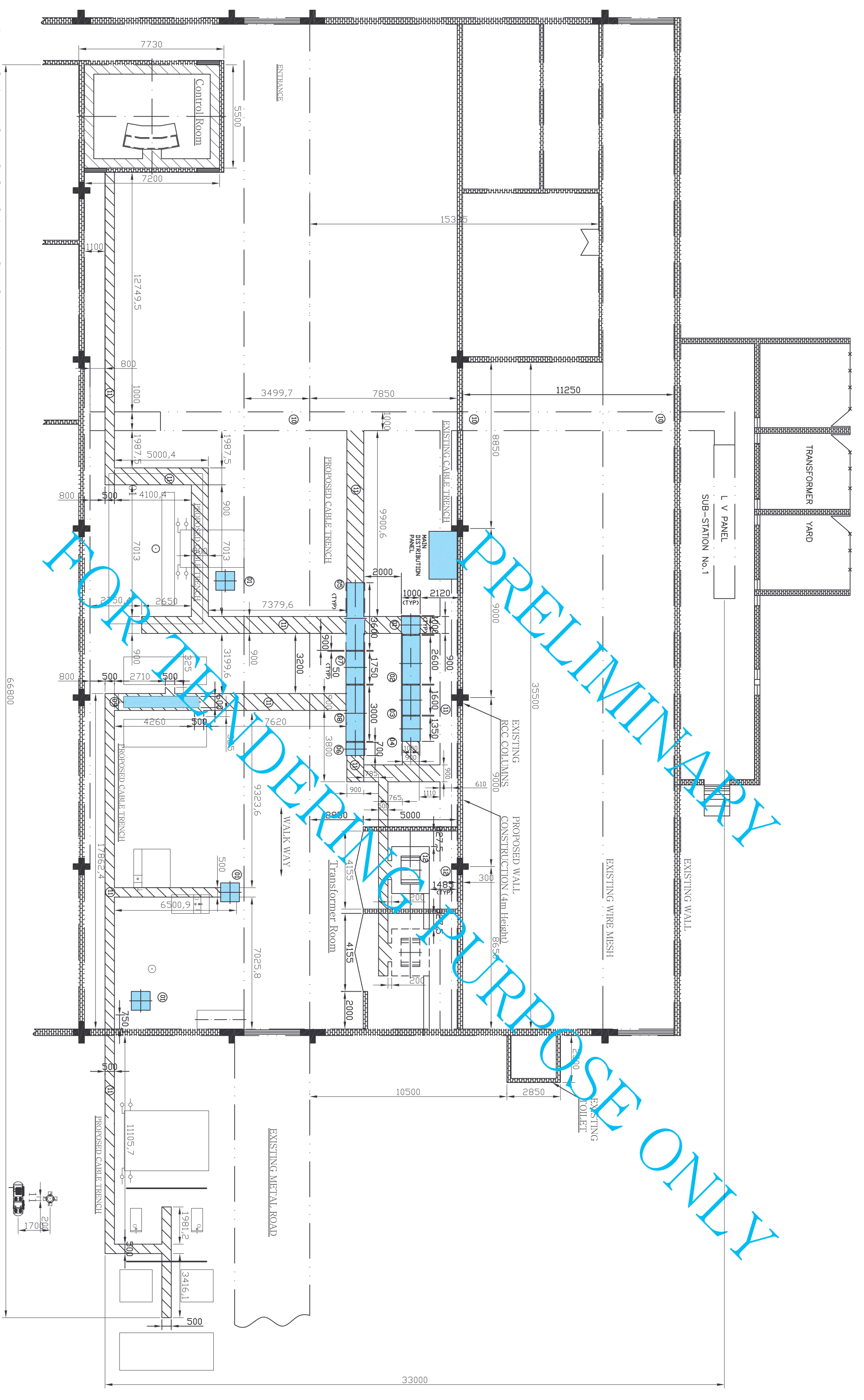


NOTE:
THIS DRAWING COVERS ONLY MAJOR EQUIPMENT AND PIPING GIVING OVER ALL IDEA ABOUT THE MECHANICAL WORK CONTENT. DETAIL DRAWING / INSTRUCTION WOULD BE GIVEN DURING THE EXECUTION OF WORK

ITEM NO	DESCRIPTION	ITEM NO	DESCRIPTION
01	STRUCTURE FOR TEST SECTION	08	PRESSURISER
02	ACCUMULATOR	09	NL CYLINDER RACK
03	REGEN. HEAT EXCHANGER	10	AMBIENT HEAT EXCHANGER
04	PRE. HEATER 1	11	COMPRESSOR & AIR DRIER
05	PRE. HEATER 2	12	COOLING WATER PUMPS
06	PISTON PUMP	13	COOLING TOWERS
07	CIRCULATION PUMP	14	FEED WATER TANK

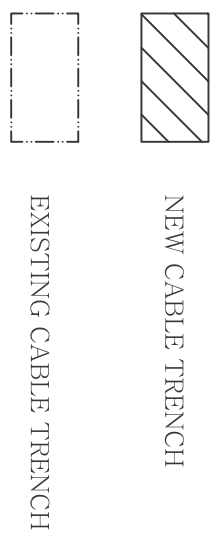
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TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		SUPERCRITICAL TEST FACILITY	
Bharat Heavy Electricals Ltd		PIR NO: 7.366-115-323	
DEPT CODE	ALL DIMENSIONS ARE IN MM	PROJECTION	SCALE
R&D 3660			NTS
UNIT: HIGH PRESSURE BOILER PLANT		WEIGHT (Kg)	
TRUCHIRAPALLI - 620014		REF TO ASSY / OLD DWG	
DRW	CHK	APPD	DATE
V.N.A.T	L.M.S	R.D.K	27-11-07
			28-11-07
			28-11-07
DRAWING NO :		REV	
2-02-323-00049		00	



LIST OF PANELS AND SIZES OF CABLES TO BE HANDELED

- 01.DCS
- 02.MCC
- 03.VFD
- 04.UPS
- 05.THYRISTER PANEL
- 06.INCOMER
- 07.VALVE CONTROL PANEL
- 08.PREHEATER I&I CONTROL PANEL
- 09.PREHEATER I&I D.B PANEL
- 10.POWER CABLES 3 1/2 X 185
- 11.POWER AND INSTRUMENTATION CABLES OF DIFFERENT SIZES
- 12.BUS DUCT



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TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		SUPERCRITICAL TEST FACILITY	
Bharat Heavy Electricals Ltd		PIR NO:7.366-115-323	
DEPT R&D CODE 3660	ALL DIMENSIONS ARE IN MM	PROJECTION SCALE NTS	WEIGHT (Kg)
UNIT: HIGH PRESSURE BOILER PLANT TRUCHIRAPALLI - 620014		NAME V.N.A.T	DATE 29-11-07
355-054		NAME L.M.S	DATE 30-11-07
GENERAL ARRANGEMENT (FOR ELECTRICAL AND INSTRUMENTATION WORKS)		NAME R.D.K	DATE 30-11-07
DRAWING NO : 2-02-323-00050		REV 00	