TENDER SPECIFICATION

BHEL:PSSR:SCT: 1187

FOR

Handling at Site Stores / Storage yard, Transportation to Site of Work, Erection, Testing and Commissioning of Reverse osmosis Demineralesed water plant. (RODM Plant)

at

Bellary Thermal Power Project

(For M/s. KPCL)
Kudatini Village,
Bellary District, Karnataka State.

PART – I TECHNICAL BID

BOOK NO :

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector – Southern Region
690, Anna Salai, Nandanam, Chennai – 600 035.

INDEX SCT : 1187

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector, Southern Region
690, Anna Salai, Nandanam, Chennai – 35

Tender Specification No. BHEL:PSSR:SCT: 1187

Messrs Date:

Dear Sir,

SUB: Handling at Site Stores / Storage yard, Transportation to Site of Work, Erection, Testing and Commissioning of Reverse osmosis demineralesed water plant. (RODM Plant) at Bellary Thermal Power Project (For M/s. KPCL) Kudatini Village, Bellary District, Karnataka State.

Please find enclosed one set of non-transferable tender documents containing -193- pages along with general conditions of contract Booklet and for the above work.

You are requested to go through the tender documents, GCC Booklet and drawing and offer your most competetitive rate and submit the tender documents duly filled in as per procedure indicated in the tender specification along with requisite EMD of Rs.1,10,000/- (Rupees One lakh Ten Thousand only) in the form Demand Draft drawn in favour of M/s.Bharat Heavy Electrical Limited Chennai - 35. Bids with Deviations from the tender conditions will be rejected.

A SEPARATE LETTER SHALL BE FURNISHED INDICATING THAT THERE ARE NO DEVIATIONS FROM THE TENDER CONDITIONS (As in Page 8.)

The completed quotations shall reach the office of the under signed on or before 07.08.2006 at 15.00 Hr0s. The Technical bids, will be opened on the same day at 15.30 hrs. We shall separately intimate the date for opening the price bids only to those parties who are technically Qualified. You are requested to depute your authorized representative at the time of opening.

ANY REVISION OF RATES / PRICES WHATSOEVER AFTER THE TIME AND DATE MENTIONED IN TENDER SPECIFICATION FOR SUBMISSION OF COMPLETED QUOTATIONS SHALL NOT BE ENTERTAINED UNLESS CALLED FOR SPECIFICALLY BY BHEL.

Kindly acknowledge the receipt of the tender documents and confirm your participation.

Kindly note that BHEL reserves the right to reject any or all tenders without assigning any reason.

Thanking you,

Yours faithfully,
For and on behalf of
BHARAT HEAVY ELECTRICALS LIMITED

SENIOR DEPUTY GENERAL MANAGER / CONTRACTS

This Tender document is not transferable.

Place : Chennai -35

Encl: One set of Tender documents along with GCC Booklet and drawing.

BHARAT HEAVY ELECTRICALS LIMITED
(A government of India undertaking)
Power Sector : Southern Region
690, Anna Salai, Nandanam, Chennai – 600 035.

SPECIAL INSTRUCTIONS TO BIDDERS

The Bidder must submit their bids as requested in a sealed cover prominently superscribing the Tender Specification number, due date and time of submission as mentioned in the TENDER NOTICE.

The following information shall be furnished by the Bidder along with their offer (Technical Bid cover)

01. Details of previous experience during the last five years indicating contract value, duration, completion period and present engagement as per G.C.C.

02. Organisation structure of the Company as per GCC.

03. Financial status of the firm enclosing balance sheet and profit and loss account for the past 3 years and certificate from the Company's Banker as per G.C.C

04. Turnover of the Company in last 3 Financial years pertaining to this scope of work only.

05. Latest Income Tax clearance certificate.

06. BIO DATA of key personnel presently in the Rolls of the company and proposed site organization for carrying out the work including deployment of Engineers and Supervisors.

07. Declaration sheets as per Appendix of Tender Specification.

08. Checklist and Schedule of General particulars as per Appendix in GCC.

09. T & P owned/deployment details as per G.C.C.

10. Technical manpower deployment details as per G.C.C

11. Other relevant details as per GCC and checklist.

12. These terms and conditions will be read and construed along with General Conditions of contract and incase of any conflict or inconsistency between the General conditions and the Terms and conditions of the tender specification, the provisions contained in the Term and conditions (NIT, Rate Schedule, Common conditions, Special Conditions including Appendices) shall prevail.

13. THE BIDDERS ARE REQUESTED TO FURNISH THE DOCUMENTS LIKE COPIES OF LOI'S, WORK ORDER'S ETC PERTAINING TO THE EXPERIENCE INDICATED IN QUALIFYING REQUIREMENTS, AS GIVEN BELOW.

14. QUALIFICATION REQUIREMENT

a) The bidders should have carried out erection, testing and commissioning of all Related mechanical equipments, electrical system and instrumentation system including cabling in RO or DM water plant in the last seven years. Also the contractor shall have experience in erection and welding of UPVC, CPVC and HDPE pipes and rubber lined pipes as applicable to RO or DM water plant.

b) The bidders should have a minimum average financial turn over of Rs.55 Lakhs in last three financial years ending on 31st March 2005.

The bidder must have earned profit in any one of the last three financial years ending on 31.03.2005 and should have positive networth as on 31.03.2005.

Bidder should submit audited balance sheet and profit & loss account of the company for last three years ending on 31.03.2005 in support of above requirement.

c) Notwithstanding the above, BHEL reserves the right to reject any Tender or all the Tenders for the reasons whatsoever beyond our control and the decision of BHEL is final.

d) Approval of the agency by customer.

LD / Penalty shall be leviable as per the applicable clauses of GCC.

15. TENDERERS HAVE TO FURNISH A DECLARATION SHEET INDICATING THAT THERE IS NO DEVIATION IN TENDER DOCUMENTS (AS IN PAGE 8) TENDERERS 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.

16. SAFETY PLAN

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

BHARAT HEAVY ELECTRICALS LIMITED
(A government of India undertaking)
Power Sector : Southern Region
690, Anna Salai, Nandanam, Chennai – 600 035.

PROCEDURE FOR SUBMISSION OF SEALED BIDS

The Tenderers must submit their bids as required in two parts in separate sealed covers prominently superscribed as Part I "Technical Bid" and Part II "Price Bid" and also indicating on each of the covers the tender specification number and due date and time as mentioned in the Tender Notice.

Part I (Technical Bid) Cover I

Excepting Rate Schedule, all other schedules, data sheets and details called for in the specification shall be enclosed, in part I Technical Bid only.

Part II (Price Bid) Cover II

All indications of price shall be given in this part II Price Bid.

Tenderers are requested to quote their rates, only in the price bid (part II) provided by BHEL. Quoting of rates in any other form / formats will not be entertained.

These two separate cover I & II (Part I and Part II) shall together be enclosed in a third envelope (Cover III) along with requisite EMD as indicated and this sealed cover shall be superscribed and submitted to Senior Deputy General Manager/Contracts at the above mentioned address before the due date as indicated. The Tenderers will be intimated separately in case any clarifications are required.

NOTE:

Tenderers are issued with 2 Nos. of Technical Bids, 2 Nos. of Price Bids and 2 Nos. of GCC booklet., out of which one set of each document shall be retained by them for their reference. Balance one set shall be submitted along with their offer as per procedure indicated above.

EMD amount for this Tender is Rs.1,10,000/- (Rupees One Lakh Ten Thousand only). This EMD amount shall be submitted in the form of either pay order or demand draft only drawn in favour of M/s. Bharat Heavy Electricals Limited, Chennai – 35.

EMD amount in the form of Bank Guarantee / fixed deposit receipt or in any other form will not be Accepted.

ANY REVISION OF RATES / PRICES WHATSOEVER AFTER THE TIME AND DATE MENTIONED IN TENDER SPECIFICATION FOR SUBMISSION OF COMPLETED QUOTATIONS SHALL NOT BE ENTERTAINED UNLESS CALLED FOR SPECIFICALLY BY BHEL.

Sr. Deputy General Manager/Contracts.

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector, Southern Region
690, Anna Salai, Nandanam, Chennai – 35

TENDER NOTICE

Sealed Tenders are invited from reputed contractors with sufficient previous experience in the under mentioned similar nature of work:

Tender Specification No. BHEL:PSSR:SCT: 1187

Description	EMD
Handling at Site Stores / Storage yard, Transportation to Site of Work, Erection, Testing and Commissioning of Reverse osmosis demineralesed water plant. (RODM Plant) at Bellary Thermal Power Project (For M/s. KPCL) Kudatini Village, Bellary District, Karnataka State.	Rs.1,10,000/- (Rupees One Lakh Ten Thousand only)

Cost of Tender Documents (Including all Taxes)	:	**Rs.1105/-**	
Sale Starts on	:	18.07.2006	
Sale closes on	:	05.08.2006	
Due date and Time for Submission	:	07.08.2006	15.00 Hrs.
Date and time for opening Of Technical Bids	:	07.08.2006	15.30 Hrs.

QUALIFICATION REQUIREMENT

b) The bidders should have carried out erection, testing and commissioning of all Related mechanical equipments, electrical system and instrumentation system including cabling in RO or DM water plant in the last seven years. Also the contractor shall have experience in erection and welding of UPVC, CPVC and HDPE pipes and rubber lined pipes as applicable to RO or DM water plant.

b) The bidders should have a minimum average financial turn over of Rs.55 Lakhs in last three financial years ending on 31st March 2005.

The bidder must have earned profit in any one of the last three financial years ending on 31.03.2005 and should have positive networth as on 31.03.2005.

Bidder should submit audited balance sheet and profit & loss account of the company for last three years ending on 31.03.2005 in support of above requirement.

c) Notwithstanding the above, BHEL reserves the right to reject any Tender or all the Tenders for the reasons whatsoever beyond our control and the decision of BHEL is final.

d) Approval of the agency by customer.

LD / Penalty shall be leviable as per the applicable clauses of GCC.

Interested parties can get the Tender documents from the office of the Senior Deputy General Manager / Contracts on all working days by remitting the cost of tender documents either by Cash or A/c Payee Demand Draft drawn in favour of M/s. Bharat Heavy Electricals Limited, Chennai – 600 035. Money order, Cheques and Postal Orders will not be accepted.

The Bharat Heavy Electricals Limited takes no responsibility for any delay, loss or non-receipt of tender documents sent by post and also reserves the right to reject any or all the tender without assigning any reason therefor. TENDER NOT ACCOMPANIED BY THE PRESCRIBED EARNEST MONEY DEPOSIT ARE LIABLE TO BE SUMMARILY REJECTED.

Purchase preference to CPSE's shall be as per control Govt. Guidelines as applicable on this date of tender opening.

SENIOR DEPUTY GENERAL MANAGER/CONTRACTS

TENDER SPECIFICATION : BHEL:PSSR:SCT:1187

CERTIFICATE FOR 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 Specification.

SIGNATURE OF THE TENDERER

OFFER OF CONTRACTOR

Senior Deputy General Manager/Contracts
Bharat Heavy Electricals Limited,
Power Sector : Southern Region
690, Anna Salai,
Nandanam,
Chennai – 600 035.

Sir,

I/We hereby offer to carry out the work detailed in Tender Specification No.BHEL:PSSR:SCT:1187 issued by Bharat Heavy Electricals Limited, Power Sector : Southern Region, in accordance with the terms and conditions thereof.

I/We have carefully perused the following documents connected with the above work and agree to abide by the same.

1. Instructions to Tenderer
2. General Conditions of Contract
3. Special conditions of Contract
4. Other Section, Appendices and Schedules

I/We have deposited/forwarded herewith the Earnest Money Deposit/a sum of Rs.1,10,000/- (Rupees One Lakh Ten Thousand only) vide DD.No. Dt. which shall be refunded should our offer not be accepted. Should our offer be accepted, I/We further agree to deposit such additional sum which along with the sum of Rs.1,10,000/- (Rupees One Lakh Ten Thousand only) mentioned above, to make up the Security Deposit for the work as provided for in the Tender Specification within the stipulated time as may be indicated by BHEL, Power Sector : Southern Region, Chennai – 600 035.

I/We further agree to execute all the works referred to in the said documents upon the terms and conditions obtained or referred to therein and as detailed in the appendices annexed thereto.

DATE: CONTRACTOR:

PLACE: ADDRESS:

Witness with their address

Signature Name Address

PROJECT INFORMATION

BELLARY THERMAL POWER PROJECT

1.0	**Owner**	:	**Karnataka Power Corporation Ltd., Shakthi Bhavan No.82, Race Course Road Bangalore – 560 001 Karnataka, India**
2.0	**Consultant**	:	**M/s.Fischtener Consulting Engineers Chennai**
3.0	**Project Title**	:	**1 x 500 MW Bellary Thermal Power Station Stage – I, Unit No 1**
4.0	**Location**	:	**Kudatini Village Bellary Dist Karnataka State India.**
5.0	**Latitude and Longitude**	:	**15^0 11' 58" N Latitude 76^0 43' 23" E Longitude**
6.0	**Elevation above mean sea level**	:	**478 meters**

7.0 Climatic Conditions

(a) Temperature

i) <u>Monthly basis</u>

Mean of daily maximum temperature	:	**42.5^0 C (in the month of April)**
Mean of daily Minimum temperature	:	**19.5^0 C (in the month of Dec)**

ii) Monthly basis

Mean of daily Maximum	:	**37.5^0C**
Mean of daily Minimum	:	**19.5^0C**

iii) Highest temperature recorded : 42.5^{0}C

iv) Lowest temperature recorded : 14.6^{0}C

(b) Relative Humidity : Varies between 11% and 70%

(c) Rainfall
Annual average rain : 492 to 846 mm most of which Occurs during August to October

(d) Wind Speed

i) Annual mean wind speed : 8.4 km / hr

ii) Maximum mean wind speed : 19 km / hr in the month of July.

8.0 Wind Load

Calculations for wind effect shall be in accordance with IS:875-1987 (Part-3) taking into account the following:

(a) Basic wind speed of 39 m/sec as given in fig.1 of the code.

(b) Factor K1 shall be taken as 1.06

(c) Terrain category shall be 2 and corresponding values shall be taken for K2

(d) Factor K3 shall be taken as 1.0

9.0 Wind Loading for Stack

(a) For wind pressure as per clause 8.0 above

(b) For RC stacks as per IS: 4998

10.0 Seismic data (as per IS: 1893 latest issue)

(a)Zone : Zone III

(b)Importance factor (I) : 2.5 for electrical equipment 1.5 for others.

11.0	**Auxiliary power supply**	**:**	**Auxiliary electrical equipment to be supplied against this specification shall be suitable for operation on the following supply system.**
	(a) For motors rated above 175 kW	**:**	**11000V, 3 phase, 3 wire, 50Hz medium earthed AC** **3300V, 3 phase, 3 wire, 50Hz medium earthed AC**
	(b) For motor control center	**:**	**415V, 3 phase, 3 wire solidly earthed AC**
	(c) For motor rated 175 kW and below	**:**	**415, 3 phase, 3 wire solidly earthed AC**
	(d) DC motor starters, DC solenoids, DC alarm, control and protections	**:**	**220 V DC, 2 wire, unearthed DC**
	(e) AC control & protective devices	**:**	**110 V 1 phase, 50Hz, 2 wire AC supply. The single-phase 110V AC supply shall be derived by CONTRACTOR BY PROVIDING 415V/110V control transformers of adequate rating with MCCB / MCB on both the primary and secondary sides.**
	(f) Uninterrupted power Supply	**:**	**230 V, 1 phase, 50Hz, 2 wire AC supply from UPS system for I & C (including indicator recorders) and UCMS only.**
	(g) AC solenoids, Indicators / recorders, space Heaters (for motors rated 30 KW and above)	**:**	**240 V 1 phase, 2 wire, 50Hz AC system with effectively earthed neutral. The power supply shall be derived by CONTRACTOR by providing 415V / 240V transformer of adequate rating with MCCB/MCB on primary / secondary sides.**

(h) Winding heating of motors below 30kW	**:**	**24 V 1 phase, 50Hz, AC with one point earthed. This shall be derived by CONTRACTOR by providing 415 V 3 phase, 3 wire, AC supply through an adequately rated stepdown transformer of adequate rating with MCCB / MCB on primary / secondary sides.**
(i) Solid state controls (including solenoid valves)	**:**	**24 V DC, 2 wire, supply from UPS for instrumentation system only.**
(j) Lighting fixtures	**:**	**24 V, 1 phase, 2 wire, 50Hz system.**
(k) Lighting fixtures and space heater in panels	**:**	**240 V, 1 Phase, 2 wire, 50Hz system.**

(i) The above voltages may vary as follows:

All divices shallbe suitable for continuous operation over the entire range of voltage and frequency indicated below without any change in their performance.

i. AC supply	**:**	**Voltage variation ± 10% Frequency variation ± 5% Combined voltage & frequency variation ± 10%**
ii. DC supply	**:**	**Voltage variation + 10% - 20%**

General Conditions of Contract for Works in Power Sector of Bharat Heavy Electricals Limited
For Mechanical, Electrical & Enabling works

SECTION I

1. GENERAL INSTRUCTIONS TO TENDERERS :

1.1 DESPATCH INSTRUCTIONS :

1.1.1 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 superscribing the name of work as given in the tender notice.

1.1.2 The tender shall be addressed to : Officer inviting tender as indicated in the tender notice.

1.1.3 Tenders submitted by post shall be sent as "REGISTERED POST ACKNOWELEDGEMENT 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.

1.1.4 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.

1.1.5 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.

1.1.6 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.

1.1.7 **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.**

1.1.8 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.

1.1.9 All entries in the tender shall either be typed or to be written in ink, including ball point pens. Erasers and overwritings 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.

1.2 **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.

1.3 **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.

1.3.1 **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.

1.3.2. **INCOME – TAX CERTIFICATES :**

A Certificate of Income –Tax clearance from the appropriate authority in the forms prescribed therefor duly indicating annual turnover. These certificates shall be valid for one year from the date of issue or for the period prescribed therein for all tenders submitted during that period.

1.3.3 **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, 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.

1.3.4 **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)

1.3.5 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.

1.3.6 **IN CASE OF AN INDIVIDUAL :**

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

1.3.7 **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.

1.3.8 **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.

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

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

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

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

1.4.0 **EARNEST MONEY DEPOSIT :**

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

1.4.1 Pay Order or Demand Draft duly drawn in favour of Bharat Heavy Electricals Limited.

1.4.2 Cash, to the extent permitted under Income-Tax Act.

Note:

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

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

1.4.4 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.

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

1.4.6 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.

1.5 **AUTHORISATION AND ATTESTATION:**

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

1.6 **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.

1.7 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.

1.8 SECURITY DEPOSIT:

1.8.1 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.

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

1.8.2.1 Upto Rs.10 lakhs 10 %

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

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

1.8.3 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).

1.8.3.1 50% of Security Deposit as indicated in the letter of Intent can either be remitted in cash to the cashier of Power Sector 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.

1.8.4 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.

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

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

1.8.7 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, Power Sector, 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.

1.8.8 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.

1.8.9 **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. **It may be noted that in no case the Security Deposit shall be refunded / released prior to passing of final bill.**

1.9 REJECTION OF TENDER AND OTHER CONDITIONS:

1.9.1 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.

1.9.1.1. To reject any or all of the tenders.

1.9.1.2 To split up the work (Please refer NIT and Special Conditions of Contract).

1.9.1.3 Either of the contingencies stated (1.9.1.1) and (1.9.1.2) above to modify the time for completion suitably.

1.9.2 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.

1.9.3 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.

1.9.4 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.

1.9.5 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.

1.9.6 If the tenderers resort to canvassing in any form in connection with the tenders submitted by them, such tenders are liable to rejection.

1.9.7 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.

1.9.8 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.

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

SECTION II

2.1 **DEFINITION:**

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

2.1.1 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.

2.1.2 **"GENERAL MANAGER"** shall mean the Officer in Administrative charge of contracting unit of BHEL.

2.1.3 **"ENGINEER"** or **"ENGINEER IN CHARGE"** shall mean engineer deputed by BHEL. The term includes "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.

2.1.4 **"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.

2.1.5 **" CLIENT OF BHEL"** or **" CUSTOMER"** shall mean the project authorities to whom BHEL is supplying the equipments/services.

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

2.1.7 **"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 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.

2.1.8 **"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"

2.1.9 **"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.

2.1.10. **"TENDER DOCUMENTS"** shall mean the General and Special Conditions of Contract (2.1.8) and tender specification (2.1.9)

2.1.11. **"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.

2.1.12. **"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.

2.1.13 **"PLANT"** shall mean and connote the assembly of the plant and equipment covered by the contract.

2.1.14 **"EQUIPMENT"** shall mean all equipments, machineries, materials, structurals, electricals and other components of the plant covered by the contract

2.1.15 **"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.

2.1.16 **"APPROVED" "DIRECTED"** or **" INSTRUCTED"** shall mean approved, directed or instructed by BHEL.

2.1.17 **"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.

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

2.1.19 **"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.

2.1.20 **"MONTH:** shall mean calendar month, unless specified otherwise in the tender.

2.1.21 **"WRITING"** shall include any manuscript typewritten or printed statement under the signature of BHEL.

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

2.2 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 Madras, 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.

2.3 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.

2.4 USE OF LAND

No land belonging to BHEL or their customer under temporary possession of BHEL shall be occupied by the Contractor without the written permission of BHEL.

2.5 COMMENCEMENT OF WORK

2.5.1 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.

2.5.2 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.

2.5.3 All the works shall be carried out under the direction and to the satisfaction of BHEL

2.5.4 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.

2.6 MODE OF PAYMENT AND MEASUREMENT OF THE WORK COMPLETED

2.6.1 All payment due to the contractor shall be paid by "Account Payee Cheques"

2.6.2 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.

2.6.3 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.

2.6.4 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.

2.6.5 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.

2.6.6 Measurement shall be restricted to that for which it is required to ascertain the financial liability of BHEL under this contract.

2.6.7 The measurement shall be taken jointly by persons duly authorised on the part of BHEL and by the contractor.

2.6.8 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.

2.6.9 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.

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

2.6.11 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.

2.7 RIGHTS OF BHEL

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

2.7.1 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.

2.7.2 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.

2.7.3 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.

2.7.3.1 Contractor's continued poor progress.

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

2.7.3.3 Corrupt act of Contractor.

2.7.3.4 Insolvency of the Contractor.

2.7.3.5 Persistent disregard to the instructions of BHEL.

2.7.3.6 Assignment transfer, subletting of the contract without BHEL's permission.

2.7.3.7 Non-fulfilment of any contractual obligations.

2.7.4 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.

2.7.5 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.

2.7.6 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.

2.7.7 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.

2.7.8 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.

2.7.9 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.

2.7.10 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.

2.7.11 In the event of any dispute of any nature, the decision of BHEL shall be final and binding on the contractor.

2.8 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.

2.8.1 As far as possible, unskilled worker shall be engaged from the local areas in which the work is being executed.

2.8.2 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.

2.8.3 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 & Aboilition) 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)

2.8.4 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.

2.8.5 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.

2.8.6 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.

2.8.7 The Contractor shall be responsible for proper accommodation including adequate medical facilities for the personnel employed by him.

2.8.8 The contractor shall be responsible for proper behavior and observance of all regulations by the staff employed by him.

2.8.9 The contractor shall ensure that no damage is caused to any person/property of other parties working at site. If any such damage is caused, it is the responsibility of the contractor to make good the losses or compensate for the same.

2.8.10 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.

2.8.11 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.

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

2.8.13 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.

2.8.14 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.

2.8.15 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.

2.8.16 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 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.

2.8.17 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.

2.8.18 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.

2.8.19 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.

2.8.20 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.

2.8.21 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.

2.8.22 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.

2.8.23 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**.**

2.8.24 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.

2.8.25 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.

2.9 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)

2.9.1 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.

2.10 INSURANCE:

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

2.10.2 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.

2.10.3 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.

2.10.4 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.

2.10.5 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.

2.11 STRIKES & LOCKOUTS:

2.11.1 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.

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

2.12 FORCE MAJEURE:

2.12.1 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**.**

2.12.2 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.

2.13 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.

2.14 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 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.

2.15.0 **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.

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

2.15.2 **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

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

2.15.3.1 **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 ExperiencedSafetyEngineer/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 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.

2.15.3.2. **HOUSE KEEPING**

2.15.3.2.1 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.

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.

2.15.3.3. 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 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.

2.15.4 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 BHLE/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.

2.15.4.1 **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 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

2.15.5 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				
PERSONAL PROTECTIVE 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				
Other				
SCAFFOLDING				
Fully decked platforms				
Guard and intermediate rails in place				
Toe boards in place				
Adequate shoring				
Adequate access				
Other				
LADDERS				
Extension side rails 1 m above				
Top of landing				
Properly secured				
Angle ± 70 from horizontal				
Other				
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				
Other				
MACHINERY, TOOLS AND EQUIPMENT				
Proper instruction				
Safety devices				

ITEM	YES	NO	REMARKS	ACTION
Proper cords				
Inspection and maintenance				
Other				
VEHICLE AND TRAFFIC				
Rules and regulations observed				
Inspection and maintenance				
Licensed drivers				
Other				
TEMPORARY FACILITIES				
Emergency instructions posted				
Fire extinguishers provided				
Fire-aid equipment available				
Secured against storm damage				
General Neatness				
In accordance with electrical requirements				
Other				
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				
Others				
HANDLING AND STORAGE OF MATERIALS				

ITEM	YES	NO	REMARKS	ACTION
Properly stored or stacked				
Passageways clear				
Other				
FLAMMABLE GASES AND LIQUIDS				
Containers clearly identified				
Proper storage				
Fire extinguisher nearby				
Other				
WORKING AT HEIGHT				
Erection plan				
Safety belts and lanyards; chute lines				
Other				
ENVIRONMENT				
Chemical and other Effluents properly disposed				
Cleaning liquid of pipes disposed off properly				
Water used for 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

2.15.6 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

2.15.7 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 :

2.15.8 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

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

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 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.

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 sub-section (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.

II . 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 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.

III. 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 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.

(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.

IV. 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.

V. 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

(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 III

COMMON CONDITIONS OF CONTRACT

3.1 SCOPE OF CONTRACT

3.1.1 The Intent of this specification is to provide erection, commissioning, operation, preservation & maintenance of the plant according to most modern and proven techniques and codes. The omission of specific reference to any method and equipment or material necessary for the proper and efficient services towards installation of the Plant shall not relieve the contractor of the responsibility of providing such services, facilities to complete the project or portion of project awarded to him. The quoted rate shall deem to be inclusive of all such contingencies.

3.1.2 The contractor shall carry out the work in accordance with instructions/ drawings/ specification/ standard practices supplied by BHEL from time to time.

3.1.3 Provision of all types of labour, Supervisors, Engineers watch and ward as required, tools and tackles as required, consumables as required under various clauses of tender specification for handling transportation, erection, testing and commissioning.Operation / maintenance and preservation tenderer is liable to arrange all necessary T & P except those being supplied by BHEL for use.

3.1.4 Proper out-turn as per BHEL plan and commitment.

3.1.5 Completion of work in time as per monthly erection plan which will be worked out to adhere to project completion schedule.

3.1.6 Good quality and accurate workmanship for proper performance of equipment. BHEL Site Engineer shall be the deciding authority with reference to quality requirement.

3.1.7 Preservation of all components at all stages of pre-assembly/erection /testing as per clause 3.15.

3.2.1 FACILITIES TO BE PROVIDED BY BHEL:

Open space for building of temporary office shed and contractor's stores shed(s) will be provided free of cost. Contractor has to make his own arrangements for labour colony.

3.2.2 WATER:

For construction purpose water will be provided at one single point free of charge, as provided by Customer to BHEL.

3.2.3 ELECTRICITY:

3.2.3.1 For construction purpose electricity will be provided at one single point free of charge within a radius of 200 meters from T.G.Building. Further distribution shall be arranged by the contractor for his office & stores shed and for construction at their cost.

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

3.2.4 CONSUMABLES:

Such of those consumables as indicated as "Consumables provided by BHEL" shall alone be provided to the contractor by BHEL free of charge. Other consumables, filler wires, electrodes, gas etc. are to be arranged by the contractor at his cost.

3.3 FACILITIES TO BE PROVIDED AND DEVELOPED BY THE TENDERER AT HIS COST.

3.3.1 CIVIL CONSTRUCTION:

It shall be the responsibility of the contractor to construct his own office shed, stores shed, with all facilities like electricity, water supply, sanitary arrangements in the area allotted to him for the purpose.

3.3.2 WATER DISTRIBUTION

Distribution of water for construction purpose and as well as drinking purpose from the single point provided by BHEL to various work-fronts shall be contractor's responsibility and at his cost.

3.3.3 ELECTRICITY DISTRIBUTION:

Any duty deposit involved in getting the Electricity shall be borne by the bidder. As regards contractor's office shed also all such expenditure shall be borne by the contractor.

3.3.4 Provision of distribution of electrical power from the given single central common point to the required places with proper distribution boards, approved cables and cable laying including supply of all materials like cables, switch boards, pipes etc., observing the safety rules laid down by

electrical authority of the State / BHEL / their customer with appropriate statutory requirements shall be the responsibility of the tenderer / contractor.

3.3.5 Necessary meters for recording consumption of water and power for cost calculation purpose and maintenance of the same during execution period shall be contractor's responsibility.

3.3.6 POSSESSION OF GENERATORS:

As there are bound to be interruptions in regular power supply, power cut/ load shedding in any construction site due to inherent power shortage in state on this account, suitable extension of time, if found necessary only be given and Contractor is not entitled for any compensation. It shall be the responsibility of the tenderer / contractor to provide, maintain the complete installation on the loadside of the supply with due regard to safety requirements at site. It shall be the responsibility of the contractor to have atleast (2 to 4) diesel operated welding generator sets to get urgent and important work to go on without interruptions. The consumables required to operate the generators are to be provided by tenderers. This may also be noted while quoting.

3.3.7 LIGHTING FACILITIES

Adequate lighting facilities such as flood lamps, low volt hand lamps and area lighting shall be arranged by the contractor at the site of construction, contractor's material storage area etc. at his cost.

3.3.8 POWER DISTRIBUTION

For the purpose of planning contractor shall furnish along with tender the estimated requirement of power (monthwise) for execution of work in terms of maximum KW demand.

3.3.9 CONTRACTOR'S OBLIGATION ON COMPLETION

On completion of work all the temporary buildings, structures, pipelines, cables etc. shall be dismantled and leveled and debris shall be removed as per instruction of BHEL by the Contractor at his cost. In the event of his failure to do so BHEL will undertake such work and the cost of the same will be recovered from the Contractor including overhead charges. The decision of BHEL Engineer in this regard is final.

3.3.10 Depending upon the nature of work and availability of facilities locally, contractor may have to arrange for a temporary workshop for facilitating uninterrupted progress of work.

3.4.1 GASES :

3.4.2 All required gases like Oxygen/ acetylene/ argon/ Nitrogen PVC welding equipment and cement for PVC pipes required for work shall be supplied by the Contractor at his cost. It shall be the responsibility of the contractor to plan the activities and store sufficient quantity of those gases. Non-availability of gases cannot be considered as reasons for not attaining the required progress of erection.

3.4.2 In case of improper arrangement of above gases, BHEL reserves the right to procure the same from any source and for issues made, recover the cost from the contractor's bill at the market value plus BHEL departmental charges. Postponement of recoveries is not permissible.

3.4.3 BHEL reserves the right to reject the use of any gas in case required purity is not maintained.

3.4.4 TIG welding operations are to be purged with Nitrogen Gas / Argon Gas for the purpose of creating inert atmosphere in the pipelines during the process of TIG welding. Nitrogen, Argon gas required for this purpose shall have to be arranged by the contractor at his cost.

3.4.5 Monthly gas consumption reports are to be furnished by the Tenderer to BHEL for statistical purposes, every month.

3.5 ELECTRODES (WHERE APPLICABLE)

3.5.1 Imported filler wire for TIG Welding as received from the respective manufacturing units along with the components / equipments only shall be supplied by BHEL free of cost. However, indigenous alloy steel, stainless steel, & carbon steel filler wires and all electrodes are to be arranged by the contractor at his cost.

3.5.2 All the required electrodes, filler wires as above are to be approved by BHEL. It shall be the responsibility of the contractor to obtain prior approval of BHEL before procurement regarding suppliers, type of electrodes etc. On receipt of the electrodes at site it shall be subject to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes batch No. date of expiry etc.

3.5.2 Storage of electrodes shall be done by the contractor in an air conditioned / controlled humidity room as per requirement.

3.5.4 All electrodes shall be dried in the electrode drying oven to the temperature and period specified by the BHEL Engineer before they are used in erection work and each HP Welder should be provided with one portable electrode drying oven at the work spot. Electrode drying oven and portable drying ovens shall be provided by the contractor.

3.5.5 All filler wires and electrodes shall be preserved by the contractor carefully to prevent deterioration of their properties. Special care shall be taken to preserve alloy steel and other special electrodes/filler wires. Contractor shall exercise maximum care in using these electrodes/filler wires to minimise wastage by maintaining a record of all usages.

3.5.6 In case of improper arrangement of procurement of above electrodes BHEL reserve the right to procure the same from any source and recover the cost from the contractor's first, subsequent bill at market value plus departmental charges of BHEL. Postponement of such recovery is not permissible.

3.5.7 BHEL reserves the right to reject the use of any electrodes at any stages if found defective because of bad quality, improper storage, date of expiry, unapproved type of electrodes etc. It shall be the responsibility of the contractor to replace at his cost without loss of time.

3.6 TOOLS & TACKLES

3.6.1 BHEL will not provide any crane / T & P Handling equipment. Contactor has to arrange lifting tackles, etc only locally.

3.6.2 All T & P and instruments required for proper and safe handling, transportation, erection, testing and commissioning shall be arranged by the contractor and quoted rates shall deem to include the same.

3.6.8 In the event of failure of contractor to bring necessary and sufficient T & P, BHEL may arrange for the same at risk and cost of contractor including transportation of the same from any of BHEL's other site and hire charges as applicable shall be deducted from the bidder's bill. Decision of BHEL in this regard is final.

3.6.9 All the T & P arranged by contractor including electrical connections wherein required shall be reliable / proven / tested and necessary test certificates to be submitted as per statutory rules of the State/Central Government in force from time to time.

3.6.10 Contractor shall have at all times experienced operators and technicians/ for routine and breakdown maintenance of the equipment. Any delay in rectification of defects will warrant to BHEL rectifying the defect and charging the cost to the contractor.

3.6.11 If at any time it is noticed that contractor is not using any of the T & P or equipment properly according to the instructions of BHEL, BHEL will have the right to withdraw any and all such equipment and any cost due to this shall be contractor's account.

3.6.12 The T & P would be issued only at stores and it shall be the responsibility of contractor to take the delivery from stores, transport the same to site and return the same in good condition after use.

3.6.13 All the T & P, lifting tackles including wire ropes, slings shackles and electrically operated equipment shall be got approved by BHEL Engineer before they are actually put on use.

3.7 SUPERVISORY STAFF AND WORKMEN

3.7.1 The Contractor shall deploy experienced Engineers, Supervisors all the skilled workmen like High Pressure Welders (gas, TIG and arc) Carbon, alloy steel welders, UPVC 7 usion welding Gas cutters, electricians, Riggers, Serangs, Erectors, carpenters, fitters etc. in addition to other skilled, semi-skilled and unskilled workmen required for all the works of handling and transportation from site storage to erection site, transportation, erection, testing and commissioning comtemplated under this specification. Only fully trained and competent men with previous experience of the job shall be employed. They shall hold valid certificates wherever necessary. BHEL reserves the right to decide on the suitability of the workers and other personnel who will be employed by the contractor, BHEL reserves right to insist on removal of any employee of the contractor at any time, if they find him unsuitable and the contractor shall forthwith remove him.

3.7.2 The supervisory staff employed by the contractor shall be qualified (Engineers – Graduates in Engineering and Supervisors – Diploma Holders) and experienced in the area of work. They shall ensure proper out-turn of work and discipline on the part of labour put on the job by the contractor and in general see that the works are carried out in safe and proper manner and in coordination with other labour and staff employed directly by BHEL or BHEL's client.

3.7.3 The Tenderer shall also furnish DAILY & MONTHLY report showing the number of employees engaged in various categories of work and a progress report of work as required by BHEL Engineer.

3.7.4 The work shall be executed under the usual conditions existing in major power plant construction and in conjunction with numerous other operations at site. The tender and his personnel shall co-operate with other personnel of other contractors, coordinating his work and proceed in a manner that shall not delay or hinder the progress of work as a whole.

3.7.5 The contractor's supervisory staff shall execute the work in the most substantial and workman like manner in the stipulated time. Accuracy of work, good workmanship and aesthetic finish are essential part of this contract. The contractor shall be responsible to ensure that assembly and workmanship conform to the dimensions and tolerances given in the drawings/instructions given by BHEL Engineers from time to time.

3.7.6 The contractor shall employ the necessary number of qualified and approved full time electricians at his cost to maintain his temporary electrical installation till the completion of work.

3.7.7 It is the responsibility of the bidder to carryout the work for achieving the target set by BHEL by working for 12 hours a day including holiday during erection and 24 hours continuously in shifts during commissioning and testing , operation, maintenance and preservation periods.

3.7.8 If the contractor or his workmen or employees shall break, deface, injure or destroy any part of a building, road, kerb, fence, enclosure, water pipes, cables, drains, electric or telephone posts or wires, trees or any other property or to any part of erected components etc. The contractor shall make the same good at his own expense or in default, BHEL may cause the same to be made good by other workmen or by other means and deduct the expenses (of which BHEL's decision is final) from any money due to the contractor.

3.8.0 CIVIL WORKS

3.8.1 Foundations of all equipments and plants and necessary civil works shall be provided by BHEL. The dimensions of the foundations and anchor bolt pits shall be checked by the contractor for their correctness as per drawings. Further top elevation of foundations shall be checked with respect to bench mark etc. All minor adjustments upto 25 mm of foundation level, dressing, chipping of foundation surface enlarging the pockets in foundations and grouting of equipments etc. as may be required for the erection of equipments / plants shall be carried out by the Contractor. All the materials like cement and cleaning consumables shall also be arranged by the contractor at his cost, required, where necessary The required special cement.

3.8.2 The contractor shall arrange for grouting of foundation bolt holes of equipment and final grouting of equipment as per the drawings / specification as advised by the Engineer or BHEL after preparing the foundation surface for grouting.

3.8.3 Contractor has to carryout the grouting as per the work instructions for grouting available at BHEL site.

3.9.0 SCOPE OF MATERIAL HANDLING

3.9.1 While BHEL will endeavor to store/stack/identify materials properly in their open/closed storage yard/shed it shall be contractor's responsibility to assist BHEL in identifying materials well in time for erection, taking delivery of the same in time following the procedure indicated by BHEL and transport the material safely to pre-assembly yard/erection site in time according to programme.

3.9.2 It shall be contractor's responsibility to arrange necessary tractors, trailor or trucks/slings/tools and tackles/labour including operators and on to transport equipment, move it to erection site/pre-assembly yard and unload the same at pre-assembly yard/ erection site and the quoted rate shall include the same.

3.9.3 In the event of Contractor's inability to arrange in time any of the above equipment / T & P etc. BHEL shall provide the same on specific written request from contractor subject to availability of equipment of the normal hire charges of BHEL / Customer applicable from time to time and recoverable from contractor's subsequent months running bills.

3.9.4 All equipment so used by contractor shall be of proven quality and safe in operation as approved by the statutory authorities as per the law in force.

3.9.5 Any loss/damage to materials issued to contractor shall be made good by him or BHEL will arrange for replacement at cost recovery basis and decision of BHEL shall be final. Any loss/damage must be intimated to Site in charge of BHEL in writing within 24 hours of the occurrence.

3.9.6 All the surplus damaged, unused materials, package materials / containers/special transporting frames, gunny bags etc. supplied by BHEL shall be returned to BHEL Stores by the contractor immediately.

3.9.7 The contractor shall take delivery of the components and equipments and special consumables from the storage area after getting the approval of the BHEL Engineer on standard indent forms to be specified by BHEL. At periodic intervals of work, complete and detailed account of the equipment so erected and electrodes used shall be submitted to BHEL Engineer.

3.10 OTHER RESPONSIBILITIES OF THE CONTRACTOR

3.10.1 BHEL Engineers shall make out a plan for erection and the contractor shall arrange for labour force and tools and plants and consumables to suit the above plan and execute the work accordingly.

3.10.2 The contractor shall have total responsibility for all equipment and materials in his custody, stores, loose, semi-assembled, assembled or erected by him at site.

3.10.3 The contractor shall make suitable security arrangement including employment of security personnel to ensure the protection of all materials/equipments and works from theft, fire, pilferage and any other damage and loss.

3.10.4 The contractor shall ensure that the packing materials and protection devices used for the various equipments during transit and storage are removed before these equipments are installed.

3.10.5 All equipments shall be handled very carefully to prevent any damage or loss. No bare wire ropes, slings etc. shall be used for unloading and/or handling of the equipments without the specific written permission of the Engineer. The equipments from the storage yard shall be moved to the actual site of erection/location at the appropriate time as per the direction of BHEL Engineer so as to avoid damage for such equipments at site.

3.10.6 The work covered under this scope of work is of highly sophisticated nature requiring best quality, proven workmanship engineering and construction management. It should also ensure successful and timely commercial operation of equipment installed. The contractor must have adequate quantity of precision tools, construction aids in possession. Contractor must also have adequate trained qualified and experienced supervisory staff and skilled personnel.

3.10.7 All the necessary certificates and licences required to carry out this scope of work are to be arranged by the contractor then and there at no extra cost.

3.10.8 The Contractor shall take all reasonable care to protect the men, materials and work till such time the erected equipment has been taken over by BHEL/their client. Necessary suitable safety equipment shall be to be provided by the contractor as a safety measure against accident and damage to men / material. Suitable caution notices shall be displayed where access to any part may be deemed to be unsafe and hazardous.

3.10.9 The contractor shall be responsible for taking all safety precautions during the construction and leaving the site safe at all items. When the work is temporarily suspended he shall protect all construction materials,

chemicals equipments and facilities from causing damage to existing property interfering with the operation of the station when it goes into - service. The contractor shall comply with all applicable provisions of the safety regulations clean-up programme and other precautionary measures which the BHEL has in effect at the site.

3.10.10 The contractor shall be responsible for good house-keeping, neat stacking and arrangement of materials on the floors. The contractor shall also be responsible for periodic regressing, reconservation of components like bearings and machined surfaces etc.

3.10.11 Contractor shall provide at his cost watch and ward staff round the clock for the safety of the equipment under erection/in his stores at site.

3.10.12 All lifting tackles including wire ropes, slings, shackles safety equipment etc. used by the contractor shall be got approved by BHEL Engineer at site before they are actually put on the work. It will be the responsibility of the contractor to ensure safe lifting of the equipment taking due precautions to avoid any accidents and damage to other equipments and personnel. All piping shall be adequately supported and protected to prevent damage during handling and erection.

3.10.13 The contractor shall take delivery of equipment from storage yard / stores sheds. He shall also make arrangements for verification of equipment maintain records and keep safe custody watch and ward of equipment after it has been handedover to him till these are fully erected, tested and commissioned and taken over by BHEL's client. The stolen/lost/ damaged goods shall have to be made good by the contractor at his own cost. Contractor should assist in claiming from the insurance to minimise his liability for the above.

3.11.0 DRAWINGS AND DOCUMENTS

3.11.1 The detailed drawings specifications available with BHEL Engineer will form part of this tender specification. These documents will be made available to the contractor during execution of work at site.

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

3.11.3 The data furnished in various appendices with this Tender Specification, describes the equipment to be installed, tested and commissioned under this specification briefly. However, the changes in the design and in the quantity may be expected to occur as is usual in any such large scales of work.

3.11.4 Deviation from design dimensions should not exceed permissible limit. The contractor shall not correct or alter any dimensions/details without specific approval of BHEL.

3.12.0 SITE CLEANLINES AND SAFETY REUIREMENTS

3.12.1 Contractor shall strictly follow all safety regulations/conditions as per clause 2.15 and its subclauses of general conditions of contract booklet enclosed with this tender.

3.12.2 Non-confirmity of safety rules and safety appliances will be viewed seriously and the BHEL has right to impose fines on the contractors as under:

Sl.No.	Safety	Fine (Rs.)
01	Not wearing safety helmet	50/-
02	Not wearing safety belt	100/-
03	Grinding without goggles / gloves / mask	50/-
04	Not using 24V supply for internal work	500/-
05	Electrical plugs not used for hand machines	100/-
06	Not slinging properly	200/-
07	Using damaged sling	200/-
08	Lifting cylinders without cage	500/-
09	Not using proper welding cable with lot of joints and not insulated properly	200/-
10	Not removing small scrap from platforms	200/-
11	Gas cutting without taking proper precaution or not using sheet below gas cutting	200/-
12	Not maintaining elec. Winches which are being operated dangerously	500/-
13	Improper earthing of electrical T & Ps	500/-

3.12.3 Contractor shall necessarily fill up the safety plan format available in general conditions of contract booklet enclosed with this tender and submit along with their offer.

3.12.4 CONTRACTOR SHALL DEPLOY A SAFETY OFFICER EXCLUSIVELY TO HANDLE SAFETY REQUIREMENT.

3.13.0 PROGRESS OF WORK

3.13.1 During the course of erection if the progress is found unsatisfactory or if the target dates fixed from time to time for every milestone are to be advanced or in the opinion of BHEL, if it is found that the skilled workmen like fitters, operators, technicians etc. employed are not sufficient, BHEL will induct required additional workmen to improve the progress or take over a part of the job and get it done on risk and cost of the contractor and recover from contractor's bill, all charges incurred on this account including all expenses together with BHEL overheads.

3.13.2 The progress reports shall indicate the progress achieved against planned with reasons indicating delays if any and shall give remedial action which the contractor intends to make good the slippage or lost time so that further works can proceed as per the original programme and the slippage do not accumulate and affect the overall programme.

3.13.3 The contractor shall submit daily, weekly and monthly progress reports, manpower reports, material reports, consumables reports and other reports considered necessary by the BHEL Engineer.

3.13.4 The manpower reports shall clearly indicate the manpower deployed category wise daily specifying also the activities in which they are engaged. The periodicity of the reports will be decided by BHEL Engineer at site.

3.13.5 The contractor shall arrange for weekly progress review meeting with the "Engineers" at site during which actual progress during the week vis-a-vis scheduled programme shall be discussed for action to be taken for achieving targets. The programme for subsequent work shall also be presented by contractor for discussion. The contractor shall constantly update/revise his work programme to meet the overall requirements and suit the material availability.

3.13.6 The contractor shall submit detailed advance monthly plan and the same has to forwarded by the first week of each month for discussion and finalisation by 15^{th} of the month which shall be basic document to be followed for the next month erection plan.

3.14.0 PRESERVATION OF COMPONENTS

3.14.1 It shall be the responsibility of the contractor to apply touch up painting on all equipments before erection. All Paint and thinner shall be provided by BHEL and it shall be contractor's responsibility to arrange for required labour, brush etc. for carrying out touch up painting. The quoted rates shall be inclusive of above work.

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

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

3.14.4 Due to atmospheric conditions erected materials are likely to get rusted more frequently. It is the responsibility of the contractor to preserve the erection materials drawn from stores for erection till these are commissioned and handed over to customer. The required consumables for this purpose like paint, thinner, rust converter compound (Ruskill or Ferropro) or any other equivalent shall be arranged by BHEL. However, the contractor should arrange other consumables like wire brushes, emery paper, cotton waste, cloth etc. at their cost. The contractor should ensure that the materials are not rusted on any account till they are handed over to customer. The decision of the BHEL Engineer is final with regard to frequency of application of paint and rust converter compound.

SPECIFIC REQUIREMENTS FOR ISO 9001 - 2000

3.15.0 IMPORTANT NOTE

Contractors shall ensure that all their Staff/Employees are exposed to periodical training programme conducted by qualified agencies/ personnel on ISO 9002 Standards.

Contractors shall ensure that the Quality is maintained in all the works connected with this contract at all stages of the requirement of BHEL.

Contractor shall ensure that all Inspection, Measuring and Testing equipment that are used, whether owned by the contractors or used on loan, are calibrated by the authorized agencies and the valid calibration certificate will be available with them for verification by BHEL. A list of such instruments possessed by contractor at site with its calibration status is to be submitted to BHEL Engineer for control.

Contractors shall arrange for the inspection of the works at various stages as required by BHEL. Immediate corrective action shall be taken by the contractors for the non-conformances if any, observed and pointed out by BHEL.

3.16.0 INSPECTION / QUALITY ASSURANCE / QUALITY CONTROL STATUSTORY INSPECTION

Various Inspection / quality control / quality assurance procedures/methods at various stages of erection and commissioning will be as per BHEL / Customer quality control procedure/codes/IBR and other statutory provisions and as per BHEL Engineer's instructions.
Preparation of quality assurance log sheets and protocols with customer's Engineers, welding logs and other quality control and quality assurance documentation as per BHEL Engineer's Instructions, is within the scope of work / specification.

The protocols between contractor and customer/BHEL shall be made prior to installation for correctness of foundations, materials, procedures, at each stage of Installation, generally as per the requirement of Customer/BHEL. This is necessary to ensure elimination of errors or keeping them within tolerable limits and to avoid accumulation and multiplication of errors.

A Daily log Book should be maintained by every supervisor/Engineer of contractor on the job in Duplicate (One for BHEL and one for Contractor) for detailing and incorporating Alignment/clearance/centering/Levelling Readings and Inspection details.

All the testing instruments such as gauges, digital instruments, testers etc should have valid calibration certificate during the course work.

The instrument mentioned above shall be drawn by the contractor from BHEL Stores on the specific authorization and use the same on the specific job for the purpose of inspection / rechecking / counter checking / finally checking of the work and shall be returned to BHEL Stores immediately on completion of the inspection.

Total Quality is the Watch Ward of the work and standards, Procedures laid down by BHEL. Contractor shall follow all the Instructions as per BHEL Drawings and Quality / Standards, and shall provide for the services of quality Assurance Engineer.

Contractor shall ensure speedy alignment welding and joining of all equipment erected by him after placement. Also all alignments, welding, Tests required for stage Inspection shall be completed as per Quality Assurance procedures.

All the Quality Assurance Procedures have to be compiled with before effecting Hydraulic Test, Trial run of Equipment, Pre-commissioning and post commissioning any other tests required to be conducted for completing erection and commissioning.

STAGE INSPECTION BY FES / QA ENGINEERS:

Apart from Day-to-Day Inspection by BHEL Engineers Stationed at site and also by Customer's Engineers, Stage Inspection of Equipment under Erection and commissioning at various stages of Erection and commissioning by TEAMS of Engineers from Field Engineering Services of BHEL's Manufacturing units and Quality Assurance Teams from Field Quality Assurance Unit/ Factory Quality Assurance and commissioning Engineers. Contractor shall arrange all labour, Tools and Tackles, etc. for such stage inspections free of cost.

Any modifications suggested by FES and QA Engineers Team shall be carried out. Claims of Contractor, if any shall be dealt as applicable.

Any minor rectifications of minor repairs of defective work found out during stage Inspection shall be rectified free of cost, by the contractor.

Any major rectification or major repairs of defective work found out during stage inspection verification / checking but not attributable to contractor shall also be carried out. Claims of contractor, if any, shall be dealt as applicable.

HSE SPECIFIC REQUIREMENT

OCCUPATIONAL HEALTH & SAFETY MANAGEMENT SYSTEM

SUB CONTRACTOR TO ENSURE COMPLIANCE OF THE FOLLOWING **HEALTH** RELATED POINTS

01. Sub-contractor to identify nearest hospital for Health check up of his staff and workers and intimate BHEL site office & PSSR HQ.

02. To arrange for occupational health check up / screening of contractor's staff and workers engaged in sub contracting activities. In this, category of workmen such as welders, gas cutters, grinders, radiographers, crane operators, technicians, chemist are to be given exclusive attention in respect of health screening.

03. Sub-contractor to arrange an ambulance vehicle or emergency vehicle on a continous basis to meet any emergency situation arising at site work in which his staff and workers are engaged.

04. To provide appropriate facilities for prompt first aid treatment of injuries and illness at work. One first Aider for each sub contractor to be provided. First Aider should undergo training on first aid.

05. To provide filtered drinking water at selected place in a clean container.

SUB CONTRACTOR TO ENSURE COMPLIANCE OF THE FOLLOWING **SAFETY** RELATED POINTS

01. Personnel protective equipment (PPES): Required number of following PPES (Confirming to Relevant IS Standards) to be made available to workmen at site and ensured that they are used .

- Helmet
- Safety goggles
- Welding face shields
- Safety belts for working at heights
- Safety shoes
- Ear plugs
- Rubber gloves and mats for low tension (I.T) electrical works
- Gum boots & aprons
- Other items as required by BHEL site

- As applicable for Chemical Handling.

02. Sub contractor to liase with nearest fire station and inform contact telephone number and contact person to meet any emergency.

03. To provide appropriate fire fighting equipment at designated work place and to provide fire fighting training to selected persons in his group of workmen to meet emergencies.

04. To provide adequate number of 24 V power supply points to work in a constrained and enclosed space.

05 . All power tapping points / switch boards /power & control cabling should fulfill required electrical safety aspects as per relevant is standard.

06. ELCH's (Earth leak circuit breakers) at all electrical distribution points to be provided.

07. Red and white caution tape of proper width (1.5 to 2 inch) to be used for cordoning unsafe area such as open trench, excavated area, etc.

08. To provide sub-contractors company logo or clothing to all staff and workers for identification including identity cards with photographs approved by BHEL.

09. High pressure and structural welders to be identified with colour clothing and to display copy of welders certificate with photographs of welder at the work place. They also should be in possession of valid welding procedure.

10. To display safe handling procedure for all chemicals such as lube oil, grease, sealing compound, kerosene, diesel etc. at stores & respective work place.

11. Contractor should authorise a person at site to stop work if there is a unsafe work noticed as per his knowledge.

12. Fitness for use of erected scaffolding to be certified by the contractors approved scaffolder and the certificate should be displayed on the scaffolding itself. If the scaffolding is unsafe , the same will not be used. the certificate to be updated daily. The scaffolding to be made as per the relevant IS standard.

13. For making platform on the scaffolding , proper thickness and size of the plank of required quality wood to be used. The safe working load of the platform to be displayed on the scaffolding itself. Proper use of platform to be explained to the user.

14. All plant equipment should have inspection report before put in to use.

15. All T&Ps should be of reputed brand and having quality certificates.

16. All IMTEs should have valid calibration certificate from recommended institution / testing lab and these should be in place.

17. All lifting tackle and plant equipment should have safe working load certificate.

18. The right worker should be deployed for right job and the resume of site incharge, supervisors, and key workers to be submitted before commencement of work..

19. Sub-contractor should submit inspection / testing matrix of all T&Ps and to be approved by BHEL.

20. Sub-contractor to display safety slogan, safety board, caution boards wherever required in consultation with BHEL.

21. Sub-contractor to provide gas detectors of reputed make at desired locations.

22. Sub-contractor to conduct emergency mock drills. one drill per 6 month and submit report to BHEL.

23. Safe handling and storing of all equipment with adequate space to be ensured.

24. Sub contractor to deploy safety supervisor till the completion of the project.

25. Sub contractor to comply the safety reporting procedure of BHEL as practiced at present and also additional requirements that may arise out of future improvements in the safety management system. This includes computation of safety indices such as frequency rate, severity rate & incident rate.

26. Sub contractor to identify probable emergency situations such as elcetric shocks to workmen , caving in of shored earth , fall from height, collapse of scaffolding fire etc., and should have clear action plan to overcome them. Sub contractor to take required guidance from BHEL in this regard.

27. Sub contractor to identify hazardous activities which he may carryout and should train his workmen in those activities with the relevant operation control procedures. Sub contractor to take required guidance from BHEL in this regard.

28. Safe work permit system to be followed while working in confined space / near electric systems.

SUB CONTRACTOR TO ENSURE COMPLIANCE OF THE FOLLOWING **ENVIRONMENT** RELATED POINTS

1. HOUSE KEEPING : Sub contractor to carry out daily house keeping of work areas / stores through a check list prepared in consultation with BHEL.

2. Sub contractor shall adopt pollution prevention / reduce /control approach in all his site activities. this shall include:

    a. Transporting of oil / chemicals from stores to site safely without causing spillage. in case of any spillage, the area shall be cleaned and the remanant spilled oil disposed off to a safe place, identified for such disposal.

    b. To use required containers / cans / safety gadgets /appliances for transporting and for usage of oil / chemicals at site.

    c. Safe disposal of spelt chemical after thorough checking.

    d. Safe storage of chemicals with hazardous notification.

3. Sub contractor shall arrange for segregation / collection of scraps and dispose off to the identified place meant for scrap collection.

4. Sub contractor to adopt good erection practices / procedures with the objective of reduction of waste generation / rework

OTHER HSE REQUIREMENTS TO BE COMPLIED BY SUB CONTRACTOR

1. Sub contractor to clearly understand and accept the HCE policy of PSSR with a commitment to comply the requirements of the policy.

2. Sub contractors to arrange for daily meeting of their supervisors and work force before they disperse for their daily planned activities where in the relevant health , safety and environment aspects of the job and use of PPES are explained

3. Sub contractor to conduct monthly HSE meeting (internal) and submit the report to BHEL.

4. HSE slogans to be displayed in a proper board – hoarding at designated places in consultation with BHEL.

5. Sub contractor to submit a structured programme for training & occupational Health Screening of their work force at site after the Award of LOI.

IMPORTANT NOTE

Bidders are requested to furnish the Informations as required in appendices of Section IV & V of this booklet

Attach separate sheet if necessary

Bids with incomplete particulars

Will be summarily Rejected

APPENDIX –I

SECTION IV

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 Last three financial years (only in Construction of Power Plants)	1.	Rs.
		2.	Rs.
		3.	Rs.
3.	Value of fixed assets of the Business in last three years	1.	Rs.
		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 Three years	1.	Rs.
		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.

APPENDIX – II

SECTION IV

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)

(B) List of Qualified Manpower to be deployed exclusively for this Contract:

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

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)

APPENDIX – III

SECTION IV

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 site for execution of the job	Remarks the project
1	2	3	4	5	6

Signature of the Tenderer

APPENDIX –IV

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

APPENDIX – V

SECTION IV

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.

SECTION – V

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.

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 oroganised 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

APPENDIX –I

SECTION V

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

APPENDIX -II

SECTION V

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 compensa-tions paid for accident	Details of insurance provided for the workers for accident/ Death	Details of safety equipments provided for workers

Signatutre of the Tenderer

APPENDIX –III

SECTION V

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

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
1.	Please indicate how you propose to ensure quality of work at site.							

Signature of the Tenderer

APPENDIX - IV
SECTION V

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

(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

ANNEXURE 'A'

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 Power Sector - Southern Region, located at 474, Anna Salai, Nandanam, Chennai – 600 035. Tamil Nadu (hereinafter called BHEL) having agreed to exempt ……..…….....……..

(hereinafter called "the said contractor(s)" from the demand, under terms and conditions of agreement dated ……..made between BHEL and …….for …….(hereinafter called " the said Agreement) of security deposit for the due fulfillment by said contactors of the terms and condition contained in the said agreement, or production of bank guarantee for Rs…….....……

(Rupees ……..only).

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. We ……undertake 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. We ……....…….lastly 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
POWER SECTOR, SOUTHERN REGION
474, ANNA SALAI, NANDANAM
CHENNAI – 600 035.

Address of the Bank in full

_____
_____
_____

Dated the ……day of ……20…..

Pincode :

Telegraphic Code : **For ……..**
(indicate the name of bank)

Telex No :

Fax No :

Witness :

ANNEXURE – 'B'

PROFORMA OF PERFORMANCE BANK GUARANTEE

1. This deed of guarantee made this ……day of …….....……20 by …….Bank Ltd……....……. ……in favour of Bharat Heavy Electricals Limited, Power Sector – Southern Region, 474, Anna Salai, Chennai – 600 035 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 approached ……Bank 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 Shri …….its, 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 Messrs ……..…….....……in 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 of ……from 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 from ……....……..all 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.

ANNEXURE – 'C'

(To be stamped in accordance with Stamp Act)
(BANK GUARANTEE FOR SECURING ADVANCE)
(Delete the words not applicable)

This Deed of Guarantee made this ……...……
day of ……between ……....……..
……..(Bank) hereinafter called " the Guarantor" (which expression shall unless repugnant to the context or meaning thereof be deemed to include its successors and assigns) of the ONE PART and M/s. Bharat Heavy Electricals Limited (A Government of India Undertaking) a Company incorporated under the Companies Act 1956, having its Registered Office at 'BHEL HOUSE' Siri Fort, New Delhi – 110 049 through this Unit / Division at 474, Anna Salai, Nandanam, P.O. Chennai - 600 035. hereinafter called "The Company" (which expression shall unless repugnant to the context or meaning thereof be deemed to include its successors) of the OTHER PART:

WHEREAS M/s……....……
(herein after called the Supplier / Contractor) has entered into a contract No……
……dated……....……
(hereinafter called "the Contract") with the company for ……...……
……....……
AND WHEREAS the Contract inter alia provides that the Company will pay to the contractor /Supplier advance of Rs……..……..(Rupees……..
…….only) on certain terms and conditions specified therein subject to the contractor furnishing a bank guarantee for Rs…….(Rupees …….....……
…….only) in favour of the company.

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

NOW THIS DEED WITNESSES AS FOLLOWS

1. **In consideration of the Company having agreed to advance a sum of Rs…….(Rupees……..only) to the Contractor/Supplier, the Guarantor do hereby guarantee the due recovery by the Company of the said advance with interest thereon as provided according to the terms and conditions of the Contract. If the said contractor/ Supplier fails to utilize the said advance for the purpose of the contract and/or the said advance together with interest thereon as aforesaid is not fully recovered by the Company, the Guarantor do hereby unconditionally and irrevocably undertake to pay to the Company without demur and merely on a demand to the extent of the said sum of Rs……...……..**
(Rupees…….....……..only).
Any claim made by the company for the loss or damage caused to or suffered by the Company by reason of the Company not being able to recover in full the said sum of Rs…….with/without interest as aforesaid.

2. **The decision of the Company whether the contractor/supplier has failed to utilize the said advance or any part thereof for the purpose of the contract and or as to the extent of loss or damage caused to suffered by the company by reason of the Company not being able to recover in full the sum of Rs……..with/without interest shall be final and binding on the Guarantor, irrespective of the fact whether the Contractor/Supplier admits or denies the default or questions the Correctness of any demand made by the Company in any court, Tribunal or Arbitration Proceedings or before any other Authority.**

3. **The Company shall have the fullest liberty without affecting in any way the liability of the Guarantor under this Guarantee, from time to time to vary any of the terms and conditions of the Contract or the advance or to extend time of performance by the Contractor/ Supplier or to postpone for any time and from time to time any of the powers exercisable by it against the said contractor/supplier and either to enforce or forbear from enforcing any of the terms and conditions governing the said contract the advance or securities available to the Company and the Guarantor shall not be released from its liability under these presents by any exercise by the Company of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor /Supplier or any other forbearance act or omission on the part of the Company or any indulgence by the company to the said contractor/**

supplier or of the other matter or thing whatsoever which under the law relating to sureties, would but for this provision have the effect of so releasing the Guarantor from its liability under this Guarantee.

4. The guarantee further agree that the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the contract and till the said advance with/without interest has been fully recovered and its claims satisfied or discharged and till…….. certifies that the said advance with interest has been fully recovered from the said contractor/supplier and accordingly discharges this Guarantee subject, however, that the company shall have no claim under the Guarantee after …….years from the date of completion of the contract, as the case may be unless a notice of the claim under this Guarantee has been served on the Guarantor before the expiry of the said period in which case the same shall be enforceable against the Guarantor not withstanding the fact that the same is enforced after the expiry of the said period.

5. The Guarantor undertake not to revoke this Guarantee during the period it is in force except with the previous consent of the Company in writing and agree that any liquidation or winding up or insolvency or any change in the constitution of the Contractor /Supplier or the Guarantor shall not discharge the Guarantor's liability hereunder.

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

7. The Guarantor hereby declares that it has power to execute this guarantee under its Memorandum and Articles of Association and the executant has full powers to do so on its behalf under the power of Attorney dated ……. granted to him by the proper authorities of the Guarantor.

8. "We …….undertake to pay to BHEL any money

(indicate the name of Bank)

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

IN WITNESS whereof the ……...……..(Bank) and M/s. Bharat Heavy Electricals Limited, have hereunto set and subscribed their respective hands the day, month and year first above written.

WITNESSES :

1.

2.

Signed for and on behalf of the (Bank)

WITNESSES :

1.

2.

Signed for and on behalf of Bharat Heavy Electricals Limited

ANNEXURE –'D'

BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking)
Power Sector – Southern Region, Chennai –600 035.

CONTRACT AGREEMENT

AGREEMENT NO: BHEL:PS:SR:SCT: **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:PS:SR:SCT DATE :

This agreement made this day, the ……...…….between the Bharat Heavy Electricals Limited, Power Sector, Chennai – 600 035 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 no …….dt…….from ……Bank …….....……..valid upto …….....…….towards 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, POWER SECTOR – SOUTHERN REGION, CHENNAI – 600 035.

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.

SECTION – VI

SPECIAL CONDITIONS OF THE CONTRACT

6.0.0 Techincal Details:

Description : (An Overview)

BHEL is setting up a 500 MW thermal power plant for KPCL, at Kudathini village, Bellary, Karnataka on turnkey basis.

As part of the packages, One integrated RO DM Plant of capacity 90 m3/Hr (Reverse Osmosis De mineralized water Plant) is being supplied by BHEL.

The pre treated and chlorinated water is received at the RODM plant, filtered, dosed and treated and fed as DM water to Boiler DM water tank.

The scope of work under this contractor broadly covers the erection, commissioning and operation of the plant consisting of following major components & materials:

6.1.0 Erection: Broad scope

1 Day Tanks – pre fabricated steel or FRP - for water /chemical storage and associated pumps, etc.

2 All Piping- Steel, GI, PVC and rubber lined with associated isolation valves-Operated manually, electrically or pneumatically and fittings and supports for the process flows and instrument and service air.

3 All mechanical process equipments like clarifiers, Activated carbon filters, Pressure Sand filters, Chemical dosing systems etc, HP/LP pumps with motors.

4 Loading and setting of main membranes of RO system in associated racks.

5 All electrical equipments – Motors, LT MCC, control panels, local push button stations, electrical cabling, earthing system, etc

6 Illumination system, air conditioning and ventilation system for control room and buildings. For air conditioning – 2 No. split A/C would be installed.

7 PLC based control systems, panels, UPS, etc for operation and all associated local instrumentations, control valves, etc

8 Handling system like hoists, Total 3 No. , 2 No. Motor operated and 1 o. Manually operated.

9 Carrying out Hydraulic pressure tests of all pipe lines to the required pressure

10 Please refer to the detailed BOM for all equipments to be erected, commissioned and operated.

6.2.0 Commissioning:

1 Commissioning of the total mechanical, electrical, instrumentation and process system.

2 Testing and commissioning of each stream of filtrations, dozing systems, all motors and pumps with associated electrical and instrumentation system.

3 Handling and loading of all chemicals required for the system.

4 Cleaning, clearing and unloading wherever necessary of all spent chemicals from the system and its disposal during commissioning as per requirement.

6.3.0 Erection:

DETAILS: (for mechanical items)

Erection, alignment, testing, pre-commissioning checks of the following systems as per BHEL's Erection manual, Process Flow diagram, P&IDs, Log sheets, etc:

a) High rate solids contact clarifier system and accessories (complete with necessary piping, valves, instrumentation, supports, sludge disposal pumps, dosing systems, structures, etc)

b) Clarified water pumps, motors, alignment, testing and pre-commissioning checks, valves, piping, supports etc as per the drawings and manuals

c) Complete dosing systems.

d) Piping, valves, instrumentation, supports, thrust blocks etc from the Clarifier to the tank, from tank to pumps and from pumps to the filter shed.

e) Pressure sand filters , Activated Carbon filters, assembly of internals for PSFs and ACFs, filling of media for PSFs and ACFs, Hot water tank, fixing of insulation for the tank, piping, Pneumatic actuated valves, manual valves, drain valves, air release valves, fabrication of supports, etc.,

f) Filtered water pumps, Back wash pumps, Potable water pumps, Air Scour Blowers, Dosing systems, accessories like Safety shower etc.,. Motors have to be fixed on the base frame and alignment to be done for all the pumps as per the manufacturer's guidelines.

g) Piping (UPVC, CPVC, HDPE, GI,), valves, instrumentation etc.,

h) Cartridge filters, dosing systems, piping, instrumentation, etc up to High pressure pump suction.

i) High pressure pumps, high pressure stainless steel piping, valves, supports, couplings, air release valves, tubing etc.

j) Fabrication of RO stack frame, Installation of RO pressure vessels, assembly of membrane elements in to the pressure vessels under the supervision of BHEL Engineers, piping and valves, alignment, valves supports, etc.,

k) Intermediate permeate storage tank, piping and valves, Chemical cleaning pumps, chemical cleaning tank, piping, valves, supports, fabrication of platform for the tank, etc

l) Fabrication of support platforms for all dosing systems

m) Mono rail with hoists in RO building, Chemical storage room, etc

n) DM plant - Complete MB system which includes MB vessels, Filling of resins, piping, valves, supports, Dosing systems, Measuring tanks, Degasser, Degassed water storage tank, etc.,

o) DM plant regeneration systems – pumps, valves and piping

p) Utility water piping and valves, tanks for the dosing systems.

q) Piping and valves from RO plant to waste water man hole, Neutralising pit, etc.

r) Piping, valves and supports from Acid and Alkali storage tanks to dosing systems and Measuring tanks

s) Instrument air piping, valves, supports, etc.,

t) Product water piping.

u) Pressure testing of complete piping

v) Fabrication of supports/additional supports for pipes, valves, etc wherever necessary at site

6.4.0 General:

1) All UPVC and CPVC pipes and fittings are to be joined by using solvent cement approved by BHEL and the piping supplier (Tangitt make). Joining of pipes is to be used by approved jointing procedure issued by BHEL and piping vendor. Separate solvent cement is to be used for UPVC and CPVC. Chamfering of inside surface of UPVC, CPVC and HDPE pipes has to be done by smooth grinding for accommodating butterfly valves wherever necessary. The contractor has to make arrangements for welding / erection of such pipes within the quoted rate.

2) HDPE pipes and fittings are to be joined by fusion welding process.

3) Final painting to be done for all supports, including the supports inside the trenches as per the approved painting procedure.

4) All the pipe trenches are to be covered with slabs or chequered plates / floor grills wherever necessary, to be supplied by BHEL.

5) Materials required for supports will be supplied in running metres only.

6) Gaskets for the flanged joints will be supplied in sheets only. Cutting is to be done at site to the requirement.

7) Tapping points in UPVC and CPVC lines are to be done by welding adapters made of UPVC rods.

8) UPVC and CPVC pipe joining and welding is to be done by experienced fitters and welders only since it involves special skills.

9) Any defect observed during erection , testing, pressure testing etc should be rectified at site. Components such as fittings, pipes, adapters etc required for such rework will be supplied by BHEL at chargeable basis, if available at site. Otherwise, Contractor has to make arrangements to get the same component approved by BHEL on their own from outside.

10) All the tools and tackles including material handling equipments, all consumables required for the entire course of work, testing equipments, instruments, alignment kit, etc are to be arranged by the contractor.

Contract Period

Total duration of the contract is 4 months period for erection, testing and commissioning of the plant.

6.5.0 The scope of work under this specification covers, but not limited to the following:

6.5.1 Handling at stores transporting to site, inspection, preparation of foundation, erection, leveling, centering, alignment, grouting & final alignment of all Fixing of internals of all tanks & vessels components, pumps, piping, electricals, instrumentation systems for the RODM Plant, pre-assembly, erection, alignment welding, NDT, fixing hangers & supports, hydro testing, of all piping, pre-commissioning, commissioning of RODM plant.

6.5.2 The terminal points decided by BHEL are final and binding on the contractor for deciding the scope of work and effecting the payment for the work done up to the terminals.

6.5.3 Contractor shall erect all the equipments as per the sequence prescribed by BHEL at site. The sequence of erection and methodology will be decided by BHEL Engineers depending upon the availability of materials, fronts and other inputs etc., No claim for extra payment from contractor will be entertained on the grounds of deviation from the methods of erection .adopted in erection of similar plants else where.

6.5.4 The work covered under this specification is of highly sophisticated nature, requiring the best quality workmanship, engineering and construction management. The contractor should ensure successful and timely operation of equipment installed. The contractor must have adequate quantity of tools, construction aids, equipments etc., in his possession. He must also have on his rolls adequate trained, qualified and experienced supervisory staff and skilled personnel.

6.6.0 MATERIALS: TRANSPORTATION FROM STORES / STORAGE YARD

6.6.1 The scope of work covers Loading at storage yard, transport to site, unloading at site/working area of equipment, placement on respective foundation/location, fabrication yard, pre-assembly bay or at working area. Required cranes for loading & unloading, placement of heavy materials will be provided by BHEL as specifically mentioned in the scope. The contractor shall provide any fixtures, concrete blocks & wooden sleepers, which are required for temporary supporting of the components at site.

6.6.2 Contractor shall take delivery of the components and equipments from the storage area after getting the approval of BHEL Engineer on standard indent forms to be specified by BHEL (Through SOMS). Complete and detailed account of the equipments received from BHEL, erected as well as the progress shall be submitted to the Engineer as directed.

6.6.3 All the equipments shall be handled very carefully to prevent any damage or loss. No bare wire ropes, slings etc., shall be used for unloading and/or handling of equipments with out the specific permission of BHEL Engineer. The equipment from the storage yard shall be moved to the actual site of erection /location at the appropriate time as per the direction of BHEL Engineer so as to avoid damage/loss of such equipment at site.

6.6.4 Contractor shall plan and transport equipments, components from storage yard to erection site and erect them in such a manner and sequence that material accumulation at site does not lead to congestion at site of work. Materials shall be stacked neatly, preserved and stored in the contractor's shed/work area in an orderly manner. In case it is necessary to shift and re-stack the materials kept at work area/site to enable other agencies to carry out their work, same shall be done by the contractor at no extra cost.

6.6.5 The contractor has to follow and adopt BHEL's computerized system of SOMS (Site Operations Management System), for drawl of materials, erection monitoring, invoicing, etc. And contractor has to arrange for necessary hardware and professional for the same.

6.7.0 Field Quality Assurance Formats

It is the responsibility of the contractor to collect and fill up the relevant FQA log sheets of BHEL and present the same to BHEL after carrying out the necessary checks as per the log sheets and obtaining the signature of BHEL and customer in token of their acceptance. Payment to the contractor will be linked with the submission of these FQA log sheets.

6.8.0 ERECTION

6.8.1 Preparation of foundation: Providing necessary skilled and other labour to BHEL/Customer for checking of dimensional accuracy, axis, elevation, levels etc., with reference to bench marks of foundations and anchor bolts pits. Also if found necessary , the contractor as a part of work should do adjustments of foundation level, dressing and chipping of foundation surfaces of all equipments, up to 25mm depth, as per BHEL Engineers instructions. Contractor should log before taking over the foundations for erection.

6.8.2 Contractor shall carry out scrapping and blue matching of embedment plates/packers of rotating equipments so as to achieve prescribed percentage of contact. Chipping and bedding of concrete surfaces, finely dressing up to the extent required to obtain contact between packer and concrete, is also covered in the scope of the work. The fine dressing of concrete shall be with Prussian blue matching checks.

6.8.3 BHEL will provide only shims and packer plates (either machined or plain), which will go as permanent parts of the equipment free of cost. Certain packer plates and shims over and above the quantity received as part of supplies from manufacturing units of BHEL will have to be cut out from steel plates/sheets at site to meet site requirement. Contractor shall cut and prepare packers and shims by gas cutting or chiseling, grinding and filing for de-burring the packers at his own cost. However machining of the packers, wherever necessary, will be arranged by BHEL at free of cost.

6.8.4 Packer plates should not only be blue matched with foundation but also inter-packer contact surfaces ,contact surface between the packers and foundation frame etc., shall also be blue matched by Prussian Blue match checks and required percentage contact shall be achieved by chipping and scrapping as per BHEL Engineers instructions.

6.8.5 Grouting of equipments is included in the scope of contractor. Cleaning of foundation surfaces, pocket holes and anchor bolt pits etc., de-watering, making them free of oil, grease, sand and other foreign materials by soda wash, water wash, compressed air or any other approved methods etc., form/shuttering work are within the scope of this work. All grouting materials like cement, including special cements such as non-shrinkable free flow cements etc. (as recommended and approved by BHEL), sand, gravel etc., shall be arranged by the contractor at his quoted rate.

6.8.6 All the works such as cleaning, leveling, aligning, trial assembly, dismantling of certain components for checking and cleaning, surface preparation, as per BHEL Engineer's instructions at site, cutting, weld depositing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scrapping, lapping, fitting-up etc., as may be applicable in such erection works and are necessary to complete the work satisfactorily, shall be carried out by the contractor as part of the work with in the quoted rate. Major machining work, which is only to be carried out in workshops, will be arranged by BHEL.

6.8.7 Normally weld neck valves will have prepared edges for welding. It may be occasionally necessary to prepare new edges, re-prepare the edges to suit site conditions, which shall be done by the contractor at no extra cost. All fittings like elbows, tees, reducers, flanges, inserts etc., shall be matched with pipes for welding which may required re-edge preparation, grinding etc., The valves will have to be checked before erection /during commissioning..

6.8.8 For skid-mounted equipment, dismantling if any, for the convenience of erection/commissioning, checking and re-alignment required at site is in the scope of wok.

6.8.9 All rotating machineries and equipments shall be cleaned, lubricated and checked for their smooth rotation, if necessary by dismantling and re-fitting before erection by the contractor. If, in the opinion of the BHEL engineer, the equipment is to be further checked at any stage of the work, necessary skilled manpower, complete facilities like T& Ps etc., for dismantling, cleaning & refitting, consumable, shall be provided by the contractor at no extra cost.

6.8.10 All the shafts of rotating equipment shall have to be properly aligned to those of matching equipment to perfection, accuracy as required and the equipment shall be free from excessive vibration so as to avoid overheating of bearings or other conditions which may tend to shorten the life of the equipment.

6.8.11 All the bearings, Gearboxes etc., of the equipment and electrical motors to be erected are provided with protective greases only. Contractor shall arrange as and when required by the engineer for cleaning the bearing/gear boxes etc., with kerosene or some other agent if necessary by dismantling some of the parts of the equipment during erection and shall arrange for re-greasing/lubricating them with recommended lubricants and assembling back. Lubricants will however be supplied by BHEL free of cost.

6.8.12 The contractor shall take necessary measures to see that all the machined surfaces are preserved and covered.

6.8.13 Certain instruments like pressure switches, gauges, air sets, regulators, filters, junction boxes, power cylinders, dial gauges, thermometers, flow meters, valve actuators, flow indicators etc., are received in assembled conditions as integral part of equipments. Contractor shall dismantle such instruments and re-erect whenever required prior to commissioning.

6.8.14 All the motors/pumps shall be stripped opened, thoroughly serviced with proper care and re-assembled properly before erection by the contractor if required. During servicing, pre-commissioning & commissioning, if any deficiency is observed the same should be taken up with BHEL Engineer at site and if possible rectified at site without any delay.

6.8.15 All Chemicals/Preservatives/ lubricant oil for flushing and during trial run of the equipment including first fill up,etc, will be provided by BHEL free of cost. Required manpower shall be provided by the contractor for handling, filling, emptying and re-filling etc., as part of the work without any extra cost. Transportation of all the above shall be arranged by the contractor from BHEL store/yard to work site and returning of the empty barrels/drums to stores at their cost. Care should be taken to avoid any spillage/wastage.

6.8.16 Supply & application of paints & required consumables etc., are in the scope of contractor and is to be with in the quoted rate.

6.8.17 Slope of 1: 500 shall be maintained towards drain point unless otherwise specified.

6.8.18 All site-fabricated pipes will be issued in running meters as straight. These are to be cut and edge prepared at site to required length to suit layout as given in the erection drawing. All the attachments like lugs, stoppers, cleats etc., will be supplied as loose items and to be cut and welded to the pipes at site as per erection drawing, the contractor shall also do necessary drilling of holes on main pipe for welding stubs at site. Fittings like bends, tees, elbow, mitre bends, reducers, flanges etc., will be supplied as loose items.

6.8.19 Erection of all the piping systems supplied along with main equipments covered in this contract, is to be erected by the contractor with in the quoted rate.

6.8.20 PIPING ERECTION:

For the plant, the piping used is of HDPE, PVC and stainless steel for process piping and GI/Carbon steel for Air/Water piping.

All pipes are supplied in standard lengths.

SS Pipes are connected with threaded SS fittings/flanges . All fittings are supplied by BHEL.

The contractor has to cut the pipes to suitable lengths and edge prepared/threaded for connections.

6.8.21 Carrying out piping as per the specification between equipments constituting terminal points, whether the terminal equipments fall with in the scope of work/specification, contractor shall carry out the terminal joints at either end. Also where the piping connection to the terminal points involve flanged joints, matching of flanges, welding, fixing gaskets, bolting and tightening as per BHEL Engineers instructions is in the scope of work. In case piping connected to equipment, matching of flanges for achieving the parallelism and alignment at the equipment end, by suitably resorting to heat correction or other method as instructed by BHEL Engineer, with in the quoted rate. Contractor should fabricate bends of </=2" diameter size from running meters of pipe.

6.8.22 Certain adjustments in length may be necessary while erecting pipelines contractor should remove the extra lengths/add extra lengths to suit the final layout after preparing edges afresh and adopting specified heat treatment procedure, are in the scope of work.

6.8.23 Minor adjustment like removal of ovalities in pipes and opening or closing of the fabricated bends by process of heat correction or any other method approved by BHEL Engineer to suit the layout, with specified heat treatment procedure with in the quoted rate.

6.8.24 Pipes above 2" diameter have to be cleaned by means of wire brush as per the instruction of BHEL Engineer and subsequently flushed with air before lifting them into position. For pipes below 2" diameter, shall be sponge cleaned with air flushing.

6.8.25 Contractor shall arrange all the equipments, alignment bolts, tools, consumables like welding electrodes (all type), TIG wires (all type) and argon gas cylinders etc. for welding of pipes at his cost. Consumables like jute, cotton waste, hacksaw blades, petrol, Kerosene oil etc. are in contractor's scope.

6.8.26 Contractor shall use only bolted clamps for achieving alignment of piping. Wherever "L" shaped stoppers and wedges are to be used for aligning piping and equipments, the same shall be subject to the approval of BHEL Engineer. Contractor shall remove the bridge, stopper etc., and not by hammer. Any burrs left on the equipments/piping, after welding, shall be ground off or any scar or cavity made good by welding and grinding. NDT tests shall be carried out if necessary to detect surface and sub-surface cracks in these ground areas.

6.8.27 All the weld joints on equipments and piping shall be ground or filed on completion of welding and before radiography as per instructions of BHEL Engineer so as to achieve smooth surface to avoid of ripples, undulations etc.,

6.8.28 Pipelines shall be cleaned off welding slag and burrs by hand files, wire brushes and flexible grinders wherever required and using cloth.

6.8.29 Flame cutting of piping and other equipment shall be strictly done as per BHEL Engineer’s instructions and in his presence only.

6.8.30 All piping items including pipes, valves, flanges, fittings etc. shall be supplied as commercially available. Hence Fit-ups, edge preparation including welding of stubs, shall be included in the contractor's scope.

6.8.31 Wherever elbows of 45 deg or any other angle. (> 2” dia pipe) are required, the same shall be cut from 90 deg. elbow supplied and used, if not supplied separately. No extra cost shall be paid.

6.8.32 The work on piping systems will include laying, edge preparation, fixing and welding of the elbows/fittings/valves etc. welded on the lines, fixing and adjustment of supports/hangers/shock absorbers and carrying out all other activities/works to complete the erection and also carrying out all pre-commissioning/commissioning operations mentioned in the specification as per BHEL Engineer's instructions and/or as per approved drawings/documents.

6.8.33 Contractor shall also weld small length of piping with root valve to the pressure, flow and level tapping points on piping or flow nozzles/orifices/ metering elements fixed on piping as per the instructions of BHEL Engineer.

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

6.8.35 Contractor shall fabricate bends at site from running meters of piping for the above and cut, edge prepare and lay the piping as per BHEL Engineer's instructions.

6.8.36 Fixing / fitting / welding of thermo wells, stubs, hoses, tapping points, root valves and instruments etc. on different lines / equipments (which will be supplied by BHEL) is within the scope of work.

6.8.37 The contractor shall conduct non destructive tests like radiography ultrasonic test for weld defects etc., ultrasonic test for finding thickness, dye penetrant tests, magnetic particle test etc. on weld joints, castings, valve bodies and other equipments etc. as per BHEL Engineer's instructions.

6.8.38 Plate/Pipe shoes for piping supports shall be fabricated at site by the contractor. Other supports namely Hangers, U-clamps etc. shall be supplied by BHEL duly bent and threaded. Assembly and necessarily cutting work etc. shall be carried out at site by contractor within the quoted rate.

6.8.39 Wherever hanger and support materials of piping are not received from manufacturing unit in time to suit the erection schedule, contractor shall erect the piping system on temporary supports to ensure the progress of work. The required structural steel materials will be issued on free of charges by BHEL, either from scrap/spare materials. The same shall be removed and returned to BHEL store after erection of permanent supports.

6.8.40 All Operating/ Approach platforms, cross over, canopies, ladders etc., shall have to be fabricated from raw materials supplied by BHEL and erected as per instruction of BHEL, by the contractor with in the quoted rate.

6.8.41 Contractor shall be supplied with two extra blue prints of the layout & isometrics. Contractor to incorporate in one of the blue prints with red ink all the changes/deviations/alterations etc. carried out at site due to various reasons, with site engineer's endorsement. Marked up drawings shall be submitted to BHEL for approval.

6.9.0 PRESERVATION / TOUCH UP PAINTING

6.9.1 Contractor shall carryout cleaning and preservation/ touch up painting as a part of erection work for the materials / equipments under this tender specification right from erection site, during erection and after erection till handing over to customer wherever deficiency in painting / rusting in noticed. The necessary paint will be supplied by the contractor at his cost.

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

6.9.3 Any failure on the part of the contractor to carry out work according to above clauses will entitle BHEL to carryout the job though any other party and recover the cost from contractor.

6.10.0 HYDRAULIC TEST, PRE – COMMISSIONING & COMMISSIONING

6.10.1 Hydraulic testing pumps for conducting hydro test as per testing procedure shall be arranged by Contractor only at his cost.

6.10.2 All erected pips shall be subjected to hydraulic test as per the Standard / statutory requirements. The contractor shall supply necessary labour and other services and make necessary arrangements to carry out the required tests as per the instructions and directions of the BHEL Engineers.

6.10.3 Contractor at his cost shall lay all necessary temporary piping, install the pumps, blanks, valves required for the test, pressure gauges etc. Required pipes, valves, plates etc., will be given by BHEL. Temporary piping, valves, flanges, blanks etc shall be removed by him and returned to BHEL.

6.10.4 The hydraulic testing of the equipment and piping, covered under this scope of work has to be carried out by the contractor as per instructions of BHEL Engineer. The contractor shall provide all facilities required for hydraulic testing. Filling pump shall be arranged by the contractor at his cost.

6.10.5 All the above tests shall be repeated till all the equipment satisfy the requirement of BHEL to their customer. Any rectifications required shall have to be done/redone by the contractor at his cost for the portion of work carried out by him.

6.10.6 Replacing / changing mechanical / other seals of removal and cleaning / replacing of filters etc. during pre-commissioning / commissioning stage is within the scope of work.

6.10.7 Overhauling, cleaning, Servicing of tanks, pumps, equipments, during erection and commissioning stages are in the scope of work. Gaskets packing for replacement will be provided by BHEL free of cost.

6.10.8 Contractor shall lay all necessary electric cables and switches etc. required for the hydraulic tests and other tests, flushing etc., and maintain the system till the tests are completed satisfactorily.

6.10.9 During initial stages of work, trenches for draining water may not be available and employing the system and piping. Necessary low point drains and temporary piping for this will have in be erected by contractor from materials provided by BHEL.

6.10.10 Raw materials for all temporary piping necessary for conducting hydraulic test. Chemical cleaning, , effluent disposal etc. Will be provided by BHEL free of cost. However, fabrication servicing, erection and dismantling the same and return of the temporary piping, flanges, valves etc. to BHEL stores is the responsibility of the contractor without any extra charges.

6.10.11 The contractor shall carryout the required tests on the equipments and the pipelines such as gas tightness test/air tightness test, kerosene test, hydrostatic testing of the equipment/piping etc. and rectify all the defects caused due to contractor's fault at his own cost. Contractor may have to replace old/damaged gaskets / packing etc. for equipments and the same shall be carried out by contractor as per requirement. Compressed air for pneumatic testing is to be arranged by contractor. The contractor shall carry out the trial run of motors including checking the direction of rotation in the uncoupled condition checking aligning and coupling the motor to the respective driven equipment. Before starting the motor IR values of insulation shall be recorded and if found necessary ,motor dry out is to be done by the contractor to improve the IR value at no extra cost.

6.10.12 In case any erection defect is detected during various tests / operations trial runs as detailed above such as loose components, undue noises or vibration, strain on connected equipment steam or oil or water leakage etc. the contractor shall immediately attend these defects and take necessary corrective measures. If any readjustment and realignments are necessary the same shall be done as per BHEL Engineer's instructions. If any part needs repairs rectification and replacement the same shall be done by the contractor at no extra cost. The parts to be replaced shall be provided by BHEL free of cost If insulation is to be removed to attend any of the defects the cost of removal and reapplication of insulation should be borne by the contractor.

6.10.13 Welding and stress relieving of temporary blanks or suitably fixing temporary blank flanges with gaskets and fasteners and welding and providing suitable de-aeration / venting / draining points with valves as per BHEL Engineer’s instructions, for performing hydro-test of piping and other equipments is within the scope of work. Gaskets, valves, fasteners will be provided free of cost by BHEL. Contractor shall cut steel blanks from steel provided without charging extra. After completion of hydraulic test, welded blanks shall be cut and removed and weld burrs ground finished and cavities/scars of cutting weld filled and ground as per BHEL Engineer’s instructions.

6.10.14 Necessary scaffolding and approaches for conducting the above shall also be within the scope of the contract.

6.10.15 In case any malfunctioning and/or defect is found during tests/trials runs such as loose components, undue noise or vibrations, strains etc. on equipment, the contractor shall immediately attend to these defects/malfunctioning and take necessary corrective measures. If any readjustment and re-alignment are necessary the same shall be done as per BHEL Engineer's instructions as part of work at no extra cost.

6.10.16 During the stages of pre-commissioning / commissioning / post commissioning, if any part of the auxiliaries need, repair/rectification / rework / replacement, the same shall be done expeditiously and promptly by the contractor.

6.10.17 During this period, though BHEL's and customer's staff will also be associated in the work, the contractor's responsibility will be to make available resources in his scope till such time the commissioned units are taken by the customer.

6.10.18 Contractor shall cut/open works if needed, as per BHEL Engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over. This contingency shall be included within the quoted value. During commissioning opening of valves changing of gaskets attending to leakages minor modification rectification works may arise. The contractor has to carry out these works at his cost by providing required manpower in all the three shifts. In case any rework is required because of contractor’s faulty erection and which is noticed during commissioning the same has to be rectified by the contractor at his cost.

6.10.19 Contractor to provide necessary commissioning assistance from pre-commissioning stage onwards and up to continuous operation The category of personnel to be as per site requirement and to meet the various pre-commissioning and commissioning program made to achieve the schedule agreed with customer.

6.10.20 After synchronization, the commissioning activities will continue. It shall be the responsibility of the contractor to provide manpower, hand tools and supervision as part of commissioning assistance.

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

6.10.22 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.

6.10.23 It is the responsibility of the contractor to provide necessary manpower, tools, tackles and consumable till the completion of work under these specifications including for trial operation,

6.11.0 GENERAL / ELECTRICAL AND INSTRUMENTATION SYSTEM

The scope of work for RODM Plant will include Erection, Commissioning of associated Electrical/ C&I equipment. The general terms and conditions for this will be in line with the Mechanical Package. The detailed scope of work pertaining to Electrical/C&I Package is as follows.

6.11.1 All the work shall be carried out as per instructions of BHEL C&I engineer. BHEL engineer's decision regarding the correctness of the work and method of working shall be final and binding on the contractor.

6.11.2 All necessary certificates and licenses required to carryout this work are to be arranged by the contractor expeditiously at his cost.

6.11.3 During the course of erection, testing and commissioning C&I/ELECTRICALS work, certain rework / modification / rectification / repairs / fabrication etc. may be necessary on account of feed back

from other projects already commissioned and / or units under erection and commissioning and also on account of design changes and manufacturing incompatibilities and site operation / maintenance requirements. Contractor shall carryout such rework / modification / rectification / fabrication / repairs etc. promptly and expeditiously and the same shall be deemed to be part of the scope of work.

6.11.4 Contractor shall retain all T&P/Testing instrument/Material handling instrument etc at site as per advice of BHEL engineer and same shall be taken out from site only after getting clearance from engineer in charge

6.11.5 Scope of work covered under this specification requires quality workmanship and construction management. The contractor shall ensure timely completion of work. The contractor shall have adequate tools, measuring instruments, calibrating equipment etc. in his possession. He shall also have adequate trained, qualified and experienced engineers, supervisory staff and skilled personnel. The manpower deployed by contractor shall match with above scope of works.

6.11.6 The scope of specification covers the installation, testing and commissioning of the instrument, hardware along with accessories as detailed in Bill of Materials.

If any item or equipment not covered but requires to be erected/commissioned, same shall be carried out by the contractor. Equivalent unit rate for those item or equipment shall be considered wherever possible from the BOQ. The rates quoted by the contractor shall be uniform as far as possible for similar items appearing in rate schedule.

6.12.0 SCOPE OF WORK – ELECTRICAL AND C & I

The Scope of work covered for RO-DM Plant shall be as follows:

6.12.1 Erection and commissioning of LT Switchboards

6.12.2 Erection and commissioning of Control panels/ Control Desk

6.12.3 Erection and commissioning of Microprocessor based panels.

6.12.4 Erection and commissioning of LT Switchboards

6.12.5 Erection and commissioning of Control panels/ Control Desk

6.12.6 Erection and commissioning of Microprocessor based panels

6.12.7 Erection and commissioning of all types of Field Instruments like Temperature, Pressure and Flow (local & remote) instruments and special type of instruments like Sensors, Recorders Analysers etc.

6.12.8 Erection and commissioning of Control Room mounted instruments like Indicator etc.

6.12.9 Erection and commissioning of UPS, Electrical Distribution Panel

6.12.10 Erection and commissioning of Lighting Distribution Panel

6.12.11 Erection of Hardware like impulse pipes, trays & tray supports.

6.12.12 Laying & Termination of LT control/instrumentation cables etc.

6.12.13 Commissioning of Electrical operated valves/ Drives.

6.12.14 Erection of split Air Conditioners

6.13.0 DETAILED SCOPE OF WORK:

The scope of work for all C&I/ ELECTRICAL items like Instruments, Panels, Hardwares, etc. covers identification of items at stores, checking, reporting the damages if any, loading, transportation, unloading at Contractor's stores/ working yard, keeping in safe custody in contractor's stores, pre-assembly, calibration, checking, erection, testing and commissioning, supply of consumables like electrodes, gas, cable dressing materials, tag plates, ferrules, lugs, specific type of fasteners, paints and its consumables. Deployment of skilled/ unskilled manpower, engineers/ supervisors, T&P, Material handling equipments, Testing instruments (excepting proprietary type instruments), returning of un-used materials/ items to stores are also covered in the scope of work.

6.13.1 SCOPE OF WORK FOR LT SWITCHBOARD

1. The scope of work covers receipt of all the materials from stores, transportation to the respective location, erection, testing, commissioning and handing over.

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. 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. This is applicable for local start/stop push button box also. Any grouting bolts required for the panel shall be supplied by the contractor at no extra cost.

3. The contractor shall set each section of equipment on its foundation or supporting structures. The contractor shall assemble equipment as required. All equipment shall be installed with parallel, horizontal and vertical alignment by skilled craftsmen arranged by the contractor.

4. Panels will be delivered in suitable shipping sections. Necessary interconnection of busbar, inter panel wiring, etc. will have to be done by the contractor as part of panel erection.

5. Normally the panels shall be supplied with complete instrument mounting and wiring. However, if necessary, dismantling of the existing components, making minor modifications in the wiring to suit operating conditions, mounting and rewiring of new components will be carried out within the quoted rate. However, if any major wiring modification is involved inside the panel, the same shall be carried out at extra cost. Mounting and wiring of any instruments, meters, relays, push buttons, indicating lamps, contactors etc. if supplied loose for safety in transit, will also be included in the scope of the job.

6. The commissioning of LT Switchgear shall also involve the trial runs and commissioning of all connected equipment like servomotors and drives etc. The contractor will have to deploy his people round the clock during the trial runs, if necessary, and promptly take action for any small repair, checks and rectification etc. required in the equipment erected by him.

7. The contractor has to do touch up painting of switchgear panels wherever necessary. The scope of work includes the necessary paint will be supplied by the contractor at his cost.

8. All T&P, Material handling equipment and Relay Testing/ HV Testing/ Calibration equipment/ Instruments shall be arranged by contractor.

9. All testing Instruments shall be arranged by the contractor and all Relay Calibration and commissioning of switchgear shall be carried out by well-experienced Engineers/ Technicians.

10. All testing Instruments/ Equipment deployed to site shall be calibrated before putting it into service. A copy of calibration certificate shall be submitted to BHEL Engineer for his verification and approval.

11. The contractor shall prepare all erection/ commissioning log sheets, protocols/test certificates as per field quality plan, get it signed by the concerned BHEL/ Customer and submit the same to BHEL Engineer as per his instruction.

12. The charged and commissioned equipment shall be maintained by the contractor till the same is taken over by Customer.

13. If any removal/ Re-fixing of contactors/relays becomes necessary for the completion of the system, the same shall be done by the contractor with in the quoted rate.

14. Any loose supplied items like lamps, lens, contactor, fuse/relays/instruments missed from the custody of the contractor shall be replaced by the contractor at with in the quoted rate.

15. 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.

16. Rubber mats for LT switchgear shall be supplied by BHEL and shall be laid, wherever required within the scope of work.

17. The contractor shall close unused opening at the panel bottom plate with suitable material in consultation with Site Engineer with in the quoted rate.

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

19. Dimensions & weights indicated in the BOQ against various panels are approximate only. There may be variations in the weight and dimensions. Any variation within ±20% shall not be considered for payment. However, for variations beyond ±20%, payment shall be considered proportional to the length of the panel. Variations in depth, height or weight of the panel shall not be considered for payment.

20. All type of relays, energy meters, transducers etc shall be calibrated by the contractor and this will be part of the commissioning work. However, for more details, please refer Scope of Calibration (Clause no 6.3.12).

6.14.0 SCOPE OF WORK FOR CONTROL PANELS/CONTROL DESK:

1. The different types of Microprocessor based panels like PLC Panels, Instrument Panels, Control desk, Control panels etc. are covered in the scope of work for erection and commissioning.

2. The scope of Installation of control panels, shall include fabrication of base frame wherever required, fixing of anti-vibration pads, levelling and alignment, welding, grouting, drilling of bottom gland plates for cable entry as required, closing control panels bottoms with suitable flame proof compounds wherever required and checking of internal wiring, instruments, components etc. and include Testing, Calibration and adjustment of relays, electronic cards and instruments mounted on the panels except the Instruments identified in the BOQ.

3. 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 TIG welded to the embedded insert plates.

4. 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 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.

5. If any minor grinding is to be carried out on the cut-outs provided in the panels for mounting instruments like recorders, indicators, console etc., the same shall be carried out by the contractor with in the quoted rate.

6. All the panels and JBs shall be Electrically earthed to the nearest earth grid by means of GI flat /wire as per the instructions of BHEL engineer. This work shall be part of the panel erection work. The earthing materials shall be supplied by BHEL.

7. 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 with in the quoted rate.

8. Closing the Panel openings and unused drilled holes with non-flammable sealant materials, including supply of above material, shall be part of erection work.

9. Normally the panels shall be supplied with instruments / modules mounted and wired. No separate payment shall be made for commissioning of any instrument/ cards/ components. If dismantling of the above such instruments and rewiring are needed at site, the same shall be carried out within the quoted rate. If any instruments/ cards/ components supplied as loose items for safe transit, the same shall be mounted and wired within the quoted rate unless otherwise specified in the BOM. However, if any major installation/modification/wiring are involved, the same may be carried out as extra work. The decision of BHEL engineer shall be final in respect of above extra works.

10. Dimensions & weights indicated in the BOQ against various panels are approximate only. There may be variations in the weight and dimensions. Any variation within ±20% shall not be considered for payment. However, for variations beyond ±20%, price adjustment shall be considered proportional to the length of the panel. Variations in depth, height or weight of the panel shall not be considered for payment.

11. UPS, AND OTHER ELECTRICAL CONTROL PANELS

Fixing of console type instruments, if supplied loose, shall be part of panel erection work. The erection & commissioning scope of above panels will be in line with clause 6.3.1.

6.15.0 SCOPE OF WORK FOR INSTRUMENTS:

1. The type of instruments to be erected and commissioned shall be as detailed below:

   i) All types of transmitters like temperature, pressure, flow, and level transmitters etc.
   ii) 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.
   iii) Air filter regulator sets, Air lock off valve etc.
   iv) Panel/ Control desk mounted Instruments like indicators, recorder, and electronic modules.
   v) Pneumatic operated control valves, trip valves, solenoid valves, etc. and electrically operated valves.
   vi) Special instruments like Sensors etc.
   vii) Analysers

2. Prior to installation, all the Instruments (local & remote), thermocouples and RTDs, I/P converters etc. shall be calibrated. Similarly, limit switches, flow switches, level switches, solenoid valves, air filter regulator etc. shall be checked for proper operation.

3. The erection of pressure/differential pressure transmitters, gauges, switches etc includes fixing the instruments on the racks / supports along with manifolds, drain valves and associated fittings and clamps. No separate rate shall be paid for each item. The unit rate for steel material shall cover Fabrication and installation of racks and supports. Steel materials required for fabrication shall be supplied by BHEL. The unit rate shall also cover marking Tag numbers of instruments, either by paint or a separate tag plate as per BHEL Engineer's directive.

4. Panel mounted instruments shall cover mounting of instruments on panels / desk wiring, minor grinding on the cut out of panels for proper fixing.

5. Erection and commissioning of instruments shall cover calibration after installation until satisfactory performance as per operational and system requirement. This activity is to be coordinated by contractor separately and the manpower for the above activities shall not be availed from commissioning manpower.

6. Erection and commissioning of temperature switches, gauges, thermocouple, RTD etc. shall include cleaning of thermowell stubs threads using tapping sets, fixing of thermowells, wherever required, as per BHEL specification and directive of site engineers.

7. scope of each instrument shall include Transportation, calibration, installation and commissioning charges as well as troubleshooting and maintenance till handing over in line with Mechanical contract. In case any instrument requires recalibration to achieve the expected performance, the same shall be carried out. However, if any instrument is to be replaced or relocated for reasons not attributable to the contractor, but required for satisfactory performance the same shall be carried out at extra cost.

8. During commissioning, if any re-calibration or replacement of instruments and rechecking of cable termination is found necessary, the contractor shall do the same within the quoted rate and no extra payment shall be made.

9. All instruments are generally covered in rate schedule. However, if any instrument is not covered, but requires to be erected/commissioned, same shall be carried out by the contractor. Equivalent unit rate for those instruments shall be considered wherever possible from the BOQ.

6.16.0 SCOPE OF WORK FOR IMPULSE PIPES:

1. Stainless steel tubes shall be supplied along with various compression type fittings.

2. Erection for impulse piping shall include erection of all fittings and accessories like valves, manifolds etc. Any supports required shall be fabricated as part of erection work. The above support materials shall be supplied by BHEL.

3. The scope covers supply of U clamps, fasteners, paints, providing Tag numbers at appropriate location etc. by contractor.

4. Hydraulic test shall be conducted for all the impulse pipes after completion of erection as per site engineer directive, with in the quoted rate.

6.17.0 SCOPE OF WORK FOR COPPER/SS TUBES :

1. Different sizes of copper tubes of different thickness with or without PVC coating shall be supplied in a standard length of 15 Mtr. Coils and SS tube shall be supplied in standard length of 6 meter. The connectors and tees will be of brass/SS of different sizes as per site requirement.

2. The erection scope includes site routing, bending, providing supports, fixing of connectors, unions, valves, tees, etc. and connecting to the instrument air line instruments, providing tag plates on instruments / power cylinders / valves.

3. If copper/SS tube length is more than ½ mtr, suitable support shall be provided either by angle or trays. Copper/SS tubes shall be clamped with suitable clamping materials. Erection of support angles and trays shall be part of work. Clamping materials and tag plates shall be supplied by the contractor. Protective angles to be used for copper tube routing. Required size of angles shall be supplied by BHEL.

4. Supply of suitable Aluminium clamps and tag plates are under contractor's scope. 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.

6.18.0 SCOPE OF WORK FOR INSTRUMENT AIR LINE :

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

2. The scope of 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, supply of U clamps, Teflon tapes and bolts, etc..

3. All the joints shall be tightened using Teflon tapes. No bending, welding etc. is allowed.

4. After installation of instrument air lines, the line shall be blown and leak test shall be conducted for all the joints as per instructions of BHEL Engineer.

6.19.0 SCOPE OF WORK FOR JUNCTION BOXES & PUSH BUTTON BOXES:

1. Different type of Junction Boxes/ Push Button boxes like explosion proof/non explosion proof will be supplied by BHEL along with or with out gland plates.

2. The scope of erection of junction boxes/push button boxes shall cover providing necessary supports, drilling of bottom gland plates or taping of for cable glands as required, Painting the tag nos of JB or fixing a separate tag plate 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.

3. The fabrication of supports shall be part of the erection work and covered in the cost of equipment.

4. All the un-used holes on the gland plates shall be closed by GROW MAT with in the quoted rate (to be supplied by contractor).

5.

6.20.0 SCOPE OF WORK FOR CABLES:

1. BHEL will supply LT cables of different sizes, as detailed in BOQ. The scope of work for cables covered in this tender is as below.

2. The scope includes laying & termination of cables, drilling of holes in the panels, gland plates, fixing of glands, ferrules, tag plates with necessary numbering, including dressing of cable, as per BHEL specification and BHEL engineer's instructions.

3. Quoted shall also include supply of clamping materials, ferrules, tag plates.

4. Cables shall generally be laid on cable trays. Any fabrication required at site for cable tray support shall be carried out as part of the erection work.

5. All the dressing material such as Aluminium/GI strips, PVC ties etc. required for cable shall be arranged by the contractor with in the quoted rate. 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.

6. While testing and commissioning, if the equipment to which the cabling is connected is observed to be not functioning, it is the responsibility of the contractor to check, establish and demonstrate, in close coordination with the commissioning agencies, that there is no defect in the cabling. The contractor shall put his supervisor and workmen along the commissioning agencies to check the interconnecting cables.

7. Contractor shall carefully plan the cutting schedule for each cable drum in consultation with Engineer such that wastage is minimized and any resultant short lengths can be used where appropriate route lengths are available.

8. Cable installation shall be properly coordinated at site with other services and wherever necessary suitable adjustment shall be made in the cable routings with a view to avoid interference with any part of the building, structures, equipment, utilities and services any such adjustment shall be done with the approval of Engineer.

CABLE TERMINATION

9. Termination of cable shall be part of unit rate quoted. Type of termination shall be wire wrapping, soldering, screwed connections etc. as the case may be.

10. The insulating sleeves shall be fire resistant and shall be long enough to over-pass conductor insulation and shall be properly sized.

11. Termination of all the cables laid by the contractor is included in his scope. Contractor shall carryout any changes like reconnecting, retesting, rearrangements of leads and changing of connectors, if required without additional cost.

12. The contractor shall arrange all type of termination tools, tackles and accessories required for cable termination. After cable terminations, the debris shall be removed then and there.

6.21.0 SCOPE OF WORK OF CABLE TRAYS/ CONDUITS/ FLEXIBLE CONDUITS:

1. This scope shall include erection of all accessories such as coupler plates, elbow, cross TEE, reducers anchor bolts, fasteners etc. For erection of cable trays routing standard tray accessories like bends (90), TEES (cross), Reducers, fixing plates, fasteners etc., shall be supplied . However if Tees, cross, bends, elbows are not supplied, the same shall be fabricated for which no separate rate shall be paid and if standard tray accessories like TEES, Reducers, Bends (90 vertical and Horizontal), cross require modification to suit the tray routing, same shall be carried out at site with in the scope.

2. This scope shall also cover making of offsets by means of cutting standard tray sections and inserting additional tray fittings to match with the existing arrangement, minor bends, cutting, reducing length etc., i.e. any modification required at site on trays or accessories, same shall be carried out as part of tray erection. However, contractor shall avoid fabrication of accessories at site and try to use pre-fabricated standard tray accessories.

3. Trays covers are to be erected after completion of cable laying and no separate payment will be made for fixing these covers and GI strip clamps to be used for fixing the tray covers.

4. 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. No separate payment will be made for end connectors of the flexible conduit

6. The unit rate quoted for flexible conduit on metre basis shall include drilling of holes on the plates, fixing of end connectors, providing suitable supports and fixing tag plates as required by BHEL. Supply of suitable clamps, fasteners and tag plates shall be covered in the unit rate.

7. In the case of flexible conduit end connectors, no separate payment will be made for fixing the end connectors.

8. GI pipes and flexible conduits shall be supplied by BHEL.

6.22.0 SCOPE OF WORK FOR FABRICATION MATERIALS & STRUCTURAL STEEL:

1. The scope of fabrication generally includes supports for cable trays, instruments, impulse pipes, GI pipes, mounting frames for JB, Control Box/Panel, Instrument Racks, canopy for local instruments wherever required. Fabrication shall be carried out as per schemes in consultation with site engineers.

2. The scope of work covers fabrication as per site requirement, installation, minor chipping and grouting, painting and supply of paints and consumables, etc.

3. The fabrication steel materials such as angles, channels, plates, flats shall be supplied by BHEL, free of cost.

4. The cost for fabrication of supports shall be included in the contract. No separate rate shall be applicable for fabrication.

5. If nuts, bolts, anchor fasteners required for fixing the racks or frames the same shall be arranged by the contractor within the quoted rate.

6. All the fabricated steel materials shall be painted as per the details given in the scope of painting and no separate rate shall be paid for painting.

7. Supply of all cement, sand etc. required for grouting of supports shall also be arranged by the contractor at no extra cost.

6.23.0 SCOPE OF EARTHING

1. The scope of earthing covered in this contract is above ground earthing, for all the electrical/ C&I equipment erected by the contractor, including supply of fasteners, lugs, minor civil works etc.

2. Different type of earthing materials will be supplied by BHEL and the contractor shall lay and connect the earthing materials as per site requirement.

3. The cost for earthing shall be included in the erection rate of the respective item. No separate payment shall be applicable for earthing.

4. All PLC/ Microprocessor based Instrumentation panels shall be electronically earthed by providing separate earth pit.

6.24.0 SCOPE OF PAINTING:

1. The scope of painting generally includes for all the steel works such as supports, racks, frames, canopy, impulse pipes etc. carried out by the contractor.

2. The scope also includes supply of synthetic enamel paints, primers, consumables like brushes, emery papers, thinner etc.

3. The painting shall include two coats of Red oxide primer and two coats of final painting of synthetic enamel paint of colour approved by BHEL.

4. Paints shall be arranged from standard reputed suppliers in consultation with BHEL.

5. For trays, control panels, junction boxes, generally Touch up paints will be required as detailed in the scope of work for the same.
6. For any bare copper tube requirement, painting as desired by the site engineer shall be carried out by the contractor.

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

6.25.0 SCOPE OF CALIBRATION:

Contractor has to calibrate all the instruments covered in their scope and maintain the calibration records as per BHEL format.

If any special instruments requires proprietary type calibrators and if the same is not available with BHEL at site, contractor shall carry out the calibration through external agency, at extra cost. The actual cost of such calibration carried out by outside agency will be absorbed by BHEL. The contractor shall co-ordinate with external agency for such calibration.

However if above such calibrator is available with BHEL at site, the calibration shall be carried out by the contractor within the quoted rate.

The contractor shall bring one instrument air compressor unit with drier unit having capacity of 6 Nm^3 /hr at 6.0 – 7.0 bar for testing and commissioning of instruments within the quoted rate.

6.26.0 SCOPE OF COMMISSIONING WORK FOR THE EQUIPMENT ERECTED AS PART OF MECHANICAL PACKAGE

1. ELECTRICAL (ALL TYPE OF DRIVES AND MOTOR OPERATED VALVES)-(if applicable)

    a) Cable identification, checking and meggering.
    b) IR value of motor, measurement of winding resistance etc.
    c) Dry out all the motors if required to improve IR value.
    d) Limit switch and torque switch setting
    e) Calibration of Electronic cards, modules etc. and fixing the same if supplied as loose item.
    f) Checking direction of rotation of motors and testing and commissioning from local as well as remote.
    g) Attending to any defects till the contract period.
    h) Replacing defective components like limit switches, electronic cards etc.

2. PNEUMATIC (ALL TYPE OF VALVES)

    a) Calibration and checking of instruments mounted on the actuators and setting stroke length of the actuator.
    b) Servicing of positioners, position transmitters, limit switches, solenoid valves, air lock-off valves, removing/replacement of defective components, copper tubes etc., if necessary.

c) If the actuator is to be removed for attending to any mechanical problems, removing of copper tubes, cables etc. reconnecting and re-commissioning of the actuators is to be done.
d) Testing and checking the remote/local operation in Auto as well as Manual mode.
e) Fixing of instruments if supplied as loose items.
f) Attending to any defects till the contract period.

3. FLOW METERS/SWITCHES

a) Checking the calibration and servicing if required.
b) Setting the alarm value
c) Replacement of defective components if any

4. LIMIT SWITCHES & LEVEL SWITCHES

a) Checking the operation
b) Replacing defective components if required

5. SOLENOID VALVES

a) Checking the healthiness of coil
b) Checking the operation
c) Replacement of defective components if required.

6. LEVEL GAUGES (REMOTE & LOCAL)

a) Checking the calibration
b) Fixing of bulbs and extending Power supply
c) Replacing defective components.

7. SCOPE OF WORK FOR OTHER INSTRUMENTS MOUNTED ON THE EQUIPMENT

Scope of work covers removal, re-calibration & re-fixing of instruments, re-termination of cables, checking the continuity, replacing any defective parts or replacing the total instrument, if required.

NOTE:

The scope of work covered in 6.3.14 also includes collecting the replacement instruments/parts from BHEL/customer stores, stockyard etc.

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

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

1. The scope of commissioning works covers commissioning of all instruments covered in the BOQ including loop checking and establishing the operation of instruments /systems to meet system commissioning/operation schedule. 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.

2. Scope of commissioning starts with the commissioning of various C&I equipment/ instruments/ systems erected by the contractor and making them available, as required, for the various commissioning activities of the RODM plant.

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

3. Contractor shall arrange specialized commissioning engineers, supervisors including electricians/instrument mechanics in each area to be associated with BHEL commissioning staff. Contractor shall earmark separate manpower for 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

4. 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. In case any rework/repair/rectification/modification/fabrication etc. is required because of contractor's faulty erection which is noticed during commissioning or 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.

6. 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.

7. Minimum requirement of Man Power for commissioning works shall be as follows:

Engineer (C&I)	1 No.
Supervisor (C&I)	1 No.
Technician (C&I)	1 No.

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.

8. 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.

6.28.0 MEASUREMENT, WASTAGE & CUTTING ALLOWANCES:

6.28.1 For all payment purposes, measurement shall be made on the basis of the execution of drawings/physical measurements. Physical measurements shall be made by the contractor in the presence of the Engineer.

6.28.2 The measurement for cable, impulse pipes/tubes, GI pipe, conduits, flexible conduits, trays etc. shall be made on the basis of length actually laid.

6.28.3 All the surplus, scrap and serviceable materials, out of the quantity issued to the contractor shall be returned to BHEL in good condition and as directed by the engineer.

6.28.4 All materials returned to stores should carry an aluminium tag indicating the size and type. More than 5 metres length shall be termed as serviceable material and returned size wise and category wise to the owner's stores/yard. Cable of serviceable length being returned to the stores in drums shall have their free ends sealed and the balance lengths on the drum(s) shall be noted and certified by the Engineer-in-charge. This shall be applicable only for the purpose of accounting the cables issued for installation.

6.28.5 While carrying out material appropriation with contractor, all the above points will be taken into account. All serviceable material returned by the contractor shall be deducted from the quantities issued for the respective sizes and categories and the balance quantity(ies) will be taken as the net quantity(ies) issued to the contractor. Material appropriation shall be done and allowable scrap quantity calculated as per wastage allowance specified. Any scrap/wastage generated by the contractor in excess of the allowable percentage shall be charged at the rates decided by the Engineer whose decision shall be final and binding on the contractor.

6.28.6 For all site-fabricated steel items such as supports, frames, Canopy etc. physical measurement shall be made and then converted to tonnage. For steel material supplied to the contractor, all scrap shall be returned to BHEL stores with due accounting.

6.28.7 Every month the contractor shall submit an account for all the materials issued to him by BHEL in the standard pro forma prescribed for this purpose by the site in charge.

6.29.0 STORAGE

6.29.1 The equipment should be preferably in its original package and should not be unpacked until absolutely necessary for its installation. The equipment should be best protected in its cases. It should be arranged away from walls.

6.29.2 The wooden pallet provided for packing itself can be retained for raised platform to protect equipment from ground damps, sinking into around and to circulate air under the stored equipment. This will also help in lifting the packing wIth fort lift truck.

6.29.3 Due care should be taken to ensure that the equipment is not exposed to fumes, gases etc. which can affect electrical contacts of relays and terminal boards.

6.29.4 The storage room and the equipment should be checked at regular interval of 3 months to ensure protection from termites, mould growth, condensation of water etc. which can damage the equipment.

6.29.5 Contractor shall keep BHEL informed about such problem and try to rectify the problem at his risk and cost.

6.29.6 All the instrument, materials and goods kept in the store room should be identified and registered in a book. Inspection report should be recorded. Any discrepancy observed should be communicated to site.

6.29.7 Packing material shall be retained if the cubicle to be repacked after inspection.

6.29.8 Loose items (wherever applicable)
The loose items supplied for the main equipment falls into various categories like tools, modules, prefabricated cables, console inserts, recorders, modules and display units, printers, sensors and transducers, PCs, monitors, cable glands, cable ducts, frames etc. are to be categorised and stored separately

6.30.0 TERMS OF PAYMENTS

The contractor shall quote a lump sum value for the entire scope of work, taking into consideration all the erection, commissioning, requirements indicated in the tender document.

For purpose of ensuring progressive payment, the following terms of payment is envisaged:

1. 75% of the contract value is allocated for payment towards erection, pro rata, on monthly progressive bills. This payment will be split up, at site, by BHEL on mutually agreed percentage for erection of mechanical equipment, piping, electrical & C & I panels, cables and instruments etc.

2. 15% of the contract value is allocated for progressive payment against commissioning. This percentage can be split up suitably at site on mutually agreed terms.

3. 5% of the contract value after completion of pending works and final bill approved.

4. 5% of the contract value will be paid against bank guarantee of equal amount for a period six from commissioning of the RODM Plant.

6.30.1 BHEL at discretion, may further split up the above percentage and effect payment to suit the site conditions, cash flow requirements, according to the progress of work.

6.30.2 CONTRACTOR SHALL NOTE THAT THE FINAL BILL SHALL BE RELEASED ONLY ON PRODUCTION OF A CERTIFICATE ISSUED BY SITE IN CHARGE THAT THE CONTRACTOR HAS FULFILLED ALL THE CONTRACTUAL / STATUTORY REQUIREMENT.

6.31.0 FINAL PAINTING :

All equipments are supplied painted. Only touch up painting/finish painting shall be done y the contractor wherever required. However all structural steel materials fabricated and erected by contractor should be painted with two coats of red oxide primer and one coat of final paint. Contractor to arrange for this in the quoted rate. Paints are to be purchased by the contractor as approved by BHEL Engineer for shade, quality and make.

6.31.1 DETAILS OF PAINTING

All the exposed metal parts of the equipments including piping, structures, hangers etc., wherever applicable after installation unless otherwise specified the surface protected, are to be first painted with at least one coat of suitable primer, which matches the shop primer paint used, after thoroughly cleaning the dust, rust, scales, grease oil, and other foreign materials by wire brushing scrapping and

chemical cleaning and the same being inspected and approved by BHEL Engineers for painting. Afterwards the above parts shall be finished with intermittent and finish coating as specified in the Painting Specification Section VII, Appendix VI and as per the instructions of BHEL / Customer official. If needed and insisted either by BHEL engineer or the BHEL client, in certain cases, spray painting has to be done wherever brush painting is not accessible, by the contractor, within the quoted rates. Contractor has to carryout painting as per the procedure lay down by the customer.

6.31.2 Before applying the subsequent coats the thickness of each coat shall be measured and recorded with BHEL/Customer. The instrument for checking the thickness of coat is to be procured by the contractor and should be calibrated at periodical intervals.

6.31.3 The quality of the finish paint shall be as per the standards of ISI or equivalent and the colors as approved by BHEL/Customer.

6.31.4 The actual color to be applied shall be intimated to the contractor before starting of actual painting work. The quoted rate shall include final painting also. The scope of painting includes application of color bands, lettering the names of the systems equipments, tag nos of valves, marking the directions of flow and other data required by BHEL within the quoted value.

6.31.5 Primer & finish coat shall be of reputed paint supplier approved by BHEL/Customer.

6.31.6 GI, Stainless steel, brass, aluminum, copper and other non-ferrous materials shall not be painted unless otherwise specified. All surfaces shall be thoroughly cleaned, free from scales, dirt and other foreign matter. Each coat shall be applied in an even & uniform film free from lumps, streaks, runs, sags and uncoated spots. Each coat (Primer, intermediate, finish) shall have a minimum thickness of 70, 70 & 60 microns respectively and total thickness of 200 microns. No paint shall be applied when the surface temp is above 55 deg. Cen or below 10 deg. Cen, and when the humidity is greater than 90%.

6.32.0 EXTRA CHARGES FOR MODIFICATION AND RECTIFICATION WORK

a) BHEL may consider payment for extra works on man day basis for such of those works which require major revamping / rework/rectification/modification which is totally unusual to normal erection or commissioning work which are not due to contractor's faulty erection.

b) The contractor may submit his work claim bills (Specifically agreed by BHEL Engineer) along with the labour sheet duly certified by BHEL Engineer at site. But BHEL also got the option to get these work done through other agencies if they so desire. The decision of BHEL in this regard shall be final and binding on the contractor.

6.32.1 All the extra work, if any, carried out should be done by a separate gang which should be identified prior to start of work for certification, of man hours. Daily labour sheets should be maintained and should be signed by contractor's representative and BHEL Engineer. Signing of the labour sheets does not necessarily mean the acceptance of extra works. Only those works which are identified as not usual to normal erection and certified so by the Project Manager, and accepted by designer/supplier or competent authority only will be considered for payment.

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

6.32.3 The following man hour rates will be applicable for modification/rectification work.

6.32.4 Average single man hour rate including overtime if any, supervision, use of tools and tackles and other site expenses and incidentals, including consumables for carrying out any rework, re-vamping as may arise during the course of erection Rs.40/- man hour.

6.32.5 Average single man hour rate including overtime if any, supervision, use of tools and tackles and other site expenses and incidentals excluding consumables for carrying out any rework/revamping as may arise during the course of erection Rs.25/- per man hour.

6.33.0 EXTRA WORK DOES NOT INCLUDE

6.33.1 Nominal dressing of foundations, holes, bases, nuts and bolts, in case of abnormal conditions, this can be mutually discussed before starting of such work.

6.34.0 Extra works are broadly defined as below:

Design changes which will be intimated to the contractor after the start of erection and same refers to dismantling of erected components rectification of components which have been received in damaged conditions during transit, rectification of components wrongly manufactured at work, any other works which do not fall in the scope of this contract.

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

6.35.0 PRICE ESCALATION

6.35.1 The quoted value have to be kept firm for the entire contractual period including total extended period if any and no claim for revision of rates is allowed under any circumstances.

6.35.2 However the contractor shall maintain sufficient work force and other resources required for completion of the job expeditiously for the entire contractual period including total extended period.

6.36.0 TAXES

6.36.1 Not withstanding the fact that this is only an erection service contract not involving any transfer of materials whatsoever and not attracting any sales tax liability, being labour oriented job work, for the purpose of Sales Tax the contractor has to maintain the complete data relating to the expenditure incurred towards wages etc. in respect of the staff/workers employed for this work as also details of purchase of materials like consumables, spares etc., interalia indicating the name of the supplier, address and ST Registration No. and ST paid and should furnish to BHEL at the year end.

6.36.2 The contractor has to register under local Sales Tax-Law and get assessed. The contractor has to give a certificate each year that the returns are submitted regularly and the turnover on this contract is

included in his sales tax return. The sales tax registration number and certificate is to be furnished at site soon after the award of contract. However in case delay is anticipated in obtaining S.T. Regn.No. a copy of application for registration filed with ST authorities shall be submitted along with first running bill and the ST Regn.No. will have to be submitted within a reasonable time.

6.36.3 The final bill amount would be paid only after submission of proof of inclusion of the turnover of this contract in the ST Returns or ST Clearance certificate. The ST deduction at source will be made from running bills, unless necessary exemption is produced.

6.36.4 IMPORTANT CONDITIONS FOR PAYMENT

It may be noted that the first running bill will be released only on production of the following.

i. PF Regn. No.

ii. Labour Licence No.

iii. Workmen Insurance Policy No.

iv. Un Qualified Acceptance for Detailed L.O.I.

v. Initial 50% Security Deposit.

vi. Rs. 100/- Stamp Paper for Preparation of contract agreement

6.37.0 PROVIDENT FUND & MINIMUM WAGES

6.37.1 Your are required to extend the benefit of Provident Fund to the labour employed by you in connection with this contract as per the Employees Provident Fund and Miscellaneous Provisions Act 1952. For due implementation of the same, you are hereby required to get yourself registered with the Provident Fund authorities for the purpose of reconciliation of PF dues and furnish to us the code number allotted to you by the Provident Fund authorities within one month from the date of issue of this letter of intent. Incase you are exempted from such remittance, an attested copy of authority for such exemption is to be furnished. Please note that in the event of your failure to comply with the provisions of said Act, if recoveries therefor are enforced from payments due to us by the customer or paid to statutory authorities by us, such amount will be recovered from payments due to you.

6.37.2 The contractor shall ensure the payment of minimum labour wages to the workmen under him as per the rules applicable from time to time in the state.

6.37.3 The final bill amount would be released only on production of clearance certificate from PF/ESI and labour authorities as applicable.

6.38.0 SERVICE TAX

Service Tax as applicable for this Contract will be borne by BHEL.

The contractor may claim the Service Tax in their R.A.bill and the same will be paid by BHEL, on production of copy of registration certificate. Proof of remittance of service tax by the contractor to the service tax authorities, relating to previous RA bill, has to be produced from the second running bill onwards.

6.39.0 TAXES, DUTIES, LEVIES

Refer to clause 2.8.4 of general conditions of contract in this regard.

6.39.1 New Levies / Taxes

In case the government imposes any new levy / Tax after award of the work, BHEL shall reimburse the same at actuals on submission of documentary proof of payment subject to the satisfaction of BHEL that such new levy / Tax is applicable to this contract. No reimbursement on account of increase in the rate of existing levies shall be made.

6.40.0 CONDITIONS FOR PAYMENT

As per Mechanical contract

6.41.0 MATERIALS/CONSUMABLES TO BE ARRANGED BY THE CONTRACTOR AS PART OF THE SCOPE AT FREE OF COST

a. Welding electrodes and gas

b. Provision for Temporary Scaffoldings.

c. "U" Clamps with nuts and washers for impulse pipes and GI pipe clamping (if applicable).

d. Tags- Plates.

e. Insulation tape.

f. Paints required for primer coating and final coating of synthetic enamel paint of approved colour

g. Solder wire (Lead) -(60/40)

h. Protocol/Calibration report sheets as per BHEL Format.

i. Panel Sealing compound material (for cable entry from bottom/Top of Panel).

j. PVC cable tie, Aluminium or GI strips and fasteners for clamping of cables and other dressing materials required for cable dressing Crow mat

k. Ferrules, sleeves for cables

l. Fastener for mounting JB and local PB Boxes.

6.42.0 ELECTRICAL INSPECTORATE'S APPROVAL:

All electrical installation covered in contractors scope which are to be inspected/approved by the electrical inspector/statutory authority. For getting electrical inspector approval, contractor shall arrange the following:

- Completion certificate for all the equipment covered in the contract
- Copy of Test results conducted at site for all the equipment including Elcl. Equipment erected by Mechanical Contractor.
- All other documents as required by statutory authority.

Contractor shall carry out the modifications/rectifications if any as suggested by the authority at his cost.

Contractor shall also have valid electrical installation license on his company as well as for individuals acceptable to respective state electrical inspectorate requirement.

BHEL shall pay all other fees (FEES FOR VISITS, INSPECTION FEES, REGISTRATION FEES, ETC). However any expenditure related to documentation shall be borne by the contractor.

6.43.0 PROGRESS AND MONITORING OF WORK

6.43.1 The responsibility of the contractor to provide all the relevant information on a regular basis regarding erection progress, welding progress, labour availability, equipment deployment, consumption of electrodes, gases, etc.

6.43.2 The contractor shall submit daily, weekly and monthly progress reports, manpower reports, material reports, equipment reports etc. as per formats specified by BHEL. The progress reports shall indicate the progress achieved against planned with reasons indicating the delays, if any. The report shall also give the remedial actions which the contractor intends to make good the slippage or lost time so that further works can proceed as per the original programme and the slippage do not accumulate and affect the overall programme.

6.44.0 DETAILS TO BE FURNISHED BY THE TENDERERS

Apart from other details called for in the tender document under the various other provisions, the following details shall be submitted by the tenderers along with their offers. Please also refer the checklist.

Tenderers shall go through very carefully all the provisions under section VI and shall submit manpower deployment plan as per appendix VI A. The contractor along with his offer shall, also submit the list of T&P and instruments that are available with him for mobilisation for the work as specified in Appendix VI B. Tenderers shall indicate the present location and submit a schedule of tools and plants for this site to meet the schedules of erection and commissioning.

Apart from other details called for in the tender document under the various other provisions, the tenderers along with technical bid shall submit the following details.

a. Site Organisation Chart Covering various function
b. Month wise Manpower deployment plan
c. T&P deployment plan
d. Erection Schedule.
e. Field Quality Plan
f. A copy of Electrical license if any

6.45.0 DOCUMENTATION

The contractor shall furnish the following information after testing and inspection:

a) Test certificates of various tests conducted at site.

b) As built drawings: After successful completion, testing and commissioning of installation work, the Purchaser's drawings/documents shall be updated in line with the actual work carried out and as built drawings/documents shall be submitted by the contractor.

6.46.0 TECHNICAL REQUIREMENTS FOR SUPPLY ITEMS

1 FERRULES:

a) Colour of ferrules: Yellow/White

b) Colour of engraving Black

2 TAGS:

a) Material : Al/Fiberglass/ Stainless Steel

b) Markings: Engraving/Embossing/Printing

LIST OF MINIMUM TOOLS AND TACKLES / INSTRUMENTS TO BE ARRANGED BY CONTRACTOR

ACCURACY CLASS AS REQUIRED BY BHEL

SL NO	DESCRIPTION	QUANTITY
01	Dead Weight tester with weights & test gauges facility	
02	Oil temperature bath suitable to calibrate upto 300 Deg C	01 No.
03	Standard Pressure Gauges as below:	1 Set
04	Standard Temperature Gauges as below :	1 Set
05	Manometer 0 to 1000 mm WC with hand bulb	03 Nos.
06	Portable air compressor with drier and regulator rated for 10 Kg/ Sq. cm	01 No.
07	Standard Milliamps Source (Digital)	01 No.
08	Standard millivolts Source (Digital)	01 No.
09	Glass Thermometers of ranges in Deg C as below : 0-120 ; 0-200;	02 Nos. (Each)
10	Tong tester AC 5/10/25 ; KEW Snap Make	01 No. (Each)
11	Hand Operated Megger 500V ; 2.5 KV / 100 M Ohms	Each type as required
12	Torque wrench	As required
13	Digital Multimeter 3 1/2 Digit	02 Nos.
14	Digital Multimeter 4 1/2 Digit	01 Nos.
15	Wire wrapping tool	As required
16	Soldering irons, soldering pump, Vacuum cleaner, Air blower etc.	As required

Note for Contractors' Instruments

a. The contractor shall arrange all the above. T&P, equipment and instruments as indicated except testing instruments, which are proprietary in nature.

b. Any other tools and plants instruments and equipment required in addition to the above for the successful completion of this job will have to be arranged by the contractor at his cost except proprietary type equipment.

d. Necessary accessories for the above shall also be provided by the contractor.

e. The above instruments/equipment will be sent for testing and calibration wherever from time to time and maintained by contractor as required by BHEL.

f. All testing instruments shall have calibration certificate issued by recognized/ accredited agencies.

g. List of such agencies and periodicity of calibration required for different instruments will be furnished by BHEL at site.

h. Contractor shall maintain calibration records as per the format enclosed in the Tender Specification and produce them whenever called for by BHEL Engineers.

i. Contractors shall arrange experienced/qualified persons for using these calibration instruments at laboratory and also at work spot.

J Wherever frequent calibration is required, contractor shall arrange adequate number of instruments such that the work does not suffer for want of test instruments.

SECTION VII

APPENDIX – I
KPCL-Bellary Electrical, Controls & Instrumentation
Bill Of Material for Erection Purpose only
ESTIMATED

Sl. No.	PGMA	Description	Specification	Model	Qty.	Unit	Weight
			Size	MOC			
		List of Electrical, C&I Sub-Deliveries					
1	BW320	Pressure Gauge	Low Pressure	SS316	51	No.	
2		Pressure Gauge	High Pressure	SS316	16	No.	
3		Pressure Switch	Low Pressure	SS316	6	No.	
4		Pressure Switch	High Pressure	SS316	4	No.	
5		Temperature Indicator with Thermowell			8	No.	
6		Temperature Switch with Thermowell			5	No.	
7		Differential Pressure Switch	Low Pressure	SS316	29	No.	
8		Differential Pressure Indicator	Low Pressure	SS316	11	No.	
9		Differential Pressure Indicator	High Pressure	SS316	8	No.	
10		Level switch for tank-Single element			7	No.	
11		Level switch for tank-Three element			10	No.	
12		Level Indicator			10	No.	

Sl. No.	PGMA	Description	Specification	Model	Qty.	Unit	Weight
			Size	MOC			
13		Level Transmitter			3	No.	
14		Flow Switch			2	Nos.	
15		Flow Transmitter	SMART		3	No.	
15a		Orifice Plate			3	No.	
16		Flow Meter (Paddle Wheel Type)				Nos.	
17		Pressure Transmitter	SMART		14	No.	
18		Temperature Transmitter+RTD+Thermowell	SMART		5	No.	
19		DP Transmitter	SMART		4	No.	
20		pH Sensor+Indicator+Cable+FTC			5	No.	
21		ORP Sensor+Indicator+Cable			1	No.	
22		Conductivity Sensor+Indicator+Cable			5	No.	
23		Silica Sensor + Indicatoe + Cable			1	No.	
24		Turbidity Indicator			1	No.	
25		Recorders to be mounted in Control Desk			3	Nos.	
26		Rotameters			6	Nos.	
27		Portable PH/ORP meter			1	No.	
28		Portable conductivity meter			1	No.	
29		UPVC Three way valve(LP)			60	No.	

Sl. No.	PGMA	Description	Specification	Model	Qty.	Unit	Weight
			Size	MOC			
30		SDI kit			1	No	
31		Three way valve	1/2"	SS	40	No.	
32		Three valve manifold	1/2"	SS	60	No.	
33		Needle valve	1/2"	SS	100	No.	
34		Solenoid Valve 1"			**1**	No.	
35		Solenoid Valve 1/2"			2	No.	
36		Solenoid Vavle Enclosure Box	1.0x1.0x0.6M		10	No	
37		Air Filter Regulator			26	No	
38	BW320	Instrument End Fittings	1/2" SS		As Reqd.		
		Instrument Air 1/4" OD PVC insulated Copper Tube End Fittings	1/4"		As Reqd.		
39	BW320	Instrument Air Line					
a		3" pipe	Galvanised Iron				
b		1" pipe	Galvanised Iron				
c		Unequal Tee Main 3" & Branch 1"	Galvanised Iron				
d		1" Isolation Valve & Drain Valve					
e		1" / !/2" Reducer					
f		1" Elbow					

Sl. No.	PGMA	Description	Specification	Model	Qty.	Unit	Weight
			Size	MOC			
g		1/2 Isolation Valves					
h		3" Isolation Valves					
40	BW300	LT MCC Panel (16200W1300/900Dx2100H)mm			1	No.	16.3 Tons
41	BW300	Local Start / Stop Push Button Station	(Motors)		50	No.	3 Kg/LSSPB
42	BW300	Control Junction Box	24way	Galvanised	34	No.	5Kg/JB
43	BW300	Instrument Junction Box	24way	Galvanised	9	No.	5Kg/JB
44	BW310	PLC Panel (1000Wx800Dx2100H) mm			3	No	2.4Tons
45		Control Desk(1000Wx800Dx1600H) mm			3	No	1.5Tons
46		UPS with Battery (400Wx600Dx1200H)mm			1	No	500Kg
47		Clarifier Control Panel			1	No	500Kg
48		Mixed Bed System Control Panel			1	No.	500Kg
49	BW330	**List of Cables (1100V Grade, XLPE, Aluminium Conductor, PVC,Armoured,**					
		FRLS Power Cables Grade confirming to IS:1554) laying & termination					

Sl. No.	PGMA	Description	Specification	Model	Qty.	Unit	Weight
			Size	MOC			
a		3.0 Core - Size sq.mm 240				Mtr.	
b		3.0 Core - Size sq.mm 70				Mtr.	
c		3.0 Core - Size sq.mm 16				Mtr.	
d		3.0 Core - Size sq.mm 2.5				Mtr.	
50	BW330	**List of Cables (1100V Grade, XLPE, Copper Conductor, PVC,Armoured,**					
		FRLS Power Cables Grade confirming to IS:1554) laying & termination					
a		7.0 Core -				Mtr.	
b		4.0 Core -				Mtr.	
51	BW330	**List of Cables (Copper Conductor,FRLS/PVC Instrument Cables suitable**					
		for 600V Grade) laying & termination					
a		12.0 Pair - Size sq.mm 0.5				Mtr.	
b		8.0 Pair - Size sq.mm 0.5				Mtr.	
c		6.0 Pair - Size sq.mm 0.5				Mtr.	
d		2.0 Pair - Size sq.mm 0.5				Mtr.	

Sl. No.	PGMA	Description	Specification	Model	Qty.	Unit	Weight
			Size	MOC			
e		1.0 Pair - Size sq.mm 0.5				Mtr.	
52	BW330	**Double Compression Cable Glands**		As Reqd.			
53	BW330	**Cable Lug**		As Reqd.			
54	BW330	**PVC Conduit**		As Reqd.			
55	BW330	Rubber Mat (1Mx1Mx12mm)		As reqd.			
56	BW330	**GI Cable trays**		As reqd			
a		600mm wide	2.5m length			No.	
b		450mm wide	2.5m length			No.	
c		300mm wide	2.5m length			No.	
d		150mm wide	2.5m length			No.	
e		50mm wide	2.5m length			No.	
57	BW330	**Earthing Materials**		As Reqd.			
a		Earthing materials - MS Fat	70mmx10mm			Mtr	
b		Earthing materials - Galvanised Steel Flat	70mmx10mm			Mtr	
c		Earthing materials - Galvanised Steel Flat	50mmx8mm			Mtr	

Sl. No.	PGMA	Description	Specification	Model	Qty.	Unit	Weight
			Size	MOC			
d		Earthing materials - Galvanised Steel Flat	25mmx3mm			Mtr	
e		Earthing materials - Galvanised Steel Flat	25mmx6mm			Mtr	
f		Earthing materials - 8 SWG GI Wire				Mtr	
g		Earthing materials - 16SWG GI Wire				Mtr	
h		Earthing Clamp for glands				No.	
58		Steel Materials		As Reqd.			
59		Laying within the RO-DM MCC room & end Termination of Customer Incomer					
		power cables at LT MCC					
a		Incomer A&B (415V,3ph, 50Hz)	2 Runs 1Cx630 sqmm/ph + 1Cx630 /ne for each feeder				**2 Feeders**
b		220V DC Cable (Normal + SB)	1Cx70sqmm / lead				**2 Feeders**
c		Emergency power from DG Set Incomer-C	3Xx70sq mm				**1 Feeder**

SECTION VII

APPENDIX – II

ERECTION INPUT – (ESH MATED)

Sl.No	PG - MA	Item Description	Overall Size in mm			Quantity in Nos	Unit weight in Kg	Total weight in Kg
			Length	Width	Height			
1	BW - 000	**Items Per Contract**						
	a	commissioning chemicals						
	b	Tools & Tackles						
2	BW - 010	**Raw water and Clarifier System**						
	a	High rate classifier				1		
	b	Sludge transfer pumps - 3 cu.m/hr, 25 m WC				2		
	c	Acid dosing system						
		Day tank - 500 mm dia & 800 mm deep				1	50	
		Dosing pumps - 0 to 6 lph at 3.0 kg/sq.cm				2	100	
	d	Ferric Chloride (coagulant) Dosing system skid	700	700	1200	1		0
		Day tank	dia 500		800	1	10	10
		Dosing pumps	210	90	140	2	5	10
		Mixer				1	10	10
	e	Polyelectrolyte dosing system						
		Preparation tank - 1200 mm dia & 1200 mm deep				1	50	

Sl.No	PG - MA	Item Description	Overall Size in mm			Quantity in Nos	Unit weight in Kg	Total weight in Kg
			Length	Width	Height			
		Day tank - 1200 mm dia & 1200 mm deep				1	50	
		Dosing pumps - 0 to 145 lph at 3 kg/sq.cm				2	100	
		Agitator (electric driven)				1	30	
	f	**Sodium hypochlorite dosing system**						
		Day tank - 250 litres capacity				**1**	**50**	
		Dosing pumps - 0 to 30 lph at 3 kg/sq.cm				**2**	**100**	
3	**BW - 020**	**Pre treatment and Filtration System:**						
	a	Clarified Water Pump with Motor Assembly - Pump dim: 625 mm x 345 mm x 430 mm; Pump wt: 86 Kg, Motor rating: 30 Kw. Other details such as base frame dim, overall dim., wt etc will be given later				2		
	b	Back wash Pump with Motor Assembly - Pump dim: 670 mm x 400 mm x 505 mm; Pump wt:134 Kg, Motor rating: 11 Kw. Other details such as base frame dim, overall dim., wt etc will be given later				3		
	c	Air Scour Blower	1615	500	1620	2	500	1000

Sl.No	PG - MA	Item Description	Overall Size in mm			Quantity in Nos	Unit weight in Kg	Total weight in Kg
			Length	Width	Height			
	d	**Pressure Sand Filter(PSF)**: Carbon steel vessel(with inside Rubber lining) vertically installed above the ground level with four lug supports tank will be erected by other contractor. Filter media to be erected filling of weigh total : 18000 Kgs.				4		
	e	**Activated Carbon Filter(ACF)**: Carbon steel vessel(with inside Rubber lining) vertically installed above the ground level with four lug supports. Tank will be created by other contractor filling of Filter media Weight: 15000 Kgs				4		
	F	**Hot water tank will be erected by other contractor. Measuring elements, Cables, Industrial insulation around the shall paying instrumentation, valves**				4		
4	**BW - 030**	**Dosing & Conditioning System**						
	a	Acid dosing system skid	1100	1100	1500	1		0

Sl.No	PG - MA	Item Description	Overall Size in mm			Quantity in Nos	Unit weight in Kg	Total weight in Kg
			Length	Width	Height			
		Day tank	dia 810		1080	1	20	20
		Dosing pumps	260	190	380	2	10.5	21
	b	Polyelectrolyte Dosing system skid	700	700	1200	1		0
		Preparation tank	dia 500		800	1	10	10
		Day tank	dia 500		800	1	10	10
		Dosing pumps	310	140	175	2	10	20
		Mixer				1	10	10
	c	Sec Chlorination dosing system skid	700	700	1200	1		0
		Day tank	dia 500		800	1	10	10
		Dosing pumps	310	140	175	2	10	20
	d	De Chlorination dosing system skid	700	700	1200	1		0
		Preparation tank	dia 500		800	1	10	10
		Day tank	dia 500		800	1	10	10
		Dosing pumps	310	140	175	2	10	20
		Mixer				1	10	10

Sl.No	PG - MA	Item Description	Overall Size in mm			Quantity in Nos	Unit weight in Kg	Total weight in Kg
			Length	Width	Height			
	e	Anti-scalant dosing system skid	700	700	1200	1		0
		Preparation tank	dia 500		800	1	10	10
		Day tank	dia 500		800	1	10	10
		Dosing pumps	210	90	140	2	5	10
		Mixer				1	10	
	f	LDPE tubings				320 mt		20
5	**BW - 040**	**Guard Filter & Pumping System:**				**2 Set**		
	a	Filtered Water Pump with Motor Assembly - Pump dim: 625 mm x 320 mm x 405 mm; Pump wt: 86 Kg, Motor rating: 15 Kw. Other details such as base frame dim, overall dim., wt etc will be given later				**2 Set**		
	b	**Guard Filter housing with Filter element**: Stainless Steel Vessel (with Filter Elements) vertically installed above the ground level with four lug supports on the foundation. Shell OD: 600mm, Straight height:1050mm, Overall height from the ground: 2500mm				**2 Set**	**500**	**1000**
6	**BW - 100**	**High Pressure Pump, Motor & Acc. - Stage - 1**				**2 Set**		**3370**
	a	High Pressure Pump with coupling				2	635	1270
	b	Motor				2	900	1800

Sl.No	PG - MA	Item Description	Overall Size in mm			Quantity in Nos	Unit weight in Kg	Total weight in Kg
			Length	Width	Height			
	c	Base Frame	1780	660	144	2	150	300
7	**BW - 101**	**High Pressure Pump, Motor & Acc. - Stage - 2**				**02 Set**		**2030**
	a	High Pressure Pump with coupling				2	350	700
	b	Motor				2	600	1200
	c	Base Frame	1600	550	145	2	65	130
8	**BW - 150**	**Membrane Stack Arrangement - Stage - 1**				**02 Set**		**12700**
	a	FRP Pressure Vessel (without Membranes): Dia.8.6" x 6660mm Length				46	200	9200
	b	Membrane elements (These elements are to be loaded into the vessels at site during erection under BHEL's supervision and guidance)				276		
	c	RO Rack Support Frame Size:1300mm(W) x 5250mm(L) x 3525mm(H)				2	1000	2000
	d	Other Support Materials				01 Lot	1500	1500
9	**BW - 151**	**Membrane Stack Arrangement - Stage – 2**				**02 Set**		**6650**
	a	FRP Pressure Vessel (without Membranes): Dia.8.6" x 6660 Length				22	200	4400

Sl.No	PG - MA	Item Description	Overall Size in mm			Quantity in Nos	Unit weight in Kg	Total weight in Kg
			Length	Width	Height			
	b	Membrane elements (These elements are to be loaded into the vessels at site during erection under BHEL's supervision and guidance)				132		
	c	RO Rack Support Frame Size:1500mm(W) x 5250mm(L) x 3525mm(H)				2	750	1500
	d	Other Support Materials				01 Lot	750	750
	e	Intermediate permeate storage tank - 20 cu.m capacity						
10	**BW - 200**	**Post Treatment & Piping System**						
	a	post Chlorination dosing system skid	700	700	1200	1		0
		Day tank	dia 500		800	1	10	10
		Dosing pumps	210	90	140	2	5	10
	b	pH dosing system skid	1100	1100	1500	1		0
		Preparation tank	dia 810		1080	1	20	20
		Day tank	dia 810		1080	1	20	20
		Dosing pumps	260	185	380	2	10.5	21
		Mixer				2	10	20

Sl.No	PG - MA	Item Description	Overall Size in mm			Quantity in Nos	Unit weight in Kg	Total weight in Kg
			Length	Width	Height			
	c	Piping and valves				1 lot		
11	BW - 210	**Chemical Cleaning & Membrane Protection System**						
	a	**Chemical Cleaning Tank:** FRP tank, Vertically installed on the finished floor level with lug supports on foundation. OD:2500mm, Vertical Height:2500mm, Overall height from floor level :3000mm				1 Set	200	200
	b	Chemical cleaning Pump with Motor Assembly - Pump dim: 600 mm x 320 mm x 405 mm; Pump wt: 79 Kg, Motor rating: 30 Kw. Other details such as base frame dim, overall dim., wt etc will be given later				2 sets		
	c	**Chemical Cleaning Cartridge Filter housing with Filter element**: Stainless Steel Vessel with (Filter Elements) installed vertically above the ground level with four lug supports on the foundation. Shell OD: 600mm, Straight height:1050mm, Overall height from the ground: 2500mm				1 set	500	500

Sl.No	PG - MA	Item Description	Overall Size in mm			Quantity in Nos	Unit weight in Kg	Total weight in Kg
			Length	Width	Height			
	d	**Piping and Valves**: UPVC pipes and fittings are envisaged in this system. Major length of the pipe lines are routed through trench. Frontal piping of CCT and pipe lines at pump suction & discharge are routed above the ground level. For the purpose of Isolation and regulation, Wafer type Butterfly Valves and wafer type,Swing check Valve are envisaged in this system.Pipe line size are varying from Dia 63 mm to Dia 225 mm				1 Lot	10000	10000
12	BW - 220	**General Details**						
	a	Mono rail with hoist				2 sets		
	b	Sample panel with valves & LDPE tubing				1 set		
	c	Pipe and valve support structure				1 lot		
14	BW - 240	LP Piping - refer to the annexure I - These piping consists of UPVC, HDPE, CPVC, GRP, GI, MSRL materials pipes, fittings ans specials. These piping involves solvent cement joining, UPVC & CPVC welding, PP fusion welding, GRP joints of pipes and fittings - These LP piping is to be subjected to a hydraulic test of 1.5 times the working pressure after final erection.				1 lot		

Sl.No	PG - MA	Item Description	Overall Size in mm			Quantity in Nos	Unit weight in Kg	Total weight in Kg
			Length	Width	Height			
15	**BW - 241**	High Pressure Piping & Valves -These pipes & fittings are of SS 316L material. Most of the components will be welded at factory and some welding will be required at site. All site weld joints to be subjected to NDT as per the instructions of site Incharge				1 lot		
	a	**High pressure Piping**:Starts from HP pump discharge to membrane feed IN at pressure vessel and Brine discharge from pressure vessel to Brine control valve. Pipe Size varies from 1.5" OD to 6" OD fixed with necessary flange connections and flexible Victaulic Couplings				01 Lot	3000	3000
	b	**High pressure Valves**:For the purpose of Control, regulation & Isolation; globe valve, Ball Valve and silent Check valves are envisaged in the HP Piping System. Globe Valve:1.5", 2.5", 4" & 6" each 02Nos : Ball Valve :2", 3", 4" & 6" each 02Nos and Silent Check Valve : 4" & 6" each 02 Nos.				01 Lot	1200	1200
16	**BW-500**	**DM plant**						
	a	Degasser unit - 1200 mm dia x 3300 mm ht				1	1000	1000
	b	Degasser blower -	1300	650	1000	2	400	800

Sl.No	PG - MA	Item Description	Overall Size in mm			Quantity in Nos	Unit weight in Kg	Total weight in Kg
			Length	Width	Height			
	c	Degassed water storage tank - MSRL tank - 2400 mm dia and 5500 mm HOS horizontal tank with necessary supports foundation etc						
	d	Degassed water transfer pumps - 1500 mm x 600 mm x 800 mm overall dimension	1250	790	800	2	400	800
	e	**Mixed Bed Unit (MB)**: Carbon steel vessel(with inside Rubber lining) tank will be erected by other contractor, Filter media Weight: 18000 Kgs to be filled.				2 set		
	f	MB Blower	1300	650	900	2 set	400	800
	g	Acid measuring tank, piping and accessories - 1200 mm dia x 1250 mm deep				1	200	200
	h	Alkali measuring tank, piping and accessories - 1400 mm dia x 1200 mm deep				1	200	200
	I	Piping, instrumentation, valves etc - Refer to the P&ID of the DM plant for the piping, valves and instrumentation				1 lot		

Sl.No	PG - MA	Item Description	Overall Size in mm			Quantity in Nos	Unit weight in Kg	Total weight in Kg
			Length	Width	Height			
	j	MB Regeneration pumps	1200	650	800	2 sets	300	600
17	**BW-240**	External piping - This includes MSRL , UPVC, CPVC, GRP piping & fittings				1 lot		
		HDPE tanks with piping and valves - 2500 litres capacity each				2 nos.		
		Note:						
	1	All the LP pipes and fittings will be sent as loose items only. These items are to be joined at site by the approved procedure. All the consumables such as solvent cement should be compatible with the material and should be approved by BHEL.						
	2	Qualified fitters and welders shall be employed by the contractor. All site requirements such as welders' qualification etc are to be complied with.						

Sl.No	PG - MA	Item Description	Overall Size in mm			Quantity in Nos	Unit weight in Kg	Total weight in Kg
			Length	Width	Height			
	3	Entire piping assembly is to be subjected to a hydraulic test to a pressure 1.5 times the working pressure after final erection.						
	5	Necessary fabrication of supports for pipes, valves and other components are to be carried out at site as per the drawings.						
	6	**Reference drawings:**						
		PIDs						
		RO DM Plant Equipment Layout drawing						
		RO DM plant Key plan drawing						
		RO DM plant Foundation, Pipe trench details						
		External piping and trenches						
		Piping isometric drawing (HP & LP)						
		Supports for pipes, valves etc						
		Major Equipment drawings						

SECTION VII APPENDIX - III

HP Pipies & Pipe Fittings (Approx)

KPCL - BELLARY DT:18.07.2005

Sl.No	Comp.description	Unit	Qty	Unit Wt. in kg	Total Wt. in kg
1	2" x 1 1/2" BW Reducer	No	2	0.37	0.74
2	3" x 2 1/2" BW Reducer	No	3	0.86	2.58
3	4" x 3" BW Reducer	No	7	1.41	9.87
4	6" x 4" BW Reducer	No	6	2.82	16.92
5	2" BW Equal Tee	No	2	1.17	2.34
6	3" BW Equal Tee	No	2	3.05	6.10
7	4" BW Equal Tee	No	2	5.17	10.34
8	1 1/2" WN Flange	No	2	2.89	5.78
9	2" WN Flange	No	2	3.40	6.80
10	2 1/2" WN Flange	No	6	5.17	31.02
11	3" WN Flange	No	4	6.93	27.72
12	4" WN Flange	No	16	11.20	179.20
13	6" WN Flange	No	10	19.10	191.00
14	2" BW LR Elbow 90 deg.	No	8	0.67	5.36
15	2 1/2" BW LR Elbow 90 deg.	No	6	1.30	7.80
16	3" BW LR Elbow 90 deg.	No	5	2.08	10.40
17	4" BW LR Elbow 90 deg.	No	14	3.95	55.30
18	6" BW LR Elbow 90 deg.	No	5	10.40	52.00
19	1 1/2" SCH 40 Pipe	Mtr	23	4.05	93.15
20	2" SCH 40 Pipe	Mtr	28.5	5.44	155.04
21	2 1/2" SCH 40 Pipe	Mtr	52.5	8.68	455.70
22	3" SCH 40 Pipe	Mtr	38	11.29	429.02
23	4" SCH 40 Pipe	No	48.5	16.07	779.40
24	6" SCH 40 Pipe	Mtr	20	28.26	565.20
25	1 1/2" Bull Plug	No	24	0.90	21.60
26	2" Bull Plug	No	6	1.10	6.60
27	2 1/2" Bull Plug	No	20	1.40	28.00
28	3" Bull Plug	No	10	2.00	20.00
29	4" Bull Plug	No	6	3.40	20.40
30	1 1/2" Victaulic coupling	No	162	1.00	162.00
31	2" Victaulic coupling	No	16	1.20	19.20
32	2 1/2" Victaulic coupling	No	34	1.40	47.60
33	3" Victaulic coupling	No	22	1.60	35.20
34	4" Victaulic coupling	No	22	3.00	66.00
35	6" Victaulic coupling	No	6	5.40	32.40
					3557.78

SECTION VII

APPENDIX - IV

UPVC / CPVC / HDPE PIPES & PIPE FITTING (Approx)

Sl no.	Item description	MOC	Size	PN rating	Unit	Qty	Unit wt in kg	Total wt in kg
1	Reducing bush	CPVC	63 x 32 mm	10	No.	2	0.06	0.12
2	Reducing bush	CPVC	40 x 20 mm	10	No.	5	0.02	0.10
3	Reducing bush	CPVC	160 x 110 mm	10	No.	3	0.87	2.62
4	Reducing bush	CPVC	225 x 140 mm	10	No.	3	2.50	7.50
5	Reducing bush	CPVC	225 x 160 mm	10	No.	9	2.20	19.80
6	Reducing bush	CPVC	315 x 225 mm	10	No.	2	5.50	11.00
7	Coupling	CPVC	20 mm	10	No.	30	0.01	0.33
8	Coupling	CPVC	32 mm	10	No.	30	0.03	0.78
9	Coupling	CPVC	63 mm	10	No.	10	0.11	1.13
10	Coupling	CPVC	160 mm	10	No.	3	1.74	5.21
11	Coupling	CPVC	225 mm	10	No.	3	3.79	11.37
12	Elbow - 90 deg.	CPVC	20 mm	10	No.	30	0.01	0.39
13	Elbow - 90 deg.	CPVC	32 mm	10	No.	30	0.04	1.08
14	Elbow - 90 deg.	CPVC	63 mm	10	No.	10	0.21	2.06
15	Elbow - 90 deg	CPVC	90 mm	10	No.	3	0.57	1.70
16	Elbow - 90 deg	CPVC	160 mm	10	No.	16	3.48	55.60
17	Elbow - 90 deg	CPVC	225 mm	10	No.	25	6.95	173.75
18	Elbow - 90 deg	CPVC	315 mm	10	No.	3	21.20	63.60
19	Equal Tee	CPVC	20 mm	10	No.	5	0.02	0.09
20	Equal Tee	CPVC	32 mm	10	No.	5	0.06	0.28
21	Equal tee	CPVC	160 mm	10	No.	4	4.96	19.85
22	Equal tee	CPVC	225 mm	10	No.	10	9.07	90.67
23	Flange adaptor	CPVC	63 mm	10	No.	5	0.10	0.52
24	Flange adaptor	CPVC	90 mm	10	No.	1	0.16	0.16
25	Flange adaptor	CPVC	110 mm	10	No.	3	0.42	1.25
26	Flange adaptor	CPVC	140 mm	10	No.	3	0.75	2.24
27	Flange adaptor	CPVC	160 mm	10	No.	20	1.08	21.54

Sl no.	Item description	MOC	Size	PN rating	Unit	Qty	Unit wt in kg	Total wt in kg
28	Flange adaptor	CPVC	225 mm	10	No.	51	1.76	89.66
29	Flange adaptor	CPVC	315 mm	10	No.	2	4.46	8.91
30	**Pipe - 20 mm OD**	**CPVC**	**20 mm**	**10**	**MR**	**100**	**0.12**	**12.00**
31	**Pipe - 32 mm OD**	**CPVC**	**32 mm**	**10**	**MR**	**50**	**0.20**	**10.00**
32	**Pipe - 63 mm OD**	**CPVC**	**63 mm**	**10**	**MR**	**50**	**0.85**	**42.70**
33	Pipe - 90mm OD	CPVC	90 mm	10	No.	3	1.75	5.25
34	Pipe - 110 mm 0D	CPVC	110 mm	10	No.	1	2.61	2.61
35	Pipe - 140 mm OD	CPVC	140 mm	10	No.	1	4.18	4.18
36	Pipe - 160mm OD	CPVC	160 mm	10	No.	3	5.47	16.41
37	Pipe - 225mm OD	CPVC	225 mm	10	No.	140	10.80	1512.00
38	Saddle piece	CPVC	63 x 40 mm	10	No.	5	0.70	3.50
39	Unequal Tee	CPVC	225 x 160 mm	10	No.	5	10.00	50.00
40	Unequal Tee	CPVC	315 x 225 mm	10	No.	2	20.30	40.60
41	Reducing bush	UPVC	50 x 32 mm	10	No.	4	0.04	0.15
42	Reducing bush	UPVC	63 x 40 mm	10	No.	4	0.07	0.27
43	Reducing bush	UPVC	63 x 50 mm	10	No.	16	0.06	0.93
44	Reducing bush	UPVC	75 x 50 mm	10	No.	2	0.11	0.21
45	Reducing bush	UPVC	75 x 63 mm	10	No.	4	0.08	0.31
46	Reducing bush	UPVC	90 x 50 mm	10	No.	14	0.18	2.53
47	Reducing bush	UPVC	90 x 63 mm	10	No.	12	0.18	2.20
48	Reducing bush	UPVC	90 x 75 mm	10	No.	10	0.14	1.36
49	Reducing bush	UPVC	110 x 50 mm	10	No.	2	0.31	0.61
50	Reducing bush	UPVC	110 x 63 mm	10	No.	2	0.31	0.63
51	Reducing bush	UPVC	110 x 90 mm	10	No.	8	0.26	2.06
52	Reducing bush	UPVC	160 x 90 mm	10	No.	8	0.74	5.90
53	Reducing bush	UPVC	160 x 110 mm	10	No.	4	0.87	3.50
54	Reducing bush	UPVC	160 x 140 mm	10	No.	2	0.56	1.12
55	Reducing bush	UPVC	225 x 110 mm	10	No.	5	2.45	12.25
56	Reducing bush	UPVC	225 x 140 mm	10	No.	2	2.50	5.00
57	Reducing bush	UPVC	225 x 160 mm	10	No.	15	2.20	33.00
58	Reducing bush	UPVC	280 x 160 mm	10	No.	1	4.10	4.10
59	Reducing bush	UPVC	280 x 225 mm	10	No.	3	4.30	12.90
60	Reducing bush	UPVC	315 x 160 mm	10	No.	2	2.05	4.10
61	Coupling	UPVC	20 mm	10	No.	25	0.01	0.28

Sl no.	Item description	MOC	Size	PN rating	Unit	Qty	Unit wt in kg	Total wt in kg
62	Coupling	UPVC	32 mm	10	No.	25	0.03	0.65
63	Coupling	UPVC	63 mm	10	No.	11	0.11	1.24
64	Coupling	UPVC	75 mm	10	No.	5	0.19	0.93
65	Coupling	UPVC	90 mm	10	No.	2	0.31	0.62
66	Coupling	UPVC	110 mm	10	No.	10	0.56	5.60
67	Coupling	UPVC	160 mm	10	No.	5	1.74	8.68
68	Coupling	UPVC	225 mm	10	No.	20	3.79	75.80
69	Coupling	UPVC	280 mm	10	No.	3	6.68	20.04
70	Coupling	UPVC	315 mm	10	No.	2	8.30	16.60
71	Elbow - 90 deg.	UPVC	20 mm	10	No.	50	0.01	0.65
72	Elbow - 90 deg.	UPVC	32 mm	10	No.	50	0.04	1.80
73	Elbow - 90 deg.	UPVC	50 mm	10	No.	8	0.11	0.86
74	Elbow - 90 deg.	UPVC	63 mm	10	No.	60	0.21	12.36
75	Elbow - 90 deg.	UPVC	75 mm	10	No.	15	0.33	4.98
76	Elbow - 90 deg.	UPVC	90 mm	10	No.	50	0.57	28.40
77	Elbow - 90 deg.	UPVC	110 mm	10	No.	20	1.22	24.30
78	Elbow - 90 deg.	UPVC	160 mm	10	No.	90	3.48	312.75
79	Elbow - 90 deg.	UPVC	225 mm	10	No.	80	6.95	556.00
80	Elbow - 90 deg.	UPVC	280 mm	10	No.	2	16.10	32.20
81	Elbow - 90 deg.	UPVC	315 mm	10	No.	10	21.20	212.00
82	Elbow 45 Deg	UPVC	90 mm	10	No.	2	0.43	0.86
83	Elbow 45 Deg	UPVC	110mm	10	No.	2	0.73	1.47
84	Elbow 45 Deg	UPVC	160 mm	10	No.	2	2.52	5.04
85	Equal Tee	UPVC	20 mm	10	No.	10	0.02	0.17
86	Equal Tee	UPVC	32 mm	10	No.	10	0.06	0.56
87	Equal Tee	UPVC	63 mm	10	No.	15	0.29	4.31
88	Equal Tee	UPVC	75 mm	10	No.	5	0.48	2.40
89	Equal Tee	UPVC	90 mm	10	No.	10	0.78	7.80
90	Equal Tee	UPVC	110 mm	10	No.	7	1.39	9.74
91	Equal Tee	UPVC	160 mm	10	No.	16	4.96	79.41
92	Equal Tee	UPVC	225 mm	10	No.	22	9.07	199.47
93	Equal Tee	UPVC	280 mm	10	No.	2	17.48	34.96
94	Equal Tee	UPVC	315 mm	10	No.	2	24.35	48.70

Sl no.	Item description	MOC	Size	PN rating	Unit	Qty	Unit wt in kg	Total wt in kg
95	Flange adaptor	UPVC	40 mm	10	No.	4	0.04	0.15
96	Flange adaptor	UPVC	50 mm	10	No.	6	0.06	0.33
97	Flange adaptor	UPVC	63 mm	10	No.	45	0.10	4.68
98	Flange adaptor	UPVC	75 mm	10	No.	20	0.16	3.10
99	Flange adaptor	UPVC	90 mm	10	No.	55	0.16	8.58
100	Flange adaptor	UPVC	110 mm	10	No.	20	0.42	8.34
101	Flange adaptor	UPVC	140 mm	10	No.	4	0.75	2.99
102	Flange adaptor	UPVC	160 mm	10	No.	140	1.08	150.78
103	Flange adaptor	UPVC	225 mm	10	No.	113	1.76	198.65
104	Flange adaptor	UPVC	280 mm	10	No.	3	2.90	8.69
105	Flange adaptor	UPVC	315 mm	10	No.	7	4.46	31.19
106	Pipe - 20 mm OD	UPVC	20 mm	10	MR	50	0.12	6.00
107	Pipe - 32 mm OD	UPVC	32 mm	10	MR	50	0.20	10.00
108	Pipe - 40 mm OD	UPVC	40 mm	10	No.	2	0.30	0.60
109	Pipe - 50 mm OD	UPVC	50 mm	10	No.	50	0.55	27.60
110	Pipe - 63 mm OD	UPVC	63 mm	10	No.	255	0.85	217.77
111	Pipe - 75 mm OD	UPVC	75 mm	10	No.	28	1.22	34.16
112	Pipe - 90 mm OD	UPVC	90 mm	10	No.	107	1.75	187.25
113	Pipe - 110 mm OD	UPVC	110 mm	10	No.	85	2.61	221.85
114	Pipe - 140 mm OD	UPVC	140 mm	10	No.	2	4.18	8.36
115	Pipe - 160 mm OD	UPVC	160 mm	10	No.	310	5.47	1695.70
116	Pipe - 225 mm OD	UPVC	225 mm	10	No.	435	10.80	4698.00
117	Pipe - 280 mm OD	UPVC	280 mm	10	No.	10	15.49	154.90
118	Pipe - 315 mm OD	UPVC	315 mm	10	No.	20	19.52	390.40
119	Union	UPVC	63 mm	10	No.	8	0.37	2.94
120	Un equal Tee	UPVC	50 x 25 mm	10	No.	80	0.18	14.40
121	Unequal Tee	UPVC	63 x 50 mm	10	No.	20	0.51	10.22
122	Unequal Tee	UPVC	75 x 50 mm	10	No.	2	0.51	1.02
123	Unequal Tee	UPVC	90 x 50 mm	10	No.	40	0.86	34.40
124	Unequal Tee	UPVC	110 x 50 mm	10	No.	10	1.43	14.25
125	Unequal Tee	UPVC	160 x 110 mm	10	No.	18	4.10	73.80
126	Unequal Tee	UPVC	225 x 110 mm	10	No.	1	9.20	9.20
127	Unequal Tee	UPVC	225 x 160 mm	10	No.	12	10.00	120.00
128	Backing flange	PP - V	DN 32	10	No.	4	0.26	1.06
129	Backing flange	PP - V	DN 40	10	No.	2	0.31	0.63
130	Backing flange	PP - V	DN 50	10	No.	60	0.40	24.06
131	Backing flange	PP - V	DN 65	10	No.	15	0.52	7.86

Sl no.	Item description	MOC	Size	PN rating	Unit	Qty	Unit wt in kg	Total wt in kg
132	Backing flange	PP - V	DN 80	10	No.	75	0.62	46.50
133	Backing flange	PP - V	DN 100	10	No.	30	0.81	24.18
134	Backing flange	PP - V	DN 125	10	No.	7	0.86	6.03
135	Backing flange	PP - V	DN 150	10	No.	170	1.19	201.79
136	Backing flange	PP - V	DN 200	10	No.	168	1.60	268.46
137	Backing flange	PP - V	DN 250	10	No.	3	2.16	6.48
138	Backing flange	PP - V	DN 300	10	No.	9	3.92	35.28
139	Adaptor socket	UPVC	50 mm	10	No.	80	0.11	8.80
140	Reducing bush	UPVC	25 mm	10	No.	80	0.02	1.60
141	Hose connector	UPVC	50 mm	10	No.	160	0.11	17.60
142	Blanking Flange	UPVC	DN 200	10	No.	6	2.60	15.60
143	Threaded Socket	UPVC	0.5" Rp	10	No.	80	0.03	2.40
144	Equal Tee	HDPE	110 mm	6	No.	3	2.400	7.200
145	Elbow - 90 Deg	HDPE	110 mm	6	No.	9	2.000	18.000
146	Backing flange	HDPE	DN 100	6	No.	20	1.300	26.000
147	End collar	HDPE	110 mm	6	No.	32	0.800	25.600
148	Pipe - 110 mm OD	HDPE	110 mm	6	No.	50	21.500	1075.000
	Total Weight							**14268**

SECTION VII

APPENDIX - V

KPCL – BELLARY RODM PLANT -LIST OF PIPES FOR ERECTION

(Approx)

Comp.description	Unit	Qty	Unit Wt. in kg	Total Wt
HP Pipies & Pipe Fittings				**(HP)**
1 1/2" SCH 40 Pipe	Mtr	23	4.05	93.15
2" SCH 40 Pipe	Mtr	28.5	5.44	155.04
2 1/2" SCH 40 Pipe	Mtr	52.5	8.68	455.70
3" SCH 40 Pipe	Mtr	38	11.29	429.02
4" SCH 40 Pipe	No	48.5	16.07	779.40
6" SCH 40 Pipe	Mtr	20	28.26	565.20

UPVC / CPVC / HDPE PIPES & PIPE FITTING (LP)

Sl No	Item description	MOC	Size	PN rating	Unit	Qty	Unit wt in kg	Total wt in kg
1	Pipe - 20 mm OD	CPVC	20 mm	10	MR	100	0.12	12.00
2	Pipe - 32 mm OD	CPVC	32 mm	10	MR	50	0.20	10.00
3	Pipe - 63 mm OD	CPVC	63 mm	10	MR	50	0.85	42.70
4	Pipe - 90mm OD	CPVC	90 mm	10	No.	3	1.75	5.25
5	Pipe - 110 mm 0D	CPVC	110 mm	10	No.	1	2.61	2.61
6	Pipe - 140 mm OD	CPVC	140 mm	10	No.	1	4.18	4.18
7	Pipe - 160mm OD	CPVC	160 mm	10	No.	3	5.47	16.41
8	Pipe - 225mm OD	CPVC	225 mm	10	No.	140	10.80	1512.00
9	Pipe - 20 mm OD	UPVC	20 mm	10	MR	50	0.12	6.00
10	Pipe - 32 mm OD	UPVC	32 mm	10	MR	50	0.20	10.00
11	Pipe - 40 mm OD	UPVC	40 mm	10	No.	2	0.30	0.60
12	Pipe - 50 mm OD	UPVC	50 mm	10	No.	50	0.55	27.60
13	Pipe - 63 mm OD	UPVC	63 mm	10	No.	255	0.85	217.77
14	Pipe - 75 mm OD	UPVC	75 mm	10	No.	28	1.22	34.16
15	Pipe - 90 mm OD	UPVC	90 mm	10	No.	107	1.75	187.25
16	Pipe - 110 mm OD	UPVC	110 mm	10	No.	85	2.61	221.85
17	Pipe - 140 mm OD	UPVC	140 mm	10	No.	2	4.18	8.36
18	Pipe - 160 mm OD	UPVC	160 mm	10	No.	310	5.47	1695.70
19	Pipe - 225 mm OD	UPVC	225 mm	10	No.	435	10.80	4698.00
20	Pipe - 280 mm OD	UPVC	280 mm	10	No.	10	15.49	154.90
21	Pipe - 315 mm OD	UPVC	315 mm	10	No.	20	19.52	390.40
22	Pipe - 110 mm OD	HDPE	110 mm	6	No.	50	21.500	1075.000

SECTION VII

APPENDIX – VI

DECLARATION SHEET

I, hereby certify that, all the information and data furnished by me with regard to this Tender Specification No.BHEL:PSSR:SCT:1187 are true and complete to the best of my knowledge. I have gone through the specifications, conditions, stipulations in detail and agree to comply which the requirements and intent specifications.

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

TENDERER'S NAME & ADDRESS

AUTHORISED REPRESENTATIVE'S
SIGNATURE WITH NAME & ADDRESS

SECTION VII

APPENDIX – VII

TENDER SPECIFICATION NO BHEL:PSSR:SCT:1187

CERTIFICATE OF DECLARATION FOR CONFIRMING KNOWLEDGE ON SITE CONDITIONS

We,

hereby declare and confirm that we have visited the project site under subject, namely and acquired full knowledge and information about the site conditions. We further confirm that the above information is true and correct and we will not raise any claim of any nature due to lack of knowledge of site conditions.

TENDERER'S NAME AND ADDRESS

Place:

Date :

SIGNATURE OF AUTHORISED
REPRESENTATIVE WITH NAME & ADDRESS:

OFFICE SEAL

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector: Southern Region
690, Anna Salai, Nandanam, Chennai – 600 035.

SECTION - VII

APPENDIX - VIII

CHECK LIST

TENDER SPECTFICATION NO, BHEL: PSSR : SCT : 1187

Tenderers are required to fill in the following details:

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 (Pvt. Ltd/Public Ltd./Partnership/Sole Proprietorship) Documentary proof For the same enclosed)	:	YES/NO
2.		Whether EMD submitted as per Tender specifications terms and Conditions	:	YES/NO
3.		Validity of offer (offer shall be kept open for acceptance for minimum six months)	:	YES/NO
4.		Whether tenderer visited the erection site and acquainted with the site conditions before quoting	:	YES/NO

SIGNATURE OF THE TENDERER

5.	Whether the following details are furnished		:	YES/NO
	a)	Previous Experience	:	YES/NO
	b)	Present assignments	:	YES/NO
	c)	organization chart of the company	:	YES/NO
	d)	Company financial statue	:	YES/NO
	e)	Incase of company, proof of Registration of the company	:	YES/NO
	f)	Memorandum & Articles of Association of company/copy of Partnership deed	:	YES/NO
	g)	Profit & Loss account for the Last 3 years	:	YES/NO
	h)	Audited Balance sheet for the Last 3 years	:	YES/NO
	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 organization chart With deployment plan at site For posting of Engineers/super Visitors and workers/labourers For satisfactory completion of Work under this specification	:	YES/NO

SIGNATURE OF THE TENDERER

6.	Whether the Tenderer is conversant with local labour laws & conditions	:	YES/NO
7.	Whether the tenderer is aware of all safety rules and codes	:	YES/NO
8.	Whether the Declaration sheet (as per appendix enclosed	:	YES/NO
9.	Time required for mobilization of of site organization and start of work	:	YES/NO
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
12.	Deviations, if any Pointed out	:	
13.	Whether PF exemption No. is allotted by RPFC of your area if so, indicate number	:	YES/NO

SIGNATURE OF THE TENDERER

TENDER SPECIFICATION

BHEL:PSSR:SCT: 1187

FOR

Handling at Site Stores / Storage yard, Transportation to Site of Work, Erection, Testing and Commissioning of Reverse osmosis demineralesed water plant. (RODM Plant)

at

Bellary Thermal Power Project

(For M/s. KPCL)
Kudatini Village,
Bellary District, Karnataka State.

PART – II PRICE BID

BOOK NO :

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector – Southern Region
690, Anna Salai, Nandanam, Chennai – 600 035.

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector, Southern Region
690, Anna Salai, Nandanam, Chennai – 35

TENDER SPECIFICATION NO:BHEL:PSSR:SCT:1187

NAME OF WORK
:

Handling at Site Stores / Storage yard, Transportation to Site of Work, Erection, Testing and Commissioning of Reverse osmosis demineralesed water plant. (RODM Plant) at Bellary Thermal Power Project (For M/s. KPCL) Kudatini Village, Bellary District, Karnataka State.

(PRICE BID)

PART II

Issued to
M/s.

For and on behalf of
BHARAT HEAVY ELECTRICALS LIMITED

Senior Deputy General Manager/Contracts

(This tender document is not transferable)

Place: Chennai-600 035.
Date:

SECTION VII – APPENDIX – IX

RATE SCHEDULE BHEL :PS:SCT:1187

Sl.No.	Description of work	Lumpsum Amount in Rupees (In Figures Words)
01	Erection of Mechanical items like Tanks / Vessels fixing of internals, pumps, dosing kids, hoists, etc.	
02	Erection & Welding of pipes, Fittings including on line requirements like gloves etc. including Instrument air line	
03	Erection of Electrical and C&I panels, instruments, cable trays, casing, termination	
04	Testing and Commissioning	
	Total Lumpsum etc.	

The Rate quoted for the above works Rs. .....

(Lumpsum)

SIGNATURE OF THE TENDERER

Note :

1. The total terms indicated in rate schedule is only approximate and is liable for variation / alteration at the discretion of BHEL and only for erection guidelines.

2. The total lumpsum value includes handling of material, chemicals, erection, commissioning of mechanical equipments, connected electrical and C&I equipments specified in the spec.

3. The lumpsum quoted rate shall include for the variation of PLUS 10% in quantity, for Erection Works.

4. Tenderers are required to quoted their rates, only in the price bid (part II) provided by BHEL. Quoting of rates in any other form / formats will not be entertained.

SIGNATURE OF THE TENDERER