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

NO. BHE/PW/PUR/MSWRH-CLE/741

FOR

HANDLING AT SITE STORES/STORAGE YARD, TRANSPORTATION FROM STORES/STORAGE TO SITE OF WORK, CALIBRATION TESTING AND COMMISSIONING OF ELECTRICAL AND CONTROL & INSTRUMENTATION WORKS FOR UNIT 3, 4 & 5 OF 10X40MW

SHREE MAHESHWAR HYDRO POWER CORPORATION LTD.
MAHESHWAR
Distt. KHARGONE (MADHYA PRADESH)

PART-I

(TECHNICAL BID SPECIFICATION, NOTICE INVITING TENDER & GCC)

BHARAT HEAVY ELECTRICALS LIMITED
(A GOVERNMENT OF INDIA UNDERTAKING)
POWER SECTOR : WESTERN REGION
345-KINGSWAY, NAGPUR – 440 001

CO N T E N T S

Sl. No.	Description	Section / Appendix No	Number of pages
01	Tender Specification issue details	--	1
02	Procedure for Submission of Sealed Tender	--	1
03	Project Information	--	1
04	Check List	--	1
05	Declaration by Bidder's Authorized Signatory	--	1
06	Certificate of **No-Deviation**	--	1
07	Notice Inviting Tender (includes **Qualification Requirements** etc.)		4
08	General Conditions of Contract	**Section 1 & 2**	$
09	Offer of Bidder	Section.3	1
Special Conditions			
10	Scope Of Work	Section.4	33
11	Obligations Of The Contractor (Tools, Tackles & Consumables)	Section.5	09
12	Contractor's Obligation In Regard To Employment Of Supervisory Staff And Workmen	Section.6	03
13	Obligations Of BHEL	Section.7	01
14	Inspection/ Quality Assurance / Quality Control / Statutory Inspection	Section.8	05
15	Safety, Occupational Health and Environmental Management	Section.9	14
16	Drawings And Documents	Section.10	01
17	Time Schedule/ Mobilisation/ Progress / Monitoring/ Completion/ Over Run/ Price Variation /Mobilisation Advance.	Section.11	04
18	Terms Of Payment	Section.12	06
19	Extra Charges For Modification/ Rectification	Section.13	01

Sl. No.	Description	Section / Appendix No	Number of pages
20	Insurance	Section.14	01
21	EARNEST MONEY DEPOSIT, SECURITY DEPOSIT & BANK GUARANTEE	Section 15	01
22	SUSPENSION OF BUSINESS DEALING WITH CONTRACTORS	Section 16	01

APPENDICES			
23	MAJOR TOOLS & PLANTS & MMES TO BE DEPLOYED BY THE CONTRACTOR	Appendix-I	03
24	List Of Consumables To Be Provided By BHEL Free Of Charge	Appendix- II	01
25	Manpower Deployment Plan By The Contractor	Appendix-III	01
26	Analysis Of Unit Rates Quoted	Appendix-IV	01
27	Current Commitments Of The Bidder	Appendix- V	01
28	Part-II (Price Bid)	@	

LEGEND:

$: Included in Tender Specifications Part-I. Hosted in BHEL web page (www.bhel.com) as file titled **"GCC-741".**

@: Issued as separate hard copy booklet 'Tender Specifications Part-II (Price Bid-708)'. Hosted in BHEL web page (www.bhel.com) as file titled **"PRICE BID-741"**

Note:
Rest of the tender documents are included in Tender Specifications Part-I. Hosted in BHEL web page (www.bhel.com) as file titled "**TECH BID+NIT-741**

BHARAT HEAVY ELECTRICALS LIMITED

(A GOVERNMENT OF INDIA UNDERTAKING)
POWER SECTOR - WESTERN REGION
SHREEMOHINI COMPLEX
345, KINGSWAY - NAGPUR 440 001

Tender Specification NO.BHE/PW/PUR/MSWRH-CLE/741

Name of the work: Handling at Site Stores/storage Yard, transportation from stores/storage to site of Work, calibration testing and commissioning of Electrical and Control & Instrumentation works for Unit 3, 4 & 5 of 10X40MW MAHESHWAR Distt. KHARGONE (MADHYA PRADESH)

EARNEST MONEY DEPOSIT: Rs 1,50,000/-

LAST DATE FOR TENDER SUBMISSION:	Please obtain updated information from web page "http://www.bhel.com" → Tender Notifications → View Corrigendums.

THESE TENDER SPECIFICATION DOCUMENTS CONTAINING **PART-I** AND **PART- II** ARE ISSUED TO:

M/s. ……

…….

PLEASE NOTE:
TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

Sr.Dy. General Manager (Purchase)
Place: Nagpur
Date:

NOTICE INVITING TENDER

T. S. No.:– BHE/PW/PUR/MSWRH-CLE/741

HANDLING AT SITE STORES/STORAGE YARD, TRANSPORTATION FROM STORES/STORAGE TO SITE OF WORK, CALIBRATION TESTING AND COMMISSIONING OF ELECTRICAL AND CONTROL & INSTRUMENTATION WORKS FOR UNIT 3, 4 & 5 OF 10X40MW **SHREE MAHESHWAR HYDRO POWER CORPORATION LTD.** MAHESHWAR DISTT. KHARGONE (MADHYA PRADESH)

- **Issue of T. S. Documents:** **from 01/07/2010 to 21/07/2010***
- **Last Date for Tender Submission:** **22/07/2010 15.00 HRS***
- **Date of Opening Technical Bid:** **22/07/2010 16.00 HRS** *

Earnest Money Deposit (EMD) : Rs 2.00 LAKHS

* : Prospective bidders to obtain latest update of these dates from our web page www.bhel.com → Tender Notifications → View Corrigendum

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- Tender Specification documents with complete details are hosted in web page (www.bhel.com). Bidders can directly download the same and use for submission of offer. Tender Document charges shall be paid to BHEL along with or before submission of Offer.
- Interested bidders may alternately collect hard copy of T.S. documents from this office on all working days within the sale period on payment of Tender Document charges.
- Tender Specification Document Charges: Rs. 2,000/- by DD (in favour of BHEL payable at Nagpur) or cash. Courier charges will be Rs. 500/- extra if T.S. documents are requested through courier.
- BHEL takes no responsibility for any delay/loss of documents or correspondences sent by courier/post.
- Bidders who have deposited One Time EMD of Rs. 2.00 Lakhs with BHEL:PSWR:Nagpur will be exempted from submission of EMD with these tenders.
- BHEL reserves the right to accept or reject any or all tenders without assigning any reasons whatsoever.
- Tenderers whose bids are found techno commercially qualified shall be informed the date and time of opening of the Price Bids.
- All corrigenda, addenda, amendments and clarifications to Tender Specifications will be hosted in this web page (www.bhel.com → Tender Notifications → View Corrigendum) and not in the newspaper. Bidders shall keep themselves updated with all such amendments.
- BHEL reserves the right to reject any tender on the basis of unsatisfactory performance of the bidder in any ongoing job or any similar job in the last seven years or for furnishing false information/declaration in the offer

- Scope of work shall be as detailed in tender specification No **BHE/PW/PUR/MSWRH-CLE/741**

Qualifying Requirements (QR)

Bidder must fulfill the Qualifying Requirements as under in order to be considered as technically qualified for this Tendering process

a) Bidder must have achieved any one of the following

a.1) Executed in the last seven (7) years as on 30/06/2010, any one of the following listed work of Erection, Testing and Commissioning of Control & Instrumentation work OR combination of Electrical and Control & Instrumentation work in any Power Plant or any Industry:

a.1.1) One similar job of at least Rs. 64.00 lakhs value in a single work order.

OR,

a.1.2) Two similar jobs of at least Rs. 40.00 lakhs value per job.

OR,

a.1.3) Three similar jobs of at least Rs. 32.00 lakhs value per job.

OR,

a.2) Executed work of Erection, Testing and Commissioning of Control & Instrumentation OR combination of Electrical and Control & Instrumentation, in one unit of 20MW or higher rated in any Power Plant.

OR,

a.3) Bidder should have been Techno Commercially Qualified for Erection, Testing and Commissioning of Control & Instrumentation work, OR combination of Electrical and Control & Instrumentation work of one unit of 40MW or higher OR 2 units of 20MW or higher in a single tender/job in any Power Plant. by any Power Sector Region of BHEL, in the last 3(Three) years as on 30/06/2010.

AND

b) Bidders must have achieved an average annual financial turnover (Audited) of Rs 24.00 Lakhs or more over last three financial years i.e. 2007-08, 2008-09 & 2009-10 **OR** 2006-07, 2007-08 & 2008-09 if Accounts for FY 09-10 has not been audited.

AND

c) Net worth of bidder based on Audited Accounts of 2009-10 (**OR** 2008-09 incase accounts for FY 09-10 has not been audited) should be higher than 50% of paid up capital in case of companies.

AND

d) Bidder must have earned cash profit in any one of the three Financial Years as applicable in case of 'b' above based on latest Audited Accounts.

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Explanatory Notes for QR 'a'

1. The word 'executed' means the bidder should have achieved the criteria specified in the QR even if the total contract has not been completed or closed

2. The word 'similar job' means the work of Erection, Testing and Commissioning of Control & Instrumentation work OR combination of Electrical and Control & Instrumentation work in any Power Plant or any Industry:

GENERAL

1) **Timing of sale of Documents:** Tender Specification documents will be issued from BHEL PSWR Nagpur office from 10:00 AM to 4:00 PM on all working days within the period specified in the NIT.

2) **Holidays:**
Sale of Tender Documents shall not take place on National Holidays, holidays declared by the Central or State Governments, Sundays, second and last Saturdays and holidays of BHEL PSWR Nagpur HQ.

3) **Seeking Clarifications on Tender Specification:**
Clarifications on the Tender Specifications, if any, may be sought by the bidders so as to reach this office at least **seven days before the Due Date** for submission.

4) **Fulfillment of Qualifying Requirements:**
A bidder must satisfy **all the Qualifying Requirements** stipulated under 'a', 'b' etc of this tender concurrently in order to get qualified.

5) **Customer Approval**: In case customer approval is required for this package, bidder's offer will be accepted subject to approval of bidder by customer.

6) **Supporting Documents:**
Bidders shall submit documents in support of possessing "Qualifying Requirements" as under duly self-certified and stamped by the authorized signatory.
   - List of jobs done with Name of the Project, Owner of Project, Name of Customer, Work Order Ref. No. & Date, Brief Details of Job, Executed Value, Date of Start, Date of Completion.
   - Photocopies of Work Orders issued by the Customer containing details of Bill of Quantities/Schedule of Rates.
   - Empanelment certificate issued by BHEL-PSWR
   - Photocopies of Completion Certificate issued by Customer or Owner of Project.
   - Photocopies of audited Profit and Loss accounts accompanied by relevant schedules for turnover figures.

7) **Earnest Money Deposit (EMD):** Refundable, Non-interest bearing EMD for each tender is indicated against each job earlier here. Bidders may also opt to deposit "One Time EMD" of Rs. 2.0 lakhs and thus be exempted henceforth from payment of EMD with each Erection and Commissioning tender of BHEL-PSWR Nagpur. EMD shall be paid ONLY by **Account Payee Demand Draft** in favour of "Bharat Heavy Electricals Limited" payable at Nagpur.

   Those bidders who have already deposited 'One Time EMD' earlier need not submit EMD with the present tenders. Please indicate the payment details of the 'One Time EMD' in each tender.

8) Tender Document Cost and Courier Charges:

Tender document charges @ Rs 2000/- per set and courier charges @ Rs 500/- per set shall be made by Account Payee Demand draft in favour of "Bharat Heavy Electricals limited" payable at Nagpur or in cash payable at cash counter of this Office. Courier charges shall be paid in case bidders requests for dispatch of Tender specifications by courier. In case bidder downloads the Tender specifications etc from web page, they shall remit the Tender document charges (Rs 2000/-) positively along with or before submission of offer.

9) **Liquidated Damages/Penalty:** BHEL will impose Liquidated Damages and Penalty as per suitable clauses in the respective Tender Specifications on account of delay, violation of contract conditions and non-performance attributable to the contractor.

10) LATE TENDER : Tender received after the specified time of submission shall not be considered in any circumstances.

11) **BHEL may resort to the process of REVERSE AUCTION (on Line bidding) among the bidders who are found to be qualified on the basis of Technical Bid and approval of customer. Details of Reverse Auction process are furnished in Section 18 of SCC under title "Reverse Auction Procedure". Date of Reverse Auction/On-line bidding shall be intimated to all techno-Commercially qualified bidders later. In case the option of Reverse Auction/On-line bidding is not exercised by BHEL, the sealed price bid of technically qualified bidders shall be considered for further processing of the offer and evaluation**.

12) Tenders Submitted By Hand

Tenders being Submitted through representative shall be handed over to any of the following BHEL offcials after making entry/registration at the reception:

1. SM Borkar/ DGM (Purchase)
2. RK Ranade/ Manager (Purchase)
3. Vivek Kamal/ Sr.Engineer(Purchase)
4. Pratish Gee Varghese/Engineer(Purchase)

Sr.Dy. General Manager (Purchase)

BHEL:PSWR:Nagpur

Bharat Heavy Electricals Limited

(A Govt.Of India Undertaking)

Power Sector: Western Region

345, Kings way, Nagpur – 440 001

PROCEDURE FOR SUBMISSION OF SEALED TENDERS

THE TENDERER MUST SUBMIT THEIR TENDERS AS REQUIRED IN TWO PARTS IN SEPARATE SEALED COVERS PROMINENTLY SUPERSCRIBED AS PART-I TECHNICAL BID AND PART-II PRICE BID 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". **EMD SHALL NOT BE INCLUDED IN THIS COVER.**

THESE TWO SEPARATE COVERS-I AND II (PART-I AND PART-II) SHALL TOGETHER BE ENCLOSED IN A THIRD ENVELOPE (COVER-III) ALONGWITH REQUISITE EMD AS INDICATED EARLIER AND THIS SEALED COVER SHALL BE SUPERSCRIBED AND SUBMITTED TO ADDL. GEN MANAGER (PURCHASE) AT THE ABOVE MENTIONED ADDRESS ON OR BEFORE THE DUE DATE AS INDICATED.

THE QUALIFIED TENDERER WILL BE INTIMATED SEPARATELY ABOUT THE STATUS OF THEIR OFFER.

TENDERER ARE REQUESTED TO MAKE SPECIFIC NOTE OF THE FOLLOWING CONDITIONS:

- CONTRACTOR SHOULD HAVE ADEQUATE RESOURCES INCLUDING MAJOR T&PS AT HIS DISPOSAL FOR THIS JOB.
- CONTRACTOR SHOULD HAVE SOUND FINANCIAL STABILITY.
- TENDERER SHOULD MEET QUALITY REQUIREMENT REGARDING WORKMANSHIP, DEPLOYMENT OF PERSONNEL, ERECTION TOOLS AND NECESSARY INSPECTION, MEASUREMENT & TESTING INSTRUMENTS.
- ALL INFORMATION AS CALLED FOR IN VARIOUS APPENDICES AND CLAUSES OF TENDER SPECIFICATION SHOULD BE FURNISHED IN COMPLETENESS. PLEASE REFER THE CHECKLIST.
- CLARIFICATION ON TENDER IF ANY, SHALL BE OBTAINED BY THE TENDERER BEFORE SUBMITTING THEIR OFFER.
- **OFFERS MUST BE SUBMITTED WITHOUT ANY DEVIATION.**
- OFFERS RECEIVED WITH ANY DEVIATION OR WITHOUT RELEVANT INFORMATION AS DESCRIBED ABOVE ARE LIABLE TO BE REJECTED. **PRICE BIDS RECEIVED IN THE FORM OTHER THAN SPECIFIED IN PART-II (PRICE BID) ARE LIABLE TO BE REJECTED.**
- **IN CASE CUSTOMER APPROVAL IS REQUIRED FOR THIS PACKAGE, BIDDER'S OFFER WILL BE ACCEPTED SUBJECT TO APPROVAL OF BIDDER BY CUSTOMER.**

PROJECT INFORMATION

Site Address	:	Maheshwar Hydro Electric Project
Post	:	Mandleshwar
Tahsil	:	Maheshwar
Dist	:	Khargone (M.P.)
Pin	:	451221
Nearest Airport	:	Indore
Nearest Railhead	:	Indore (BG)
Max. Temperature	:	47.5 Degree Celsius
Min. Temperature	:	1.2 Degree Celsius
Relative humidity-		
a) Max.	:	87.5 %
b) Min.	:	12 %
Average annual rain fall	:	930 mm
No. of rainy days (average)	:	48

The Site is located at a Distance of app. 100 Km from Indore.

THE BIDDERS ARE HOWEVER, ADVISED TO ACQUAINT THEMSELVES WITH THE SITE CONDITIONS, BEFORE QUOTING. NO COMPENSATION WHATSOEVER, ON ACCOUNT OF LACK OF FAMILIARIZATION WITH THESE, SUBSEQUENT TO QUOTING, WILL BE ENTERTAINED.

Check List

(VIDE PARA 1.3 OF SECTION-I OF GENERAL CONDITIONS OF CONTRACT)

1	NAME OF THE TENDERER WITH ADDRESS		
2	NATURE OF THE FIRM	LIMITED / PARTNERSHIP / PROPRIETARY	
3	EMD DETAILS (Rs. 1.5 LAKHS BY DD ONLY OR ONE TIME EMD)		
4	VALIDITY OF OFFER (REQUIRED **6 MONTHS** FROM TENDER OPENING DATE)		
5	MOBILIZATION TIME (**WITHIN 2 WEEKS DAYS FROM FAX LOI**)		
6	WHETHER NO DEVIATION CERTIFICATE FURNISHED	YES	NO
7	TENDERER HAS VISITED THE PROJECT SITE AND ACQUAINTED WITH THE SITE CONDITIONS	YES	NO
8	DETAILS OF CONCURRENT JOBS ARE FURNISHED (AS PER RELEVANT APPENDIX)	YES	NO
9	HEAD QUARTER'S ORGANISATION IS FURNISHED	YES	NO
10	PROPOSED SITE ORGANISATION IS FURNISHED	YES	NO
11	FINANCIAL STATUS OF THE COMPANY (ANNEXURE 'A' OF GCC) IS FURNISHED	YES	NO
12	PROFIT & LOSS ACCOUNT FOR PRECEDING THREE YEARS IS FURNISHED	YES	NO
13	LATEST SOLVENCY CERTIFICATE FROM THE BANKER IS FURNISHED	YES	NO
14	LATEST INCOME TAX CLEARANCE CERTIFICATE OR COPY OF PAN CARD ACCOMPANIED BY 'IT RETURN' COPY IS FURNISHED	YES	NO
15	MANPOWER DEPLOYMENT PLAN (AS PER RELEVANT APPENDIX) IS FURNISHED	YES	NO
16	MONTHWISE DEPLOYMENT PLAN FOR MAJOR T&P (AS PER RELEVANT APPENDIX) IS FURNISHED	YES	NO
17	ANALYSIS OF UNIT RATES QUOTED (AS PER RELEVANT APPENDIX) IS FURNISHED	YES	NO

18	POWER OF ATTORNEY ENCLOSED IN FAVOUR OF PERSON MAKING OFFER.	YES	NO
19	DETAILS OF SIMILAR WORK DONE IN LAST SEVEN YEARS (AS PER RELEVANT APPENDIX) AND SUPPORTING DOUCMENTS FURNISHED.	YES	NO
20	PROGRAMME FOR THE SUBJECT WORK FURNISHED	YES	NO
21	BIDDER HAS FMILIARIZED HIMSELF WITH ALL RELEVANT LOCAL LAWS & CONDITIONS.	YES	NO
22	WHETHER ALL THE PAGES OF THE TENDER DOCUMENTS ARE READ, UNDERSTOOD AND SIGNED	YES	NO
23	WHETHER THE FOLLOWING DETAILS PERTAINING TO YOUR BANK ACCOUNT DULY ENDORSED BY THE BANK HAVE BEEN FURNISHED {TO ENABLE BHEL RELEASE PAYMENTS THROUGH ELECTRONIC FUND TRANSFER (EFT/RTGS) AS SPECIFIED IN SECTION 12 } 1. Name of the Company 2. Name of Bank 3. Name of Bank Branch 4. City/Place 5. Account Number 6. Account type 7. IFSC code of the Bank Branch 8. MICR Code of the Bank Branch NOTE: In case Bank endorsed certificate regarding above has already been submitted earlier, Kindly submit photocopy of the same	YES	NO

NOTE: STRIKE OFF YES OR NO, AS APPLICABLE

DATE: SIGNATURE OF TENDERER

Declaration sheet

I, ...HEREBY CERTIFY THAT ALL THE INFORMATION AND DATA FURNISHED BY ME WITH REGARD TO THIS TENDER SPECIFICATION NO.BHE/PW/PUR/MSWRH-CLE/741 ARE TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE. I HAVE GONE THROUGH THE SPECIFICATION, CONDITIONS AND STIPULATIONS IN DETAIL AND AGREE TO COMPLY WITH THE REQUIREMENTS AND INTENT OF THE SPECIFICATION. I FURTHER CERTIFY THAT I AM DULY AUTHORIZED REPRESENTATIVE OF THE UNDER MENTIONED BIDDER AND A VALID POWER OF ATTORNEY TO THIS EFFECT IS ALSO ENCLOSED.

AUTHORISED REPRESENTATIVE'S SIGNATURE WITH
NAME AND ADDRESS

DATE:

TENDERER'S NAME AND ADDRESS

CERTIFICATE OF NO DEVIATION

TENDER SPECIFICATION NO. BHE/PW/PUR/MSWRH-CLE/741

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

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

SIGNATURE OF THE TENDERER

DATE:

Section-3

Offer of the Contractor

To,
Sr.Dy. GENERAL MANAGER (PURCHASE)
BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR - WESTERN REGION
SHREEMOHINI COMPLEX
345, KINGSWAY
NAGPUR 440 001

Dear Sir,

I/we hereby offer to carry out the work detailed in tender specification no. **BHE/PW/PUR/MSWRH-CLE/741** issued by Bharat Heavy Electricals Limited, Power Sector-Western Region, Nagpur, in accordance with the terms and conditions thereof.

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

1. Instructions to bidders
2. General conditions of contract
3. Special conditions of contract
4. Other sections, appendices, schedules and drawings.

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

EMD SHALL BE REFUNDED SHOULD OUR OFFER NOT BE ACCEPTED / EMD **NEED NOT BE REFUNDED AND THE AMOUNT MAY BE TREATED AS "ONE TIME EMD" FOR ERECTION AND COMMISSIONING TENDERS OF BHEL-PSWR, NAGPUR**. SHOULD OUR OFFER BE ACCEPTED, I/WE FURTHER AGREE TO DEPOSIT SECURITY DEPOSIT FOR THE WORK AS PROVIDED FOR IN THE TENDER SPECIFICATION WITHIN THE STIPULATED TIME AS MAY SBE INDICATED BY BHEL, POWER SECTOR-WESTERN REGION, NAGPUR.
OR,
WE HAVE ALREADY DEPOSITED ONE TIME EMD OF Rs. 2,00,000/- (RUPEES TWO LACS ONLY), DETAILS OF WHICH ARE FURNISHED IN THE CHECK LIST.

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

Place: Signature Of Bidder:

Date: Address:

Witnesses With Their Address

Signature	Name	Address
1.		
2.		

Section-4

SPECIAL CONDITIONS OF CONTRACT

4.0 SCOPE OF WORK

The work under these specifications broadly covers the complete work of handling at storage yard/stores, transportation to work site, calibration, pre-assembly, erection, testing , pre-commissioning , and handing over of Electrical and Control & Instrumentation of unit 3,4 & 5 of

10 x 40 MW Hydro Turbine Generator & its auxiliaries.

Of various system as listed under

1. GENERATOR TRANSFORMER, STATION TRANSFORMER, DISTRIBUTION TRANSFORMER, EXCITATION TRANSFORMER.
2. STATIC EXCITATION EQUIPMENT.
3. AUTO SEQUENCER (FOR UNITS, FEEDERS & GATES).
4. PROTECTION EQUIPMENT FOR GENERATOR, TRANSFORMERS.
5. TRAY WORK,CABLING SYSTEM(Including telephone & PA System)
6. ABOVE GROUND EARTHING SYSTEM.
7. LOCAL STARTER BOX OF AUXILIARIES.
8. CONTROL & RELAY PANELS.
9. HT / LT MOTORS TESTING AND COMMISSIONING.
10. BELOW GROUND EARTHING.
11. TRANSFORMER RAILS
12. FIELD AND PANEL MOUNTED INSTRUMENTATION
13. SCADA SYSTEM AND MIMIC PANEL

Contractor may tie up with separate suitable agency/agencies for carrying out Transformer, Bus Duct, Relay Testing and Integrated Testing of Generator System work. However, before deploying such agencies on job, the Contractor shall obtain approval of BHEL Construction Manager in writing.

For proper planning, monitoring and smooth execution of job at site, the contractor will be required to maintain his own computer, printer along with operator at his site office.

BHEL uses its own software SOMS (Site Operation and Management System) for total project execution and billing. The contractor shall also provide adequate and suitable manpower for updating/entries into SOMS in BHEL computers at site.

Scope of work is further detailed in various clauses hereafter.

4.1 GENERAL REQUIREMENTS

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

4.1.2 The work to be carried out under the scope of this specification covers the complete work of loading, handling, transporting, unloading, preassembly, erection, calibration, testing, air flushing, pre-commissioning tests, commissioning of systems, trial run of various auxiliaries and equipments, achieving various milestones till handing over of the unit to BHEL's customer. . The work shall conform to dimensions and tolerances specified in various drawings that will be provided during the erection. If any portion of the work is found to be defective in workman ship or not conforming to drawings or other specifications, the contractor shall dismantle and re-do the work duly replacing the defective materials at his cost, failing which the work will be got done by engaging other agencies or departmentally and recoveries will be effected from contractor's bills towards expenditure incurred including 30% departmental charges.

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

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

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

4.1.6 Contractor shall erect, align and commission all the equipments and auxiliaries as per the sequence & methodology prescribed by BHEL depending upon the

technical requirements. Availability of materials and fronts will decide this. BHEL engineer's decision regarding correctness of the work and method of working shall be final and binding on the contractor. No claims for extra payment from the contractor will be entertained on the ground of deviation from the methods / sequences adopted in erection of similar sets elsewhere.

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

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

4.1.9 Contractor will be required to maintain in his site office at least one PC along with minimum accessories like printer, etc to enable him to carry out site activities in a planned, well coordinated and smooth manner All necessary certificates and licenses required for carrying out this work are to be arranged by the contractor expeditiously.

4.1.10 The contractor shall execute the work in the most substantial and workman like manner. The stores shall be handled with care and diligence.

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

4.1.12 All transport equipment, handling equipment, tools, tackles, fixtures, equipment, materials, manpower, supervisors/engineers, consumables etc., except otherwise specified as BHEL scope of free issue, required for this scope of work shall be provided by the contractor. All expenditure including taxes and incidentals in this connection will have to be borne by him unless otherwise specified in the relevant clauses. The contractor's quoted rates should be inclusive of all such contingencies.

4.1.13 During the course of erection, testing and commissioning certain rework / modification / rectification / repair / fabrication etc., may become necessary on account of feedback / revision of drawing. This will also include modifications / re-works suggested by BHEL / customer / other inspection group. Contractor

shall carry out such rework / modification / rectification / fabrication / repair etc., promptly and expeditiously. Daily log sheets signed by BHEL engineer and indicating the details of work carried out, man-hours etc. Shall be maintained by the contractor for such reworks. Claim of contractor if any, for such works will be governed by clauses 13.1 to 13.8.

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

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

4.1.16 The contractor shall take delivery of the components, equipments, chemicals, lubricants etc from the BHEL stores/ storage area after getting the approval of BHEL engineer on standard indent forms of BHEL. Complete and detailed account of the materials and equipments after usage shall be submitted to the BHEL and reconciled periodically. While taking delivery of items from store it may be necessary to handle (shift / relocate) other items (not necessarily those in the scope of the contractor). Separate payment will NOT be made if such situations arise.

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

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

4.1.19 The services, tests and support to be provided by the agency for the work mentioned in various sections of this tender are indicative and not

exhaustive, but not limited to these for completion of the work in all respects.

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

4.1.21 **The weights & dimensions as mentioned against the individual items in Price Bid Part –II "Rate Schedule" are indicative approximate and there may be variation in dimension & weight in actual supply of equipment. No rate variation shall be considered on this account**

4.1.22 The scope of work & description of system / equipment as given in the various clause of this tender specification and rate schedule are only for understanding the system requirement, contractor shall note this point and assess the volume of work prior to submit the offer. No compensation shall be considered later on.

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

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

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

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

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

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

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

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

4.1.30 House keeping in the erection and preassembly area is as important as the well-planned and orderly work. The access to site for inspection, approaches by BHEL and customer engineers and leading of the material shall be made available by the contractor at all times. The shifting and resifting of erection materials, tools and plants and clearance of restrictions, filling of ditches, undulation near the pre-assembly and boiler area is the responsibility of the contractor. Contractor should visit the site and acquaint himself with all restrictions and difficulties that he may encounter during erection/commissioning stages

4.1.31 The contractor shall take delivery of equipment, materials from the storage yard/ stores/sheds of BHEL/customer he shall also make arrangements for verification of equipment, transportation up to site of work, safe custody, watch and ward of equipment after it has been handed over to him till these are fully erected, tested and commissioned and taken over by the customer. The contractor should note that the transport of equipments to erection site, assembly yards etc. should be done by the prescribed route without disturbing the other works and contractors and in the most professional manner. Special equipments such as measuring and control equipments, panels, console inserts, switches, cables, conduits etc. shall be stored when taken over by the contractor in appropriate manner as per BHEL's instructions.

4.1.32 The contractor shall handover all parts/materials remaining extra over the normal requirement with proper identification tags in a packed condition to BHEL stores. In case of any misuse or use over actual design requirements, BHEL reserves the right to recover the cost of parts/materials used in excess or misused. Decision of BHEL engineer in this regard will be final and binding on the contractor

4.1.33 The contractor should take all reasonable care to protect equipment and materials under his custody either in his stores or at site. Copper tubing, Copper bus bars, brass fittings, brass valves, contactors, etc., forming an integral part of equipment or system are liable to greater damages / pilferages /theft / losses. It will be responsibility of contractor to arrange for adequate security round the clock for protection from such damages/pilferages/theft/losses.

4.1.34 The contractor shall ensure that all the packing materials and protection devices used for the various equipments during transit and storage are removed before these equipments are erected in position

4.1.35 **Overhauling, cleaning, revisioning, servicing of equipments during erection and commissioning stages will be arranged by the contractor. All equipments shall be preserved and protected before and after erection as per the advice of BHEL engineer.**

4.1.36 Substantial portion of Cable laying & termination shall be done by other agencies for those equipment covered under this tender specification. The glands & lugs shall be supplied either loose or fitted with the equipments. Contractor shall take care of this aspect at the time of receipt of the equipment from BHEL stores. Contractor shall account for the quantities received with equipments and shall hand over the same to cabling agency under intimation to BHEL Engineer. Contractor shall extend all necessary help & co-ordinate with the cabling agency during the course of work.

4.1.37 Contractor shall prepare Marked-Up drawings incorporating modifications and deviations from original drawings or prepare fresh sketch for actual installation / connection details if need be, that can be converted to "As-built" drawing

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

4.2 WELDING, NON DESTRUCTIVE TESTING ETC.

A) Installation of equipment involves good quality welding, NDE checks etc.

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

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

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

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

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

G) Certain types of coated welding electrodes, prior to their use, call for baking for specified period and will have to be held at specified temperature for specified period. Also, during execution, the coated welding electrodes have to be carried in portable ovens.

4.3 TESTING, PRE-COMMISSIONING, AND POST COMMISSIONING:

4.3.1 The contractor shall perform various activities during pre-commissioning, Integrated Testing, post-commissioning stages of equipment covered under this tender specification. It is responsibility of contractor to arrange tools & plants, test equipments, experienced engineers and technicians. Contractor shall earmark separate manpower for respective area of as specified in relevant clause and shall not be disturbed /diverted for other work. The contractor's commissioning group shall work as per the instruction of BHEL Engineer and they shall coordinate day-to-day activity with other agency and BHEL/ Customer. The testing activity may have to be repeated till satisfactory results are obtained and also to satisfy the requirement of Customer / statutory Authority.

Testing, pre-commissioning, commissioning , Post Commissioning will involve, though not limited to these: setting/adjusting, testing, proving, trial runs, etc. Of various equipments and systems installed. All the activities for commissioning of the set, as informed by BHEL from time to time shall be completed.

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

4.3.3 The contractor shall immediately attend to the defect noticed during tests, trial runs, pre-commissioning, commissioning such as loose components, undue noise or vibration, strain on connected equipment etc. Readjustment and realignment as called for shall be done as per BHEL's instructions. Claim, if any, for these works from the contractor shall be governed by clauses 13.1 to 13.8.

4.3.4

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

Ii) Similarly, during the course of erection, if certain portion of equipment's erected by the contractor has to be undone for enabling other contractors/agencies of BHEL/customer to carry out their work, contractor shall carry out such jobs expeditiously and promptly and make good the job after completion of work by other contractor's/ agencies of BHEL/customer as per BHEL

engineer's/agencies of BHEL/customers instructions. Claims, if any, in this regard shall be governed as per clauses 13.1 to 13.8.

III) Certain instruments may have to be installed temporarily/ in temporary installations for specific requirements. Contractor shall install, after due calibration if required, such instruments for which payment shall be regulated as per respective item rates. Contractor shall remove these instruments and return to BHEL/client's stores after the use. No separate payment will be made for removal and returning of such instruments.

4.3.5 The contractor shall simultaneously start testing & commissioning activities for equipments to match the mile stone activities of the project and shall continue till equipments are being commissioning fully with all connected drives/ equipment to HT/LT switchgear or handed over to customer for regular operation. In this duration other erection activities such as cabling or other work shall be carried out by other agency even though HT/LT switchgear board are charged. In order to co-ordinate the work such as issue of safety permit, normalization and compliance of other requirement, contractor shall keep team of one experience engineer / supervisor, technician and helper or as decided by BHEL Engineer. The team shall take instruction from BHEL Engineer for day-to-day work and shall not be diverted for other work. No extra payment shall be made for their services.

The testing/calibration / commissioning activities shall start prior to synchronization of HTG sets. The contractor shall provide adequate manpower, including supervision, of required skill level in various area of work with necessary consumables, tools and tackles etc., as part of commissioning till handing over of the unit to BHEL's customer.

4.3.6 **It shall be specifically noted that the contractor may have to work round the clock during the pre-commissioning and commissioning period alongwith or without BHEL engineers and hence considerable overtime payment is involved. The contractor's quoted rates shall be inclusive of all these factors.**

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

4.3.8 During this period, though BHEL/ SMHPCL staff will also be associated in the work, the contractor's responsibility will be to arrange for complete requirement of men and required tools and plants, consumables, scaffolding and approaches etc., till such time the commissioned unit is taken over for trial operations.

4.3.9 **The mobilization of these commissioning groups shall be such that planned activities are taken up in time and also completed as per schedule and work undertaken round the clock if required. It is responsibility of contractor to discuss on day to day / weekly / monthly basis the requirement of manpower, consumables, tools & tackles / testing equipments with BHEL Engineers and arrange for the same. If at any time the requisite manpower, consumables etc are not arranged then BHEL shall make alternative arrangements and necessary recoveries with overhead cost will be made from the running bills**

4.3.10 The scope of testing & commissioning of electrically operated actuators for valves, dampers, gates,etc., will include meggering, providing loop wire on actuator terminal block, adjustments of mechanical/ electrical or electronic position transmitters, setting of limit/torque switches, cable checking, internal wiring checking, local/remote operation from MCC & MMI package, replacement of limit/torque switches if required.

4.4 GENERAL RESPONSIBILITY OF THE CONTRACTOR

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

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

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

4.4.3 Contractor shall maintain good house keeping & collect all scrap materials periodically from various area of work site, deposit the same at one place earmarked at site or shift the same to a place earmarked in BHEL/ client's stores. *1% value of each RA bill will be earmarked against compliance of the above, to be released only on satisfactory collection and deposit of scrap as stated above. In case of failure of contractor to comply with this requirement, BHEL will make suitable arrangement at contractor's risk and cost. In such case, any expenditure over and above the withheld 1% amount will also be recovered suitably from the RA bills of vendor.*

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

4.4.5 The contractor shall not waste any materials issued to him. In case it is observed at any stage that the wastage/excess utilization of materials is not within the permissible limits, recovery for the excess quantity used or wasted will be effected with departmental charges from the contractor. Decision of BHEL on this will be final and binding on the contractor.

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

4.5.0 MEASUREMENTS & WASTAGE & CUTTING ALLOWANCES

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

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

4.5.3 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.

4.5.4 All materials returned to stores should carry an aluminium tag indicating the size and type. More than 5 metres length termed as serviceable material and shall be 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.

4.5.5 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 percentage specified above. 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.

4.5.6 For all site-fabricated steel items such as supports, racks , frame , 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.

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

4.5.8 The erection contractor shall make every effort to minimize wastage during erection work. Cutting and wastage allowance shall be computed on length, weight of material actually used, measured and accepted. In any case, the wastage shall not exceed the following limits;

S.No.	Item	Maximum Wastage on Net Issued Qty (%)
01.	Each iron/steel section	2
02.	Each size of power cables	1
03.	Each size of control cables	2

4.5.9 If the actual wastage be more than the specified figure, then equivalent price of the excess portion will be deducted from the contractor's bill

4.5.10 The cable take off from drums shall be planned strategically such that jointing in the run of cables and wastage are avoided. for this purpose the exact route length between various equipment/panels as per the cable schedule shall be measured and the route length recorded before laying of the cables. Depending upon the route length the type of cable required for various destinations, the cable drums shall be suitably selected for cable laying. any jointing which may be approved by the engineer. All the cut pieces/bits of cables that are not used/unused shall be returned to the purchaser for accounting towards wastage. The cables damaged by the contractor shall have to be replaced by the contractor at his own cost.

NOTE: Salvageable scrap shall mean lengths of pipes, multicables, other cables etc., that can be used one time or other at a later date and normally they are recovered from the cut-pieces of pipes, multicore cables, cables etc.

Non - Salvageable scrap means the lengths of tubes, pipes, multicore cables, cables etc., and they are from cut-pieces of tubes, pipes, multicore cables, cables etc., that cannot be used at all one time or other.

4.5.11 The rates of laying for LT Power, control & Signal cables is inclusive of glanding and termination at both ends. Glands & Lugs above 4 sq mm shall be supplied by BHEL. Lugs up to 4 sq mm shall be in vendor's scope.

The Unit rates for HT cable termination are exclusive of Unit rates for laying of HT Cables. Glands & Termination Kits for HT Cables shall be supplied by BHEL

4.6.0 For any items or class of work not specified herein but required for total completion of work, the same shall be carried out as per BHEL requirement. However, payment of these items/class of work shall be regulated on the basis of rate arrived at by either of the following methods:

A) Based on rate of identical/similar items in the rate schedule.

B) Based on the rate arrived from nearby items in the rate schedule.

C) Wherever any item rate for similar type of work or nearby item rate does not exist in the rate schedule, rate will be worked out on the basis of work element or from fundamentals of estimation.

Contractor shall provide necessary resources for completion of such work within the stipulated time schedule. Value of such work shall be included while computing the total value of work finally executed for all contractual purposes, particularly for contract variation purpose.

4.7.0 The contractor's scope of work is further described in the clauses hereafter:

The work will comprise of, but not limited to the following:

4.7.1 INSTALLATION OF PANELS AND HT/LT SWITCHGEAR, LOCAL STARTERS BOX PANEL

A. Electrical control panels, electronic control panels, unit supervisory control desk, HT/LT switchgear, 415 volt LT MCC's, Analyser panels and transmitter racks/enclosure are normally supplied in suit of either one/two/three or loose shipping sections with integral base frame or loose base frame. These panels may have to be installed as stand alone or in group consisting of number of panels in each row, depending upon the plant layout and foundation arrangement.

B. The panels shall be transported from stores to the place of installation in vertical position. Care shall be taken such that the switches, lamps, instruments etc.mounted on the panel does not get damaged during transit.

C Installation of panel shall include fixing of base frame, leveling, alignment, fixing of anti-vibration pads, removal of side covers, fixing of cubical interconnection hardwares, bus bar jointing, wiring interconnection, welding and grouting of panels and base frames, mounting of panel canopy wherever supplied as part of panel, drilling of gland plates, sealing of panels/ cable entries. Where the base frame is not supplied as part of panel supply, the contractor shall fabricate the

base frame from structural items at site. Payment for such fabrication will be effected on measured quantity at the rate applicable for structural steel fabrication and installation. Proper sealing of all the holes and cable entries (even if the cable has been laid by others) in the panel is in the contractor's scope.

D Panels have to be shifted to their locations through floor openings, temporary openings like floor grills, door etc. Which shall be a part of work and no claim whatsoever will be entertained with regard to non-availability of opening as per shortest route etc. Panels have to be erected at different locations and elevation in power house building, unit control room etc.

D Panel and instruments once erected in position should be properly protected using necessary care to prevent ingress of dust/moisture. This will have to be periodically cleaned and surroundings have to be kept tidy.

E Whenever the panels to be mounted on cable trenches, channel supports have to be provided across the cable trench over which the base frame of panel shall be mounted. For such work, structural steel fabrication & installation rate shall be applicable.

F Normally the panels shall be supplied with meters, relays, electronic modules, contractors, pushbuttons etc mounted and pre-wired. However, if such devices are supplied loose/separately for safety in transit, contractor shall mount the same as part of panel installation work and no extra payment shall be made for this.

G Supplier's instruction manuals, packing slips, door keys etc. Received along with the panels will be handed over to BHEL's engineer on opening of the panels.

H Regular cleaning of the panels as per the instruction of BHEL engineer till handing over of the set to customer is to be carried out by the contractor free of cost.

4.7.2 STRUCTURAL STEEL FABRICATION AND INSTALLATION

A. INSTRUMENT/ JUNCTION BOX FRAME/ CABLE TRAY & MISC STRUCTURES FABRICATION

1. Structural steel material like MS angles, channels, beams, flats, plates etc. Shall be supplied in running meter and the same shall be used for fabrication of panel base frame, canopies for instruments/panels/ drives/JB's/push buttons etc., instrument/junction box frames, impulse pipe/instrument air pipe supports and instruments etc. if required.

2. This shall include cutting to size, contouring of ends for connections if required, welding, grinding of excess weld deposits/burrs, drilling of holes for mounting of device/instrument, installation at location, leveling, alignment, providing bracings and painting etc. No gas cut holes will be permitted.

3. All the fabricated supports/frames shall be cleaned & painted as per painting specifications.

4. Frame installation at site may involve mounting either on concrete floor by grouting/using anchor fasteners or on steel structure by welding etc. All consumables including anchor fasteners shall be arranged by the contractor. Where required, as part of work, concrete floors may have to be chipped out to reinforcement depth for anchoring the frames. Wherever grouting is required, contractor shall arrange all the required material including cement/grout mix, shuttering etc., necessary labour and meet all other requirements as part of work.

5. In case, structural cable trays, bends, tees, reducers etc., are required to be fabricated from structural steel and installed, unit rate applicable for fabrication and installation of structural steel shall be applicable in such instances.

6. In certain packages, members of frames/rack for mounting of junction boxes/ instruments may be supplied readymade. These have to be assembled prior to installation. The installation rate as quoted shall include assembly of the frames.

7. Gas cutting of tray/impulse pipe support and holes in frame is not permitted. Only hacksaw cutting/ drilled hole shall be permitted

B. CABLE TRAY SUPPORT

1. GI Structural material shall be supplied in standard length. The support member required for typical installation to be cut suit to site / lay out requirement from the straight length. Tray supporting members to be installed for typical installation as indicated in sectional arrangement of cable tray route plan. Refer drgs. BHEL ‘s customer shall be provided projected dowels embedded in cables trenched for welding of supports. The support shall be either bolted or welded type as per drg. No cutting by gas shall be permitted.

2. Wherever supports needs to fixed on concrete slabs or ceiling with anchor fastener, and anchor fastener shall be arranged by contractor as part of work.

3. All galvanization damaged due to cutting / welding operation required to be carried out for the installation of cable support system shall be made good with application of cold galvanization paint immediately after completion of welding.

4. Gas cutting of tray/impulse pipe support and holes in frame is not permitted. Only hacksaw cutting/ drilled hole shall be permitted.

4.7.3 LAYING OF PIPES/TUBES (IMPULSE PIPE)

A Installation of impulse pipe of CS/AS/SS material shall include cleaning, air flushing, cutting to length from the running meter, edge preparation, cold bending, welding of sockets/ reducers/ tee/ cross/ isolating valves/union nut and nipples/tail pieces etc., mounting of SS/CS three/five valve manifolds and compression fittings, condensate pot/equalizing vessel, providing supports, clamping, conducting leak test/hydraulic pressure test, painting and other accessories as per instrument hook-up diagram. Piping works shall involve either arc or TIG welding.

IBR certified welders shall be deployed for welding of impulse pipe and contractor shall take approval for welder and welding consumables from BHEL site engineer.

B All fittings and accessories for impulse pipe and air line shall be provided by BHEL. Quoted rate for piping shall include cost of installation of such fittings as no separate rate is envisaged.

C Contractor shall provide GI clamps for impulse pipe and GI pipes within the quoted rate for installation of the same.

4.7.4 INSTRUMENT & SERVICE AIR PIPING (GI PIPE)

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

4.7.5 COPPER TUBING/PIPE/SS TUBE

Installation of copper tube/SS tube/copper pipe shall include cutting into required length, laying, bending, cleaning, brazing wherever required, fixing of fittings like compression fittings/tees/end connectors/straight connectors/bulk heads/valves etc. Supporting, clamping including supply of clamps and hardware, flushing and conducting leak test. Suitable tube cutters, benders and deburring tools will be used for such jobs.

4.7.6 CABLE TRAYS/CABLE DUCTS

Ladder & perforated cable trays of aluminum alloy hot rolled shall be supplied in standard length and accessories such as bends, cross, tee, elbow, coupler plate, hardware shall be supplied loose. **Quoted unit rate for installation of cable tray & duct shall includes the following work.**

A. Cutting, laying, jointing, fixing tee/reducers/ bends/clamps, fixing of tray covers etc.

B. Pre-fabricated bends/tee/ reducers/ cross / elbow shall be supplied, however due to lay out constraint or in case of additional requirement, such accessories need to be fabricated out of straight length. For such fabrication unit rate of per meter length shall be applicable and fabrication shall be done by using bolting / revetting.

C. Fabrication of bends/tee/ reducers from straight length is within the scope of work and rate quoted shall be inclusive of this. All site welds of cable trays shall be painted with approved primer and cold galvanizing paint, which shall be arranged by the contractor.

D. The cable tray and support installation is to be done as per Cable Tray Route Plan drawings.

E. Cable trays/duct etc may have to be routed underground in cable trench, overhead on structure, along the walls, floors etc; for various applications.

4.7.7 **Cable laying (power/control/instrumentation shielded cables/triad cable/ plug-in cables/ UPT cables for Ethernet n/w / armoured/un-armoured, single/multi-core, PVC/HR PVC/FRLS/Teflon/XLPE insulation)**

A Cable laying will include:

1. Cutting to the required length, laying in overhead/underground cable trench/ through pipes/flexible conduits. Cable rollers have to be used as per requirement. The contractor shall prepare the drum schedule in order to minimize the wastage.
2. Dressing/clamping in tray etc.
3. Drilling of holes in gland plates in panels and junction boxes for the entry of cable.
4. Cable glanding, splicing, dressing of spliced wire inside the panel and jbs.

5. Providing PVC numerical/alphabetical ferrules. Wherever required ferrules shall be one-piece heat shrinkable type.
6. Termination by using crimp type lugs copper tinned/ aluminium (insulated/ un-insulated).
7. All cables shall be provided with identification tags indicating the cable numbers in accordance with cable circuit schedule . Cable tags shall be fixed at terminal ends, at tray intersection / bends and at every 20 meters in cable trench / cable tray.
8. Single core cables for A.C. three phase circuit when laid in tray , shall be in trefoil formation.
9. Continuity checking, insulation resistance checking, high voltage test on HT cables, as applicable.
10. Entry to the panels, JBs may be from top, side or bottom. All cable shall be supported and clamped near the panels/ JB.
11. Wherever cable glanding is not possible, either due to the gland plate size limitations or more number of cable entries, suitable alternative arrangement as specified by BHEL shall be done. Pre-fab plug-in cables, for such cases, cables may have to be lifted inside the panel either making cut-out in gland plate and providing rubber profile for sharp edge protection or alternatively provide 4/6" PVC pipe coupling gland and these pipe coupling gland shall be supplied by contractor within the quoted rate of cable laying.
12. All care should be taken to avoid abrasion, tension, twisting, kinking, stretching of cables during installation.
13. Cable shielding – all signal cables are supplied with bare shielded copper wire/with breaded wire shield, generally sealed wire is kept isolated at instrument/field device end and continuity is maintained through JBs and getting earth at panel end only. While terminated the sealed wire either in panel or JBs, PVC sleeves is to be used to avoid two-point earthing. Supply of PVC sleeves of appropriate colour is in contractor's scope.
14. Wherever cable ducts/tray, conduits pass through fire barriers such as walls, floors etc., the openings/ passage shall be sealed using fireproof/ weatherproof sealing compound. Similarly cable entry in panels, MCC/LT/HT breakers, instruments, electrical actuators etc are also required to be sealed. These shall be done as per the specifications of BHEL. Required consumable shall be in contractor scope of supply within quoted rate for cabling.
15. Normally, cables glands on junction boxes side are received mounted. While terminating the cables as PER DRAWINGS, the cable glands to be removed and fixed. Wherever cable glands are not received alongwith junction boxes, no

separate payment will be made for fixing the cable glands to the junction boxes including drilling of holes.

16. Many of the cables may have to be laid in the cable trenches. For this purpose, the cover of trenches has to be opened for working inside. All safety precautions have to be observed while laying the cables in the trench. After completing the work, the trench has to be cleaned and covers put back into position. The contractor, if required, shall do de-watering of trenches.

17. BHEL Shall provide consumable for cabling as per detail given in Appendix –

18. TERMINATIONS:

The types of cable terminations are as detailed below:

1) Power cable : Crimping hydraluic / manual
2) Control cable: Manual crimping
3) Crimped/soldered plug-in-type
4) Screwed type.
5) All console devices / computer peripherals shall be screwed, crimped, soldered plug in type.

The contractor shall arrange for special tools and skilled manpower required for any type of cable as mentioned above.

4.7.8 SCOPE OF ABOVE GROUND EARTHING

4.7.8.1 The scope of earthing covered in this contract is above ground earthing. Below ground earthing will be terminated upto the raiser by customer and other contractors. The contractor shall carry out earthing for all Electrical equipment which may be erected by him or some other agency. Different type of earthing materials shall be supplied and the contractor shall lay and connect the earthing materials as per site requirement Unit rate for earthing material shall be paid on running metre basis.

4.7.8.2 All equipment shall be earthed by two separate and distinct connections. Earthing terminals will be available in all the equipment supplied by BHEL.

4.7.8.3 The earthing conductors shall be mild steel/G.I. strips/wires. All connections from the equipment to the main earthing conductors shall be made as illustrated in earthing drawings. A copy of earthing drawing shall be provided to the successful tenderer.

4.7.8.4 A continuous earthing conductor shall be installed in all cables trays and securely clamped to each tray section by suitable connectors to form a

continuous earthing system. When two or more trays supporting power cables run on parallel a continuous earthing conductors shall be provided on one tray only with tap-offs to the control cable trays. All valve and damper motor and rapping motors will be earthed to this conductor.

4.7.8.5 If the equipment is not available at the time of earthing conductor laying tap connections from the main earthing conductor shall be brought out up to slab equipment foundation level with at least 200 mm spare length left for further connections to equipment earthing terminals.

4.7.8.6 Entire system shall be earthed in accordance with the provisions of the relevant IEC recommendations/IS code of practice IS 3043-1947 and Indian Electricity Rules, so that the values of the step and contact potentials in case of faults are kept within safe permissible limits.

4.7.8.7 Parts of all electrical equipment and machinery not intended to be alive shall have two separate and distinct earth connections each to conform to the stipulation of the Indian Electricity Rules and apparatus rated 240 V and below may have single earth connections.

4.7.8.8 If any outer shops and buildings as well as the electrical sub-stations and electrical rooms are also in contractor's scope, a ring main earthing system will be provided. Ring main earthing systems shall again be inter connected as a net work to power plant main earthing mat. Internal earthing ring in the electrical equipment room provided by the contractor whether equipment of the area is in their scope of not.

4.7.8.9 For different floors in a building, localized internal earthing ring shall be formed and connected to the ground earthing through vertical risers. The earthing mat shall be common to both power and lighting installations.

4.7.8.10 A minimum of two spare earth rings will be provided in each floor of the building for earthing future building.

4.7.8.11 Each RCC steel column of the building will be interconnected to the floor-earthing grid in basement/ground floor.

4.7.8.12 Detail drawings shall be provided at site during the execution of work.

4.7.9 BATTERY, BATTERY CHARGES AND UPS & ITS BATTERY BANK

VOID

4.7.10 FIELD INSTRUMENTATION

A Various type of primary/secondary/ indicating/ recording instrument for pressure, temperature, flow, level, speed, turbo supervisory and analytical measurement shall be supplied either loose or mounted alongwith the equipment.

B Scope of work under calibration, erection// testing/ commissioning shall include calibration, setting, adjustment, supply and fixing of instrument tag plates as

specified by BHEL, report making, installation, servicing, minor repairs, putting instrument into service, signal checking from field upto the functional group panels and remote indicating/recording instrument, functional checks, interlock and protection/alarm checks by simulating the field devices, trouble shooting during pre-commissioning/ commissioning and till the unit is handed over to the customer.

C Contractor shall establish calibration laboratory with adequate facilities and they should arrange standard test instruments duly calibrated from the agencies approved by BHEL. Calibration report of the same should be submitted prior to start of calibration of the field instruments/devices.

D It is the responsibility of contractor to make erection, calibration/ testing and commissioning protocols for various equipments/devices installed by them and they should get duly certified by customer/BHEL engineer and should be submitted to BHEL engineer regularly.

E Installation of instrument shall also include drilling of holes and tapping for mounting of instrument and local instrument frames/panels and supply of hardware for mounting of the instrument.

F For such of those instruments/devices such as temperature gauge/switches, pressure gauge/switches, transmitter pressure/flow/ level/DP, level probe/switch etc, which are received, assembled with mechanical equipments and are to be calibrated, only calibration rate will be paid as per applicable rate for respective instruments/devices. No payments shall be made for removal and re-fixing of such instruments.

G Contract shall do re- calibration of those instruments, which are initially calibrated, if there performance is found un satisfactory during commissioning and post commission of systems. For such re-calibration no extra payments shall be made.

H Installation of themowells and seal welding of the same is in contractor's scope.

4.7.11 POWER TRANSFORMER (STATION TRANSFORMER / DISTRIBUTION TRANSFORMER (DRY TYPE)

Transformers are generally supplied in partly assembled condition either filled with oil upto the core end winding level ,accessories like radiators, conservator tank, pipes, fittings, hardwares, gaskets, buchholz relay, marshalling box, relief vent, valves, , bushings, , rollers, , electrical control unit, neutral ground transformer and neutral ground resistance, cabling for each transformer shall be supplied loose.

oil in 200/210 ltrs. Barrels shall be supplied loose. The erection and testing of transformer shall include the following work and activity:-

A) Transportation of transformer tank from store/unloading place to the transofmrer foundation. The transformer should be handled in such a manner so that no jerk is transferred to the core end winding and internals of the transformer.

B) Placement on plinth, alignment with respect to the foundation and lay out drawings.

C) Internal inspection to verify the intactness of core end winding, tape changer leads, off-load switch, measurement of core and core bolt insulation.

D) In case of large capacity of transformers when supplied partly oil filled/gas filled, after internal inspection, the transformer shall be kept under vacuum for a period (to be decided by site engineer) and treated oil to be filled upto required level.

E) Each drums of oil to be tested for BDV and if BDV is less, then each drum should be filtered separately.

F) All the accessories shall be assembled/mounted as per OGA drawings and these should be thoroughly cleaned prior to installation.

G) Drying out of transformer and filtration of oil in cooling bank, pipe line, etc. To be done with ultra vacuum filtering machine of adequate capacity. Drying out process shall be carried out round-the-clock and contractor shall deploy trained manpower for this purpose.

H) During dry out process, contractor has to plot the curve for insulation resistance value/time/oil temperature. Hourly reading to be recorded till completion of the dry out.

I) The criteria for deciding completion of drying out shall be breakdown value of oil, ppm value of oil, resistivity of oil, insulation resistance value and polarization index.

J) The filter machine capacity if found to be inadequate, or in case of failure of existing machine, an alternative arrangement is required to be done to meet the required result and time.

K) Due to unforeseen reasons the commissioning of transformer is delayed after first drying out and if required, the contractor shall carry out the oil filtration of assembled transformer. For full refiltration, payment will be made at 25 % of quoted price of transformer.

L) Contractor shall arrange required testing equipments for carrying out electrical test like voltage ratio, turn ratio, vector group, magnetic balance, winding resistance measurements, BDV value of oil, insulation resistance, measurement of oil ppm , resistivity and tan delta test. The contractor shall arrange oil sample testing for ppm/resistivity or any other tests applicable for oil sample at approved testing laboratory at his own cost including all incidental expenses.

M) Contractor shall discuss and finalise installation and testing activity procedure with bhel/customer prior to starting the work.

N) Contractor should have valid electrical contractor ship license to carry out installation of high voltage equipment.

O) Generator Transformer tanks shall be made available to the contractor 50 to 70 meters away from the respective foundation; further transport and shifting to the

foundation shall be in the scope of this work. The shifting operation may require dragging, fixing of wheels, rollers and turning of transformer to a suitable location enroute to suit the layout. The contractor shall arrange wooden sleepers, winches, jacks, rails, crane etc at his cost for this operation. However accessories shall have to be shifted from stores

P) After getting BDV/ withstand value, this treated oil to be filled in the transformers and auxiliaries. Contractor has to arrange storage tank of 20 kilo litre capacity with internally sand blasted and coated with one coat of oil resistance paint. Oil from drums to be transferred in storage tank and filtration to be carried out to achieve the required However, for low capacity of transformer, a separate storage tank for mass filtration may not be required

Q) Dry type transformer is supplied in sheet metal enclosure with natural/forced air-cooling. The contractor shall carry out all electrical tests as applicable for other transformer

4.3.12 INTEGRATED ELECTRICAL TESTING/COMMISSIONING

The brief scope of work under is defined as below, but not limited to the following. Contractor shall discuss & finalize testing procedure with BHEL Engineer In-Charge for the test to be conducted on Generator Control & Relay Panel testing. Drawing & documents shall be provided by BHEL at the time of testing. BHEL decision in this regard shall be final and biding on the contractor.

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

Contractor shall maintain the charged and commissioned equipment till the same is taken over by BHEL's end customer.

Contractor's quoted rates for all concerned items shall include Integrated Testing as defined hereinafter.

4.7.13 GENERATOR CONTROLS AND PROTECTIONS RELAY PANELS & ASSOCIATED EQUIPMENTS SUCH AS BUS DUCT GT, UNIT & STATION TRANFORMER, GENERATOR BREAKER etc INTEGRATED ELECTRICAL TESTING/ COMMISSIONING OF GENERATOR CONTROLS AND PROTECTIONS RELAY PANELS & ASSOCIATED EQUIPMENTS, ELECTRICAL MOTOR etc.

1. Integrated Electrical testing/commissioning of Generator Control and Protection Relay Panels & associated equipment, etc. shall involve various activities like relay testing/setting, simulation checks, testing of energy meters, on/off line functional checks on integrated system.

2. Relay Testing in static condition for Generator, Transformers, and associated system by secondary current injection at different current and recording the time duration.

3. Testing and checking of control and protection interlock scheme in static condition and simulation of protection device contact from internal and external devices of all electrical panels.

4. Measurement of Insulations, Winding Resistance, Polarization Index of winding of Generator & associated equipment/ system, DC resistance test & Impedance test on rotor, Brushless excitation system at the time of rotor insertion as well as during pre-commissioning stage / commissioning stage/ post commissioning stage.

5. Relay setting and checking the stability of protection relays in static and dynamic condition during the OCC (Open Circuit Characteristic) & SCC (Short Circuit Characteristic).

6. Functional checks / testing of synchronizing schemes, other electrical panels during the static and dynamic by simulation / back charging of generator transformer conditions.

7. Monitoring & recording the various parameters during open circuit and short circuit conditions test on generator & associated field equipment like generator transformer, unit auxiliary transformer. Recording and monitoring measurement.

8. Testing of protection current transformer for ratio test by primary injection, magnetization characteristic, polarity test, and IR measurement. Functional checks of relays of protection system by primary injection.

9. Testing of potential transformer for ratio test by voltage ratio, polarity test, insulation resistance measurement etc, testing of surge capacitors, PT isolator in PTPS cubicle etc.

10. Measurement of Insulation resistance of individual equipment and connected together.

11. Calibration of energy meters, tri-vector meters, voltmeters, ammeters, current & power transducers etc.

12. Providing temporary shorting link on bus duct or any other location while testing & normalisation after the test.

4.7.14 STATIC EXCITATION SYSTEM.

System comprises of excitation transformer, regulation, field flashing, thyristor, field breaker panels/cubicle along with copper bus bar/flexible connectors including internal wiring, and associated inter connecting cables.

4.7.15 BELOW GROUND EARTHING:

Treated test pits, Test Links, Earth Electrodes, Column earth connections for various areas : Earth electrodes of 3 meters long and 4” dia shall be issued from BHEL stores. Work shall be done as per drawing given at site**. Supply of all other items including charcoal, salt, civil items is also in the scope of the contractor. Civil works are**

also to be carried out by the contractor. The contractor shall also connect this pit to the earth grid (by other agency) at nominal distances of 3 to 5 meters by 40 mm rods, Details are given elsewhere in tender. Electronic earth pit resistance to be achieved specifically as per requirement shown in EDN 's earthing requirement drgs.

4.7.16 **ABOVE GROUND EARTHING;**

GI flats of Various sizes shall be supplied, these are to be welded between earth riser and equipment. Equipment end shall be mostly bolted connection. All materials such as welding electrodes and other consumables shall be in contractors scope.

Where ever GI wires are provided , lugs are to be provided at both ends.

Wherever single core cables are supplied fro earthing, 50 mm portion of both ends to be sleeved and copper tinned lugs to be crimped. Lugs & sleeves shall be supplied by BHEL.

4.7.16.1 The contractor shall carry out above ground earthing for all Electrical equipment, which may be erected by him, or some other agency. Different type of earthing materials shall be supplied and the contractor shall lay and connect the earthing materials as per site requirement and as detailed in drawings. Unit rate for earthing material shall be paid on running meter basis.

4.7.16.2 All equipment shall be earthed by two separate and distinct connections. Earthing terminals will be available in all the equipment supplied by BHEL.

4.7.16.3 Generally risers are provided near the structure / equipment foundation, In case risers are not visible and buried below the foundation level, contractor shall carry out necessary earth excavation for connecting the above ground earthing strips. Wherever welding is involved necessary protective coating shall be applied on weld joints.

4.7.16.4 The earthing conductors shall be mild steel/G.I. strips/wires. All connections from the equipment to the main earthing conductors shall be made as illustrated in earthing drawings. A copy of earthing drawing shall be provided to the successful bidder.

4.7.16.5 A continuous earthing conductor shall be installed in all cables trays and securely clamped to each tray section by suitable connectors to form a continuous earthing system. When two or more trays supporting power cables run on parallel a

continuous earthing conductors shall be provided on one tray only with tap-offs to the control cable trays. All valve and damper motor and rapping motors will be earthed to this conductor.

4.7.16.6 If the equipment is not available at the time of earthing conductor laying tap connections from the main earthing conductor shall be brought out up to slab equipment foundation level with at least 200 mm spare length left for further connections to equipment earthing terminals.

4.7.16.7 Entire system shall be earthed in accordance with the provisions of the relevant IEC recommendations/IS code of practice IS 3043-1947 and Indian Electricity Rules, so that the values of the step and contact potentials in case of faults are kept within safe permissible limits.

4.7.16.8 Parts of all electrical equipment and machinery not intended to be live shall have two separate and distinct earth connections each to conform to the stipulation of the Indian Electricity Rules and apparatus rated 240 V and below may have single earth connections.

4.7.16.9 If any outer shops and buildings as well as the electrical sub-stations and electrical rooms are also in contractor's scope, a ring main earthing system will be provided. Ring main earthing systems shall again be inter connected as a net work to power plant main earthing mat. Internal earthing ring in the electrical equipment room provided by the contractor whether equipment of the area is in their scope of not.

4.7.16.10 For different floors in a building, localized internal earthing ring shall be formed and connected to the ground earthing through vertical risers. The earthing mat shall be common to both power and lighting installations.

4.7.16.11 A minimum of two spare earth rings will be provided in each floor of the building for earthing future building.

4.7.16.12 Each RCC steel column of the building will be interconnected to the floor-earthing grid in basement/ground floor.

For protective earthing separate conductor shall be used for flow of earth fault current as elaborated below:

4.7.16.13 Contractor shall carry out minor civil i.e. chipping of floor (where earth strip is to be laid on floor), removal of topsoil for laying earth strip.

4.7.17 TAN DELTA TEST ON GENERATOR, GT BUSHING & STATION TRANSFORMER BUSHING AND DISTRIBUTION TRANSFORMER BUSHINGS..

Contractor shall arrange required testing equipments for carrying out tan delta test on all the bushings of GT, ST & Distribution transformer before their erection and tan delta testing on GT, ST & Distribution transformer with their bushings before charging of transformers.

4.7.18 11 KV HT SWITCHGEAR,

1. Checking of installation for correctness.
2. Mechanical functional checking/ adjustment of individual breaker.
3. Measurement of Insulation resistance of individual breaker, complete switchgear board and combined insulation resistance of individual breaker with cable connected to drives.
4. Testing of Protection Relay, Thermal over relay, Power transducers Energy/ Ammeters, Voltmeters, Power factor, frequency, tri-vector meters & metering etc. in static & dynamic condition relay
5. Conducting test such as Insulation Resistance measurement, Ratio, polarity, magnetisation characteristic, winding resistance on CT and PT.
6. Checking of electrical control & protection interlock of individual breaker and integration with other system.
7. Calibration of energy meters, tri-vector meters, voltmeters, ammeters, power current & voltage transducers etc.
8. Provide assistance for checking the electrical operation of individuals breakers from remote panels / MMI package.

In price Bid Part –II under head “NN” lump sum rate is to be quoted for integrated electrical testing as defined above clauses, which also includes the items covered under the head BB.

However contractor shall carry out all electrical tests, functional checks etc; for those items mentioned under "Testing & Commissioning" heads in the price bid within the quoted rate.

Wherever combined quote is asked for Erection & Commissioning in price bid for respective item head, no separate payment shall be made for commissioning.

In case Contractor has not done similar work, they are free to tie –up with the experienced agency who has carried out similar nature of work and having adequate resources i.e. experienced manpower, T&Ps / testing/ measuring instruments. Contractor shall submit documents in support of such tie –up arrangement of such parties along with the offer. Credential of such parties shall be submitted with technical bid along with tie-up MOU.

4.7.19 MISC.OTHER INSTRUMENT/ EQUIPMENT CALIBRATION, ERECTION, TESTING, AND COMMISSIONING.

A Contractor shall carry out testing & commissioning of panels, electrically operated valves, pneumatic control valves, pneumatic trip valves, solenoid valves, limit switches, HT/LT motors including drying out, and any other integral devices forming part of various mechanical skids/equipments, & piping etc.

B The scope of commissioning of electrically operated actuators for valves, dampers, gates etc., will include meggaring, adjustments of mechanical/ electrical or electronic position transmitters, setting of limit/torque switches, cable checking, internal wiring checking, local/remote operation, replacement of limit/torque switches if required.

C The scope of commissioning of devices like solenoid valves, feedback position transmitter, limit switches, air filter regulator, airlock relay, positioner etc. Which are integral part of pneumatic control valves/ power cylinder/ trip valves etc. And electrically operated valve will involve adjustments/servicing, calibration etc. As incidental to work, contractor shall remove such devices prior to erection either at site or at store to avoid damage/pilferage and for keeping in safe custody. These shall be installed at appropriate stage as instructed by BHEL.

D Whenever additional instrumentation work viz gauges, transmitters, temperature elements, is to be carried out for performance guarantee test, the same has to be executed by the contractor as per the rate applicable already provided in the rate schedule.

4.7.20 CALIBRATION, TESTING & COMMISSIONING

Calibration, testing & commissioning activity as specified in this technical specification and rate schedule against various equipments, devices, systems etc. Are broadly described hereunder. However, there may be some overlapping between the activities, i.e. Erection, calibration and testing, commissioning. The classification of each activity is only a guideline for understanding the volume of work in each activity. The contractor shall have no claim for performing or providing manpower assistance for such overlapping work, which is also within the scope of work.

A CALIBRATION

1. Verification of instruments for range, type etc; with respect to instrument schedule, data sheet or system document.
2. Codification of instruments as per system tag numbers
3. Calibration/adjustment of instrument as per system requirement/set values.
4. Providing head correction in case of pressure measuring instruments.
5. Verification of installation of instruments for range, type, tag number as per physical location of process point as per process, instrumentation diagram.
6. Checking and ensuring the proper functioning of instruments.
7. All the recorders shall be made functional with proper chart movement and ink marking.
8. Preparation of calibration certificates and erection commissioning protocols.

B ERECTION

1. Drawal of material from store, verification, inspection as per shipping list, drawings and documents.
2. Preservation, upkeep, safe custody of the erected equipments till handing over.
3. Verification of installation as per drawing and document for the correctness of cabling, jbs, impulse pipe, various field device, panels, instruments etc.
4. Continuity check & IR value of cables.
5. Verification of correction of cable termination with respect to instrument, electrical hook-up diagram, panel interconnection diagram, jb schedule.
6. Checking earthing of the equipments and cable shield wire continuity.
7. Energizing the functional group control panels and field devices.
8. Flushing of impulse pipe before making the instruments process connections through.
9. Any leakage damages to impulse pipe, field device connections, air connections etc. Shall be fully attended by contractor.

C. TESTING & COMMISSIONING

1. Checking/verification of binary/analog input and output signal from field and panel and upto recording/indicating instrument/MMI monitors.
2. Adjustment, testing, calibration of pneumatic drive (control valve, trip valve, power cylinder for gate/dampers etc), electrical actuator operated valve/gate/dampers of other functional elements.
3. Checking and operating electrical/pneumatic drive through functional group panel, remote control desk, MMI, CRT operation and repeatability and smooth operation to be checked.
4. Checking the interlock, protection and alarm for various processes by stimulation of field devices/process changes.
5. Functional check of sub-loop control, sub group control and auto loop and fine-tuning.
6. Adjustment of limit switches/feed back position transmitter checking the limit switches. of actuator for correct position indication and repeatability shall be ensured.
7. HT/LT motor IR value measurement, bearing/winding RTD checking, checking the HT lead connector, providing assistance for trial run of motor which includes monitoring temperature rise winding/bearing during trial run.
8. Contractor shall prepare calibration/testing report/protocols.
9. During trial run of various systems, the performance of any instrument found erratic, un-satisfactory are required re-adjustment, re-calibration etc. Contractor shall attend to the defects.
10. Observing and checking the performance of the various devices on load/process variation. Any deficiencies/defect noticed during the variable load conditions, the same shall be attended promptly.
11. Observe the proper functioning of sub-group/sub-loop control.
12. Check the operation of various control in manual /auto mode for smooth functioning.
13. Clearing of all bad signals arising during commissioning.
14. Any wiring correction or minor modification in control panel wiring noticed during the pre-commissioning, it shall be carried out.

4.7.21 PAINTING

Colour Banding, Legend and Identification Marking, Direction Marking etc. shall be in scope of the contractor for all items (Erection or Commissioning) in the scope of the contractor.

Irrespective to scopes of painting & supply of paint mentioned elsewhere it is to be noted that supply of paint, primers, other consumables etc for all primer/painting works to be done by the contractor, shall be in Contractor's scope. No dispute shall be entertained on the above matter.

All exposed metal parts of the equipment including supports, structures, etc., as applicable shall be painted after thoroughly cleaning the surface from dust, rust, greases, oils, scales, etc, by wire brush, scrapping, sand/shot blasting etc; as specified in relevant erection documents. The above parts shall then be painted with specified two coats of specified paint over the shop primer/paint. Also, where the shop primer/paint has peeled off, the affected area shall be cleaned thoroughly by the specified method and then primer coat applied. Similarly, certain components may be supplied without any primer/paint coat from shop. The surface of such items shall be cleaned as per specifications, coated with suitable primer and then coated with final paint coats. The dry film thickness after final coat should be as per specification. The color, shade etc. shall be as per specification. Painting schedule will be furnished at site. The scope of painting work is for the following areas.

4.7.22.1 TRANSFORMERS & BUS DUCTS

Transformers and Bus Ducts erected by the contractor shall be painted with two coats of Finish Paint after thoroughly cleaning the surface from dust, rust, greases, oils, scales, etc, by wire brush, scrapping, machine buffing, water washing and any other appropriate method as specified in relevant erection documents. Bus Ducts shall first be coated with two coats of Primer before application of Finish Paint. Touch-up primer coat shall also be applied on Transformers as and where necessary. Supply of paints, etc for the above is in the scope of the contractor

4.7.22.2 STRUCTURALS
Structural components may be supplied without any primer/paint coat from shop. The surface of such items shall be cleaned as per specifications and then coated with two coats of ROZC (IS:2074) Primer. Supply of Primer, etc is included in the scope of the contractor.

4.7.22.3 Panels and Junction Boxes
Panels and Junction Boxes shall be Touch-up painted as and where original shop paint is peeled off. Necessary surface cleaning and preparation shall be done by the contractor as per relevant painting codes followed by two coats of Primer and two coats of Finish Paint. All necessary paints, primers, etc are to be arranged by the contractor within the quoted rates
Primers, Paints etc.

4.7.22.4 The contractor shall provide the Primer (ROZC as per IS:2074) for the scope of painting work indicated in Section-4 as well as for protection of site weld joints and gas cut locations. Contractor shall also arrange to provide the required thinner and other consumables, T&P etc required for application of ROZC Primer. All paints and thinners shall be sourced only from BHEL approved manufacturers. Some of them are as listed under.

1) M/s Asian Paints

2) M/s Berger paints
3) M/s Jenson & Nicholson
4) M/s Shalimar Paints

4.7.22.5 LABELS & MARKING –

Contractor shall fix danger boards, phase identification plate, Identification marking on towers / gantry/equipments by paint. No separate payment is envisaged for such work and shall be executed as a part of respective items as detailed in rate schedule

4.7.22.6 Supply of paint, primers, other consumables etc for above and any other scope in these specifications shall be in Contractor's scope.

4.7.23 Troubleshooting during plant operation

During pre-commissioning / commissioning stages when the plant will be under various stages of operation, it will be necessary to have continuous (day and night) presence of suitable manpower along with required tools to attend to any defects etc that may arise during such operation. The contractor will be required to put such personnel in shifts in both electrical and C&I area. The bidder must also take this aspect into consideration.

4.7.24 Equipments/instruments etc., under the above scope of erection and commissioning are generally dispatched from BHEL's manufacturing units / vendor's works at site well before start of erection. Sometimes, such dispatched materials may get stuck up with transporters/railways. The contractor shall provide support / manpower for necessary chase up for removal of such bottlenecks in transportation. Also, for smaller items, it could be necessary to depute his person to personally carry certain items from works to site. Requirement of such activities which will be decided by BHEL engineer and chase up activities, if required, shall be performed under authorization by BHEL. The above services shall be provided without any additional price to BHEL.

4.7.25 TRANSFORMER RAILS

1. Transportation of rail track and guide channels from stores/storage yard to erection site, Laying, alignment, Fixing of rails and guide channels as per civil drawing.(including fixing of lugs / insert required for fixing of above).
2. The concreting for RCC raft shall be done in two stages by civil agency/ customer as per drg.
3. Fixing of rails shall be done as per the sequence given in civil drg.
4. Fixing of the rails/guide channels shall be paid under relevant items of bill of quantity.
5. A gauge to be fabricated for parallel alignment checking, the fabrication of Gauge is in scope of work and no separate rate shall be payable.
6. The civil drg is only indicative and for understanding the scope of work.
7. Detail drawing shall be provided by customer / BHEL at the time of execution of work
8. During concreting proper supervision required to avoid any deformation of rail track.

It may be noted by Contractor that Price Bid is meant for Three Units. But particularly for Transformer Rails, the tentative quantity indicated in rate schedule is for three units.

Section-5

Special Conditions

5.0 Obligations Of The Contractor

5.1 Labour Colony

BHEL'S customer will provide the open land with single point for drinking water and electricity. Contractor shall make further arrangements for constructing the labour colony and including lighting, water distribution and suitable provisions of drainage/sanitation.

5.2 Staff colony

Contractor has to make their own arrangements for accommodation of their staff at site. BHEL / SMHPCL shall not provide any facility in this regard.

5.3 Tools And Tackles, MME

5.3.1 The contractor shall provide all required Tools and Plants, inspection, Measuring and Monitoring Equipments (MME), Handling & Transportation Equipments for the scope of work covered under these specifications. An indicative list of major T&P and MME to be deployed by the Contractor is given in the relevant **Appendix I**. It may be noted that this list does not intend to exhaustively cover the contractor's responsibility with regard to T&P to be deployed by him. BHEL will provide the services of their T & P listed in relevant Appendix, free of charge, on sharing basis. Refer section-7 for further details in this regard.

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

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

The contractor shall provide all the necessary scaffolding materials, temporary structures and necessary safety devices etc, during pre -assembly, erection, testing and commissioning of the hydro sets.

5.3.4 Contractor shall maintain and operate his tools and plants in such a way that major breakdowns are avoided. In the event of major breakdown, contractor

shall make alternate arrangements expeditiously so that the progress of work is not hampered.

5.3.5 In the event of contractor failing to arrange the required tools, plants, machinery, equipment, material and non-availability of the same owing to breakdown, BHEL shall have right to make alternate arrangement at the contractor's risk and cost.

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

5.3.7 Holders, welding cables, connecting cables to equipments and other welding accessories including temporary electrical connection from construction power point to individual equipment like winches, hoisting equipment, welding generators, transformers, and other construction equipment shall be arranged by the contractor.

5.3.8 The contractor at his cost will carry out periodical testing of lifting equipments and calibration of measuring instruments and certificates produced for the same to BHEL. Periodicity shall be as per BHEL's requirement.

5.3.9 Contractor shall provide T&P and tackles for loading of materials at SMHPCL/BHEL stores/shed/yard and transport for shifting the materials to site. As far as possible SMHPCL's EOT crane will be provided to the contractor for unloading of the materials only . Where & when required In the event of EOT crane not being available due to any reasons, the contractor shall use his crane for unloading of materials at site.

The contractor shall provide all the necessary steel scaffolding materials, temporary structures and necessary safety devices etc. during preassembly, calibration, erection, testing and commissioning of the equipment.

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

5.3.10 Wooden sleepers etc required for stacking of materials at site shall be arranged by the contractor

5.4 Consumables

5.4.1 The contractor shall provide all consumables required for carrying out the work covered under this scope of work excepting those which are specifically indicated as BHEL supply.

5.4.2 Wherever required consumables to be used for the work shall have prior approval of BHEL engineer in regard to quality specifications. **Test reports/ certificates in respect of these consumables, wherever applicable, shall be submitted to BHEL engineer**

5.4.3 If at any time during the execution of work, it is noticed that the work is suffering on account of shortage/non-availability of consumables from the contractor's side like electrodes, gases and other consumables, then, BHEL will make alternate arrangements and the necessary costs with overheads at 30% will be recovered from the running bills of the contractor.

5.4.4 Primers, Paints etc.

The contractor shall provide Primer (ROZC as per IS:2074), Synthetic Enamel Paint (IS:2932) and Aluminum Paint – as necessary for respective painting area for the scope of painting work indicated in Section-4 as well as for protection of site weld joints and gas cut locations. Contractor shall also arrange to provide the required thinner and other consumables, T&P and implements etc. required for application of Primer and Paints. All primers, paints and thinners shall be sourced by contractor only from BHEL approved manufacturers. Some of them are as listed under.

1. M/s Asian Paints
2. M/s Berger paints
3. M/s Jenson & Nicholson
4. M/s Shalimar Paints

Any other BHEL approved manufacturers

5.5 Field Office and Stores

5.6.1 The contractor shall make his own arrangements for field office with necessary equipments, tools room, clerical staff, and storekeeper etc, for the execution of the work.

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The work under this scope being quite sophisticated and also quite extensive, for proper planning, monitoring, reporting, etc of ongoing works, the contractor shall establish his own computer(s) and printer(s) at his site office, along with suitable operator(s), consumables, etc*. Non-establishment of above equipment will attract penalty @ Rs 10000 (Rs Ten thousand only) per month.*
BHEL uses its own software SOMS (Site Operation and Management System) for total project execution and billing. The contractor shall also provide adequate and suitable manpower for updating / entries into SOMS in BHEL computers at site.

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

5.7 Area Lighting

Contractor shall arrange adequate floodlights, hand lamps and area lighting. Provision of distribution lines for lighting from the single point to the required place with proper distribution boards, observing the safety rules laid down by the electrical authorities of the state shall be done by the contractor including all the materials like cables, fuses, switch boards etc

5.8 Construction Power and Water

5.8.1 Construction Power

SMHPCL / BHEL will not provide any construction power

1. Contractor shall arrange Diesel Generating sets/Alternative source of power of adequate rating within the quoted price. Fuel, operation and maintenance of the DG sets/Power Source are in the contractor's scope.

2. Distribution of power supply to the work points of both the units and erection bay etc & maintenance of such electrical system is covered in the scope of contractor.

5.8.2 Lighting

5.8.2.1 The contractor, at his cost should arrange for temporary lighting, besides the local lighting arrangement, that may be required for execution of the work. Contractor shall arrange adequate floodlights, hand lamps and area lighting

5.8.2.2 All temporary wiring & installations for construction power & lighting must comply with local regulations and will be subjected to engineer's inspection and approval before connecting to supply point.

5.8.2.3 It shall be the responsibility of the contractor to provide, maintain the complete installation on the load side of the supply with due regard to the safety requirements at site.

5.8.3 Water & Compressed Air

Water for construction/hydraulic testing of spiral casing and repetition of hydraulic test if any shall be arranged by contractor from the nearby source / river by installing suitable pumps and temporary piping etc. Contractor has to make own arrangement for Diesel engine operated air compressor for their work.

5.8.4 Responsibilities of the Contractor in Respect of Local Law and Employment of Workers etc.

5.8.5 Contractor shall adhere to the responsibilities stated vide clause no. 2.8 of general conditions of contract**.**

5.9 Insurance

5.9.1 BHEL shall arrange for the comprehensive insurance covering all risks including third party liability and damage/loss occurring during the internal transport, but such loss/damage is limited to only the consignments transported. The contractor has to arrange on his own, insurance for their T&P and other fixed assets, which he may have to acquire and deploy at site.

It is also the responsibility of the contractor to arrange for accident risk policy/workmen compensation policy. The contractor has to provide all assistance in processing the insurance claims covered by the said comprehensive insurance policy that is taken by BHEL

Please refer relevant clauses of GCC .for contractor's responsibility in this regard.

5.9.2. The contractor should satisfy BHEL that an accident insurance policy of their employees is taken before starting of the works and the policy is kept in force till the work is completed. If required, recoveries will be made from the contractor's bill for any liabilities for the accident and refund of the same shall be considered later after the claim is fully settled by insurance authorities.

5.9.2.1 ESIC

Void

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5.10 **Contract Labour**

5.10.1
The contractor in the event of his engaging 10 or more workmen will obtain independent license under the Contract Labour (regulations and abolition) Act 1970 from the concerned authorities based on the certificate (form –V) issued by the principal employer/customer.

5.10.2 Provident Fund

Contractor will deduct the necessary amount from his employees towards provident fund and contribute equal amount as per government of India labour laws. Contractor regularly to the provident fund commissioner and get the account code will deposit this amount. Contractor shall submit the account code duly certified by pf commissioner to BHEL project in-charge.

5.10.3
Contractor shall also comply with the provisions of ESIS act in vogue and submit evidence thereof to BHEL site in-charge. All other expenses such as employees' benefits to be borne by the contractor as per the labour laws. Contractor shall produce necessary certificates towards their compliance with such statutes and payment of all statutory dues.

5.10.4
Contractor shall also comply with the requirements of local authorities/ project authorities calling for police verification of antecedents of the workmen, staff etc

5.10.5
Where applicable, provisions of workman compensation act shall be adhered to.

5.10.6
BHEL/customer may insist upon witnessing the regular payment to the labour. They may also like to verify the relevant records for compliance with statutory requirements. Contractor shall enable such facilities to BHEL/ Customer.

5.11 TAXES, DUTIES, LEVIES

5.11.0 TAXES, DUTIES, LEVIES

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

5.11.1
The contractor shall pay all (save the specific exclusions as enumerated in this contract) taxes, fees, license charges, deposits, duties, tools, royalty, commissions or other charges which may be levied on the input goods & services consumed and output goods & services delivered in course of his operations in executing the contract. In case BHEL is forced to pay any of such taxes, BHEL shall have the right to recover the same from his bills or otherwise as deemed fit.

However, provisions regarding Service Tax and Value Added Tax (VAT) on output services and goods shall be as per following clauses.

5.11.2 Service Tax & Cess on Service Tax

Service Tax and Cess on Service Tax as applicable on output Services are excluded from contractor's scope; therefore contractor's price/rates shall be **exclusive** of Service Tax and Cess on Output Services. In case, it becomes mandatory for the contractor under provisions of relevant act/law to collect the Service Tax & Cess from BHEL and deposit the same with the concerned tax authorities, such applicable amount will be paid by BHEL.

Contractor shall submit to BHEL documentary evidence of Service Tax registration certificate specifying name of services covered under this contract. **Contractor shall submit serially numbered Service Tax and Cess Invoice, signed by him or a person authorized by him in respect of taxable service provided, and shall contain the following, namely,**

I. **The name, address and the registration number of the contractor,**
II. **The name and address of the party receiving taxable service,**
III. **Description, classification and value of taxable service provided and,**
IV. **The service tax payable thereon.**

All the four conditions shall be fulfilled in the invoice before release of service tax payment.
Contractor shall obtain prior written consent from BHEL before billing the amount towards such taxes.

With introduction of Cenvat Credit Rules 2004, which came into force w.e.f. 10.09.2004, Excise Duty paid on Input Goods including Capital Goods and Service Tax paid on Input Services that are used for providing the output services can be taken credit of against the Service Tax payable on output services. However BHEL may opt for availing the abatement provision in which case cenvat credit may not be available on input duty.

5.11.3 VAT (Sales Tax /WCT)

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

5.11.4 Modalities of Tax Incidence on BHEL

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

5.11.5 New Taxes/Levies

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

In case any new tax/levy/duty etc. becomes applicable after the date of Bidder's offer, the Bidder/Contractor must convey its impact on his price duly substantiated by documentary evidence in support of the same **before opening of Price Bid**. Claim for any such impact after opening the Price Bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.

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

5.12 Submission of Periodical Reports

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

1) Consumption of welding electrodes and gases
2) Consumption of construction power
3) Manpower reports
4) Progress reports – periodically
5) Field calibration reports

BHEL at site will inform formats for these reports.

5.13

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

5.14ELECTRICAL INSPECTORATE'S APPROVAL /STATUTORY INSPECTION

5.14.1 Contractor shall have/obtain valid Electrical Contractors License to carry out the Erection, Testing & Commissioning work on High/Low Voltage Electrical Equipments from the appropriate statutory authority of the concerned state or Central Electricity Authority, as the case may be. All fees and expenses in this regard shall be in the contractor's account

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5.14.2 The contractor has to arrange electrical licence to work in the state of madhyapradesh within a 6 weeks of mobilisation at site for carrying out the works covered under this contract. Failure to arrange the requisite licence shall invite levy of non refundable penalty at the rate of Rs 1.0 lakh per month deductable from running bills till it is obtained

5.14.3 Contractor shall arrange inspection of concerned Statutory Authority for the installation, testing & commissioning of High / Low voltage equipments covered under the scope of work in this tender specification and obtain their approval in appropriate format prior to charging of the equipments.

5.14.4 Contractor shall be responsible for all necessary liasioning work with Statutory Authority towards the certification of installation / works. BHEL will pay Statutory Fees in respect of inspection of installations as per demand note/challan issued by the statutory authority. All other expenses shall be borne by the Contractor. BHEL/ BHEL's Customer shall be providing technical assistance, drawing & document for submission to Statutory Authority. Contractor shall provide all logistics services in this regard.

SECTION-6

SPECIAL CONDITIONS OF CONTRACT

6.0 CONTRACTOR'S OBLIGATION IN REGARD TO EMPLOYMENT OF SUPERVISORY STAFF AND WORKMEN

6.1 Supervisory Staff and Workmen

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

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

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

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

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

6.6 WATCH AND WARD

Contractor has to arrange and provide watch and ward round the clock. Any theft or damage of component due to negligence of the contractor will have to be replaced/repaired by the contractor. The areas are unit control room and field.

6.7 Industrial Relations and Labour Laws

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

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

6.9 Site Organization.

Contractor shall employ only qualified and experienced engineers/supervisors for this job. They shall have professional approach in executing the work having adequate knowledge and experience in the fields of erection, erection methodology, calibration, testing and commissioning, quality control and quality assurance procedures, planning, safety etc., required to undertake the type of work as per this tender.

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

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

Contractor should provide a team of engineers with proven experience of erection, testing/ commissioning of electrical equipments as specified in tender specification. They shall be in a position to undertake specific assignments during the start up/ post start up/stabilization.

The contractor shall deploy adequate laboures and supervisory staff in the following areas.

A) Overall planning, monitoring & control

B) Equipments Erection

C) Welding & NDT & Stress Relieving operators, induction.

D) Testing & Commissioning

E) Quality Control and Quality Assurance

F) Materials Management

G) Safety, Fire & Security

H) Industrial Relations and Fulfillment of Labour Laws and Other Statutory Obligations.

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

SECTION-7

SPECIAL CONDITIONS OF CONTRACT

7.0 Obligations Of BHEL

7.1 Facilities Provided By BHEL

7.2 Space For Field Office

Refer section-5 in this regard.

7.3 Construction Water

Refer section-5 in this regard.

7.4 Construction Power

Refer section-5 in this regard.

7.5 Other Materials and Consumables:

BHEL will supply consumables free of charges as listed in relevant **Appendix**.

7.6 Test Blanks (Plates & Pipes)

Test pieces for qualification of structural welders shall be supplied by the Contractor.

7.7 Filler Wire and Welding Electrodes

All the welding consumables shall be arranged by contractor.

7.8 **Tools & Plants**

BHEL will provide the Tools & Plants listed in relevant **Appendix** free of charges on sharing basis.

BHEL will also provide any special tools that are supplied by BHEL manufacturing units/vendors/suppliers as special installation tools under regular DU/DESS numbers in various product groups free to contractor. Contractor shall return these tools after the completion of the specific task for which such tools are intended, in good working order after proper servicing/overhauling.

SECTION-8 (Rev 01, 24/01/2009)
SPECIAL CONDITIONS OF CONTRACT

8.0 Inspection/Quality Assurance/Quality Control/ Statutory Inspection

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

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

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.

8.3 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 / leveling readings and inspection details of various equipments etc.

High pressure welding details like serial number of weld joints, welders name, date of welding, details of repair, heat treatment etc. will be documented in welding log as per BHEL Engineer's instructions.

Record of radiography containing details like serial number of weld joints, date of radiography, repairs, if any, re-shots etc shall also be maintained as per BHEL Engineer's instructions.

Record of heat treatments performed shall be maintained as prescribed by BHEL.

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

8.5 All the welders shall carry identity cards as per the proforma prescribed by BHEL/Customer/Consultant. Only welders duly authorized by BHEL/customer/consultant shall be engaged on the work.

8.6 Contractor shall provide all the measuring monitoring devices (MMDs) required for completion of the work satisfactorily. These MMDs shall be of brand, quality and accuracy specified by BHEL Engineer and should have necessary calibration and other certificates as per the requirement of BHEL Engineer. Decision of BHEL Engineer regarding acceptance or otherwise of the measuring instruments/gauges/tools for the work under this specification, is final and binding on the contractor. The indicative list of MMDs required for this work and to be made available by the contractor is given in relevant appendix. The list will be reviewed by BHEL and the contractor shall meet any augmentation needed wherever required.

8.7 It is the responsibility of the contractor to prove the accuracy of the testing/measuring/calibrating equipments brought by him based on the periodicity of calibration as called for in the BHEL's quality assurance standards/BHEL Engineer's instructions.

8.8

Any re-laying or re-termination of cables/re-erection of instruments/ recalibration of instruments etc. required due to contractor's mistake or design requirement and found at any stage inspection, shall be carried out by the contractor at no extra cost.

8.9 BHEL, Power Sector – Western Region (PSWR) has already been accredited with ISO 9002 certification and as such this work is subject to various audits to meet ISO 9002 requirements. One particular aspect which needs special mention is about arrangement of calibration of instruments by the contractor. Contractor shall ensure deployment of reliable and calibrated MMDs (Instrument Measuring and Test Equipment). The MMDS shall have test / calibration certificates from authorised / Government approved / Accredited agencies traceable to National / International Standards. Re-testing / re-calibration shall also be arranged at regular intervals during the period of use as advised by BHEL Engineer within the contract price. The contractor will also have alternate arrangements for such MMDs so that work does not suffer when the particular equipment / instrument is sent for calibration. Also if any MMDs not found fit for use, BHEL shall have the right to stop the use of such item and instruct the contractor to deploy proper item and recall ie repeat the readings taken by that instrument, failing which BHEL may deploy MMD and retake the readings at Contractor’s cost.

8.10 Re-work necessitated on account of use of invalid MMDs shall be entirely to the contractor’s account. He shall be responsible to take all

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

8.11 In the courses of erection, it may become necessary to carry repeated checks of the work with instruments recently calibrated, re-calibrated. BHEL may counter/ finally check the measurements with their own MMDs. Contractor shall render all assistance in conduct of such counter/final measurements.

8.12 Vibration indicators / vibration recorders / vibration analysers will be provided by BHEL for checking and analysing vibration levels of rotating equipments with necessary operators. Contractor shall provide necessary labour for carrying out such tests.

8.13 Total Quality is the watchword of the work and Contractor shall strive to achieve the Quality Standards, procedures laid down by BHEL. He shall follow all the instructions as per BHEL drawings and Quality Standards. Contractor shall provide the services of Quality Assurance Engineer.

8.14 Stage Inspection By FES/QA Engineers

Apart from day-to-day inspection by BHEL Engineers stationed at Site and Customer's Engineers, stage inspection of equipments under erection and commissioning at various stages shall also be conducted by teams of Engineers from Field Engineering Services of BHEL's Manufacturing Units, Quality Assurance teams from field Quality Assurance, Unit/Factory Quality Assurance and Commissioning Engineers from Technical Services etc. Contractor shall arrange all labour, tools and tackles etc for such stage inspections free of cost.

8.15 **Any modifications suggested by BHEL FES and QA Engineers' team shall be carried out. Claims of contractor, if any, shall be dealt as per Section 13, and provided such modifications have not arisen for reasons attributable to the contractor.**

Statutory Inspection of Work

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

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

1) Inspectorate of steam boilers and smoke nuisance

2) Factory Inspector, Labour Commissioner, Electrical Inspector PF Commissioner and other authoritiy connected to this project work

The scope includes getting the approvals from the statutory authorities, which includes arranging for inspection visits of statutory authority periodically as per BHELl Engineer's instructions, arranging materials for ground inspection, taking rub outs for the pressure parts to be offered for inspection, submitting co-related inspection reports, documents, radiographs etc and following up the matter with them. Contractor shall also make all arrangements for offering the Products / Systems for inspection at location, as applicable, to the concerned authority.

8.17 Contractor should be qualified to execute pressure parts & piping work coming under the purview of IBR, for which he should register himself with CIB of state concerned. contractor also should be aware of the latest IBR regulations and Electricity Act, including the amendments thereof.

8.18 All fees connected with the contractors for testing his welders / men / workers and testing, inspection, calibrating of his instruments and equipments, shall be paid by the contractor. It shall be contractor's responsibility to obtain approval of Statutory Authorities, wherever applicable, for the conducting of any work which comes under the purview of these authorities.

8.19 Other fees like fees for periodic visits, hydraulic test fees, light up inspection fees etc. shall be borne by the contractor.

8.20 Payment of Registration fees for Boiler is excluded from the scope.

8.21 BHEL shall pay the ground inspection fees of Boiler Inspectorate. All other arrangements for site visits periodically by Boiler Inspector to site, for obtaining Inspection certificate etc, will have to be made by contractor.

8.22 The quality management system of BHEL, Power Sector – Western Region (PSWR) has already been certified and accredited under ISO 9002 standards in this regard. The basic philosophy of the quality management system is to define the organizational responsibility, work as per documented procedures, verify the output with respect to acceptance norms, identify the non-conforming product/ procedure and take corrective action for removal of non-conformance specifying the steps for avoiding recurrence of such non-conformities, & maintain the relevant quality records. The non-conformities are to be identified through the conduct of periodical audit of implementation of quality systems at various locations/stages of work. Suppliers/vendors of various products/services contributing in the work are also considered as

part of the quality management system. .as such the contractor is expected not only to conform to the quality management system of BHEL but also it is desirable that they themselves are accredited under any quality management system standard.

Field Quality Assurance

8.23 Contractor shall carry out all activities conforming to the approved Field Quality Plan (FQP) as revised from time to time. Total quality shall be the watchword of the work and contractor shall strive to achieve the quality standards, procedures laid down by BHEL. He shall follow all the instructions as per BHEL drawings and quality standards. Contractor shall provide the services of quality assurance engineer as per the relevant clauses.

SECTION-9

SPECIAL CONDITIONS OF CONTRACT

SAFETY, OCCUPATIONAL HEALTH AND ENVIRONMENTAL MANAGEMENT

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

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

9.0 Responsibility of the Contractor in Respect of Safety of Men, Equipment, Material and Environment.

9.1 The Contractor shall:

9.1.1

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

9.1.2

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

9.1.3

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

9.1.4

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

9.1.5

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

i) Name of Contractor
ii) Name of Contractor Site-in-charge & Telephone number
iii) Job Description in short

iv) Date of start of job
v) Date of expected completion
vi) Name of BHEL Site-in-charge.

9.1.6
Abide by the rules and regulations existing during the contract period as applicable for the contractors at the Project premises.

9.1.7
Observe the timings of work as advised by BHEL Engineer-in-charge for carrying out the contract work.

9.2 SPECIAL CONDITIONS

9.2.1 Safety

9.2.1.1 Safety Plan

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

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

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

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

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

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

9.2.1.5
All electrical equipment, connections and wiring for construction power, its distribution and use shall conform to the requirements of Indian Electricity Act and

Rules. Only electricians licensed by the appropriate statutory authority shall be employed by the contractor to carryout all types of electrical works. All electrical appliances including portable electric tools used by the contractor shall have safe plugging system to source of power and be appropriately earthed.

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

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

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

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

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

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

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

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

9.2.1.14
Only authorized persons holding relevant license will drive and operate site plant and equipments e.g. cranes, dumpers, excavators, transport vehicles etc

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

9.2.1.16

Gas Cylinders shall be handled and stored as per Gas Cylinders Rules and relevant safe working practices

9.2.1.17
All wastes generated at Site shall be segregated and collected in a designated place so as to prevent spillage/contamination/scattering at Site, until the waste is lifted for disposal to designated disposal area as advised by BHEL official.

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

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

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

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

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

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

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

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

9.2.1.25
If the contractor fails to improve the standards of safety in its operation to the satisfaction of BHEL after being given a reasonable opportunity to do so, and/or if the contractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instructions regarding safety issued by the authorized BHEL official, BHEL shall have the right to take corrective steps at the risk and cost of the contractor after giving a notice of not less than seven days indicating the steps that would be taken by BHEL.

9.2.1.26 **Emergency Response**

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

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

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

9.2.1.27
At least 5% Contractors supervisors and workmen shall undergo training in administering 'First Aid'. The trained persons should represent for all categories of work and for all areas of work. Adequate number of trained persons should be available for each shift. These first aides shall be included in the emergency response team. Contractor employees and workmen are encouraged to participate in first aid training programmes whenever organized by BHEL.

9.2.2 OCCUPATIONAL HEALTH

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

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

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

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

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

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

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

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

9.2.2.8
Adequate arrangements shall be made to provide safe drinking water

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

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

9.2.3.0 HYGIENE and HOUSEKEEPING

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

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

9.2.3.3
BHEL may take up appropriate remedial measures at the cost of the contractors if the contractors fail in good house keeping and if there is an imminent risk of pollution

9.2.4 ENVIRONMENT MANAGEMENT

9.2.4.1

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

9.2.4.2 WASTE MANAGEMENT

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

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

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

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

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

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

9.3 SUPERVISION

9.3.1

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

9.3.2

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

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

9.3.3

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

9.3.4

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

9.4.0 **TRAINING & AWARENESS**

9.4.1

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

9.4.2

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

9.4.3

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

9.4.4

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

9.4.5

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

9.5.0 **REPORTING**

9.5.1

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

9.5.2

Any injury sustained by any of the contractor's employees within the Project premises must be reported to BHEL supervisor and FIRST AID should be

immediately administered. The Contractor shall be responsible for keeping and maintaining proper records of Accidents to his personnel.

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

9.5.4
According to the Factory Act and the Employees state Insurance Act & regulation, any person sustaining any injury within the project premises and absenting himself from work for more than 46 hours, his accident report has to be sent to the respective Government Authorities. Therefore contractor shall inform the owner's representative such matter immediately for their needful action.

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

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

9.6 **AUDIT REVIEW AND INSPECTION**

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

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

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

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

recommendations for preventing recurrence. Adequacy of corrective actions will be verified

The contractor shall take remedial measures as per the findings of each inspection
Besides the above, the contractor shall be required to carry out the following inspections

Sl no	Equipment	Scope of inspection	Inspection by	Schedule
1	Hand tools	To identify unsafe/defective tool	User	Daily
2	Power tools	To identify unsafe/defective tool	User	Daily
3	Fire Extinguishers	To check pressure and any defect	User / Safety Coordinator	Daily Every month
4	Lifting equipment/tackles	To check for defects and efficacy of brakes	User Third party	Daily Every Year
5	PPE	To check for defects	User	Daily

9.7 **NON COMPLIANCE**:-

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

Sl. No	Instance of Violation	Fine (in Rs)
01	Not Wearing Safety Helmet	50/-
02.	Not wearing Safety Belt	100/-
03.	Grinding Without Goggles	50/-
04.	Not using 24 V Supply For Internal Work	500/-
05.	Electrical Plugs Not used for hand Machine	100/-
06.	Not Slinging property	200/-
07.	Using Damaged Sling	200/-
08.	Lifting Cylinders Without Cage	500/-
09.	Not Using Proper Welding Cable With Lot of Joints And Not Insulated Property.	200/-
10.	Not Removing Small Scrap From Platforms	200/-
11.	Gas Cutting Without Taking Proper Precaution or Not Using Sheet Below Gas Cutting	200/-
12.	Not Maintaining Electric Winches Which are Operated Dangerously	500/-
13.	Improper Earthing Of Electrical T&P	500/-
	Major Accident or Accidents causing partial loss of earning to the victim	50,000/- per victim
14	Fatal Accident or Accidents causing permanent loss of earning to the victim	1,00,000/- per victim

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

9.8

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

9.9 Memorandum of Understanding

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

Memorandum of Understanding

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

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

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

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

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

Name :

Place & Date:

9.10

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

IS No	YEAR	Amd upto	DESCRIPTION
IS 10204	1982		PORTABLE FIRE EXTINGUISHERS MECHANICAL FOAM TYPE
IS 10245	1994		SPECIFICATION FOR BREATHING APPARATUS
IS 10291	1982		SAFETY CODE FOR DRESS DRIVERS IN CIVIL ENGINEERING WORKS
IS 10658	1983		HIGHER CAPACITY DRY POWDER FIRE EXTINGUISHERS (TROLLEY MOUNTED)

IS No	YEAR	Amd upto	DESCRIPTION
IS 10662	1992		COLOUR TELEVISION
IS 10667	1983		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR PROTECTION OF FOOT AND LEG
IS 11037	1984		ELECTRONIC FAN REGULATORS
IS 11057	1984		INDUSTRIAL SAFETY NETS
IS 11451	1998		RECOMMENDATION FOR SAFETY AND HEALTH REQUIREMENT RELATING TO OCCUPATION EXPOSURE TO ASBESTOS
IS 1169	1967		PEDESTAL FANS
IS 1179	1967		SPECIFICATION FOR EQUIPMENT FOR EYE AND FACE PROTECTION DURING WELDING
IS 11833	1986		DRY POWDER FIRE EXTINGUISHERS FOR METAL FIRES
IS 11972	1987		CODE OF PRACTICE FOR SAFETY PRECAUTION TO BE TAKEN WHEN ENTERING A SEWARAGE SYSTEM
IS 1287	1986		ELECTRIC TOASTER
IS 13063	1991		STRUCTURAL SAFETY OF BUILDINGS ON SHALLOW FOUNDATIONS ON ROCKS
IS 13385	1992		SPECIFICATIONS FOR FIRE EXTINGUISHERS 50 LITRE WHEEL MOUNTED WATER TYPE (GAS CARTRIDGES)
IS 13386	1992		SPECIFICATIONS FOR FIRE EXTINGUISHERS 50 LITRE MECHANICAL FOAM TYPE
IS 13415	1992		CODE OF SAFETY FOR PROTECTIVE BARRIERS IN AND AROUND BUILDINGS
IS 13416	1992		RECOMMENDATIONS FOR PREVENTIVE MEASURES AGAINST HAZARDS AT WORKING PLACE PART 1 TO PART 5
IS 13430	1992		CODE OF PRACTICE FOR SAFETY DURING ADDITIONAL CONSTRUCTION AND ALTERATION TO EXISTING BUILDINGS
IS 13849	1993		PORTABLE FIRE EXTINGUISHERS DRY POWDER TYPE (CONSTANT PRESSURE)
IS 1446	1985		CLASSIFICATION OF DANGEROUS GOODS (FIRST REVISION)
IS 1476	1979		REFRIGERATORS
IS 1641	1988		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): GENERAL PRINCIPLES OF FIRE GRADING AND CLASSIFICATION
IS 1642	1989		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS-DETAILS OF CONSTRUCTION
IS 1643	1988		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): EXPOSURE HAZARD
IS 1646	1997		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): ELECTRICAL INSTALLATIONS
IS 1904	1986		CODE OF PRACTICE FOR DESIGN AND CONSTRUCTION OF FOUNDATIONS IN SOIL
IS 1905	1987		STRUCTURAL SAFETY OF BUILDINGS MASONARY WALLS
IS 2082	1985		ELECTRICAL GEYSERS
IS 2171	1985		PORTABLE FIRE EXTINGUISHERS DRY POWDER TYPE (CARTRIDGE)
IS 2309	1989		PRACTICE FOR THE PROTECTION OF BUILDINGS AND ALLIED BUILDINGS AGAINST LIGHTENING
IS 2312	1967		EXHAUST FANS
IS 2361	1994		SPECIFICATION FOR BUILDING GRIPS - FIRST REVISION
IS 2418	1977		TUBULAR FLUORSCENT LAMPS IS 2418 (FT-1)
IS 2750	1964		STEEL SCAFFOLDINGS

IS No	YEAR	Amd upto	DESCRIPTION
IS 2762	1964		SAFE WORKING LOADS IN KGS FOR WIRE ROPE SLINGS
IS 2878	1986		FIRE EXTINGUISHERS CARBON DIOXIDE TYPE (PORTABLE AND TROLLEY MOUNTED)
IS 2925	1984		SPECIFICATION FOR INDUSTRIAL SAFETY HELMETS
IS 3016	1982		CODE OF PRACTICE FOR FIRE PRECAUTIONS IN WELDING AND CUTTING OPERATIONS- FIRST REVISION
IS 3315	1974		DESERT COOLERS
IS 3521	1989		INDUSTRIAL SAFETY BELTS AND HARNESS
IS 368	1983		IMMERSION WATER HEATERS
IS 3696	1991		SAFETY CODE OF SCAFFOLDS AND LADDERS PART 1 TO 2
IS 3737	1996		LEATHER SAFETY BOOTS FOR WORKERS IN HEAVY METAL INDUSTRIES
IS 374	1979		CEILING FANS INCLUDING REGULATORS
IS 3764	1992		EXCAVATION WORK - CODE OF SAFETY
IS 3786	1983		METHOD FOR COMPUTATION OF FREQUENCY AND SEVERITY RATES FOR INDUSTRIAL INJURIES AND CLASSIFICATION OF INDUSTRIAL ACCIDENTS
IS 3935	1966		CODE OF PRACTICE FOR COMPOSITE CONSTRUCTION
IS 4014	1967		CODE OF PRACTICE FOR STEEL TUBULAR SCAFFOLDING
IS 4081	1986		SAFETY CODE FOR BLASTING AND RELATED DRILLING OPERATIONS
IS 4082	1977	1996	STACKING AND STORAGE OF CONSTRUCTION MATERIALS AND COMPONENTS AT SITE
IS 4130	1991		DEMOLITION OF BUILDINGS - CODE OF SAFETY PART 1 TO 2
IS 4138	1977		SAFETY CODE FOR WORKING IN COMPRESSED AIR (FIRST REVISION)
IS 4155	1966		GLOSSARY OF TERMS RELATING TO CHEMICAL AND RADIATION HAZARDS AND HAZARDOUS CHEMICALS
IS 4209	1967		CODE OF SAFETY FOR CHEMICAL LABORATORY
IS 4250	1980		FOOD MIXERS
IS 4262	1967		CODE OF SAFETY FOR SULFURIC ACID
IS 4756	1978		SAFETY CODE FOR TUNNELING WORK
IS 4912	1978		SAFETY REQUIREMENTS FOR FLOOR AND WALL OPENINGS, RAILINGS AND TOE BOARDS
IS 5121	1969		SAFETY CODE FOR PILING AND OTHER DEEP FOUNDATIONS
IS 5182	1969	1982	METHODS FOR MEASUREMENT OF AIR POLLUTION
IS 5184	1969		CODE OF SAFETY FOR HYDROFLUORIC ACID
IS 5216	1982	2000	RECOMMENDATIONS ON SAFETY PROCEDURES AND PRACTICE IN ELECTRICAL WORK PART I AND II
IS 555	1979		TABLE FANS
IS 5557	1995		INDUSTRIAL AND SAFETY LINED RUBBER BOOTS (SECOND REVISION)
IS 5916	1970		SAFETY CODE FOR CONSTRUCTION INVOLVING USE OF HOR BITUMINOUS MATERIALS
IS 5983	1980		SPECIFICATION FOR EYE PROTECTORS - FIRST REVISION
IS 6234	1986		PORTABLE FIRE EXTINGUISHERS WATER TYPE (STORED PRESSURE)
IS 692	1994		CRITERIA FOR SAFETY AND DESIGN OF STRUCTURES

IS No	YEAR	Amd upto	DESCRIPTION
			SUBJECTED TO UNDERGROUND BLASTS
IS 6994	1973		SPECIFICATION FOR SAFETY GLOVES
IS 7155	1986		CODE OF RECOMMENDED PRACTICE FOR CONVEYOR SAFETY (PART 1 TO 8)
IS 7205	1974		SAFETY CODE FOR ERECTION OF STRUCTURAL STEEL WORK
IS 7293	1974		SAFETY CODE FOR WORKING WITH CONSTRUCTION MACHINERY
IS 7323	1994		GUIDELINES FOR OPERATIONS OF RESERVOIRS
IS 7812	1975		CODE OF SAFETY FOR MERCURY
IS 7969	1975		SAFETY CODE FOR HANDLING AND STORAGE OF BUILDING MATERIALS
IS 8089	1976		CODE OF SAFE PRACTICE FOR LAYOUT OF OUTSIDE FACILITIES IN AN INDUSTRIAL PLANT
IS 8091	1976		CODE OF PRACTICE FOR INDUSTRIAL PLANT LAYOUT
IS 8095	1976		ACCIDENTS PREVENTION TAGS
IS 818	1968	1997	CODE OF PRACTICE FOR SAFETY AND HEALTH REQUIREMENTS IN ELECTRIC AND GAS WELDING, AND CUTTING OPERATIONS
IS 8448	1989		AUTOMATIC LINE VOLTAGE CORRECTOR (STABILISER)
IS 8519	1977		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR BODY PROTECTION
IS 8520	1977		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR EYE, FACE AND EAR PROTECTION
IS 875	1987		STRUCTURAL SAFETY OF BUILDING: LOADING STANDARD PART 1 TO 5
IS 8807	1978		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR PROTECTION OF ARMS AND HANDS
IS 8978	1985		INSTANTANEOUS WATER HEATERS
IS 8989	1978		SAFETY CODE FOR ERECTION OF CONCRETE FRAMED STRUCTURES
IS 940	1989		PORTABLE FIRE EXTINGUISHERS WATER TYPE (GAS CARTRIDGE)
IS 9457	1980		SAFETY COLOURS AND SIGNS
IS 9679	1980		CODE OF SAFETY FOR WORK ENVIRONMENTAL MONITORING
IS 9706	1997		CODE OF PRACTICE FOR THE CONSTRUCTION OF AERIAL RPEWAYS FOR THE TRANSPORTATION OF MATERIAL
IS 9759	1981		GUIDELINES FOR DEWATERING DURING CONSTRUCTION
IS 9815	1989		SERVO MOTOR OPERATED LINE VOLTAGE CORRECTOR (SERVO STABILISER)
IS 9944	1992		RECOMMENDATIONS ON SAFE WORKING LOAD FOR NATURAL AND MAN-MADE FIBRE ROPE SLINGS
IS 996	1979		SINGLE PHASE ELECTRIC MOTORS
ISO 3873	1977		SAFETY HELMET

SECTION-10

SPECIAL CONDITIONS OF CONTRACT

10.0 Drawings And Documents

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

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

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

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

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

SECTION-11

SPECIAL CONDITIONS OF CONTRACT

11.0 TIME SCHEDULE – MOBILIZATION – PROGRESS AND MONITORING, COMPLETION, OVER RUN, PRICE VARIATION ETC

COMPLETION PERIOD: -

THE PROJECT IS BEING IMPLEMENTED AS A FAST TRACK PROJECT AND SHALL BE COMPLETED WITHIN 14 MONTHS FROM START OF ERECTION AS CERTIFIED BY BHEL. The important works to be completed unit-wise to achieve the above target are indicated below. **CONTRACTOR SHALL REACH SITE, MAKE HIS SITE ESTABLISHMENT AND BE READY TO COMMENCE THE WORK WITHIN TWO WEEKS FROM THE DATE OF FAX LETTER OF INTENT (LOI) OR AS PER DIRECTIONS OF CONSTRUCTION MANAGER OF BHEL**

Schedule Of Milestone Activities: -

Sl. No	Milestone Activity	Tentative Date		
		40 MW	40MW	40MW
		U#3	U#4	U#5
1	Pre-commissioning checks, synchronizing and commissioning	Apr 2011	May 2011	June 2011

BHEL, OWING TO ITS COMMITMENT TO THEIR CUSTOMER, MAY ASK CONTRACTOR TO COMPRESS THE SCHEDULE TO THE POSSIBLE EXTENT FOR ADVANCEMENT OF VARIOUS MILESTONES. CONTRACTOR SHALL PLAN HIS ACTIVITIES AND MOBILISE ADDITIONAL RESOURCES ACCORDINGLY TO THE SATISFACTION OF BHEL ENGINEER WITHIN THE QUOTED RATES.

11.1.1 Contract Period

THE CONTRACT PERIOD SHALL BE 10 MONTHS from the start of work. Erection, testing, calibration and commissioning of permanent equipments required for completion of system shall be completed within the time schedule given above. **Erection/placement on it's designated foundation/location, of the first major permanent equipment/component/column covered in the scope of these specifications or calibration of field equipment/instrument in calibration lab of the subcontractor set up at site shall be recognized as "start of contract period".** Smaller items like packer plates, shims, anchors, inserts etc. Will not be considered as start of contract period.

BHEL, owing to progress of work in other areas and due to its commitment to their customer, may ask contractor to compress the schedule to the possible extent for advancement of various milestones. Contractor shall plan his activities and mobilise additional resources accordingly to the satisfaction of BHEL engineer within the quoted rates.

11.1.2 Grace period

Not Applicable

11.2

The contractor should reach site and establish his site office and mobilise to commence the work as per directions of BHEL engineer. The date of starting the work at site shall be fixed in consultation with BHEL's engineer and the same will be recorded in measurement book while entering the first RA bill.

11.3

Subject to availability of materials and other inputs, it is the responsibility of the contractor to carry out work to achieve the monthly progress and keep up the schedules.

11.4

Contractor shall draw the monthly erection programme along with BHEL engineer indicating the work to be achieved and event to be completed as per clause 11.1. Once the programme is drawn, he shall adhere to the same. Contractor shall plan and erect the materials as it is received at site. The monthly planned percentage shall take into consideration the material available at site before the start of the month and also any material received during the month. Contractor shall mobilise his resources required to achieve the monthly programmes.

11.5 Progress and monitoring of work

11.5.1

It is 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, down time of measuring test equipment etc.

11.5.2

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 that 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.

11.5.3
Any other information required for decision-making, planning and action taking, the contractor shall furnish the same, other reports and daily/weekly/monthly erection progress shall be furnished in the format prescribed by BHEL.

11.5.4
Contractor shall work out tentative programmes of erection, commissioning to match the schedules indicated in clause 11.1 and should submit along with his offer the month-wise calibration, erection and testing and commissioning programme area-wise.

11.6.0 Quantity Variation
Refer 'General Conditions of Contract'

11.7.0 Price Variation
Refer 'General Conditions of Contract'

11.8.0 Extension of Contract Period
Refer 'General Conditions of Contract'

11.8.6 Overrun Compensation
Refer 'General Conditions of Contract'

11.9 Foreclosing of Contract
11.9.1
BHEL, at its discretion may foreclose the contract at any time after the completion of contract period from the date of starting the work at site.

11.9.2
In case it is decided to withdraw any portion of work or foreclose the contract, the percentage value of the work withdrawn / left over shall be determined mutually. BHEL engineer's decision in regard to status of an item shall be final and binding on the contractor.

11.9.3
The date of completion of work for the purpose of guarantee vide clause 2.24 of general conditions will be the date on which the contract is foreclosed.

11.10
Clause 2.02 of GCC regarding force majeure shall, inter-alia, include stoppage of work due to 'local bandhs' arising out of external factors.

11.11 INTEREST BEARING ADVANCE

Refer 'General Conditions of Contract'

11.12 DEFINITION OF WORK COMPLETION

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

SECTION-12

SPECIAL CONDITIONS OF CONTRACT

12.0 TERMS OF PAYMENT

12.0.1
The contractor shall submit his monthly RA account bills with all the details required by BHEL on specified date every month covering progress of work in all respects and areas for the previous calendar month. However, first RA Bill shall be released only after signing of Contract Agreement.

Note: Contractor shall maintain good house keeping & collect all scrap materials periodically from various area of work site, deposit the same at one place earmarked at site or shift the same to a place earmarked in BHEL/ client's stores. ***1% value of each RA bill will be earmarked against compliance of the above, to be released only on satisfactory collection and deposit of scrap as stated above. In case of failure of contractor to comply with this requirement, BHEL will make suitable arrangement at contractor's risk and cost. In such case, any expenditure over and above the withheld 1% amount will also be recovered suitably from the RA bills of vendor.***

12.0.2
Clause 2.6 of general conditions of contract shall be referred to as regards mode of payment, and measurement of the work completed.

12.0.3
Release of payment in each running bill will be restricted to 95% of the value of work admitted, as per the percentage break-up for the stage of work completion stipulated vide clauses hereinafter.

Release of remaining 5 % payment shall be as per:
'General Conditions of Contract' for Retention amount

and guarantee period shall be 6 months from the date of completion of entire work as certified by BHEL.

12.0.4
The payment for running bills will normally be released within around 30 days of submission of running bill with measurement sheets. Contractor shall make his own arrangement for making payment of impending labour wages and other dues in the meanwhile.

12.0.5
BHEL will release payment through Electronic Fund Transfer (EFT)/RTGS. In order to implement this system, the following details are to be furnished by the Contractor pertaining to his Bank Accounts where proceeds will be transferred through BHEL's banker:

1. Name of the Company

2. Name of Bank
3. Name of Bank Branch
4. City/Place
5. Account Number
6. Account type
7. IFSC code of the Bank Branch
8. MICR Code of the Bank Branch

BHEL may also choose to release payment by other alternative modes as suitable.

12.1 STAGES OF PROGRESSIVE PRO-RATA PAYMENTS

12.1.1

The agreed rates for each item shall be paid on pro-rata basis progressively as per the break up given hereunder (aggregating 100%), based on the progress of work in each month. The contractor shall submit his running bills with the details of measurement required by BHEL engineer on or before 26th of every month covering progress of work in all respect in the area upto 24th day of the same month.(Refer Price Bid part -II Rate Schedule)

EXCITATION SYSTEMS & FIELD BREAKER, DAVR, PANELS: Item nos. AA1(1.1) of Rate Schedule		
SN	DESCRIPTION OF ACTIVITY	PERCENTAGE
01	COLLECTION OF MATERIAL, TRANSPORTATION FROM BHEL STORE TO SITE	10%
02	PLACEMENT, ALIGNMENT, GROUTING, INTER CONNECTION OF BUS BAR AND WIRING, FIXING OF LOOSE COMPONENTS AND AIR EXHAUST OUTLET DUCT FOR REGULATION, FIELD FLUSHING AND THYRISTOR PANELS	60%
04	PRE-COMMISSIONING TESTS	13%
05	UNIT SYNCHRONIZATION AND STABILIZATION, **INTEGRATED ELECTRICAL TESTING/ COMMISSIONING WITH ASSOCIATED CONNECTED EQUIPMENT**	13%
06	TRIAL RUN AND FULL LOADING	02%
07	COMPLETION OF ALL FACILITIES AND HANDING OVER	02%

AUTO SEQUENCER PANEL (FOR UNITS, FEEDERS & GATES), GENERATOR, GT & UT PROTECTION & METERING PANELS: Item nos. AA2 (2.1 to2.12) & BB 1 of Rate Schedule

AUTO SEQUENCER PANEL (FOR UNITS, FEEDERS & GATES), GENERATOR, GT & UT PROTECTION & METERING PANELS: Item nos. AA2 (2.1 to2.12) & BB 1 of Rate Schedule		
SN	DESCRIPTION OF ACTIVITY	PERCENTAGE
01	COLLECTION OF MATERIAL, TRANSPORTATION FROM BHEL STORE TO SITE	10%
02	PLACEMENT, ALIGNMENT, GROUTING, INTER CONNECTION OF BUS BAR AND WIRING, FIXING OF LOOSE COMPONENTS	60%
04	PRE-COMMISSIONING TESTS	13%
05	UNIT SYNCHRONIZATION AND STABILIZATION, **INTEGRATED ELECTRICAL TESTING/ COMMISSIONING WITH ASSOCIATED CONNECTED EQUIPMENT**	13%
06	TRIAL RUN AND FULL LOADING	02%
07	COMPLETION OF ALL FACILITIES AND HANDING OVER	02%

TRANSFORMERS (GT, ST): Item nos LL1 to LL2 of Rate Schedule		
SN	DESCRIPTION OF ACTIVITY	PERCENTAGE
01	COLLECTION OF MATERIALS, TRANSPORTATION POSITIONING ON FOUNDATION AND ALIGNMENT AS PER LAYOUT DRAWING	15%
02	INTERNAL INSPECTION OF CORE AND WINDING TAPS SWITCH OFF-LOAD/ON-LOAD, H.V./L.V. BUSHING TURRET ASSEMBLY, VACUUM PULLING, OIL FILTERATION AND FITTING OF OIL UPTO CORE AND WINDING LEVEL	15%
03	ASSEMBLY OF ALL ACCESSORIES, PIPES AND FITTINGS, CONSERVATOR TANK, COOLER BANK/RADIATOR BANK, BUSHINGS, MARSHALLING BOX, CABLING FROM MARSHALLING BOX TO FIELD DEVICES, FANS AND PUMPS ETC.	20%
04	OIL FILLING IN COMPLETE ASSEMBLED TRANSFORMERS, COMPLETION OF DRY OUT AND FILTERATION OF OIL OF COOLING BANK, ACCEPTANCE OF DRY OUT.	15%
05	PRE-COMMISSIONING CHECKS, ELECTRICAL TESTS, CALIBRATION AND PROTECTION AND INTER LOCK CHECKS	15%
06	**INTEGRATED ELECTRICAL TESTING/ COMMISSIONING WITH ASSOCIATED CONNECTED EQUIPMENT,** BACK CHARGING/FORWARD CHARGING	12%
07	FINISH PAINTING	05%
08	TRIAL RUN AND FULL LOADING	02%
09	COMPLETION OF ALL FACILITIES AND HANDING OVER	01%

TRANSFORMERS : Item nos LL3 to LL6 of Rate Schedule		
SN	DESCRIPTION OF ACTIVITY	PERCENTAGE
01	COLLECTION OF MATERIALS, TRANSPORTATION POSITIONING ON FOUNDATION AND ALIGNMENT AS PER LAYOUT DRAWING	15%
02	INTERNAL INSPECTION OF CORE AND WINDING TAPS SWITCH OFF-LOAD/ON-LOAD, H.V./L.V. BUSHING TURRET ASSEMBLY,	15%
03	ASSEMBLY OF ALL ACCESSORIES, MARSHALLING BOX, CABLING FROM MARSHALLING BOX TO FIELD DEVICES, FANS.	30%
04	PRE-COMMISSIONING CHECKS, ELECTRICAL TESTS, CALIBRATION AND PROTECTION AND INTER LOCK CHECKS	20%
05	**INTEGRATED ELECTRICAL TESTING/ COMMISSIONING WITH ASSOCIATED CONNECTED EQUIPMENT,** BACK CHARGING/FORWARD CHARGING	12%
06	FINISH PAINTING	05%
07	TRIAL RUN AND FULL LOADING	02%
08	COMPLETION OF ALL FACILITIES AND HANDING OVER	01%

12.1.2 OTHERS: Item nos. MM1 TO MM 8, KK 1 to KK 4, TT1 of Rate Schedule)

Unit rate payment shall be made for other systems (Local Starter Boxes) as per the rate schedule and percentage break-up for erection, testing, commissioning shall be as per detailed break-up given below: -

1. 80% of the agreed unit rates on completion of erection, testing and commissioning.
2. 12% after completion of the individual system commissioning.
3. 5% after trial operation or unit handing over whichever is earlier.
4. 3% on completion of facilities and handing over.

12.1.3 Testing of Commissioning of Equipment erected by other agencies: Item nos. NN, OO, PP, QQ, RR, SS, UU of Rate Schedule

1. 80% of the agreed unit rates on completion of testing and off-load commissioning.
2. 10% after on-load commissioning of each item.
3. 5% after completion of trial operation of unit.

4. 5% on completion of facilities and handing over.

12.1.4 Cables -Item nos. DD (1to 17), EE (1 to 2), FF (1to 4), GG (1to 6), HH(1), II(1to 2), JJ(1 to 2) of Rate Schedule

1. 60 %after laying of cable.
2. 10% after termination.
3. 10 % after testing of cables
4. 05% after dressing of cables
5. 05% after completion of Facilities and Handing Over.

12.1.4 Cable tray Item no. (CC 1 to 8)

1 80% after erection of trays in position

2. 15% after completion of welding/ bolting.

3. 05% after completion of facilities and handing over

12.1.6 Field and Panel mounted Instrumentation (Items no.VV1 to VV10)

1. 80% after erection

2. 20 % after calibration and testing.

12.1.7 SCADA system and MIMIC Panel (item no.WW1 to WW 9)

1. 75% after erection.

2. 25% after commissioning and testing.

12.2 PAYMENT FOR THE WORK COMPLETED

12.2.1
For the items where the payment is to be made against unit of weight, the actual weight of items erected by contractor will be paid after assessing the weight on the basis of shipping list or standard engineering practice. BHEL engineer's decision will be final and binding on contractor in this regard.

12.2.2
The bidder shall quote separate unit rates for each item of work listed in the rate schedule.

12.3 Measurement for Payment

12.3.1
In rate schedule, unit rates called for erection, testing and commissioning for various devices and equipment and payment shall be made accordingly.

12.3.2

For all payment purpose, measurement shall be made on the basis of physical measurement. Contractor shall make physical measurement in presence of BHEL engineer. Contractor shall maintain records for utilization of material system-wise.

12.3.3

All the surplus, scrap and serviceable materials shall be returned by the contractor to BHEL's stores as per the instruction of engineer

12.3.4

Wherever additional instrumentation work has to be carried out for performance guarantee test, the same has to be executed by the contractor as per the applicable rates already provided in the rate schedule

12.3.5
All the cables returned to stores should carry aluminium tag(s) indicating the size and type of cables. Cable of more than five-meter length is termed as "serviceable material".

12.3.6
Any item returned to stores shall be clearly identified and tagged for its serviceability or any defects in the returned items.

SECTION-13

SPECIAL CONDITIONS OF CONDITIONS

13.0 Extra Charges For Modification And Rectification

Refer 'General Conditions of Contract'

SECTION-14 (rev:01 dated 02/02/2009)

SPECIAL CONDITIONS OF CONTRACT

INSURANCE

Refer 'General Conditions of Contract'

SECTION-15 (Rev dated 12/1/2009)

SPECIAL CONDITIONS OF CONTRACT

15.0 EARNEST MONEY DEPOSIT, SECURITY DEPOSIT & BANK GUARANTEE

15.1 EARNEST MONEY DEPOSIT:

Refer 'General Conditions of Contract'

15.2 SECURITY DEPOSIT:

Refer 'General Conditions of Contract'

15.3 BANK GUARANTEE:

Refer 'General Conditions of Contract'

15.3.1 Guidelines for acceptance of Bank Guarantees are as follows :

- Vendors are advised to obtain BG from any of the following BHEL consortium banks

State Bank of India	The Hongkong and Shanghai banking Corporation Ltd.
ICICI Bank Ltd	ABN Amro Bank N.V
Bank of Baroda	IDBI Ltd
Canara Bank	Punjab National Bank
Citi bank N.A	Standard Chartered Bank
Corporation Bank	State Bank of Travancore
Detshe Bank	State Bank of Hydrabad
HDFC Bank Ltd	Syndicate Bank

- The Bank Guarantees of all Public sector banks shall be accepted (Other than consortium banks also).
- The Bank Guarantees of Co-operative banks shall not be accepted.
- Bank Guarantees of other banks (banks other than consortium bank, public sector bank, & Co-operative banks) can be accepted subject to an overall exposure limit (at BHEL, PSWR, Nagpur) of RS. 10 crores for banks with net worth of more than Rs. 500 crores as on last balance sheet date and Rs 5 crores for banks with net worth between Rs. 350 to Rs 500 crores (A certificate and copy of latest Balance Sheet to be given at the time of submission of banuarantees . (A certificate and copy of latest Balance Sheet to be given at the time of submission of bank guarantees .
- In case Bank Guarantees given by non consortium banks (Private sector or Public sector), the bank Guarantees shall be enforceable at Nagpur, Maharastra.

SECTION 16
SUSPENSION OF BUSINESS DEALING WITH CONTRACTORS
(W.E.F 18.05.09)

16.1 A bidder may be put on HOLD for a period of 6 months, for future tenders for specific works on the basis of one or more of the following reasons:

I. Bidder does not honour his own offer or any of its conditions within the validity period.
II. Bidder fails to respond against three consecutive enquires of BHEL.
III. After placement of order, Bidder fails to execute a contract.
IV. Bidder fails to settle sundry debt account, for which he is legitimately liable, within one year of its occurrence.
V. Bidder's performance rating falls below 60% in specific category.
VI. Bidder works are under strike/ lockout for a long period.

16.2 A Bidder may be de-listed from the list of registered Bidders of the region for a period of 1 year on the basis of one or more of the following reasons:-

I. Bidder tampers with tendering procedure affecting ordering process or commits any misconduct which is contrary to business ethics.
II. Bidder has substituted, damaged, failed to return, short returned or unauthorizedly
disposed off materials/ documents/ drawings/ tools etc of BHEL.
III. Bidder no longer has the technical staff, equipment, financial resources etc. required to execute the orders/ contracts.

16.3 A Bidder can be banned from doing any business with all Units of BHEL for a period of 3 years on the basis of one or more of the following reasons:

I. Bidder is found to be responsible for submitting fake/ false/ forged documents, certificates, or information prejudicial to BHEL's interest.
II. In spite of warnings, the Bidder persistently violates or circumvents the provisions of labour laws/ regulations/ rules and other statutory requirements.
III. Bidder is found to be involved in cartel formation.
IV. The Bidder has indulged in malpractices or misconduct such as bribery, corruption and fraud, pilferage etc which are contrary to business ethics.
V. The Bidder is found guilty by any court of law for criminal activity/ offences involving moral turpitude in relation to business dealings.
VI. The Bidder is declared bankrupt, insolvent, has wound up or been dissolved; i.e ceases to exist for all practical purposes.
VII. Bidder is found to have obtained Official Company information/ documentation by questionable means.
VIII. Communication is received from the administrative Ministry of BHEL to ban the Bidder from business dealings.

Appendix-I

MAJOR TOOLS & PLANTS & MMES TO BE DEPLOYED BY THE CONTRACTOR

Tool & Plants

Sl. No.	Description Of Equipments	Capacity	Min. Qty
01	TIG Welding Torch Air/Water Cooled	-	As Per Site Requirement
02	Diesel Welding Generator/Transformer		As Per Site Requirement
03	3 Ph Distribution Board With Complete Set Up for Drawl of Construction Power	600 Amp	2 Nos.
04	Electric Cable for Drawl & Distribution of Construction Power	-	As Per Site Requirement
05	Hydraulic Pipe Bending Machine		1 No.
06	Dead Weight Tester	0-700 Kg.	1 No.
07	Temperature Controlled Oil Bath	0-450 Deg	1No.
08	U-Tube Manometer +/- 1000 mm water/ mercury column		2 Nos.
09	Standard Pressure Test gauges	0-6, 0-10, 0-25, 0-60, 0-100, 0-250, 0-400/600 Kg/cm^2, Vaccum Gauge minus 1 to 0 Kg/cm^2	1 Set
10	Digital Thermometer 0-150 Deg C, 0-450 Deg C		1 No Each
11	Glass Thermometer	0-100, 0-200, 0-300, 0-450 Deg C	1 No. Each.
12	Low Pressure Calibrator		1 No.
13	mA & mV Source	0-100 mA 0-100 mV	2 No. Each
14	Dc voltage source	+/-30 Volt Dc	2 Nos.
15	Transformer Oil test kit	0-100 KV	1 No.

16	Primary Current Injection kit	0-1000 Amps	1 No.
17	Secondary Current Injection Kit with Timer for relay test		1 No.
18	Insulation Tester (Megger)	0-500/ 1000 Volt 0-2.5/5 KV	1 No. Each
19	Decade Resistance Box		2 Nos.
20	1 and 3 Phase Variac, 415 Volt		1 Nos.
21	4 ½ Digit Analog Multimeter		2 Nos.
22	3 ½ Digit Multimeter		4 Nos
23	Transformer oil purification plant with vacuum pump(capacity 760mmhg) for evacuation of transformer alongwith accessories & hoses. A) Capacity 6000 ltr.per hour B) Capacity 3000 ltr. Per hour		1 NO. 1 NO.
24	Tan Delta Test Kit		1 NO
25.	Multi Function Generator		1 No.
26	Soldering iron “Soldron” make 25 watt	.	2 Nos.
27	Insulation tester hand operated 250V / 500V / 1000V rated mains/battery operated		As required
28	DC power supply 0-50 VDC, 5 A make “Aplab” or equivalent (variable source)		1 no.
29	Single phase variac 250 V, 8 amp		1 no
30	3 phase variac rating 5 amps		1 no

31	Digital Tongue Tester A/C 5/10, 25/60/300 Amp Range Ac Kew Snap Make		As required
32	Digital Tongue Tester D/C 30/60/300 Amps		1 No.
33.	Suitable Drill machine		1 No.

NOTE:

1. The list of instruments / equipments to be brought by the contractor as shown above **are only indicative**. Any other instruments / equipments required for the execution of the work is to be necessarily arranged by the contractor within the quoted rates.

2. Above list is not intended to be exhaustive. Contractor shall arrange other T&Ps required excepting those provided by BHEL. Contractor has to provide above mentioned T&Ps and MMEs as per the site requirements. And to has to insure that there is no waiting time for T&P and MME. If contractor fails to arrange the testing instruments as listed above, BHEL site will arrange the instruments at the cost of contractor. Contractor to submit calibration report from recognized agency prior to deployment of same at site and periodical calibration of the same to be arranged by contractor as per procedure of BHEL.

3. All the small tools & plants etc have to be provided by the contractor.

APPENDIX-II

A) The following consumables shall be provided by BHEL free of charge.

1. Cable lugs above 4 sq.mm

B) Consumables (Contractor Scope)

1. Cable Marker
2. Cable identification tag
3. Cable clamping material with hardware
4. PVC ferrules

Note:- Contractor shall arrange all consumable, other than the consumable as specified above.

Appendix-III

Monthwise Manpower Deployment Plan

(Category-wise Numbers to be Indicated for Each Month)

Sl. No.	Category	MONTHS 1	2	3	4	5	6	7	8	9	10
i.	Resident Engineer										
ii.	Erection Engineers										
iii.	Erection Supervisors										
iv.	Materials Management Supervisors										
v.	Welders (All Categories)										
vi.	Riggers										
vii.	Khalasis										
viii.	Fitters										
ix.	Crane Operator										
x.	Truck/Trailer Drivers										
xi.	Store Keepers										
xii.	Electricians										
xiii.	Helpers/Semiskilled										
xiv.	Workers										
xv.	Unskilled Workers										
	Month wise Total										

Note:

Name, qualification and experience of engineers/supervisors proposed to be deployed may be indicated in organization chart.
The deployment plan shall be finalized with BHEL site at the time of mobilization.

Signature Of Bidder With Seal

APPENDIX- IV

ANALYSIS OF UNIT RATE QUOTED

Sl.No.	Description	% Of Unit Rate Quoted	Remarks
01	Site Facilities And Other Infrastructure		
02	Salary And Wages		
03	Consumables		
04	Depreciation And Maintenance For T&P And Other Items		
05	Establishment and Administrative Expenses of Site		
06	Retrenchment Benefit		
07	Extra Work Incidental To Erection		
08	Overheads		
09	Profit		
TOTAL			

SIGNATURE OF THE BIDDER WITH SEAL

APPENDIX-V

CONCURRENT COMMITMENTS

SL. NO	FULL POSTAL ADRESS OF CLIENT AND NAME OF OFFICER IN-CHARGE	DESCRIPTION OF THE WORK	VALUE OF THE CONTRACT	COMMENC-EMENT DATE	SCHEDU-LED COMPLE-TION	% COMPL-TD. AS ON DATE	ANTICIPA-TED COMPLN. DATE	REMARK

SIGNATURE OF THE BIDDER

DATE: