

# **TENDER SPECIFICATION**

**No. - BHE/PW/PUR/BINT– BLR Vertical Pkg/648**

FOR

COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE; ERECTION, TESTING & COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF BOILER AND AUXILIARIES INCLUDING ESP, ROTATING MACHINES, DUCTS & DAMPERS, FUEL PIPING, BOILER PIPING, POWER CYCLE PIPING, LINING & INSULATION, AND FINAL PAINTING ETC.OF 2x250 MW UNIT # 1&2

AT

**BINA POWER SUPPLY COMPANY LTD**

BINA THERMAL POWER PROJECT (2x250 MW)

BINA, DISTT: SAGAR,

MADHYA PRADESH

**PART I - (TECHNICAL BID SPECIFICATION, NOTICE INVITING TENDER & GCC)**

BOOK NO.:



**BHARAT HEAVY ELECTRICALS LIMITED**

*(A GOVERNMENT OF INDIA UNDERTAKING)*

POWER SECTOR : WESTERN REGION

345, KINGSWAY: NAGPUR 440 001

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LEGEND:

§: Included in Tender Specifications Part-I. Hosted in BHEL web page ([www.bhel.com](http://www.bhel.com)) as file titled "**NIT+GCC-648**".

@: Issued as separate hard copy booklet 'Tender Specifications Part-II (Price Bid-648)'. Hosted in BHEL web page ([www.bhel.com](http://www.bhel.com)) as file titled "**PRICE BID-648**"

**Note:**

Rest of the tender documents are included in Tender Specifications Part-I. Hosted in BHEL web page ([www.bhel.com](http://www.bhel.com)) as file titled "**TECH BID-648**"

**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/BINT- BLR Vertical Pkg/648**

FOR

COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE; ERECTION, TESTING & COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF BOILER AND AUXILIARIES INCLUDING ESP, ROTATING MACHINES, DUCTS & DAMPERS, FUEL PIPING, BOILER PIPING, POWER CYCLE PIPING, LINING & INSULATION, AND FINAL PAINTING ETC.OF 2x250 MW UNIT # 1&2

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BINA THERMAL POWER PROJECT (2x250 MW)

BINA, DISTT: SAGAR,

MADHYA PRADESH

EARNEST MONEY DEPOSIT: Please see Special Conditions of Contract.

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:  
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

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

# **BHARAT HEAVY ELECTRICALS LIMITED**

(A Government of India Undertaking)  
POWER SECTOR - WESTERN REGION  
345-KINGSWAY, 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

COAL BASED BINA THERMAL POWER PROJECT (COAL BASED) TO BE SET UP BY BPSCL IN THE STATE OF MADHYA PRADESH, LOCATED NEAR BINA IN SAGAR DISTRICT. THE CAPACITY OF THE PROJECT TO BE EXECUTED IN PHASE -I IS 500 MW COMPRISING OF 2 X 250 MW UNITS AND FUTURE EXPANSION OF 3 X 250 MW UNITS IN PHASE- II MAKING THE ULTIMATE CAPACITY OF THE PROJECT AS 1250 MW.

### LOCATION:

THE SITE IS LOCATED IN SAGAR DISTRICT OF MADHYA PRADESH. THE SITE IS APPROX. 15 KMS. FROM BINA CITY AND IS APPROACHABLE VIA THE BINA MUNGAWALI STATE HIGH-WAY FROM BINA CITY.

THE NEAREST RAILWAY STATION IS BINA ON THE BHOPAL - MUMBAI MAIN LINE.

THE NEAREST COMMERCIAL AIRPORT IS BHOPAL WHICH IS APPROX. 100 KM FROM THE SITE.

MAJOR RAIL & ROAD DISTANCES FROM THE PROJECT SITE ARE AS FOLLOWS:

<u>BETWEEN</u>	<u>APPROX. DISTANCE IN KMS.</u>	
	<u>ROAD</u>	<u>RAIL</u>
BINA	15	-----
BHOPAL	110	90

**THE BIDDER IS ADVISED TO VISIT AND EXAMINE THE SITE OF WORKS AND ITS SURROUNDINGS AND OBTAIN FOR HIMSELF ON HIS OWN RESPONSIBILITY ALL INFORMATION THAT MAY BE NECESSARY FOR PREPARING THE BID AND ENTERING INTO THE CONTRACT. ALL COSTS FOR AND ASSOCIATED WITH SITE VISITS SHALL BE BORNE BY THE BIDDER.**

## 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. 2.0 LACS BY DD ONLY OR ONE TIME EMD)		
4	VALIDITY OF OFFER (REQUIRED 6 MONTHS FROM TENDER OPENING DATE)		
5	MOBILIZATION TIME (NOT EXCEEDING 03 WEEKS 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	<p>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 }</p> <ol style="list-style-type: none"> <li>1. Name of the Company</li> <li>2. Name of Bank</li> <li>3. Name of Bank Branch</li> <li>4. City/Place</li> <li>5. Account Number</li> <li>6. Account type</li> <li>7. IFSC code of the Bank Branch</li> <li>8. MICR Code of the Bank Branch</li> </ol> <p>NOTE: In case Bank endorsed certificate regarding above has already been submitted earlier, Kindly submit photocopy of the same</p>	YES	NO

NOTE : STRIKE OFF YES OR NO, AS APPLICABLE

DATE :

SIGNATURE OF TENDERER



## DECLARATION BY BIDDER'S AUTHORIZED SIGNATORY

I, \_\_\_\_\_ HEREBY CERTIFY THAT ALL THE INFORMATION AND DATA FURNISHED BY ME WITH REGARD TO THE TENDER SPECIFICATION No. BHE/PW/PUR/BINT- BLR Vertical Pkg/648 IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE. I HAVE GONE THROUGH THE SPECIFICATIONS, 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 TENDERER 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/BINT-BLR Vertical Pkg/648**

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

**HEREBY CERTIFY THAT IN OUR OFFER I/WE HAVE NEITHER SET ANY TERMS AND CONDITIONS NOR THERE ANY DEVIATION TAKEN FROM THE TENDER CONDITIONS EITHER TECHNICAL OR COMMERCIAL AND I/WE AGREE TO ALL THE TERMS AND CONDITIONS MENTIONED IN THE TENDER SPECIFICATION.**

DATE:

SIGNATURE OF THE TENDERER

**SECTION-3**  
**OFFER OF THE CONTRACTOR**

To,  
The Dy. General Manager (Purchase)  
Bharat Heavy Electricals Limited  
Power Sector - Western Region  
Shreemohini Complex  
345, Kingsway  
Nagpur 440 001

Dear Sir,  
Sub: Offer against Tender Specification No. BHE/PW/PUR/BINT-BLR Vertical Pkg/648

I/we hereby offer to carry out the work detailed in the tender specification 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 listed 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 requisite Earnest Money Deposit (EMD) 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 be indicated by BHEL, Power Sector-Western Region, Nagpur.

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:  
Date:

Signature of bidder:  
Address:

Witnesses with their address

Signature	Name	Address
1.		
2.		

## **SECTION-4 SPECIAL CONDITIONS OF CONTRACT**

### **SCOPE OF WORK**

#### **4.0 GENERAL**

THE WORK TO BE CARRIED OUT UNDER THE SCOPE OF THESE SPECIFICATIONS IS BROADLY AS UNDER:

- 1) TRANSPORTATION / DRAGGING OF BOILER DRUM FROM UNLOADING BAY TO INSIDE BOILER STRUCTURES AND POSITIONING ON GROUND, ERECTION INCLUDING FINAL ALIGNMENT.
- 2) PRE-ASSEMBLY, IF ANY, PRE-ERECTION CHECKS AS APPLICABLE
- 3) ERECTION, TESTING & COMMISSIONING, OF:
  - a) BOILER SUPPORTING STRUCTURES
  - b) BOILER PRESSURE PARTS
  - c) BOILER TRIM & INTEGRAL PIPING AND MOUNTINGS
  - d) FUEL OIL PIPING
  - e) NON-PRESSURE PARTS
  - f) ROTATING MACHINES (e.g. MILLS, FANS, and BLOWERS ETC. WITH THEIR DRIVES & LUBE OIL SYSTEM ETC.)
  - g) ELECTROSTATIC PRECIPITATOR
  - h) PULVERISED FUEL PIPING
  - i) EXTERNAL STRUCTURES (e.g. DUCT SUPPORTING, PIPE RACK STRUCTURES, ELEVATOR STRUCTURE etc.)
  - j) HANDLING ARRANGEMENTS FOR ROTATING MACHINES
  - k) LOW PRESSURE (AIR & WATER) PIPELINE
  - l) HP BY-PASS SYSTEM (VALVES, CONTROL FLUID SYSTEM WITH PIPELINE).
  - m) HP & LP CHEMICAL DOZING SYSTEMS
  - n) ROOF & SIDE CLADDING OF BOILER & ELEVATOR.
- 4) ERECTION, TESTING AND COMMISSIONING OF POWER CYCLE & OTHER PIPING INCLUDING P-91 MATERIAL PIPING
- 5) APPLICATION OF THERMAL LINING & INSULATION ON ALL THE ABOVE AND TG EQUIPMENTS & AUXILIARIES AS APPLICABLE
- 6) FINAL PAINTING
- 7) TRIAL OPERATION AND ASSOCIATED TESTS
- 8) COMPLETION OF FACILITY/SYSTEMS
- 9) HANDING OVER OF THE UNIT

#### **4.1 SCOPE OF WORK IS FURTHER DETAILED IN VARIOUS CLAUSES HEREINAFTER.**

##### **4.1.1 GENERAL REQUIREMENTS – COMMON TO ALL WORK**

###### **4.1.1.1**

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.

4.1.1.2

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.

4.1.1.3

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.

4.1.1.4

CONTRACTOR SHALL ERECT 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 / SEQUENCE ADOPTED IN ERECTION OF SIMILAR SETS ELSEWHERE.

4.1.1.5

THE WORK COVERED UNDER THIS SPECIFICATION IS OF HIGHLY SOPHISTICATED NATURE, REQUIRING THE BEST QUALITY WORKMANSHIP, ENGINEERING AND CONSTRUCTION MANAGEMENT. THE CONTRACTOR SHOULD ENSURE SUCCESSFUL AND TIMELY COMPLETION OF THE WORK. THE CONTRACTOR MUST DEPLOY ADEQUATE QUANTITY OF TOOLS, CONSTRUCTION AIDS, EQUIPMENT ETC HE MUST ALSO DEPLOY ADEQUATE TRAINED, QUALIFIED AND EXPERIENCED SUPERVISORY STAFF AND SKILLED PERSONNEL.

4.1.1.6

ALL NECESSARY CERTIFICATES AND LICENSES, PERMITS & CLEARANCES REQUIRED TO CARRY OUT THIS WORK ARE TO BE ARRANGED BY THE CONTRACTOR EXPEDITIOUSLY AT HIS COST.

4.1.1.7

THE BOILER SHALL BE ERECTED AS PER RELEVANT PROVISIONS OF LATEST INDIAN BOILER REGULATIONS AND AMENDMENTS/ADDENDUMS THEREOF, IF ANY.

4.1.1.8

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.

4.1.1.9

THE CONTRACTOR SHALL PERFORM ANY SERVICES, TESTS ETC, WHICH MAY NOT BE SPECIFIED BUT NEVERTHELESS, REQUIRED FOR THE COMPLETION OF WORK WITHIN QUOTED RATES.

4.1.1.10

THE CONTRACTOR SHALL EXECUTE THE WORK IN THE MOST SUBSTANTIAL AND WORKMANLIKE MANNER. THE STORES SHALL BE HANDLED WITH CARE AND DILIGENCE.

#### 4.1.1.11

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.

#### 4.1.1.12

ALL CRANES, TRANSPORT EQUIPMENT, HANDLING EQUIPMENT, TOOLS, TACKLES, FIXTURES, EQUIPMENT, 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. THESE TOOLS & PLANT, EQUIPMENTS, MEN & MATERIAL SHALL REMAIN AT SITE THROUGHOUT THE DURATION OF CONTRACT AND EXTENSION THEREOF, IF ANY. DIVERSION/REMOVAL OF THESE SHALL BE DONE ONLY ON THE APPROVAL OF BHEL. BHEL WILL BE PROVIDING THEIR T & P ON SHARING BASIS FOR ERECTION AND RELATED ACTIVITIES AT SITE AS PER DETAILS SPECIFIED IN SECTIONS-7.

#### 4.1.1.13

DURING THE COURSE OF ERECTION, TESTING AND COMMISSIONING CERTAIN REWORK / MODIFICATION / RECTIFICATION / REPAIR / FABRICATION ETC MAY BECOME NECESSARY ON ACCOUNT OF FEED BACK / REVISION OF DRAWING ETC. 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 RELEVANT CLAUSES OF SECTION-13.

#### 4.1.1.14

ALL WORKS SUCH AS CLEANING, LEVELING, ALIGNING, TRIAL ASSEMBLY, DISMANTLING OF CERTAIN EQUIPMENTS / COMPONENTS FOR CHECKING AND CLEANING, SURFACE PREPARATION, FABRICATION OF STRUCTURES, 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.

#### 4.1.1.15

THE CONTRACTOR SHALL PROVIDE, EXCEPTING THOSE SPECIFICALLY IN BHEL SCOPE, ALL FIXTURES, CONCRETE BLOCK SUPPORTS, WOODEN SLEEPERS, STEEL STRUCTURES REQUIRED FOR JIGS & FIXTURES, TEMPORARY SUPPORTS AND SCAFFOLDS, LADDERS ETC, ANCHORS FOR LOAD AND GUIDE PULLEYS REQUIRED FOR THE WORK. ALL EXTRANEIOUS STEEL AND SCAFFOLDING MATERIAL, LADDERS, STEPS ETC., WELDED ON THE STRUCTURAL OR OTHER COMPONENTS DURING ERECTION SHOULD BE CUT AND REMOVED AND SUCH AREAS BE FINISHED PROPERLY AS PER BHEL ENGINEER'S INSTRUCTIONS.

#### 4.1.1.16

THE CONTRACTOR SHALL TAKE DELIVERY OF THE COMPONENTS, EQUIPMENTS, CHEMICALS, AND 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.

#### 4.1.1.17

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, SAME SHALL BE DONE BY CONTRACTOR MOST EXPEDITIOUSLY. NO CLAIM FOR EXTRA PAYMENT FOR SUCH WORK WILL BE ENTERTAINED.

#### 4.1.1.18

PLANT MATERIALS SHOULD NOT BE USED FOR ANY TEMPORARY SUPPORTS / SCAFFOLDING/ PREPARING PRE-ASSEMBLY BED ETC.

#### 4.1.1.19

THE DETAILS OF EQUIPMENTS TO BE ERECTED UNDER THIS CONTRACT IS GENERALLY AS PER THE SCHEDULE GIVEN IN APPENDIX-I. THESE DETAILS ARE APPROXIMATE AND MEANT ONLY TO GIVE A GENERAL IDEA TO THE TENDERER ABOUT THE MAGNITUDE OF THE WORK INVOLVED. ACTUAL QUANTUM AND TYPE OF EQUIPMENTS WILL BE BASED ON THE RELEVANT ERECTION DOCUMENTS WHICH WILL BE FURNISHED TO THE CONTRACTOR IN DUE COURSE OF ERECTION AND THE WEIGHT AND QUANTITY AS PER THE RELEVANT ENGINEERING DOCUMENTS WILL ONLY BE ADMISSIBLE FOR THE BILLING PURPOSE.

#### 4.1.1.20

HANGERS & SUSPENSIONS, SUPPORTS ETC FOR TUBES, PIPING, & DUCTS ETC WILL BE SUPPLIED IN RUNNING / RANDOM LENGTHS / SIZES WHICH SHALL BE CUT TO SUITABLE SIZES AND ADJUSTED AS REQUIRED.

#### 4.1.1.21

SPRING SUSPENSION/CONSTANT LOAD HANGERS MAY HAVE TO BE PRE-ASSEMBLED FOR REQUIRED LOAD AND ERECTION CARRIED OUT AS PER INSTRUCTIONS OF BHEL. ADJUSTMENTS, REMOVAL OF TEMPORARY ARRESTS/LOCKS, CUTTING OF EXCESS THREAD LENGTH OF HANGER TIE-ROD ETC HAVE TO BE CARRIED OUT AS AND WHEN REQUIRED. LOAD SETTING OF SPRING HANGERS, AS PER BHEL'S DOCUMENTS/INSTRUCTIONS, DURING VARIOUS STAGES OF ERECTION & TESTING AND AFTER FLOATING OF PIPING/DUCTING DURING COLD AND HOT CONDITION WILL HAVE TO BE DONE AS PART OF WORK. THIS EXERCISE MAY HAVE TO BE REPEATED TILL SATISFACTORY RESULTS ARE ACHIEVED.

#### 4.1.1.22

LAYOUT OF FIELD ROUTED/ SMALL BORE PIPING SHALL BE DONE AS PER SITE REQUIREMENT. NECESSARY SKETCH FOR ROUTING THESE LINES SHOULD BE GOT APPROVED FROM BHEL BY THE CONTRACTOR. THERE IS A POSSIBILITY OF SLIGHT CHANGE IN ROUTING THE ABOVE PIPE LINES EVEN AFTER COMPLETION OF ERECTION.

#### 4.1.1.23

WELDING OF NECESSARY INSTRUMENTATION TAPPING POINTS, THERMOWELL, THERMOCOUPLE PAD, METAL TEMP PAD AND CLAMPS, ROOT VALVE, CONDENSING VESSEL, FLOW METERING & MEASUREMENT DEVICES, AND CONTROL VALVES TO BE PROVIDED ON BOILER & ITS AUXILIARIES AND PIPING ARE COVERED WITHIN THE SCOPE OF THIS SPECIFICATION. THE INSTALLATION OF ALL THE ABOVE ITEMS WILL BE CONTRACTOR'S RESPONSIBILITY EVEN IF:

- a) ITEMS ARE NOT SPECIFICALLY INDICATED UNDER THE RESPECTIVE PRODUCT GROUPS AS GIVEN IN THE TECHNICAL SPECIFICATIONS.
- b) ITEMS ARE SUPPLIED BY AN AGENCY OTHER THAN BHEL.

PRE-HEATING, NDE, AND POST WELD HEAT TREATMENT FOR ABOVE SHALL BE DONE AS PER THE SPECIFICATIONS AS PART OF WORK.

#### 4.1.1.24

FIXING AND SEAL WELDING OF THERMOWELLS & PLUGS BEFORE HYDRO TEST/ STEAM BLOWING OF EQUIPMENT OR OTHER PIPING SYSTEM IS WITHIN THE SCOPE OF WORK. CONTRACTOR SHALL ALSO REMOVE THE SEAL WELDED PLUGS BY PROCESS OF GRINDING AND FIX AND SEAL WELD THERMOWELLS AFTER HYDRO TEST/STEAM BLOWING OF LINES AS PART OF WORK.

#### 4.1.1.25

THE RATES QUOTED IN RATE SCHEDULE SHALL BE INCLUSIVE OF WELDING, BOLTING, FASTENING, JOINTING AND PRE-HEATING, POST WELD HEAT TREATMENTS/ STRESS RELIEVING, DESTRUCTIVE/NON-DESTRUCTIVE EXAMINATION (NDE) ETC AS APPLICABLE. HOWEVER, SEPARATE PAYMENT IS ENVISAGED FOR ACCEPTABLE RADIOGRAPHY AS SPECIFIED ELSEWHERE IN THESE SPECIFICATIONS.

#### 4.1.1.26

CERTAIN INSTRUMENTATION LIKE PRESSURE SWITCHES, AIR SETS, FILTERS, REGULATORS, PRESSURE GAUGES, JUNCTION BOXES, POWER CYLINDERS, DIAL THERMOMETERS, FLOW METERS, VALVE ACTUATORS, FLOW INDICATORS, CENTRIFUGAL/SPEED SWITCHES OF MOTORS, ACCUMULATORS ETC ARE RECEIVED IN ASSEMBLED CONDITION AS INTEGRAL PART OF EQUIPMENTS. CONTRACTOR SHALL DISMOUNT SUCH INSTRUMENTS FOR CALIBRATION AND HAND OVER THE SAME TO BHEL. C & I ERECTION AGENCY WILL DO STORAGE/RE-ERECTION CALIBRATION ETC.

#### 4.1.1.27

ACTUATORS/DRIVES OF VALVES, DAMPERS, GATES, POWERED VANES ETC MAY HAVE TO BE SERVICED, LUBRICATED, BEFORE ERECTION, DURING PRE-COMMISSIONING & COMMISSIONING, INCLUDING CARRYING OUT MINOR ADJUSTMENTS REQUIRED AS INCIDENTAL TO THE WORK.

#### 4.1.1.28

ALL ELECTRICAL MOTORS HAVE TO BE TESTED FOR IR & PI VALUES PRIOR TO THE TRIAL RUN. WHERE REQUIRED, DRY OUT MAY HAVE TO BE CARRIED OUT BY USING EXTERNAL HEATING SOURCE. CONTRACTOR SHALL MAKE ALL ARRANGEMENTS IN THIS REGARD AND COMPLETE THE WORK AS INSTRUCTED. BHEL WILL PROVIDE THE MOTORIZED INSULATION TESTERS.

#### 4.1.1.29

IN INSTALLATION OF VARIOUS EQUIPMENTS IT MAY BECOME NECESSARY TO INSTALL THESE ON TEMPORARY SUPPORTS/ HANGER DUE TO VARIOUS REASONS INCLUDING NON-AVAILABILITY OF SUSPENSION MATERIALS. CONTRACTOR SHALL INSTALL SUCH TEMPORARY SUSPENSIONS/HANGERS AND LATER ON SHIFT THE RELEVANT EQUIPMENTS TO THEIR RESPECTIVE PERMANENT HANGERS/ SUSPENSIONS/ SUPPORTS AS INCIDENTAL TO WORK. REQUISITE MATERIALS FOR SUCH TEMPORARY ARRANGEMENTS WILL BE PROVIDED BY BHEL ON FREE -RETURNABLE BASIS WHICH SHALL BE RETURNED TO BHEL AFTER THE USE.

#### 4.1.1.30

THE WORK SHALL BE CARRIED OUT STRICTLY IN ACCORDANCE TO THE "FIELD QUALITY PLAN" APPROVED BY BHEL/CLIENT. CONTRACTOR, JOINTLY WITH BHEL, SHALL PREPARE ALL NECESSARY RECORDS OF MEASUREMENTS/READINGS/ PROTOCOLS ETC.

#### 4.1.1.31

INTERCONNECTION/ HOOKUP, IF ANY, WITH THE EXISTING SYSTEM SHALL FORM PART OF WORK. SUCH INTERCONNECTIONS, HOOKUPS MAY REQUIRE SHUT DOWN OF RUNNING PLANT AND THE RELEVANT WORK HAVE TO BE COMPLETED WITHIN SUCH PLANNED SHUTDOWNS. THIS MAY CALL FOR WORKING WITH ENHANCED RESOURCES AND ON EXTENDED HOURS. CONTRACTOR'S OFFER SHALL COVER ALL SUCH CONTINGENCIES.

#### 4.1.1.32

THE CONTRACTOR SHALL HAVE TOTAL RESPONSIBILITY FOR ALL EQUIPMENTS AND MATERIALS IN HIS CUSTODY AT HIS 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 DEFAACEMENT 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.

#### 4.1.1.33

IT MAY SO HAPPEN THAT CERTAIN COMPONENTS LIKE MANHOLE DOORS, HANGER ETC MAY BE SUPPLIED IN LOOSE ITEMS. THEY NEED TO BE ASSEMBLED AS PER RELEVANT DRAWINGS OR AS PER ADVICE OF BHEL ENGINEER PRIOR TO ERECTION. THIS FORMS THE PART OF THE SCOPE OF WORK.

## 4.2 DETAILS OF SCOPE OF WORK FOR BOILER & AUXILIARIES & PIPING

THE SCOPE OF WORK IS FURTHER DETAILED IN THE SPECIFICATIONS HEREINAFTER.

### 4.2.1 PRESSURE PARTS

- A) FABRICATION AND INSTALLATION OF **TEMPORARY STRUCTURE** FOR ERECTION OF BOILER DRUM IS IN THE SCOPE OF THE CONTRACTOR'S WORK. BHEL WILL ISSUE THE REQUIRED STRUCTURAL STEEL FOR THIS PURPOSE FREE OF CHARGES. CONTRACTOR SHALL HAVE TO FABRICATE BUILT UP BEAMS AND OTHER STRUCTURAL MEMBERS THAT ARE REQUIRED FOR SUPPORTING THE DRUM LIFTING EQUIPMENT. CONTRACTOR SHALL ERECT, FASTEN, WELD THESE STRUCTURES AND CARRY OUT NDE AS PER RELEVANT CODES AND PRACTICES AS PART OF WORK. AFTER COMPLETION OF DRUM ERECTION ACTIVITY, CONTRACTOR SHALL DISMANTLE THESE STRUCTURES AND RETURN TO BHEL STORES. CONTRACTOR SHALL REPAIR THE AREAS OF PERMANENT EQUIPMENT/ STRUCTURES AS WELL AS BUILT-UP STRUCTURAL BEAMS AFFECTED DUE TO INSTALLATION OF TEMPORARY STRUCTURES AND FINISH AS PER RELEVANT CODES OF PRACTICE OR AS INSTRUCTED BY BHEL. PAYMENT FOR INSTALLATION OF TEMPORARY STRUCTURES AS AFORESAID WILL BE MADE AT THE RATE ACCEPTED FOR STRUCTURES; NO SEPARATE PAYMENT WILL BE MADE FOR FABRICATION, DISMANTLING AND FINISHING WORK AND RETURN OF MATERIALS.
- B) PRESSURE PARTS COMPONENTS LIKE HEADERS, PANELS, COILS, LOOSE TUBES ETC HAVE TO BE FLUSHED/BLOWN WITH COMPRESSED AIR, CHECKED FOR DIMENSIONAL ACCURACY AND CONFIGURATION AND MINOR RECTIFICATIONS, IF NECESSARY WILL HAVE TO BE DONE BEFORE ERECTION. THIS WILL INVOLVE MAKING APPROPRIATE BED OF STEEL STRUCTURES OVER THE CONCRETE BLOCKS/ STEEL PEDESTALS. NECESSARY STEEL, CONCRETE BLOCKS SHALL BE ARRANGED BY THE CONTRACTOR. BED SHALL BE FABRICATED AS PER BHEL REQUIREMENT.
- C) NORMALLY THE HIGH PRESSURE VALVES WILL HAVE PREPARED EDGES FOR WELDING. BUT, IF IT BECOMES NECESSARY, THE CONTRACTOR SHALL PREPARE NEW EDGES OR RECONDITION THE EDGES BY GRINDING OR CHAMFERING TO MATCH THE CORRESPONDING TUBES AND PIPES. NO GAS CUTTING WILL BE PERMITTED. ALL FITTINGS LIKE "T" PIECES, WELD NECK FLANGES, REDUCERS, ETC SHALL BE SUITABLY MATCHED WITH PIPES FOR WELDING ( THIS IS APPLICABLE TO PIPING WORK ALSO).
- D) WELDING OF ALL ATTACHMENTS ON PRESSURE PARTS INCLUDING THOSE REQUIRED FOR INSULATION WORK IS IN THE SCOPE OF WORK.
- E) SURFACES INSIDE SEAL BOX AND OTHER AREAS THAT ARE TO BE APPLIED WITH CASTABLE REFRACTORY LINING SHALL BE PAINTED WITH BLACK BITUMEN PAINT BEFORE BOXING UP AND APPLICATION OF REFRACTORY. SEAL BOXES NEED TO BE PARTIALLY CUT OPEN IN ORDER TO POUR REFRACTORY. CONTRACTOR SHALL CARRY OUT NECESSARY CUTTING AND SEAL WELDING OF SUCH CUTOUTS. **CONTRACTOR SHALL PROVIDE THE BLACK BITUMEN PAINT OF REQUIRED SPECIFICATION FOR SUCH APPLICATIONS.**

- F) FURNACE AREA AND HEAT RECOVERY AREA OF FLUE GAS PASSAGE HAS TO BE MADE LEAK PROOF BY SEAL WELDING. AIR LEAK TEST BY PRESSURIZATION HAS TO BE CONDUCTED TO PROVE EFFECTIVENESS OF THE SEAL WELD AND SOAP BUBBLE OR ANY OTHER SIMILAR TEST WILL HAVE TO BE CARRIED OUT FOR THE ENTIRE SEAL WELDS TO ASCERTAIN THE EFFECTIVE SEALING IS ACHIEVED. THE TESTS MAY HAVE TO BE REPEATED TILL SATISFACTORY RESULT IS ACHIEVED.
- G) IF REQUIRED, THE PRESSURE PARTS, AFTER INITIAL ERECTION AND TESTS, WILL HAVE TO BE PRESERVED BY EITHER DRY OR WET PRESERVATION PROCEDURE. CONTRACTOR SHALL ERECT THE PIPING & VALVES AND PROVIDE NECESSARY ASSISTANCE FOR THE SAME. REQUIRED PIPING, VALVES AND PRESERVATIVE (GAS/CHEMICALS) WILL BE PROVIDED BY BHEL AS FREE ISSUE.
- H) THE DRUM INTERNALS, IF ALREADY INSTALLED, MAY HAVE TO BE REMOVED TO FACILITATE INSPECTION BY STATUTORY AUTHORITIES AND CHEMICAL CLEANING. THE DRUM INTERNALS ARE TO BE PRESERVED PROPERLY AND RE-FITTED AT APPROPRIATE STAGE AS PART OF WORK.
- I) SUPERHEATER AND/OR REHEATER SYSTEM WILL HAVE HP BUTT WELD JOINTS OF T-91 MATERIAL. WELDING OF THESE HP JOINTS SHALL INVOLVE PRE-HEATING AND POST HEATING BY RESISTANCE HEATING, ARGON PURGING OF JOINTS DURING WELDING PROCESS AND FULL TIG WELD. CONTRACTOR SHOULD FOLLOW REQUIRED PROCEDURE FOR T91 WELDING NDT, ETC.
- J) **BOILER DRUM:** BHEL WILL HAND OVER THE BOILER DRUM DULY UNLOADED AND STACKED ON WOODEN SLEEPERS AT THE UNLOADING YARD. CONTRACTOR SHALL TRANSPORT THE BOILER DRUM FROM THE SAID SPOT TO THE CAVITY OF BOILER AS REQUIRED FOR ITS ERECTION. CONTRACTOR SHALL MAKE ALL NECESSARY ARRANGEMENTS LIKE ARRANGING AND LAYING OF SLEEPER BED, STEEL STRUCTURALS, STEEL PLATES & RAILS ETC FOR TRANSPORT OF BOILER DRUM.
- BOILER DRUM IS TO BE ERECTED USING **STRAND & JACK** METHOD. CONTRACTOR MAY ENGAGE SPECIALIZED AGENCY TO ERECT THE BOILER DRUM BY THIS METHOD. CONTRACTOR SHALL DEPLOY THE AGENCY AND OTHER RESOURCES WELL IN TIME TO SUIT THE MILESTONE SCHEDULE.
- K) CORRECTIONS IN THE PROFILES OF SCALLOPED PLATES/BARS, SKIN CASING, SEAL PLATES ETC. FOR PROPER MATCHING WITH MATING PARTS, WHEREVER REQUIRED, SHALL BE DONE AS INCIDENTAL TO THE WORK.

#### 4.2.2 TRIM & INTEGRAL PIPELINE OF BOILER, POWER CYCLE & OTHER PIPELINE

##### 4.2.2.1

THE WORK ON VARIOUS PIPING SYSTEMS WILL INCLUDE CUTTING TO REQUIRED LENGTH, EDGE PREPARATION, LAYING, FIXING & WELDING OF THE PIPES / ELBOWS / FITTINGS/ VALVES ETC. IN THE PIPELINE, FIXING & ADJUSTMENT OF SUPPORTS / ANCHORS / SHOCK ABSORBERS AND CARRYING OUT ALL OTHER ACTIVITIES / WORK TO COMPLETE THE ERECTION AND ALSO CARRYING OUT ALL PRE-COMMISSIONING / COMMISSIONING OPERATIONS MENTIONED IN THE SPECIFICATION AS PER BHEL ENGINEERS INSTRUCTIONS AND / OR AS PER APPROVED DRAWINGS / DOCUMENTS.

##### 4.2.2.2

TUBES OR PIPES WHEREVER DEEMED CONVENIENT, WILL BE SENT IN RANDOM LENGTHS. THESE SHALL BE CUT AND EDGE PREPARED TO SUIT THE SITE CONDITIONS AND THE LAYOUTS. FITTINGS LIKE BENDS TEES, ELBOWS, REDUCERS, AND FLANGES ETC WILL BE SUPPLIED AS LOOSE ITEMS. HOWEVER, BENDS OF TUBE SIZE UP TO NB. 65 MM WILL HAVE TO BE FORMED AT SITE AS INCIDENTAL TO WORK.

#### 4.2.2.3

ALL DRAINS / VENTS / RELIEF/ ESCAPE / SAFETY VALVE EXHAUST PIPING ETC TO VARIOUS TANKS / SEWAGE / DRAIN CANAL / FLASH BOX / SUMP / ATMOSPHERE ETC FROM THE STUBS ON THE PIPING AND EQUIPMENTS ARE COVERED IN THE SCOPE OF WORK.

#### 4.2.2.4

CONNECTION (FLANGED, BOLTED OR WELDED) OF PIPING TO THE TERMINAL POINTS/EQUIPMENTS ETC IS IN THE SCOPE OF WORK EVEN THOUGH SUCH TERMINAL POINT/EQUIPMENT MAY NOT FORM PART OF THIS WORK. ALL NDE INCLUDING RADIOGRAPHY OF JOINTS SO MADE, POST-WELD-HEAT-TREATMENT IF ANY, ARE ALSO WITHIN THE SCOPE OF WORK/SPECIFICATION. THE TERMINAL POINTS WORK IS INCLUSIVE OF CUTTING OF EXISTING LINES, IF REQUIRED, EDGE PREPARATION, WELDING/BLANKING AND HOOK UP WORK.

#### 4.2.2.5

IT SHOULD BE ENSURED THAT ALL THE TERMINAL POINT CONNECTIONS ARE DONE WITHOUT TRANSFERRING ANY UNDUE LOAD OR STRAIN TO THE OTHER EQUIPMENTS. NECESSARY PROTOCOLS HAVE TO BE PREPARED FOR SUCH FIT-UP ALONGWITH BHEL/CUSTOMER REPRESENTATIVE BEFORE CONNECTING. ALL NDE INCLUDING RADIOGRAPHY OF JOINTS SO MADE, POST WELD HEAT TREATMENT IF ANY, IS ALSO WITHIN THE SCOPE OF WORK/ SPECIFICATION.

#### 4.2.2.6

MECHANICAL FREENESS OF VALVES HAS TO BE ENSURED PRIOR TO ERECTION.

#### 4.2.2.7

THE ABOVE PROVISIONS SHALL BE APPLICABLE, MUTATIS - MUTANDIS, TO OTHER PIPING SYSTEMS e.g. FUELOIL PIPING, LUB OIL PIPING OF ROTATING M/c ACW LINES ETC.

#### 4.2.2.8

MAIN STEAM PIPELINE UP TO TURBINE INCLUDING THE STRAINER AND TERMINAL JOINT WITH TURBINE IS INCLUDED IN THE SCOPE OF WORK. THE MATERIAL WILL BE SA-335 P-91. BIDDER SHALL FOLLOW BHEL APPROVED PROCEDURE FOR WELDING, PRE HEATING, PWHT & NDT OF SA-335 P-91 MATERIAL. DETAILED PROCEDURE WILL BE ISSUED TO THE CONTRACTOR. THE MAIN STEAM PIPELINE BETWEEN STRAINER AND TURBINE DOES NOT UNDERGO STEAM BLOWING, THEREFORE THIS PIPELINE MUST BE THOROUGHLY CLEANED OF DUST, SCALE, BURR, ANY FOREIGN MATERIALS AND DEPOSITS BY MANUAL AND MECHANICAL CLEANING METHOD. CONTRACTOR SHALL TAKE AT MOST CARE IN THE CLEANING ACTIVITY SO AS TO ENSURE THAT NO UNDESIRABLE PARTICLE ENTERS INSIDE THE TURBINE. CONTRACTOR SHALL OBTAIN SPECIFIC WRITTEN CLEARANCE FROM BHEL BEFORE AND AFTER THE CLEANING ACTIVITY.

#### **4.2.2.9 FOLLOWING ITEMS OF WORK SHALL ALSO FORM PART OF PIPING ERECTION:**

1. INSTALLATION & REMOVAL OF ISOLATING DEVICES/ NRVs AND REMOVAL & RE-FIXING OF INTERNALS REQUIRED FOR HYDRAULIC TESTING, PRE-COMMISSIONING AND COMMISSIONING ACTIVITIES. REQUIRED GASKETS WILL BE SUPPLIED BY BHEL FREE OF COST.
2. MATCHING OF FLANGES FOR ACHIEVING PARALLELISM AND ALIGNMENT RESORTING TO HEAT CORRECTION OR OTHER SUITABLE METHODS AS PER INSTRUCTIONS OF BHEL ENGINEERS.
3. TO LOCATE THE CAUSE OF VIBRATIONS IN PUMPS OR OTHER AUXILIARIES AND TO CARRY OUT NECESSARY CORRECTIONS IN PIPING AND ITS SUPPORTS. THIS MAY INVOLVE CUTTING, FRESH EDGE PREPARATION, WELDING, RADIOGRAPHY, STRESS RELIEVING, ETC., OF SUCTION, DISCHARGE, RE-CIRCULATING AND OTHER CONNECTED PIPING AND ITS SUPPORTS AT A NUMBER OF PLACE.

4. FABRICATION AND ERECTION OF RACKS AND STEEL SUPPORTS FOR ALL THE PIPING INCLUDING CRITICAL PIPING. STEEL FOR THIS PURPOSE WILL BE SUPPLIED BY BHEL.
5. ERECTION, WELDING, HEAT TREATMENT AND NDE OF CERTAIN EQUIPMENTS LIKE FLOW NOZZLES, CONTROL VALVES ETC, AFTER COMPLETION OF CERTAIN ACTIVITIES E.G. CHEMICAL CLEANING, STEAM BLOWING ETC IS PART OF WORK. THIS MAY INVOLVE REMOVAL OF PORTIONS FROM THE ALREADY ERECTED PIPELINES IN ORDER TO INTRODUCE THESE EQUIPMENTS AND RESULTANT EDGE PREPARATION ETC SHALL BE INCIDENTAL TO WORK. BHEL WILL MAKE PAYMENTS FOR THE FRESH ITEMS ON PRO-RATA BASIS; THE CONTRACTUAL ITEM RATE AS APPLICABLE FOR THE CONCERNED PIPELINE SHALL BE ADOPTED FOR SUCH PAYMENT. NO SEPARATE/ADDITIONAL PAYMENT IS ENVISAGED FOR CUTTING AND EDGE PREPARATION IN THIS REGARD. THE REMOVED PIECES OF PIPES SHALL BE RETURNED TO BHEL STORES WITH PROPER CLEANING, DRESSING AND IDENTIFICATION MARKING.
6. WELDING OF ROOT VALVES WITH SMALL LENGTH OF PIPING TO THE PRESSURE, FLOW AND LEVEL TAPPING POINTS ON PIPING OR FLOW NOZZLES / ORIFICES / METERING ELEMENTS FIXED ON PIPING.
7. OPENING OF VALVE ACTUATORS, DISMANTLING OF ACTUATORS FROM THE VALVES, REFITTING AND RENDERING ASSISTANCE CONNECTED WITH THE ELECTRICAL AND MECHANICAL PROBLEMS.
8. FIXING AND WELDING INCLUDING DUE NDE & PWHT ETC OF CARRIER PLATES ON TO THE PIPES.

#### 4.2.2.10

AS FAR AS POSSIBLE PRE-ASSY OF PIPING ON GROUND IS TO BE DONE. THE ERECTION OF VARIOUS PIPING MAY HAVE TO BE STARTED FROM ANY RANDOM REFERENCE INSTEAD OF THE TERMINAL POINTS IN ORDER TO MEET MILESTONE COMPLETION SCHEDULE.

#### 4.2.2.11

THE LOCATION OF DRAIN HEADERS, VALVES, STATIONS, AND STEAM TRAPS OF PIPING AS INDICATED IN THE BHEL DRAWINGS ARE SUGGESTIVE ONLY. THE FINAL LOCATION AND ROUTINGS SHALL BE DECIDED TO SUIT THE SITE CONDITIONS. WHILE ROUTING SUCH LINES AND FIXING THE STATIONS, IT HAS TO BE ERECTED SO AS TO PROVIDE EASY ACCESSIBILITY AND FREE PATH FOR THE PURPOSE OF EASY OPERATION AND MAINTENANCE. THESE LOCATIONS SHALL BE ACCEPTABLE TO THE CLIENT. SOMETIMES, THE LOCATIONS OF STATIONS AND ROUTING OF LINES MAY HAVE TO BE CHANGED AS PER THE SITE CONDITIONS. ALL SUCH WORKS SHALL BE CARRIED OUT EXPEDITIOUSLY AS PER THE INSTRUCTIONS OF BHEL ENGINEER. THE DECISION OF BHEL ENGINEER IS FINAL AND BINDING ON THE CONTRACTOR.

#### 4.2.2.12

ERECTION OF PIPING SYSTEMS SHALL INVOLVE CO-ORDINATION WITH THE ERECTION OF THE TURBINE, TURBO-GENERATOR, CONDENSER, BOILER, BOILER FEED PUMPS AND OTHER MAJOR EQUIPMENTS. WHEREVER REQUIRED, APPROVAL OF CONCERNED BHEL ENGINEER/OTHER ERECTION AGENCY MUST BE OBTAINED PRIOR TO MAKING PIPING INTERFACE CONNECTIONS TO SUCH EQUIPMENTS. SEQUENCE OF WORK SHALL BE CAREFULLY PLANNED TO MINIMIZE INTERFERENCE WITH OTHER GROUPS WORKING IN THE SAME AREA. ACTUAL SEQUENCE TO BE FOLLOWED SHALL BE SUBJECT TO THE APPROVAL OF BHEL ENGINEER AND BHEL ENGINEER MAY DIRECT THE CONTRACTOR TO RESCHEDULE HIS WORK TO SUIT THE STATUS OF THE SITE WORK.

#### 4.2.2.13

WHILE ERECTING THE FIELD- ROUTED PIPELINES, THE CONTRACTOR SHALL CHECK THE ACCESSIBILITY OF VALVES, INSTRUMENTS TAPPING POINTS AND MAINTAIN MINIMUM HEADROOM/ACCESS REQUIREMENT AND OTHER NECESSARY CLEARANCES FROM THE ADJOINING WORK AREAS TO AVOID INTERFERENCE AND CONGESTION.

#### 4.2.2.14

ALL PIPELINES SHALL BE GIVEN PROPER SLOPE TOWARDS THE DRAIN POINTS DURING ERECTION. FOR MAINTAINING THE SLOPES AS GIVEN IN THE DRAWINGS FOR LARGER THICKNESS AND LARGER DIA PIPELINES, EDGE PREPARATION FOR WELDING MAY HAVE TO BE ALTERED SUITABLY TO ACHIEVE THE SLOPE.

#### 4.2.2.15

ALL PIPELINES SHALL BE PROVIDED, AS PER THE INSTRUCTIONS OF BHEL ENGINEER, WITH SUITABLE VENT AND THE DRAIN POINTS WITH VALVE (S) ON THE HIGHEST AND LOWER POINTS OF THE PIPE RUN ALTHOUGH MAY NOT BE SPECIFICALLY MENTIONED IN THE DRAWING.

#### 4.2.2.16

IT MAY BECOME NECESSARY TO MAKE & INSTALL TEMPORARY SPOOL PIECES FOR CERTAIN PROCESS REQUIREMENTS. CONTRACTOR'S SCOPE SHALL INCLUDE PREPARATION, ERECTION, FIT-UP, WELDING, NDE ETC AND DISMANTLING OF SUCH SPOOL PIECES AT APPROPRIATE STAGE WITHOUT ANY ADDITIONAL PAYMENT.

#### 4.2.2.17

NORMALLY, HANGERS SETTING IN COLD CONDITION ARE DONE BY SIMULATION ADDING ADDITIONAL TEMPORARY WEIGHT, WHICH WILL BE ROUGHLY EQUAL TO THE WEIGHT OF THE INSULATION. ATTACHMENT OF TEMPORARY WEIGHTS AND FLOATING OF THE JOINTS IN THE SIMULATION TEST TO BE TREATED AS PART OF JOB. HANGER SETTINGS HAVE TO BE REPEATED FOR ACHIEVING FREE-FLOATING JOINTS. HANGER ADJUSTMENTS TO BE REPEATED FOR STEAM BLOWING BY RESETTING HOT AND COLD VALUES IF REQUIRED. THIS MAY HAVE TO BE REPEATED SEVERAL TIMES AFTER STEAM BLOWING AND SYNCHRONIZATION. THE WEIGHTS WILL BE SUPPLIED BY BHEL. CONTRACTOR HAS TO TRANSPORT FROM BHEL STORES AND RETURN THE SAME AFTER COMPLETION OF WORK. NO EXTRA CLAIM ON THIS ACCOUNT WILL BE ENTERTAINED.

### **4.2.3 ROTATING MACHINERY**

- A) SPECIFICATIONS COVERED UNDER THE FOLLOWING PARA AND ALSO OTHER RELEVANT SPECIFICATIONS CONTAINED IN OTHER PARAS ELSEWHERE IN THIS TENDER DOCUMENT WILL BE APPLICABLE FOR ROTATING MACHINES LIKE FD / ID / PA / SEAL AIR FANS, BLOWERS, COAL MILLS, FUEL FEEDERS, HP & LP DOSING PUMP SKIDS AND OTHER SIMILAR AUXILIARIES.
- B) ALL LUBRICANTS FOR TESTING, PRESERVATION AND LUBRICANTS FOR TRIAL RUNS OF THE EQUIPMENTS SHALL BE SUPPLIED BY BHEL AS FREE ISSUE. ALL SERVICES INCLUDING LABOUR SHALL BE PROVIDED BY THE CONTRACTOR FOR DRAWING THESE FROM BHEL / CUSTOMER'S STORES, TRANSPORTING, HANDLING, FILLING, EMPTYING, RE-FILLING, ACCOUNTING AND RETURN OF SURPLUS LUBRICANTS / EMPTY CONTAINERS / OLD & USED LUBRICANTS AFTER DRAINING ETC. CONTRACTOR SHOULD CLEAN THE SPILLED / LEAKING LUBRICANTS THOROUGHLY, CONSUMABLES FOR SUCH CLEANING WILL BE IN CONTRACTOR'S SCOPE.
- C) ALL ROTATING MACHINERY AND EQUIPMENTS SHALL BE CLEANED, LUBRICATED, CHECKED FOR THEIR SMOOTH ROTATION, IF NECESSARY, BY DISMANTLING AND RE-FITTING BEFORE ERECTION. ALSO, THE EQUIPMENTS MAY HAVE TO BE CHECKED FOR CLEARANCES, TOLERANCES AT ANY STAGE OF THE WORK INCLUDING DURING TESTING, COMMISSIONING ETC. SHAFT OF THE ROTATING MACHINES SHALL BE ROTATED PERIODICALLY TO AVOID DAMAGES. ALL THESE SHALL BE PART OF WORK.
- D) TRIAL RUN OF THE DRIVES IN UN-COUPLED STATE AND THEN COUPLED WITH EQUIPMENT HAS TO BE DONE AFTER NECESSARY ALIGNMENT.
- E) FORCED LUBE OIL SYSTEMS INCLUDING LUBE OIL PIPING OF DRIVES, ROTATING EQUIPMENTS ETC FORM PART OF THE WORK UNDER THESE SPECIFICATIONS. HYDRAULIC TEST OF OIL

COOLERS, OIL PIPING ETC ARE IN THE SCOPE OF WORK. WHERE REQUIRED COOLER MAY HAVE TO BE DISMANTLED FOR HYDRAULIC TEST AND RE-ERECTED THEREAFTER AS PART OF WORK.

- F) CERTAIN ROTATING MACHINERY, AFTER TESTING, PRE-COMMISSIONING MAY HAVE TO BE RE-ALIGNED/HOT ALIGNED AND VITAL CLEARANCES RE-SET. THIS MAY CALL FOR DISCONNECTION OF CABLING, REMOVAL OF CERTAIN INSTRUMENTS ETC AND RESTORATION AT APPROPRIATE STAGE.
- G) PROTECTIVE LUBRICANT COATS / FILL PROVIDED ON / IN THE CRITICAL AREA OF EQUIPMENTS HAVE TO BE REMOVED AT APPROPRIATE STAGE AND REGULAR LUBRICANTS, AFTER REMOVAL / CLEANING OF PROTECTIVE COAT / FILL, AS PER SPECIFICATIONS SHOULD BE FILLED / APPLIED. CLEANING / FLUSHING AGENTS / OILS WILL BE PROVIDED BY BHEL.
- H) CHEMICAL CLEANING, STEAM BLOWING AND AIR DRYING OF THE CONNECTING PIPES FOR THE LUBE OIL SYSTEM HAS TO BE CARRIED OUT WHEREVER REQUIRED AS PER INSTRUCTION MANUALS / DRAWINGS. CHEMICALS, SUITING BHEL SPECIFICATION, FOR SUCH CHEMICAL CLEANING IS IN THE SCOPE OF CONTRACTOR.
- I) EVENTHOUGH ROTATING MACHINES MAY BE GROUTED TO FOUNDATION USING NON-SHRINK GROUT MIX, BLUE MATCHING OF PACKER PLATES / SHIMS WITH FOUNDATION / BETWEEN PACKERS / EQUIPMENT BASE SHOULD BE DONE AS INCIDENTAL TO WORK WHEREVER INSTRUCTED BY BHEL ENGINEER.
- J) SKID MOUNTED EQUIPMENTS MAY NEED CHECKING, RE-SETTING DUE TO VARIOUS REASONS AS INCIDENTALS TO WORK.
- K) THERE ARE 6 NOS OF BOWL MILLS PER UNIT.

#### **4.2.4 ERECTION OF ELECTROSTATIC PRECIPITATOR**

##### 4.2.4.1

WHEREVER CALLED FOR, PRE-ASSEMBLY OF SUPPORTING STRUCTURES, CASING WALLS HAVE TO BE DONE, ON GROUND.

##### 4.2.4.2

LOADING OF COLLECTING ELECTRODES EITHER FROM TOP OR BOTTOM, TO BE DECIDED SUITING SITE CONDITIONS, SHALL BE DONE WITH DUE CARE AS PER INSTRUCTIONS.

##### 4.2.4.3

STRAIGHTNESS OF ALL COLLECTING ELECTRODES HAS TO BE CHECKED ON GROUND PRIOR TO LOADING IN TO THE FIELD.

##### 4.2.4.4

BUNDLE OF COLLECTING ELECTRODES SHOULD BE HANDLED ONLY WITH SPECIAL LIFTING BEAM AND SLINGS SUPPLIED FOR THE PURPOSE.

##### 4.2.4.5

BHEL WILL SUPPLY HUCK BOLTING M/C WITH NECESSARY AUXILIARIES FREE OF CHARGES. HOWEVER, ELECTRICAL CONNECTIONS, OPERATION ETC SHALL BE ARRANGED BY THE CONTRACTOR.

##### 4.2.4.6

CLEARANCES AS PRESCRIBED AMONGST COLLECTING ELECTRODES AND WITH CASING WALLS HAS TO BE MAINTAINED. SPOT HEATING OF COLLECTING ELECTRODES, WHEREVER CALLED FOR, SHALL BE DONE AS PART OF WORK TO ACHIEVE THE REQUIRED CLEARANCES.

##### 4.2.4.7

ERECTION, ALIGNMENT/ FIXING IN FINAL POSITION, OF HIGH VOLTAGE RECTIFIERS OF ESP IS IN THE SCOPE OF WORK. HOWEVER TESTING & COMMISSIONING WILL BE DONE BY OTHER AGENCY.

#### 4.2.4.8

INSTALLATION OF HIGH VOLTAGE INTERLOCKS (EXCEPTING ROTARY SWITCH INTERLOCK OF SWITCHGEAR PANELS) IS IN THE SCOPE OF WORK.

#### 4.2.4.9

COMPLETE ERECTION, ALIGNMENT, TESTING, PRE-COMMISSIONING AND COMMISSION ETC FOR DRIVE MOTORS OF COLLECTING ELECTRODES AND EMITTING ELECTRODE RAPPING MECHANISM IS IN THE SCOPE OF WORK.

#### **4.2.4.10 AIR LEAK TEST**

AFTER ERECTION OF ESP AND BEFORE CLEARING FOR INSULATION, AIR LEAK TEST HAS TO BE CARRIED OUT. NECESSARY EQUIPMENT LIKE, AIR BLOWER, VENTURY, DUCTING, AND INSTRUMENTATION ETC. WILL BE PROVIDED BY BHEL FREE OF CHARGES. HANDLING AT STORES, TRANSPORT, ERECTION, COMMISSIONING AND CARRYING OUT THE LEAKAGE TEST, ATTENDING TO THE LEAKAGES TILL SATISFACTORY SEALING / LEAK PROOFNESS SHALL BE IN SCOPE OF THE WORK. CONTRACTOR SHALL DISMANTLE THE TEST EQUIPMENTS AND RETURN TO BHEL STORES IN GOOD CONDITION AFTER DUE RECONCILIATION, CLEANING AND SERVICING. NO SEPARATE/ ADDITIONAL PAYMENT IS ENVISAGED FOR THE ABOVE.

#### **4.2.5**

#### **MAIN SUPPORTING STRUCTURES, EXTERNAL STRUCTURES, ELEVATOR STRUCTURES, STAIRWAYS, GALLERIES & PLATFORMS & HANDLING ARRANGEMENT**

##### 4.2.5.1

BOILER MAIN SUPPORTING STRUCTURES HAS TO BE ERECTED IN A SEQUENTIAL MANNER.

##### 4.2.5.2

QUALITY NORMS WITH REGARD TO VERTICALITY OF COLUMN, INTER-ALIA, HAVE TO BE ADHERED TO STRICTLY, AT VARIOUS STAGES OF ERECTION.

##### 4.2.5.3

STIFFENING/STRENGTHENING OF MAIN SUPPORTING STRUCTURE, IF ANY, DUE TO DEVIATION IN VERTICALITY OF COLUMNS POST DRUM LIFTING, SHALL BE CARRIED OUT, INCLUDING FABRICATION, IF ANY. NECESSARY STEEL FOR THIS WILL BE PROVIDED IN RANDOM SIZES BY BHEL AS FREE ISSUE. PAYMENT FOR SUCH STIFFENING/ STRENGTHENING SHALL BE MADE FOR WEIGHT CERTIFIED BY BHEL ENGINEER AT THE ITEM RATE APPLICABLE TO STRUCTURES, PROVIDED THE DEVIATION HAS OCCURED FOR THE REASONS NOT ATTRIBUTABLE TO THE CONTRACTOR.

##### 4.2.5.4

EACH OF THE CEILING GIRDERS WILL BE SENT IN 2 PIECES AND WILL HAVE TO BE ASSEMBLED, WELDED AND NDE & PWHT (SR) DONE ON GROUND PRIOR TO THEIR ERECTION IN POSITION.

##### 4.2.5.5

IT IS LIKELY THAT, IN DEVIATION FROM PRESCRIBED SEQUENCE, ERECTION OF CERTAIN ELEMENTS OF STRUCTURE MAY BE DEFERRED FOR LATER STAGE, TO FACILITATE, SAY CRANE BOOM REACH TO HIGHER ELEVATION, PASSAGE OF DRUM DURING DRUM LIFTING ETC. THIS MAY NECESSITATE TEMPORARY INSTALLATION OF SOME STRUCTURAL STEELS AT APPROPRIATE LOCATIONS TO KEEP THE STABILITY OF STRUCTURE INTACT. SUCH TEMPORARY INSTALLATIONS SHALL BE REMOVED SUBSEQUENTLY AND RETURNED TO BHEL STORES/ STORAGE YARD. FINISHING WORK IN THE RELATED PERMANENT STRUCTURES SHALL BE DONE AS PER THE INSTRUCTION OF BHEL ENGINEER. BHEL WILL PROVIDE NECESSARY STEELS ON FREE ISSUE BASIS IN RANDOM SIZES FOR SUCH INSTALLATIONS, WHICH SHALL BE FABRICATED BY THE CONTRACTOR TO SUIT THE REQUIREMENT.

PAYMENT FOR SUCH INSTALLATIONS SHALL BE MADE ON THE ACCEPTED TONNAGE RATE OF STRUCTURES. NO SEPARATE PAYMENT WILL BE MADE FOR FABRICATION, REMOVAL & RETURN OF THE MATERIALS TO BHEL STORES.

#### 4.2.5.6

IN SOME CASES, THE STRUCTURAL MATERIAL WILL BE SUPPLIED IN RANDOM LENGTHS, WHICH HAVE TO BE FABRICATED TO SUIT THE REQUIREMENT AS INCIDENTAL TO WORK. ALSO, IT MAY SOMETIMES BE NECESSARY TO REMOVE SOME OF THE ERECTED MEMBERS TO FACILITATE ERECTION OF BIGGER/ PRE-ASSEMBLED EQUIPMENTS. IN SUCH CASES, THE REMOVAL AND RE-ERECTION OF SUCH MEMBERS AS AGREED BY THE BHEL ENGINEER, WILL HAVE TO BE DONE BY THE CONTRACTOR AS INCIDENTAL TO WORK.

#### 4.2.5.7

CONTRACTOR SHALL ARRANGE MATERIALS REQUIRED FOR TEMPORARY CAT LADDERS & WORKING PLATFORMS DURING ERECTION OF COLUMNS, PLATFORMS AND OTHER STRUCTURAL COMPONENTS. SUCH ARRANGEMENTS SHALL, AS FAR AS POSSIBLE, BE ONLY OF CLAMPING & BOLTING TYPE, AS WELDING ON COLUMNS ETC WILL NOT BE PERMITTED. AFTER THE COMPLETION OF WORK THESE SHALL BE REMOVED.

#### 4.2.5.8

ALL THE HAND RAILS AND TOE GUARDS SHALL BE PROVIDED AS PER DRAWINGS AND SITE REQUIREMENT. HAND RAILS SUPPLIED IN RUNNING LENGTHS SHALL BE SUITABLY CUT, EDGE PREPARED AND WELDED. ALSO, HAND RAILS/ GUARDS MAY HAVE TO BE PROVIDED FROM THE SAFETY POINT OF VIEW IN CERTAIN PLACES THOUGH NOT INDICATED IN THE ERECTION DRAWINGS. THE WELD JOINTS OF HAND RAILS SHALL BE GROUND SMOOTH TO FLUSH FINISH.

#### 4.2.5.9

ELECTROFORGED FLOOR GRILLS WILL BE SUPPLIED FOR THIS PROJECT. THESE MAY HAVE TO BE CUT TO SUIT REQUIREMENT. CUTTING SHALL BE DONE ONLY BY MECHANICAL CUTTERS **AND NOT BY GAS CUTTING**. COLD GALVANIZING COMPOUND IS TO BE APPLIED ON THE CUT SURFACE/EDGE. **CONTRACTOR SHALL PROVIDE THE COLD GALVANIZING PAINT OF REQUIRED SPECIFICATION FOR SUCH APPLICATIONS.**

FIXING OF FLOOR GRILLS SHALL BE DONE BY SELF-TAPPING SCREWS **AND NOT BY WELDABLE STUDS**. SPECIAL PURPOSE ELECTRICALLY OPERATED HAND TOOLS ARE AVAILABLE IN THE MARKET FOR THIS, WHICH DRILLS, TAPS AND FIXES THE SCREWS IN A SINGLE OPERATION. BHEL WILL SUPPLY THE NECESSARY SELF-DRILLING-CUM-TAPPING SCREWS AND FIXING CLIPS. CONTRACTOR SHALL DEPLOY THE **DRILLING CUM FIXING MACHINE** REQUIRED FOR THIS PURPOSE AS A REGULAR SCOPE OF WORK.

#### 4.2.5.10

THE CONTRACTOR SHALL ALSO INSTALL ADDITIONAL PLATFORMS OF PERMANENT NATURE FOR APPROACHING DIFFERENT EQUIPMENT AS PER THE SITE REQUIREMENT AND TO MEET O&M REQUIREMENTS, THOUGH THESE MAY NOT INDICATED IN THE ERECTION DRAWINGS. MATERIALS REQUIRED FOR SUCH PLATFORMS WILL BE SUPPLIED BY BHEL IN RANDOM SIZES ON FREE ISSUE BASIS. THESE HAVE TO BE FABRICATED TO SUIT THE REQUIREMENT. PAYMENT ONLY FOR ERECTED WEIGHT AS CERTIFIED BY BHEL ENGINEER SHALL BE MADE AT THE RATE APPLICABLE FOR STRUCTURES. NO PAYMENT IS ENVISAGED FOR FABRICATION OF STRUCTURES.

#### 4.2.5.11

ALL RELEVANT PROVISIONS AS ABOVE SHALL APPLY, MUTATIS-MUTANDIS, TO THE WORK OF EXTERNAL STRUCTURES, INTERCONNECTING STRUCTURES, ELEVATOR STRUCTURES, ESP STAIRWAYS AND GALLARIES & EQUIPMENT HANDLING SYSTEM ETC.

### **4.2.6 OTHER PRODUCTS AND SYSTEMS AND COMMON REQUIREMENTS**



A) DUCTS / EXPANSION BELLOWS (METALLIC & NON-METALLIC) ARE NORMALLY SUPPLIED IN LOOSE COMPONENTS / SEGMENTS AND THESE ARE TO BE ASSEMBLED AND WELDED/ JOINTED AT SITE BEFORE ERECTION. THE FABRIC PORTION OF NON-METALLIC EXPANSION JOINTS (NMEJ) NAMELY BOLSTER; FABRIC BELT AND CANOPY SHALL BE INSTALLED BY CONTRACTOR UNDER SUPERVISION/GUIDENCE OF EQUIPMENT SUPPLIER/BHEL FOR THE FIRST FEW CASES. CONTRACTOR SHALL ENSURE THAT ALL SUBSEQUENT NMEJ ARE ASSEMBLED WITH DUE CARE AND PROPER PROCEDURE. IN SIMILAR MANNER ALL JOINTS, CONNECTING DUCTS, EXPANSION PIECES AND DAMPERS SHALL BE SEAL WELDED. THESE WELDS HAVE TO BE MADE LEAK PROOF AND TESTED AS PER TECHNICAL INSTRUCTION / REQUIREMENT.

B) CERTAIN STRUCTURAL ITEMS LIKE SILENCER SUPPORTS, ROOF CLADDING STRUCTURE, PLATFORM ETC WILL BE SUPPLIED IN RUNNING LENGTHS WHICH SHALL BE CUT TO REQUIRED SUITABLE SIZES AND ADJUSTED/TRIMMED AS PART OF WORK.

C) CONTRACTOR HAS TO MAKE CANOPIES FOR MOTORS, ACTUATORS, LUB OIL UNITS, CONTROL VALVES, ETC. MATERIAL FOR THIS WILL BE SUPPLIED IN RANDOM LENGTHS / SIZES. NO SEPARATE PAYMENT FOR FABRICATION IS ENVISAGED. ONLY THE ERECTION TONNAGE RATE APPLICABLE FOR STRUCTURE WILL BE PAID FOR THIS WORK.

D) BHEL WILL SUPPLY **SPECIFIED SHEETS** FOR ROOF AND SIDE CLADDING OF BOILER AND ELEVATOR STRUCTURE. THESE SHEETS ARE TO BE FIXED WITH SELF TAPPING SCREWS (SUPPLIED BY BHEL) IN SIMILAR MANNER AS IN CASE OF GALVANIZED FLOOR GRILLS. CONTRACTOR SHALL DEPLOY THE **DRILLING CUM FIXING MACHINE** REQUIRED FOR THIS PURPOSE AS A REGULAR SCOPE OF WORK.

E) IN CASE THE ID FANS ARE PROVIDED WITH VARIABLE FREQUENCY DRIVE, CONTRACTOR HAS TO ERECT & COMMISSION THE MECHANICAL COMPONENTS OF THE FAN. ELECTRICAL/ELECTRONIC PANELS, TRANSFORMERS, CABLING ETC ARE NOT IN THIS WORK SPECIFICATION. HOWEVER IN CASE OF HYDRAULIC COUPLING, THE COUPLING SHALL BE IN SCOPE OF THIS CONTRACTOR.

F) ALL WELDED JOINTS SHOULD BE PAINTED WITH ANTICORROSIVE PAINT/PRIMER IMMEDIATELY AFTER COMPLETION OF ALL WORK. NECESSARY PAINTS AND OTHER CONSUMABLES FOR THE ABOVE WORK ARE IN THE SCOPE OF THE CONTRACTOR.

G) HANGERS AND SUSPENSIONS, SUPPORT STEELS FOR DUCTS AND OTHER EQUIPMENTS, PIPING ETC WILL BE SUPPLIED IN RUNNING/RANDOM LENGTHS/ SIZES, WHICH SHALL BE CUT TO SUITABLE SIZES AND ADJUSTED AS REQUIRED.

H) TOUCH UP AND PRESERVATIVE PAINTING OF ALL COMPONENTS ISSUED TO AND/OR ERECTED BY CONTRACTOR SHALL FORM PART OF SCOPE OF WORK. THE CONTRACTOR SHALL ARRANGE ALL PAINTS, PRIMER CONSUMABLES, T&P AND FACILITIES.

### **4.3 PREPARATION OF FOUNDATIONS, AND GROUTING OF EQUIPMENT OF BOILER & AUXILIARIES**

#### **4.3.1**

BUILDINGS, FOUNDATIONS AND OTHER NECESSARY CIVIL WORKS FOR SUPPORTING STRUCTURES, EQUIPMENTS ETC, WILL BE PROVIDED BY THE BHEL/CUSTOMER. THE CHECKING OF DIMENSIONAL ACCURACY, AXES, ELEVATION, LEVELS ETC, WITH REFERENCE TO BENCH MARKS OF FOUNDATIONS AND ANCHOR BOLT PITS AND ALSO ADJUSTMENTS OF FOUNDATION LEVEL, DRESSING AND CHIPPING OF FOUNDATION SURFACES OF ALL EQUIPMENTS CONTRACTOR/BHEL SHALL PREPARE PROTOCOLS BEFORE TAKING OVER THE FOUNDATIONS. DRESSING AND CHIPPING OF FOUNDATIONS UPTO 25MM FOR ACHIEVING PROPER LEVELS WILL BE WITHIN THE SCOPE OF WORK/SPECIFICATION.

#### **4.3.2**

ALL TEMPORARY FOUNDATIONS AND ANCHOR POINTS REQUIRED FOR INSTALLING ERECTION EQUIPMENTS AND WINCHES, FOUNDATIONS FOR PUMPS, TANKS ETC ARE IN THE SCOPE OF CONTRACTOR. ALL BUILDING MATERIALS LIKE CEMENT, STEEL INCLUDING RE-INFORCEMENT BARS, GRITS CEMENTS ETC FOR SUCH TEMPORARY FOUNDATIONS SHALL HAVE TO BE ARRANGED BY THE CONTRACTOR WITHIN THE QUOTED RATES. ALL SUCH FOUNDATIONS SHALL BE DEMOLISHED AND NORMAL GROUND CONDITIONS RESTORED AFTER THE USAGE.

#### 4.3.3

THE COMPLETE WORK OF SECONDARY GROUTING OF EQUIPMENTS (STATIC AS WELL AS ROTATING IN TOTALITY) ETC IS INCLUDED IN THE SCOPE OF WORK/SPECIFICATION. CONTRACTOR SHALL ARRANGE ALL MANPOWER, T&P, FORM WORK AND SHUTTERING MATERIALS, ALL GROUTING MATERIALS SUCH AS ORDINARY PORTLAND CEMENT, SAND, STONE CHIPS ETC & QUICK-SETTING-NON-SHRINK-FREE-FLOW SPECIAL GROUT MIX OF REQUIRED SPECIFICATION (LIKE CONBEXTRA-GP1/ GP2 OR EQUIVALENT).

##### 4.3.3.1

THE QUICK-SETTING-NON-SHRINK-FREE-FLOW SPECIAL GROUT MIX SHALL BE PURCHASED ONLY FROM THE FOLLOWING BHEL APPROVED VENDORS:

1. M/S FOSROC CHEMICALS (INDIA) PVT LTD;
2. M/S SIKA INDIA PVT LTD;
3. M/S PAGEL CONCRETE TECHNOLOGIES PVT LTD;
4. M/S PIDILITE INDUSTRIES LTD.

IN ORDER TO ENSURE THE QUALITY, THE MAJOR GROUTING OF EQUIPMENTS USING ANY OF ABOVE GROUT MIXES SHALL ESSENTIALLY BE DONE AS PER THE RECOMMENDATIONS OF SUPPLIER WITH REGARD TO GROUT PREPARATION AND USE OF MACHINERY ETC UNDER THE SUPERVISION OF THE RESPECTIVE SUPPLIER. BHEL HAS ARRANGEMENT WITH ABOVE SUPPLIERS FOR SUPERVISION SERVICES AND THE SUPERVISION CHARGES FOR THE SAME WILL BE BORNE BY BHEL. HOWEVER, THE CONTRACTOR SHALL ENSURE READINESS OF EQUIPMENT FOR GROUTING IN ALL RESPECT BEFORE SUCH A SERVICE IS REQUISITIONED AND THE DURATION IS NOT PROLONGED UNDULY. ANY OVERSTAY REQUIRED DUE TO CONTRACTOR SHALL BE CHARGED TO THE CONTRACTOR WITH BHEL'S DEPARTMENTAL CHARGES. CONTRACTOR SHALL CONSULT BHEL ENGINEER BEFORE DECIDING UPON THE VENDOR FOR THE ABOVE.

##### 4.3.3.2

CLEANING OF THE FOUNDATION SURFACES, POCKET HOLES, ANCHOR BOLT PITS AND DE-WATERING AND MAKING THEM FREE OF OIL, GREASE, SAND AND OTHER FOREIGN MATERIALS BY SODA WASHING, WATER WASHING, COMPRESSED AIR AND OTHER APPROVED METHODS WILL BE WITHIN THE SCOPE OF THIS WORK.

#### 4.3.4

BHEL WILL PROVIDE ONLY SHIMS AND PACKER PLATES (EITHER MACHINED OR PLAIN) WHICH ARE RECEIVED FROM BHEL'S MANUFACTURING PLANTS AND GO AS PERMANENT PART OF THE EQUIPMENT. ADDITIONAL PACKER PLATES AND SHIMS IF REQUIRED, WILL HAVE TO BE PREPARED BY THE CONTRACTOR OUT OF STEEL PLATES, STEEL SHEETS TO MEET SITE REQUIREMENTS. NECESSARY STEEL PLATES FOR THIS PURPOSE WILL BE PROVIDED BY BHEL FREE OF COST.

#### 4.3.5

PACKER PLATES SHALL NOT ONLY BE BLUE MATCHED WITH FOUNDATIONS BUT ALSO INTER-PACKER CONTACT SURFACES, CONTACT SURFACES BETWEEN PACKER AND PEDESTALS, CONTACT SURFACE BETWEEN PACKER AND FOUNDATION FRAME ETC SHALL ALSO BE BLUE MATCHED AND REQUIRED QUANTUM OF CONTACT SHALL BE ACHIEVED BY CHIPPING AND SCRAPPING AS PER ENGINEER'S INSTRUCTIONS.

### **4.4 WELDING, RADIOGRAPHY AND OTHER NON-DESTRUCTIVE TESTING, POST WELD HEAT TREATMENT**

Bharat Heavy Electricals Limited: PSWR: NAGPUR

Tender Specs No. BHE/PW/PUR/BINT-BLR Vertical pkg/648

#### 4.4.1 **WELDING**

##### 4.4.1.1

INSTALLATION OF EQUIPMENT INVOLVES GOOD QUALITY WELDING, NDE CHECKS, POST WELD HEAT TREATMENT ETC. CONTRACTOR'S PERSONNEL ENGAGED SHOULD HAVE ADEQUATE QUALIFICATION ON THE ABOVE WORKS.

##### 4.4.1.2

THE METHOD OF WELDING (VIZ) ARC, TIG OR OTHER METHOD WILL BE INDICATED IN THE DETAILED DRAWING/DOCUMENTS. BHEL ENGINEER WILL HAVE THE OPTION OF CHANGING THE METHOD OF WELDING AS PER SITE REQUIREMENT.

##### 4.4.1.3

WELDING OF HIGH PRESSURE JOINTS SHALL BE DONE BY IBR CERTIFIED HIGH PRESSURE WELDERS WHO HAVE BEEN PERMITTED BY CIB OF STATE CONCERNED FOR DEPLOYMENT AT THE SITE OF WORK.

##### 4.4.1.4

WELDING OF ALL ATTACHMENTS TO PRESSURE PARTS, PIPING SHALL BE DONE ONLY BY THE QUALIFIED AND APPROVED WELDERS.

##### 4.4.1.5

BEFORE ANY WELDER IS ENGAGED ON WORK, HE SHALL BE TESTED AND QUALIFIED BY BHEL/CUSTOMER, THOUGH THEY MAY POSSESS THE IBR/OTHER CERTIFICATE. BHEL RESERVES THE RIGHT TO REJECT ANY WELDER WITHOUT ASSIGNING ANY REASON. ALL THE EXPENDITURE IN TESTING/QUALIFICATION OF THE CONTRACTOR'S WELDER SHALL BE BORNE BY CONTRACTOR.

##### 4.4.1.6

UNSATISFACTORY AND CONTINUOUS POOR PERFORMANCE MAY RESULT IN DISCONTINUATION OF CONCERNED WELDER.

##### 4.4.1.7

THE WELDED SURFACE SHALL BE CLEANED OF SLAG AND PAINTED WITH PRIMER PAINT TO PREVENT RUSTING, CORROSION. FOR THIS CONSUMABLES LIKE PAINT /PRIMER ETC WILL BE IN THE CONTRACTOR'S SCOPE.

##### 4.4.1.8

HP JOINT FIT-UP, SHOULD BE PROTECTED, WHERE REQUIRED, BY USE OF TAPES/PROTECTIVE PAINT AS MAY BE PRESCRIBED BY BHEL. THE CONTRACTOR SHALL ARRANGE CONSUMABLES LIKE PROTECTIVE PAINTS/TAPES ETC.

##### 4.4.1.9

THE CONTRACTOR SHALL MAINTAIN WELDING RECORDS IN THE FORM AS PRESCRIBED BY BHEL CONTAINING ALL NECESSARY DETAILS, AND SUBMIT THE SAME TO THE BHEL ENGINEER AS REQUIRED. INTERPRETATION OF THE BHEL ENGINEER REGARDING ACCEPTABILITY OF THE WELDS SHALL BE FINAL.

##### 4.4.1.10

IN THE CASE OF P-91 PIPE WELDING, CONTRACTOR SHALL DEPLOY WELDERS HAVING EXPERIENCE IN WELDING OF P-91 MATERIAL. THE WELDERS ENGAGED BY CONTRACTOR IF NOT QUALIFIED FOR P-91 WELDING WILL BE TRAINED BY BHEL AT BHEL WELDING RESEARCH INSTITUTE (WRI) TRICHY AND ALLOWED TO WORK ONLY AFTER PASSING THE REQUIRED TEST ARRANGED BY BHEL. ALL THE EXPENDITURE TOWARDS SUCH QUALIFICATION INCLUDING COST OF TRAINING, TRAVELING EXPENSES, STAY ETC., SHALL BE BORNE BY THE CONTRACTOR.

##### 4.4.1.11

JOINT FIT UP WILL BE A STAGE INSPECTION. WHERE REQUIRED, JOINTS SHALL BE OFFERED FOR VISUAL INSPECTION AFTER ROOT RUN. SUBSEQUENT WELDING SHOULD BE MADE ONLY AFTER THE APPROVAL OF ROOT RUN.

#### 4.4.1.12 **SOCKET WELDING:**

IN EXECUTION OF THIS WORK, CONSIDERABLE NUMBER OF SOCKET WELD JOINTS IS INVOLVED. THE EXACT QUANTITY OF SUCH SOCKET WELDS OR PROBABLE VARIATION IN THE QUANTUM CANNOT BE FURNISHED. THE TENDERER SHALL TAKE NOTICE OF THIS WHILE QUOTING AS NO EXTRA CLAIM ON THIS ACCOUNT WILL BE ENTERTAINED. THE SOCKET WELDING ON HP PARTS/ HP PIPING SHALL BE DONE BY THE IBR QUALIFIED WELDERS. CONTRACTOR HAS TO ADHERE TO THE PROCEDURES/SPECIFICATION AS INDICATED IN THE DRAWING FOR SOCKET WELDING.

#### 4.4.1.13

WELDING ELECTRODES HAVE TO BE STORED IN ENCLOSURES HAVING TEMPERATURE AND HUMIDITY CONTROL ARRANGEMENTS. THIS ENCLOSURE SHALL MEET BHEL SPECIFICATIONS.

#### 4.4.1.14

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 WELDING ELECTRODES HAVE TO BE CARRIED IN PORTABLE OVENS.

### **4.4.2 HEAT TREATMENT:**

#### 4.4.2.1

FOR THE PURPOSE OF TEMPERATURE RECORDING OF STRESS RELIEVING PROCESS, THERMOCOUPLES HAVE TO BE ATTACHED TO THE WELD JOINT. THE NUMBER OF TEMPERATURE MEASURING POINTS AND LOCATIONS SHALL BE AS PER THE STANDARDS OF BHEL. THERMOCOUPLES HAVE TO BE ATTACHED USING CAPACITOR DISCHARGE TYPE PORTABLE THERMOCOUPLE ATTACHMENT UNIT. CONTRACTOR SHALL ARRANGE SUFFICIENT NUMBER OF THERMOCOUPLE ATTACHMENT UNITS.

#### 4.4.2.2

CONTRACTOR SHOULD PROVIDE TEMPERATURE INDICATOR / TEMPERATURE RECORDER FOR MEASURING TEMPERATURE DURING PRE-HEATING FOR WELDING OR FOR CONTROLLING TEMPERATURE OF METAL FOR HOT CORRECTION ETC. THE TEMPERATURE RECORDERS SHOULD BE PREFERABLY OF SOLID STATE TYPE.

#### 4.4.2.3

HEAT TREATMENT MAY BE REQUIRED TO BE CARRIED OUT AT ANY TIME (DAY OR NIGHT) TO ENSURE THE CONTINUITY OF THE PROCESS. THE CONTRACTOR SHALL MAKE ALL NECESSARY ARRANGEMENTS INCLUDING LABOURER REQUIRED FOR THE SAME AS PER DIRECTIONS OF BHEL.

#### 4.4.2.4

IN CERTAIN CASES ONLY THE PRE-HEATING OF WELD JOINTS MAY BE CALLED FOR.

#### 4.4.2.5

FOR WELD JOINTS OF HEAVY STRUCTURAL SECTIONS, IF HEAT TREATMENT IS REQUIRED, THE SAME SHALL BE CARRIED OUT AS PART OF THE WORK.

#### 4.4.2.6

CHECKING EFFECTIVENESS OF STRESS RELIEVING BY HARDNESS TESTS (BY DIGITAL HARDNESS TESTER OR OTHER APPROVED TEST METHODS AS PER BHEL ENGINEER'S INSTRUCTION) INCLUDING NECESSARY TESTING EQUIPMENTS IS WITHIN THE SCOPE OF THE WORK / SPECIFICATION.

#### 4.4.2.7

PREHEATING, INTER-PASS HEATING, POST WELD HEATING AND STRESS RELIEVING AFTER WELDING ARE PART OF ERECTION WORK AND SHALL BE PERFORMED BY THE CONTRACTOR IN

ACCORDANCE WITH BHEL ENGINEER'S INSTRUCTIONS. WHERE THE ELECTRIC RESISTANCE HEATING METHOD IS ADOPTED CONTRACTOR SHALL MAKE ALL ARRANGEMENT INCLUDING HEATING EQUIPMENT WITH AUTOMATIC RECORDING DEVICES, ALL HEATING ELEMENTS, THERMOCOUPLES AND ATTACHMENT UNITS, GRAPH SHEETS, THERMAL CHALKS, & INSULATING MATERIALS LIKE MINERAL WOOL, ASBESTOS CLOTH, CERAMIC BEADS, ASBESTOS ROPES ETC, REQUIRED FOR ALL HEATING AND STRESS RELIEVING WORKS.

BHEL WILL PROVIDE THE INDUCTION HEATING EQUIPMENT SET FOR SA 335 P-91 MATERIALS PIPING ONLY. THE SET WILL COMPRISE OF FOLLOWING:

- (i) MAIN PANEL
- (ii) CAPACITOR PANEL
- (iii) INTERCONNECTION POWER & CONTROL CABLES BETWEEN ABOVE PANELS
- (iv) 185 sq mm SPECIAL CONNECTING CABLE FROM CAPACITOR PANEL OUTPUT – 5M LENGTH.

CONTRACTOR SHALL PROVIDE THE INPUT ELECTRICAL POWER CONNECTION INCLUDING ARRANGEMENTS SUCH AS DB, CABLES ETC, THERMOCOUPLE PADS, THERMOCOUPLES AND COMPENSATING CABLES, INDUCTION HEATING ANNEALING CABLES (FROM THE CAPACITOR PANEL TO JOINT AND FOR WRAPPING AROUND THE WELD JOINT) (SPEC: SINGLE CORE 240 Sq mm, 1200A, 3KHz), CERAMIC WOOL AND OTHER CONSUMABLES ETC AS MAY BE REQUIRED. QUANTUM OF ANNEALING CABLE REQUIREMENT WILL DEPEND ON MANY PARAMETERS e.g. WELD JOINT SIZE, HEAT INPUT, TYPE OF CONNECTION i.e. SERIES OR PARALLEL ETC.

**LIKELY SUPPLIER: MANSFIELD CABLE CO. NOIDA (UP).**

#### 4.4.2.8

ALL THE RECORDED GRAPHS FOR HEAT TREATMENT SHALL BE HANDED OVER TO BHEL/ IBR AUTHORITIES AND DUE CLEARANCES OBTAINED.

#### 4.4.2.9

DURING WELDING & POST WELD HEAT TREATMENT OF MAIN STEAM PIPING (P-91 MATERIAL), THE INDUCTION HEATING PROCESS SHALL CONTINUE UN-INTERRUPTED. THEREFORE, CONTACTOR SHALL ARRANGE BACK-UP DG SET TO TAKE CARE OF POWER INTERRUPTIONS DURING THE PROCESS.

#### 4.4.2.10

RESULTS OF THESE PROCESSES SHALL BE VERIFIED/ VALIDATED AS PER REQUIREMENTS OF BHEL/CLIENT.

### **4.4.3 NON DESTRUCTIVE EXAMINATION:**

#### 4.4.3.1

CONTRACTOR SHALL PROVIDE ALL RESOURCES AND MAKE ALL ARRANGEMENTS FOR THE RADIOGRAPHIC EXAMINATION OF WELDS FOR THIS WORK. FOR REASONS OF SAFETY, INVARIABLY THE RADIOGRAPHY WORK WILL BE CARRIED OUT AFTER THE NORMAL WORKING HOURS AND CLOSE OF OTHER SITE ACTIVITIES ONLY. IN THIS REGARD, THE CONTRACTOR HAS TO ADHERE TO THE SAFETY RULES / REGULATIONS LAID BY BARC AUTHORITIES FROM TIME TO TIME.

#### 4.4.3.2

RADIOGRAPHY INSPECTION OF WELDS SHALL BE PERFORMED IN ACCORDANCE WITH REQUIREMENTS AND RECOMMENDATION OF BHEL ENGINEER. THE MINIMUM QUANTUM OF RADIOGRAPHIC INSPECTION SHALL BE AS PER PROVISION OF IBR/BHEL'S ERECTION DOCUMENTS. THEY MAY, HOWEVER BE INCREASED DEPENDING UPON THE PERFORMANCE OF THE INDIVIDUAL WELDER AT THE DISCRETION OF BHEL ENGINEER/BOILER INSPECTING AUTHORITY. BIDDER SHALL ALSO ARRANGE THE UT EQUIPMENT WITH RECORDING FACILITY AT HIS OWN COST. USAGE OF UT EQUIPMENT SHALL BE AS PER DIRECTION OF BHEL ENGINEER. RECORDS OF UT SHALL BE PRODUCED AS PER SITE REQUIREMENT.

#### 4.4.3.4

ALL X-RAY / GAMMA RAY FILMS OF WELD JOINTS SHALL BE PRESERVED PROPERLY AND BE HANDED OVER TO BHEL/ IBR AUTHORITIES AND REQUISITE CLEARANCES SHALL BE OBTAINED BY THE CONTRACTOR.

#### 4.4.3.5

THE FIELD WELDED JOINTS SHALL BE SUBJECT TO DYE-PENETRANT/MPT/RT/ OTHER NON-DESTRUCTIVE EXAMINATION AS SPECIFIED IN THE RESPECTIVE ENGINEERING DOCUMENTS/ AS INSTRUCTED BY BHEL.

#### 4.4.3.6

WHERE REQUIRED, SURFACE PREPARATION, LIKE SMOOTH GRINDING OF WELDED AREA, PRIOR TO RADIOGRAPHY SHALL BE DONE. IT MAY ALSO BECOME NECESSARY TO ADOPT INTER-LAYER RADIOGRAPHY/MPT/UT DEPENDING UPON THE SITE/ TECHNICAL REQUIREMENT NECESSITATING INTERRUPTIONS IN CONTINUITY OF THE WORK AND MAKING NECESSARY ARRANGEMENTS FOR CARRYING OUT THE ABOVE WORK. THE CONTRACTOR SHALL TAKE ALL THIS INTO ACCOUNT IN HIS OFFER. THE REQUIRED NDT METHOD/PROCEDURE WILL BE DECIDED BY BHEL ENGINEER AT SITE.

#### 4.4.3.7

TENDERER SHALL NOTE THAT 100% RADIOGRAPHY SHALL BE TAKEN ON ALL HIGH PRESSURE WELDING TILL SUCH TIME THE WELDERS' PERFORMANCE IS FOUND BY BHEL ENGINEERS TO BE SATISFACTORY. SUBSEQUENTLY, SUBJECT TO CONSISTENCY IN WELDER'S PERFORMANCE. THE PERCENTAGE OF RADIOGRAPHY WILL BE BASED ON BHEL'S STANDARD PRACTICE/CODE REQUIREMENT. THE DEFECTS SHALL BE RECTIFIED IMMEDIATELY AND TO THE SATISFACTION OF BHEL ENGINEER. THE DECISION OF BHEL ENGINEER REGARDING ACCEPTANCE / REJECTING THE JOINTS WILL BE FINAL AND BINDING ON THE CONTRACTOR.

#### 4.4.3.8

THE PERCENTAGE OF RADIOGRAPHY TEST WILL BE BASED ON BHEL'S STANDARD PRACTICE/CODE REQUIREMENT. BIDDER SHALL NOTE THAT THE PERCENTAGE SHALL BE SUITABLY INCREASED IN CASE THE CONCERNED WELDERS' PERFORMANCE IS FOUND INCONSISTENT/UNSATISFACTORY BY BHEL. IN THE EVENT OF CONTINUED/PROLONGED UNSATISFACTORY PERFORMANCE, THE CONCERNED WELDER SHALL BE WITHDRAWN FORTHWITH FROM ANY FURTHER WELDING WORK. HE MAY HOWEVER BE RE-INDUCTED LATER AFTER GOING THROUGH FRESH QUALIFICATION TESTS IN ACCORDANCE

THE DEFECTS SHALL BE RECTIFIED IMMEDIATELY AND TO THE SATISFACTION OF BHEL ENGINEER. THE DECISION OF BHEL ENGINEER REGARDING ACCEPTANCE / REJECTING THE JOINTS WILL BE FINAL AND BINDING ON THE CONTRACTOR.

#### 4.4.3.9

100% RADIOGRAPHY OF CERTAIN SIZES IN PIPING HAVE TO BE TAKEN AS PER BHEL STANDARDS/ DRAWINGS.

#### 4.4.3.10

FOR CARRYING OUT ULTRASONIC TESTING OF WELDING JOINTS OF LARGE SIZE TUBES AND PIPES, IT WILL BE NECESSARY TO PREPARE SURFACE BY GRINDING AND BUFFING A SMOOTH FINISH AND CONTOUR AS NECESSARY. THE CONTRACTOR'S SCOPE OF WORK INCLUDES SUCH PREPARATION AS INCIDENTAL TO WORK.

#### 4.4.3.11

AFTER STRESS RELIEVING 5% OF UT FOR ALL CRITICAL LINES AND 2% OF UT FOR OTHER ALLOY STEEL LINES TO BE TAKEN TO ENSURE SOUNDNESS OF JOINTS PARTICULARLY STRESS RELIEVING CRACKS. NO SEPARATE PAYMENT WILL BE MADE.

#### 4.4.3.12

CONTRACTOR MAY HAVE TO UNDERTAKE RADIOGRAPHY WITH COBALT-60 ISOTOPE CAMERA IN CERTAIN CASES. HOWEVER, FOR ANY REASON IF USE OF COBALT-60 IS NOT POSSIBLE THEN

THESE JOINTS SHALL BE CHECKED BY RADIOGRAPHY AFTER COMPLETION OF WELDING UP TO SUITABLE PART OF THICKNESS WITH IR-192 OTHER SUITABLE SOURCE. SUBSEQUENTLY AFTER COMPLETING THE JOINT UT TO BE DONE. FOR THIS CONTRACTOR HAS TO DEPLOY LEVEL-II OPERATOR CERTIFIED BY BARC.

#### 4.4.3.13

IN THE CASE OF P-91 PIPING WHEREVER RADIOGRAPHY IS NOT POSSIBLE, ALTERNATIVELY ULTRASONIC TEST HAS TO BE CARRIED OUT APART FROM OTHER NDE CHECKS.

#### 4.4.3.14

FOR PIPING OF THICKNESS LESS THAN 25 MM NO RADIOGRAPHY PLUGS WILL BE PROVIDED. RADIOGRAPHY SHOTS TO BE TAKEN BY DOUBLE WALL TECHNIQUE OR ANY OTHER METHOD TO BE ADOPTED IN CONSULTATION WITH BHEL ENGINEER AT SITE.

#### 4.4.3.15

NO SEPARATE PAYMENT FOR ANY NDE ACTIVITIES, EXCEPT FOR RADIOGRAPHY, IS ENVISAGED. FOR RADIOGRAPHY PAYMENT WILL BE MADE BASED ON THE ACCEPTED ITEM RATE ON CERTIFIED MEASUREMENT.

#### 4.4.3.16

NO SEPARATE ITEM RATE PAYMENT FOR NDE ACTIVITIES, EXCEPT FOR RADIOGRAPHY TEST, IS ENVISAGED. FOR RADIOGRAPHY TEST, PAYMENT WILL BE MADE BASED ON THE ACCEPTED ITEM RATE ON CERTIFIED MEASUREMENT. CERTIFIED MEASUREMENT SHALL BE FOR THE ACCEPTED WELD JOINTS AND NOT FOR THE ONES HAVING ANY WELD/WORKMANSHIP DEFECTS.

## 4.5 LINING AND INSULATION

### 4.5.1

APPLICATION OF WOOL INSULATION, SHEET METAL CLADDING, WELDING OF HOOKS/SUPPORTS TO HOLD INSULATION COVERED UNDER THIS CONTRACT, SHALL INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING :-

- A) WHERE INDICATED, REMOVABLE TYPE OF INSULATION TO BE PROVIDED FOR VALVES, EXPANSION JOINTS, ETC. AS PER THE DRAWINGS OR AS DIRECTED BY BHEL ENGINEER.
- B) WOOL INSULATIONS ARE RECEIVED AT SITE AS BONDED AND UNBOUNDED MATTRESSES IN STANDARD SIZES. THESE ARE TO BE DRESSED/CUT TO SUIT WORK BY THE CONTRACTOR.
- C) APPLICATION OF INSULATION AND REFRACTORY WORKS AND SHEET METAL COVERING AS GIVEN IN VARIOUS DRAWINGS/ SPECIFICATIONS OF BHEL, SUPPLIED TO THE CONTRACTOR.
- D) OUTER SHEET CLADDING BY FABRICATION OF ALUMINUM SHEETS TO THE SIZES AND SHAPES SPECIFIED IN DRAWINGS, BEADING, SWAGING, BEVELING OF SHEETS, CROWNING THE SHEETS, IF NECESSARY, FIXING THE SAME TO SUPPORTS, OVER WOOL INSULATION WITH SCREWS/RETAINERS AS SPECIFIED IN BHEL DRAWINGS OR AS INSTRUCTED BY BHEL ENGINEER.
- E) WELDING OF HOOKS/SUPPORTS ON EQUIPMENT INCLUDING ON PR. PARTS AND PIPING TO SUPPORT WOOL INSULATION, AS PER THE DRAWINGS OR AS INSTRUCTED BY BHEL ENGINEERS.
- F) PAINTING THE INNER SIDE OF ALUMINUM/GI/STEEL CLADDING, WITH ANTI-CORROSIVE PAINT AS SPECIFIED. THE REQUIRED PAINT AND THINNER IS IN THE CONTRACTOR'S SCOPE. ALSO, ALL OTHER ACCESSORIES CONSUMABLES FOR PAINTING, CLEANING THE SURFACES ETC SHALL ALSO BE ARRANGED BY THE CONTRACTOR.

- G) THE CONTRACTOR SHALL LEAVE CERTAIN GAPS AND OPENINGS WHILE DOING THE WORK AS PER THE INSTRUCTIONS OF BHEL ENGINEER TO FACILITATE INSPECTION BY BOILER INSPECTOR OR CUT OPEN DURING COMMISSIONING TO FIX GAUGES, FITTINGS, INSTRUMENTS. THESE GAPS WILL HAVE TO BE FINISHED AS PER DRAWINGS AT A LATER DATE BY THE CONTRACTOR AT NO EXTRA COST TO BHEL.
- H) THE SKIN CASING PLATES SCALLOPED BARS AND OTHER MATERIALS THAT ARE TO BE MATCHED WITH THE ERECTED COMPONENTS HAVE TO BE CUT AND RE-WELDED FROM THE FABRICATED PIECES AS INCIDENTAL TO WORK.
- I) WASTAGE ALLOWANCE FOR THE MATERIALS ISSUED SHALL BE AS UNDER:-
- |      |                 |    |
|------|-----------------|----|
| i)   | REFRACTORY      | 2% |
| ii)  | WOOL INSULATION | 2% |
| iii) | CLADDING SHEETS | 2% |

#### 4.5.2

APPLICATION OF LINING AND INSULATION ON ALL PIPING COVERED UNDER THIS SPECIFICATION IS ALSO THE PART OF THIS WORK. SIMILARY, IT IS APPLICABLE FOR LINING AND INSULATION OF TG SIDE AUXILIARIES SUCH AS HEATERS, DE-AERATORS ETC. HOWEVER; APPLICATION OF SPRAY INSULATION ON TURBINE & ISOLATION VALVES IS NOT IN THE SCOPE OF WORK.

#### 4.5.3

A LOG BOOK SHALL BE MAINTAINED BY THE CONTRACTOR FOR THE CLEARANCE OF THE AREA FOR APPLICATION OF REFRACTORY AND INSULATION. WHERE THE CONTRACTOR DOSE THE WORK ON HIS OWN ACCORD WITHOUT PRIOR PERMISSION, SUCH WORK SHOULD BE RE-DONE AT HIS OWN COST.

### 4.6 PAINTING

#### 4.6.1

ALL EQUIPMENTS COVERED IN THIS WORK WILL BE SUPPLIED BY RESPECTIVE BHEL UNITS WITH ONE COAT OF PRIMER AND TWO COATS OF FINISH PAINT APPLIED AT THE MANUFACTURING SHOP; CONTRACTOR SHALL APPLY TWO COATS OF SPECIFIED FINISH PAINT ON ALL SUCH COMPONENTS/EQUIPMENTS (WHICH ARE NOT INSULATED) AFTER ERECTION AT SITE TO ACHIEVE REQUIRED DFT(DRY FILM THICKNESS).

#### 4.6.2

IN ADDITION TO COMPONENTS/EQUIPMENT AS ABOVE, THERE COULD BE LIMITED FEW WITHOUT ANY PRIOR PROTECTIVE COATING. SUCH COMPONENTS SHALL FIRST BE THOROUGHLY CLEANED OF ALL DIRT, RUST, SCALE, GREASE, OIL AND OTHER SURFACE DEPOSITS BY WIRE BRUSHING, SCRAPING, WASHING, WIPING WITH SOLVENT OR ANY APPROPRIATE METHOD AND THE SAME BEING INSPECTED AND APPROVED BY BHEL FOLLOWED BY APPLICATION OF ONE COAT OF PRIMER. AFTERWARDS, THE ABOVE PARTS SHALL BE OVER-COATED WITH TWO COATS OF SPECIFIED PAINT AS PER APPLICATION PROCEDURE PRESCRIBED BY THE PAINT MANUFACTURER.

#### 4.6.3 TOUCH-UP PAINTING ON DAMAGED AREAS -

- a) FOR COATINGS DAMAGED UP TO METAL SURFACE

SURFACE PREPARATION SHALL BE CARRIED OUT BY MANUAL CLEANING. MINIMUM 6 INCHES ADJOINING AREA WITH EXISTING COATING SHALL BE ROUGHENED BY WIRE BRUSHING, EMERY PAPER RUBBING ETC., FOR BEST ADHESION OF PATCH PRIMER.

#### 4.6.4

PAINTING OF SITE-WELDED AREAS / PAINTING OF AREAS EXPOSED AFTER REMOVAL OF TEMPORARY SUPPORTS / TOUCH-UP PAINTING ON DAMAGED AREAS OF EMPLOYER'S STRUCTURES, WHERE INTER-CONNECTION, WELDING / MODIFICATION ETC HAS BEEN CARRIED OUT BY THE BIDDER.

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- (A) CLEAN THE SURFACE TO REMOVE FLUX SPATTERS AND LOOSE RUST, LOOSE COATINGS IN THE ADJOINING AREAS OF WELD SEAMS BY WIRE BRUSH AND EMERY PAPER.
- (B) PAINTING PROCEDURE TO BE FOLLOWED AS MENTIONED ABOVE FOR TOUCH-UP PAINTING ON DAMAGED AREAS.

#### 4.6.5

THE SCOPE OF WORK INCLUDES PAINTING OF COLOUR BANDS, LETTERING, MARKING AND SIGNS FOR DIRECTION OF FLOW/ROTATION, NAMES ETC OF APPROVED COLOURS AS PER THE STANDARD COLOUR CODES AND SPECIFICATIONS SPECIFIED IN TENDER SPECIFICATION OR AS ADVISED BY BHEL/ CUSTOMER ENGINEER AT SITE FOR THE EQUIPMENTS/COMPONENTS COVERED IN THESE SPECIFICATIONS.

#### 4.6.6

IN CERTAIN ISOLATED INSTANCES WHERE IT IS NOT POSSIBLE TO CLEAN THE EQUIPMENTS AS EXPLAINED ABOVE, CLEANING BY GRINDING MIGHT HAVE TO BE RESORTED TO. NO DAMAGE TO THE EQUIPMENT/COMPONENTS SHOULD BE CAUSED.

#### 4.6.7

SURFACE TO BE PAINTED SHOULD BE FREE OF OIL AND GREASE. IT SHOULD BE REMOVED BY USING SUITABLE CLEANING AGENTS INCLUDING PERMITTED SOLVENTS. SURFACE CLEANED BY CHEMICAL AGENT, IF REQUIRED, SHALL BE TREATED FURTHER AS PRESCRIBED IN USE OF SUCH CLEANING AGENTS. THE CONTRACTOR AT HIS OWN COST SHALL PROVIDE ALL THE CONSUMABLES AND APPLICATION IMPLEMENTS.

#### 4.6.8

DURING THE PREPARATION OF SURFACE, IF THE SHOP COAT IS DAMAGE BY CHEMICAL CLEANING OR BY MECHANICAL MEANS, CONTRACTOR SHALL REPAIR THE SAME FREE OF COST TO BHEL. **BHEL WILL MAKE AVAILABLE ONLY THE PRIMER AND PAINTS FREE OF ANY CHARGE TO CONTRACTOR.**

#### 4.6.9

SPECIFIED DRYING TIME SHALL BE PERMITTED FROM ONE TO ANOTHER COAT.

#### 4.6.10

THIS WORK REQUIRES WORKING AT HIGHER ALTITUDES FROM GROUND LEVEL TO AS HIGH AS 60 M AND MORE. THE WORK SPREAD IS ALSO SUBSTANTIAL INVOLVING SUBSTANTIAL RUN OF STRUCTURES AND PIPING. CONTRACTOR SHALL TAKE SUFFICIENT PRECAUTIONS TO ENSURE SAFE AND HAZARD-FREE WORKING CONDITION. THE ROPES, LADDERS, SCAFFOLDING MATERIALS, CLAMPS ETC AND CLIMBER USED SHOULD BE OF APPROPRIATE QUALITY FOR SAFE AND SMOOTH EXECUTION OF WORK.

#### 4.6.11

CONTRACTOR SHALL CARRY OUT THE WORK IN SUCH A WAY THAT OTHER ERECTED EQUIPMENT, STRUCTURE, CIVIL FOUNDATIONS AND OTHER PROPERTY ARE NOT DAMAGED. FOR DAMAGES IN ANY OF SUCH CASES DUE TO LAPSES BY CONTRACTOR, BHEL SHALL HAVE THE RIGHT TO RECOVER THE COST OF SUCH DAMAGES FROM THE CONTRACTOR.

#### 4.6.12

CONTRACTOR SHALL TAKE DUE CARE TO COVER/PROTECT THE EQUIPMENT WHICH ARE ALREADY PAINTED WHILE CARRYING OUT THE PAINTING OF OTHER ADJACENT EQUIPMENT. IF SO HAPPENS, IT SHALL BE CLEANED AND REPAINTED BY THE CONTRACTOR WITHOUT ANY EXTRA CHARGES.

#### 4.6.13

IN GENERAL, PAINTING OF STRUCTURAL PARTS AND COLOUR BANDS, LETTERING, MARKING OF DIRECTION OF FLOW/ROTATION ETC WILL BE CARRIED OUT BY BRUSH PAINTING. HOWEVER, AREAS/EQUIPMENT INACCESSIBLE FOR MANUAL PAINTING HAVE TO BE PAINTED BY SPRAY

PAINTING. THE DECISION OF BHEL ENGINEER, IN THIS REGARD, SHALL BE FINAL AND BINDING ON THE CONTRACTOR. FOR THE PURPOSE OF SPRAY PAINTING, SERVICE AIR AT ONE POINT WILL BE MADE AVAILABLE BY BHEL FREE OF COST. LAYING OF AIR PIPELINE, HOSE AND ANY OTHER LINE REQUIRED SHALL BE DONE BY CONTRACTOR AT HIS COST. THE CONTRACTOR SHALL PROVIDE SPRAY EQUIPMENT SET.

#### 4.6.14

THE CONTRACTOR SHALL PROVIDE ALL THE NECESSARY SCAFFOLDING MATERIALS, TEMPORARY STRUCTURES AND NECESSARY SAFETY DEVICES ETC, DURING EXECUTION OF THE WORK.

#### 4.6.15

FINAL PAINTING WORK SHALL BE STARTED AFTER OBTAINING CLEARANCE FROM BHEL ENGINEERS AND AS PER HIS INSTRUCTIONS.

### **4.7 TESTING, PRE-COMMISSIONING, AND COMMISSIONING**

#### 4.7.1

TESTING, PRE-COMMISSIONING, & COMMISSIONING WILL INVOLVE, THOUGH NOT LIMITED TO THESE, VARIOUS TESTING e.g. HYDRO-STATIC PRESSURE, PRESSURE DECAY TESTS, LEAK TEST, TRIAL RUNS OF EQUIPMENTS; FLUSHING BY AIR, WATER, OIL, STEAM AS APPLICABLE; CHECKING/SETTING VARIOUS CLEARANCES/ PARAMETERS, ENSURING OPERATION OF VARIOUS EQUIPMENTS FREE OF UNDUE RESTRICTIONS, CHEMICAL CLEANING & ALKAALI BOIL OUT OF BOILER, STEAM BLOWING OF THE BOILER AND THE CRITICAL PIPING, FLOATING OF SAFETY VALVES, COAL FIRING, TRIAL OPERATION AND LOADING ETC ARE SOME OF THESE ACTIVITIES. ALL THE ACTIVITIES FOR COMMISSIONING OF THE SET, AS INFORMED BY BHEL FROM TIME TO TIME SHALL BE COMPLETED.

#### 4.7.2

ALL THESE TESTS SHOULD BE REPEATED TILL ALL THE EQUIPMENTS SATISFY THE REQUIREMENT / OBLIGATIONS OF BHEL TO THEIR CLIENT AND ALSO THE RELEVANT STATUTORY AUTHORITY.

#### 4.7.3

CONTRACTOR SHALL LAY / INSTALL NECESSARY TEMPORARY PIPING, PUMPS, VALVES, BLANKS, GAUGES, CABLES, SWITCHES ETC FOR CONDUCT OF HYDRAULIC / PRESSURE TEST, CHEMICAL CLEANING, STEAM / AIR BLOWING ETC. THIS MAY INVOLVE CUTTING OF SOME PORTION OF EXISTING PIPING / VALVES, PLACING OF RUBBER WEDGES / BLANKS IN THE VALVES AND OTHER OPENINGS, FABRICATION AND INSTALLATION OF TEMPORARY TANKS FOR CHEMICAL MIXING, TEMPORARY ACCESS PLATFORMS TO MIXING TANKS ETC. WHERE REQUIRED, BENDS HAVE TO BE FABRICATED / FORMED AT SITE FROM RANDOM LENGTH / SIZE OF PIPES / STRUCTURAL STEEL. TEMPORARY INSTALLATION ITSELF HAS TO BE TESTED, TRIED, AND SUBJECT TO NON-DESTRUCTIVE EXAMINATIONS AS PER THE INSTRUCTIONS OF BHEL AS PART OF WORK.

NO PAYMENT WILL BE MADE FOR TEMPORARY INSTALLATIONS MADE FOR HYDRAULIC TESTING OF VARIOUS SYSTEMS & PIPING. SIMILARLY NO PAYMENT WILL BE MADE FOR ELECTRICAL INSTALLATIONS MADE FOR ANY TEMPORARY SYSTEM.

#### 4.7.4

ALL MATERIALS, EQUIPMENTS NECESSARY FOR INSTALLATION OF TEMPORARY SYSTEM AS ABOVE WILL BE SUPPLIED BY BHEL AS FREE RETURNABLE ISSUE IN RANDOM SIZES / LENGTHS. HOWEVER, SERVICING, FABRICATION, ERECTION, DISMANTLING OF THE SAME AFTER COMPLETION OF THE PROCESS, AND HANDING OVER BACK TO BHEL STORES WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.

IN ACCOUNTING OF MATERIALS FOLLOWING WASTAGE ALLOWANCES ARE PROVIDED:

1. STRUCTURAL ITEMS : 5%
2. PIPES : 3%

NO WASTAGE ALLOWANCE FOR VALVES & OTHER EQUIPMENTS.

#### 4.7.5

FABRICATION, FIT-UP, PRE-HEATING, WELDING, POST-WELD HEATING AND POST-WELD-HEAT TREATMENT IF ANY, OF REQUISITE BLANKS FOR CONDUCT OF HYDRAULIC TEST / LEAKAGE TEST IS PART OF WORK. SIMILARLY, REMOVAL OF BLANKS, RESTORATION AND NORMALIZATION OF THE CONCERNED SYSTEM / LINE IS TO BE DONE AS PART OF WORK. BHEL WILL PROVIDE THE MATERIAL FOR BLANKS FREE OF CHARGE. NO SEPARATE PAYMENT IS ENVISAGED FOR THESE ACTIVITIES.

#### 4.7.6

OVERHAULING, CLEANING, SERVICING OF TANKS, PUMPS, EQUIPMENTS, VALVES, DURING ERECTION AND COMMISSIONING STAGES ARE IN THE SCOPE OF WORK. GASKETS, PACKING & SPARES FOR REPLACEMENT WILL BE PROVIDED FREE OF CHARGES BY BHEL.

#### 4.7.7

AFTER CHEMICAL CLEANING / PICKLING OF LUBRICATING SYSTEM (INCLUDING OIL PIPING, OIL TANK AND OTHER FITTINGS) OF ROTATING MACHINES, OIL FLUSHING FOR LUBRICATING SYSTEMS AS PER INSTRUCTIONS OF BHEL ENGINEER SHALL BE CARRIED OUT. CLEANING OF OIL TANK OF LUBRICATING OIL SYSTEM OF ROTATING MACHINERY BEFORE AND AFTER OIL FLUSHING IS IN THE SCOPE OF WORK.

#### 4.7.8

TRANSPORTATION OF OIL DRUMS FROM CUSTOMER'S / BHEL'S STORES, FILLING OF OIL FOR FLUSHING, FIRST FILL OF LUBRICANTS AND SUBSEQUENT TOPPING UP DURING TRIALS, TESTS AND COMMISSIONING IS INCLUDED IN THE SCOPE OF THIS CONTRACT. THE CONTRACTOR SHALL HAVE TO RETURN ALL THE EMPTY DRUMS TO THE CUSTOMER / BHEL STORES. SIMILARLY, FOR VARIOUS PRE-COMMISSIONING / COMMISSIONING ACTIVITIES / PROCESSES MENTIONED IN VARIOUS CLAUSES, TRANSPORT OF CHEMICALS FROM BHEL / CUSTOMER'S STORES, CHARGING OF CHEMICALS INTO THE SYSTEM AND RETURNING OF REMAINING CHEMICALS AND THE EMPTY CONTAINERS OF THE CHEMICALS TO CUSTOMER / BHEL STORES IS THE RESPONSIBILITY OF THE CONTRACTOR.

#### 4.7.9

DURING TRIAL RUNS/ TESTS, PRE-COMMISSIONING / COMMISSIONING, REPLACING / CHANGING MECHANICAL / OTHER SEALS OF EQUIPMENTS LIKE PUMPS, REMOVAL AND CLEANING / REPLACING OF FILTERS ETC IS WITHIN THE SCOPE OF WORK. REPLACEMENT SPARES FOR THIS PURPOSE WILL BE PROVIDED BY BHEL.

#### 4.7.10

IN CASE ANY DEFECT IS NOTICED DURING TESTS, TRIAL RUNS OF ALL EQUIPMENTS AND THEIR AUXILIARIES, SUCH AS INTERFERENCES, RUBBING, LOOSE COMPONENTS, ABNORMAL NOISE OR VIBRATION, STRAIN ON CONNECTED EQUIPMENT ETC THE CONTRACTOR SHALL IMMEDIATELY ATTEND TO THESE DEFECTS AND TAKE NECESSARY CORRECTIVE MEASURES. READJUSTMENT AND/OR REALIGNMENT, IF NECESSARY, SHALL BE DONE AS PER BHEL ENGINEER'S INSTRUCTIONS. CLAIM, IF ANY, FOR THESE WORKS SHALL BE GOVERNED BY SECTION-13, SPECIAL CONDITIONS OF CONTRACT PROVIDED THE CAUSE OF SUCH WORK IS NOT ATTRIBUTABLE TO THE CONTRACTOR.

#### 4.7.11

- i) CONTRACTOR SHALL CUT / OPEN / DISMANTLE 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 EQUIPMENTS 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 CONTRACTORS / 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 IN SECTION-13 HEREIN.

4.7.12

DURING THIS PERIOD, THOUGH BHEL/ CLIENT'S 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 UNDERGOES TRIAL OPERATIONS.

4.7.13

COMMISSIONING ACTIVITIES WILL CONTINUE TILL THE COMPLETION OF TRIAL OPERATION. DURING THIS PERIOD CONTRACTOR SHALL MAKE AVAILABLE THE SERVICES OF SEPARATE DEDICATED WORKFORCE COMPRISING OF SUITABLE SKILLED AND SEMI-SKILLED / UN-SKILLED WORKMEN AND SUPERVISORY STAFF ALONGWITH NECESSARY TOOLS AND PLANTS, CONSUMABLES ETC.

4.7.14

IT SHALL BE SPECIFICALLY NOTED THAT THE CONTRACTOR MAY HAVE TO WORK ROUND THE CLOCK DURING THE PRE-COMMISSIONING AND COMMISSIONING PERIOD ALONGWITH BHEL ENGINEERS AND HENCE CONSIDERABLE OVERTIME PAYMENT IS INVOLVED. THE CONTRACTOR'S QUOTED RATES SHALL BE INCLUSIVE OF ALL THESE FACTORS.

4.7.15

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.

4.7.16

AT VARIOUS STAGES OF COMPLETION BOILER HAS TO BE PRESERVED AGAINST CORROSION EITHER BY WET PRESERVATION OR BY DRY PRESERVATION AS PER THE REQUIREMENT OF BHEL ENGINEER. CONTRACTOR SHALL CARRY OUT ALL THE INCIDENTAL JOBS LIKE FILLING UP OF WATER, DOZING OF CHEMICALS AND PRESSURIZING THE SYSTEM TO THE REQUIRED PRESSURE, CHANGE OF GAS REFILLS ETC. THE BOILERS HAVE A PERMANENT N<sub>2</sub> BLANKETING ARRANGEMENT.

DURING THIS PERIOD, THOUGH BHEL/ CLIENT'S 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.

4.7.17

COMMISSIONING ACTIVITIES WILL CONTINUE TILL THE COMPLETION OF TRIAL RUN, TRIAL OPERATION. DURING THIS PERIOD CONTRACTOR SHALL MAKE AVAILABLE THE SERVICES OF SEPARATE DEDICATED LABOR FORCE COMPRISING OF SUITABLE SKILLED AND SEMI/UN-SKILLED HANDS ALONG WITH NECESSARY TOOLS AND PLANTS, CONSUMABLES ETC.

4.7.18

IT SHALL BE SPECIFICALLY NOTED THAT THE CONTRACTOR MAY HAVE TO WORK ROUND THE CLOCK DURING THE PRE-COMMISSIONING AND COMMISSIONING PERIOD ALONG WITH BHEL ENGINEERS AND HENCE CONSIDERABLE OVERTIME PAYMENT IS INVOLVED. THE CONTRACTOR'S QUOTED RATES SHALL BE INCLUSIVE OF ALL THESE FACTORS.

4.7.19

CONDUCT OF PERFORMANCE GUARANTEE TEST IS IN THE SCOPE OF WORK. CONTRACTOR SHALL INSTALL ALL NECESSARY TAPPING POINTS, INSTRUMENTS ETC AND PROVIDE NECESSARY ASSISTANCE IN THIS REGARD.

4.7.20

ASSISTANCE FOR CONDUCTING PERFORMANCE GUARANTEE TEST IS IN THE SCOPE OF CONTRACTOR. CONTRACTOR SHALL INSTALL ALL NECESSARY TAPPING POINTS; INSTRUMENTS ETC AND PROVIDE NECESSARY ASSISTANCE IN THIS REGARD.

IN CASE PG TEST GETS DELAYED BEYOND THE CONTRACT PERIOD (NORMAL PLUS GRACE PLUS EXTENSION IF ANY) DUE TO REASONS NOT ATTRIBUTABLE TO THE CONTRACTOR, PG TEST ISSUE WILL BE MUTUALLY DISCUSSED AND COMMERCIALY SETTLED. HOWEVER CONTRACTOR SHALL INSTALL THE TAPPING POINTS, IMPULSE PIPES, APPROACHES ETC AS PER BHEL INSTRUCTION AND TO THE EXTENT BHEL INPUTS ARE AVAILABLE PRIOR TO CLOSURE OF CONTRACT.

#### 4.7.21

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.

### **4.8 GENERAL RESPONSIBILITY OF THE CONTRACTOR**

#### 4.8.1

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 DEFAACEMENT 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.

#### **4.8.2 PRESERVATION & PROTECTION OF COMPONENTS**

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. NECESSARY PRESERVATION AGENTS, EXCLUDING THE PRIMER & PAINT, FOR THE ABOVE WORK SHALL BE PROVIDED BY BHEL.

#### 4.8.3

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.

#### 4.8.4

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.

#### 4.8.5

THE ENTIRE SURPLUS, DAMAGED, SCRAP, UNUSED MATERIALS, PACKAGE MATERIALS / BOXES / CONTAINERS, SPECIAL TRANSPORTING FRAMES ETC, SHALL BE RETURNED TO BHEL STORES BY THE CONTRACTOR WITH PROPER RECORDS.

#### 4.8.6

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 AFFECTED WITH DEPARTMENTAL CHARGES FROM THE CONTRACTOR. THE ALLOWANCE TOWARDS SUCH WASTAGE SHALL BE IN LINE WITH STANDARD ENGINEERING PRACTICES, STANDARDS/

CODES AS MAY BE APPLICABLE. DECISION OF BHEL ON THIS WILL BE FINAL AND BINDING ON THE CONTRACTOR. IN ADDITION TO ABOVE, THERE COULD BE INVISIBLE SCRAP/ WASTAGE I.E. WHICH CAN NOT BE SEEN PHYSICALLY AND LOST IN THE PROCESS. THE TOTAL OF INVISIBLE SCRAP/ WASTE SHALL NOT EXCEED 1%.

#### 4.8.7

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.

### **4.9 COMPUTER BASED SYSTEM**

BHEL IS OPERATING WEB BASED COMPUTERIZED SITE OPERATION MANAGEMENT SYSTEM (SOMS) THAT INCLUDES, INTER-ALIA, ISSUE OF MATERIALS, DAILY PROGRESS REPORTING, CONTRACTOR'S RUNNING MONTHLY BILLING AND MATERIAL RECONCILIATION THROUGH A COMPUTERIZED DATA MANAGEMENT SYSTEM. CONTRACTOR SHALL INSTALL NECESSARY HARDWARE TO HOOK-UP WITH THE BHEL'S SYSTEM AND USE THE SAME FOR HIS SCOPE OF WORK.

IN THE EVENT THE COMPUTERIZED SOMS IS INOPERATIVE FOR ANY REASONS, THE CONTRACTOR SHALL TAKE DELIVERY OF MATERIALS FROM THE STORAGE AREA/SHEDS OF BHEL/CUSTOMER AFTER GETTING THE APPROVAL OF THE ENGINEER/CUSTOMER ON STANDARD INDENT FORMS TO BE SPECIFIED BY BHEL/CUSTOMER. ALL THESE RECORDS HOWEVER SHALL BE UPDATED IN THE SOMS AS AND WHEN THE SOMS IS REACTIVATED/NORMALIZED.

### **4.9 EXCLUSIONS**

THE FOLLOWING WORKS ARE SPECIFIC EXCLUSIONS FROM THE SCOPE OF WORK / SPECIFICATION:-

1. LP BY-PASS VALVE WITH HYDRAULIC SYSTEM
2. DOWNSTREAM STEAM PIPELINE FROM LP BY-PASS VALVE TO CONDENSER
3. INTERCEPTOR VALVE TO IP TURBINE PIPELINE
4. ELECTRICAL COMPONENTS SUCH AS PUSH-BUTTONS, JUNCTION BOXES ETC.
5. E&C WORK OF CABLE TRAYS, CABLES AND EARTHING ETC
6. CONTROL PANELS, EPMS, MCC ETC.
7. ELECTRICAL & C&I ITEMS OF EQUIPMENT HANDLING SYSTEM
8. ALL ELECTRICAL AND CONTROL & INSTRUMENTATION ITEMS EXCEPT THOSE SPECIFIED ELSEWHERE IN THESE SPECIFICATIONS.
9. CIVIL WORKS EXCEPT TO THE EXTENT SPECIFICALLY INDICATED ELSEWHERE IN THIS TENDER.
10. SUPPLY OF PRIMER AND PAINTS FOR FINAL PAINTING
11. PNEUMATIC COPPER TUBING AND FITTINGS THEREOF.
12. TESTING AND COMMISSIONING OF HEATING ELEMENTS, THERMOSTATS, HV RECTIFIER TRANSFORMERS.
13. ELECTRICAL AND C&I ITEMS OF VARIABLE FREQUENCY DRIVES AS PROVIDED ELSEWHERE IN THESE SPECIFICATIONS.

## SECTION-5

### SPECIAL CONDITIONS OF CONTRACT

5.0 OBLIGATIONS OF THE CONTRACTOR (TOOLS, TACKLES, CONSUMABLES ETC.)

5.1 ACCOMMODATION, DRINKING WATER & LOCAL TRANSPORTATION FOR THE LABOUR OTHER EMPLOYEES

CUSTOMER/BHEL WILL PROVIDE ONLY THE OPEN LAND FOR CONSTRUCTION OF LABOUR COLONY. CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENTS FOR LABOUR COLONY INCLUDING LIGHTING AND SANITATION ETC WITH HYGENE AND COMPLY WITH ALL REQUIREMENTS. **LABOUR COLONY MAY HAVE TO BE CONSTRUCTED CONFORMING TO THE LAYOUT & DESIGN OF CLIENT. THE NECESSARY DRAWINGS IF ANY, WILL BE HOSTED ON WEB SITE AT A LATER DATE HOWEVER PRIOR TO SUBMISSION OF OFFER.** CUSTOMER WILL PROVIDE THE ELECTRICITY FOR LABOUR AND STAFF COLONY ON CHARGEABLE BASIS. ALSO, THE CONTRACTOR HAS TO MAKE HIS OWN ARRANGEMENT FOR TRANSPORTATION OF HIS WORKMEN AND OTHER EMPLOYEES. BHEL/CLIENT SHALL NOT PROVIDE ANY FACILITY IN THIS REGARD.

5.2 TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES:

5.2.1

THE CONTRACTOR SHALL PROVIDE ALL (EXCEPTING THOSE INDICATED IN BHEL SCOPE) REQUIRED TOOLS AND PLANTS, MONITORING AND MEASURING DEVICES (MMD) AND HANDLING & TRANSPORTATION EQUIPMENTS FOR THE SCOPE OF WORK COVERED UNDER THESE SPECIFICATIONS. CONTRACTOR HAS TO PROVIDE SUITABLE CRANES FOR MATERIAL HANDLING AT BHEL/CLIENT'S STORES/STORAGE YARD. BHEL'S CRANE WILL NOT BE AVAILABLE FOR THIS PURPOSE. PLEASE REFER RELEVANT APPENDIX FOR THE LIST OF T&P BEING PROVIDED BY BHEL FREE OF CHARGES ON SHARING BASIS.

5.2.2

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. INDICATIVE LIST OF MAJOR T&P TO BE ARRANGED BY THE CONTRACTOR HAS BEEN FURNISHED IN RELEVANT APPENDIX. CONTRACTOR SHALL ALSO MOBILIZE ALL OTHER T&P NECESSARY FOR TIMELY AND SATISFACTORY COMPLETION OF THE WORK IN SCOPE.

5.2.3

CONTRACTOR'S RESPONSIBILITIES WITH REGARD TO OPERATOR, FUEL, LUBRICANTS AND DAILY UPKEEP OF T&P PROVIDED BY BHEL IS FURTHER DETAILED IN SECTION-7 AND APPENDIX DETAILING BHEL'S T & P TO BE PROVIDED FOR THIS WORK.

5.2.4

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 PROGRAMME AND TO ACHIEVE THE MILESTONES.

#### 5.2.5 SCAFFOLDING MATERIALS

(A) THE CONTRACTOR SHALL PROVIDE ALL THE NECESSARY SCAFFOLDING MATERIALS, TEMPORARY STRUCTURES AND NECESSARY SAFETY DEVICES ETC, DURING ALL STAGES TILL COMPLETION OF WORK. SCAFFOLDING MATERIALS (MS PIPES, GRATINGS ETC) SHALL BE OF LIGHT WEIGHT CONSTRUCTION. CONTRACTOR SHALL ARRANGE STEEL PIPES & CLAMPS WITH ACCESSORIES LIKE BASE PLATE ATTACHMENT, FIXING PINS, STRUTS ETC FOR SCAFFOLDING REQUIRED FOR THIS WORK. IT IS TO BE SPECIFICALLY NOTED THAT NO WOOD OR ANY SUCH OTHER INFLAMMABLE MATERIAL WILL BE PERMITTED TO BE USED FOR ABOVE APPLICATIONS. ANY SUCH USE ON EACH OCCASSION SHALL INVITE LEVY OF PENALTY AS DEEMED FIT BY BHEL ENGINEER.

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(B)

(i) CONTRACTOR SHALL DEPLOY A MINIMUM OF 8000 NOS OF SCAFFOLDING MS PIPES (SIZE NOMINAL BORE – 40 mm, LENGTH: 6M EACH) WITH NECESSARY CLAMPS AND FITTINGS.

(i) THESE SHOULD BE DEPLOYED OVER A PERIOD OF 3 MONTHS FROM THE START OF WORK (REFER APPENDIX-IV) OUT OF WHICH 2000 PIPES WITH ASSOCIATED CLAMPS AND OTHER FITTINGS/ FASTENERS SHALL BE DEPLOYED WITHIN THE FIRST MONTH OF START OF WORK

(iii) BHEL WILL IMPOSE PENALTY FOR ANY SHORTFALL IN QUANTITY, OF PIPE AND ASSOCIATED PAIR OF CLAMPS, FROM THE END OF MONTH IN WHICH THE SPECIFIED QUANTITY IS SCHEDULED TO BE FULLY INDUCTED IN RESPECTIVE UNIT. THE RECOVERY WILL CONTINUE TILL THE SHORTFALL IS MADE GOOD. THIS PROVISION WILL BE APPLICABLE TILL THE COMPLETION OF WORK. PENALTY WILL BE IMPOSED AT THE RATE OF Rs.15/- PER PIPE AND ASSOCIATED PAIR OF CLAMPS PER MONTH ON PRO-RATA BASIS.

(iv) IN CASE ADDITIONAL INDUCTION OF SCAFFOLDING PIPES WITH ASSOCIATED PAIR OF CLAMPS IS NECESSITATED OVER AND ABOVE THE TOTAL QUANTITY SPECIFIED FOR U #7.THEN, BHEL WILL MAKE ADDITIONAL PAYMENT @ Rs. 15/ PER PIPE WITH ASSOCIATED PAIR OF CLAMPS PER MONTH OF INDUCTION. ANY SUCH ADDITIONAL INDUCTION SHALL BE DONE BASED ON WRITTEN INSTRUCTIONS FROM BHEL. SIMILARLY THESE SHOULD BE DEMOBILIZED ON WRITTEN ADVICE FROM BHEL.

(C) WHEN ADDITIONAL INDUCTION OF SCAFFOLDING PIPES AND CLAMPS IS REQUIRED DURING EXTENDED PERIOD OF CONTRACT, FOLLOWING METHOD SHALL BE APPLICABLE:

(i) DURING EXTENSION ATTRIBUTABLE TO THE CONTRACTOR NO ADDITIONAL PAYMENT WILL BE MADE.

(ii) DURING EXTENSION ATTRIBUTABLE TO BHEL ADDITIONAL PAYMENT WILL BE MADE AS STIPULATED AT B(iv) ABOVE.

(D) FOR WORKING IN OVERHEAD POSITION AT HIGH ELEVATIONS CONTRACTOR SHALL ARRANGE NON-COMBUSTIBLE LIGHT-WEIGHT AND STURDY PLATFORM MATERIALS.

#### 5.2.6

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 ALTERNATIVE ARRANGEMENTS EXPEDITIOUSLY SO THAT THE PROGRESS OF WORK IS NOT HAMPERED.

#### 5.2.7

IN THE EVENT OF CONTRACTOR FAILING TO ARRANGE THE REQUIRED TOOLS, PLANTS, MACHINERY, EQUIPMENT, MATERIAL OR NON-AVAILABILITY OF THE SAME OWING TO BREAKDOWN, BHEL WILL MAKE THE ALTERNATIVE ARRANGEMENT AT THE RISK AND COST OF THE CONTRACTOR INCLUDING BHEL'S DEPARTMENTAL OVERHEAD @ 30%.

#### 5.2.8

THE T&P TO BE ARRANGED BY THE CONTRACTOR SHALL BE IN PROPER WORKING CONDITION AND THEIR OPERATION SHALL NOT LEAD TO UNSAFE CONDITION. THE MOVEMENTS OF CRANES, AND OTHER EQUIPMENT SHOULD BE SUCH THAT NO DAMAGE / BREAKAGE OCCURS TO FOUNDATIONS, OTHER EQUIPMENTS, MATERIAL, PROPERTY AND MEN. ALL ARRANGEMENTS FOR THE MOVEMENT OF THE T&P ETC SHALL BE THE CONTRACTOR'S RESPONSIBILITY.THE NECESSARY TEST CERTIFICATES FOR EQUIPMENTS TO BE SUBMITTED.

#### 5.2.9



USE OF WELDING GENERATORS/ RECTIFIERS FOR WELDING ONLY SHALL BE PERMITTED. USE OF WELDING TRANSFORMERS WILL BE SUBJECT TO SPECIFIC APPROVAL OF BHEL ENGINEER.

#### 5.2.10

THE CONTRACTOR AT HIS COST SHALL CARRY OUT PERIODICAL TESTING OF HIS CONSTRUCTION EQUIPMENTS AND CALIBRATION OF MEASURING & MONITORING DEVICES (MMD). TEST/ CALIBRATION CERTIFICATES SHALL BE FURNISHED TO BHEL. MMDS SHALL BE CALIBRATED ONLY AT ACCREDITED LABORATORY AS PER THE LIST AVAILABLE WITH BHEL OR ANY OTHER LABORATORY APPROVED BY BHEL.

#### 5.2.11

BHEL T&P WILL BE ISSUED IN BASIC ASSEMBLED CONDITION, CONTRACTOR SHALL TRANSPORT THESE T&P TO & FRO BETWEEN BHEL STORES AND SITE. ADDITIONAL LOOSE COMPONENTS / SUB-ASSEMBLIES / ATTACHMENTS AS AND WHEN NECESSARY, WILL BE ISSUED BY BHEL, TO & FRO BETWEEN BHEL STORES AND SITE OF SUCH ITEMS SHALL ALSO BE DONE BY THE CONTRACTOR. ASSEMBLY OF SUCH ADDITIONAL LOOSE COMPONENTS/SUB-ASSEMBLIES/ ATTACHMENTS IS IN CONTRACTOR'S SCOPE. ANY BOOM REDUCTION/ EXTENSION OF BHEL CRANES FOR CONTRACTOR'S USE AND RESTORATION TO PREVIOUS STATE OR AS DIRECTED BY BHEL SHALL BE THE CONTRACTOR'S RESPONSIBILITY. CONTRACTOR SHALL PROVIDE ALL ENABLING SERVICES WITH TOOLS AND TACKLES FOR ASSEMBLY/DISMANTLING AND BOOM EXTENSION/REDUCTION AS ABOVE. THIS IS ALSO APPLICABLE IN RESPECT OF CRANES HIRED BY BHEL AND MADE AVAILABLE TO THE CONTRACTOR FOR THIS WORK.

#### **5.2.12 STRAND AND JACK ARRANGEMENT FOR BOILER DRUM ERECTION**

BOILER DRUM WILL HAVE PROVISION OF LIFTING LUGS TO ENABLE ERECTION BY STRAND AND JACK METHOD. CONTRACTOR SHALL ARRANGE COMPLETE SET UP OF STRAND AND JACK ARRANGEMENT FOR ERECTION OF BOILER DRUM TO ITS DESIGNATED ELEVATION INCLUDING THE SERVICES OF EXPERT FOR EXECUTION AND SUPERVISION. BHEL WILL NOT BE PROVIDING THE CONVENTIONAL ELECTRIC WINCH AND PULLEY SET UP FOR THIS PURPOSE.

CONTRACTOR MAY ENGAGE ANY OF THE RENOWNED/COMPETENT AGENCIES FOR THIS LIFTING ACTIVITY. HOWEVER CONTRACTOR SHALL FURNISH CREDENTIALS OF THE AGENCY AND OBTAIN APPROVAL OF BHEL BEFORE ASSIGNING THE WORK TO THE AGENCY.

#### **5.2.13 PENALTY FOR DELAYED DEPLOYMENT OF MAJOR T&P**

BHEL SHALL LEVY NON-REFUNDABLE PENALTY IN THE FOLLOWING MANNER IF THE CONTRACTOR DELAYS DEPLOYMENT OF MAJOR T&P SUCH AS CRANES, CONSTRUCTION ELEVATOR, HUCK INSTALLATION TOOLS & HUCK HOSE ASSY VIS-A-VIS THE SCHEDULE AS PER THE ADVICE OF BHEL BASED ON PROJECT REQUIREMENTS. TENTATIVE SCHEDULE GIVEN IN RELEVANT APPENDIX IS FOR GUIDANCE PURPOSE.

- a) IN RESPECT OF 8 MT CAPACITY PICK AND CARRY MOBILE CRANE: @ RS. 1,000/- PER DAY OF DELAY, PER CRANE.
- b) IN RESPECT OF 18 MT CAPACITY CRANE: @ RS. 5,000/- PER DAY OF DELAY, PER CRANE.
- c) IN RESPECT OF 75 MT CAPACITY CRANE: @ RS. 10,000/- PER DAY OF DELAY, PER CRANE

IN CASE SUCH DELAY IS ATTRIBUTABLE TO EITHER BHEL OR FORCE MAJEURE CONDITIONS, NO SUCH PENALTY SHALL BE APPLICABLE.

WHEREVER TENTATIVE SCHEDULES ARE NOT INDICATED, THE DECISION OF BHEL SHALL BE FINAL.

### 5.3 CONSUMABLES

#### 5.3.1

THE CONTRACTOR SHALL PROVIDE ALL CONSUMABLES REQUIRED FOR CARRYING OUT THE WORK COVERED UNDER THESE SPECIFICATIONS EXCEPTING THOSE SPECIFICALLY INDICATED AS BHEL SCOPE.

#### 5.3.2

ALL CONSUMABLES TO BE USED FOR THE WORK SHALL HAVE PRIOR APPROVAL OF BHEL ENGINEER WITH REGARD TO BRAND AND QUALITY SPECIFICATIONS. TEST REPORTS / CERTIFICATES IN RESPECT OF THESE CONSUMABLES, WHEREVER APPLICABLE, SHALL BE SUBMITTED TO BHEL ENGINEER.

#### 5.3.3 PRIMERS & PAINTS

ALL PRIMERS AND PAINTS IS IN THE CONTRACTOR'S SCOPE UNLESS PROVIDED OTHERWISE IN BHEL SCOPE AS FREE ISSUE.

#### 5.3.4 COSUMABLIS FOR BHEL SUPPLIED EQUIPMENTS (CRANES, T &P ETC)

REFER RELEVANT CLAUSE OF SECTION-7 SPECIAL CONDITIONS OF CONTRACT IN THIS REGARD.

### 5.4 WELDING ELECTRODES, FILLER WIRES FOR TIG WELDING AND GASES

#### 5.4.1

ALL THE REQUIRED WELDING ELECTRODES, EXCEPT THOSE INDICATED AS BHEL SCOPE ELSEWHERE IN THESE SPECIFICATIONS, AS APPROVED BY BHEL SHALL BE ARRANGED BY CONTRACTOR AT HIS COST. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN PRIOR APPROVAL OF BHEL, BEFORE PROCUREMENT, REGARDING MANUFACTURER, TYPE OF ELECTRODES ETC. ON RECEIPT OF THE ELECTRODES AT SITE, IT SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY BHEL REGARDING TYPE OF ELECTRODES, BATCH NUMBER, DATE OF EXPIRY ETC. BATCH TEST CERTIFICATES SHALL BE MADE AVAILABLE FOR VERIFICATION & RECORD BEFORE THE ACTUAL USE OF THE WELDING CONSUMABLES.

BHEL RESERVES THE RIGHT TO REJECT THE USE OF ANY ELECTRODES, IF FOUND NON-ACCEPTABLE BECAUSE OF BAD QUALITY, DETERIORATION IN QUALITY DUE TO IMPROPER STORAGE, SHELF LIFE EXPIRY, UNAPPROVED TYPE / BRAND ETC.

#### 5.4.2

FILLER WIRES, FOR TIG WELDING OF PRESSURE PARTS & PIPING, TO THE EXTENT SUPPLIED BY THE MANUFACTURING UNITS OF BHEL ALONGWITH THE COMPONENTS / EQUIPMENTS ONLY SHALL BE PROVIDED BY BHEL AS FREE ISSUE. CONTRACTOR SHALL AT HIS COST MEET REQUIREMENTS OF TIG FILLER WIRES, IF ANY, BEYOND THESE FREE ISSUES BY BHEL. **SIMILARLY, BHEL WILL PROVIDE AS FREE ISSUE THE WELDING ELECTRODE FOR WELDING OF T-91/P-91 MATERIAL TUBES/PIPES RELEASED AS PART OF SUPPLY FROM MANUFACTURING UNIT OF BHEL.**

#### 5.4.3

GASES LIKE ARGON, OXYGEN, AND ACETYLENE ETC THAT ARE REQUIRED FOR ERECTION RELATED ACTIVITIES SHALL BE ARRANGED BY THE CONTRACTOR AT HIS COST. ARGON GAS FOR P-91 PIPE JOINTS WELDING PROCESS SHALL BE CONFORMING TO GRADE -3 OF IS: 5760-1998 WITH OXYGEN AND WATER VAPOUR RESTRICTED TO MAXIMUM 6 PPM EACH AND WITH ARGON PURITY LEVEL OF MINIMUM 99.99%. THE SUPPLY SHOULD ACCOMPANY TEST CERTIFICATE FOR THE BATCH INDICATING INDIVIDUAL ELEMENT 'PPM' LEVEL AND OVERALL PURITY LEVEL.

#### 5.4.4

NITROGEN GAS, IF REQUIRED, FOR PRESERVATION OF BOILER AND NITROGEN CAPPING DURING CHEMICAL CLEANING PROCESS, WILL BE PROVIDED BY BHEL FREE OF CHARGE. CONTRACTOR SHALL ARRANGE NECESSARY CONNECTOR, NIPPLE, REGULATOR, HEADER AND PIPING FOR USAGE OF SUCH GAS FROM CYLINDERS.

## **5.5 FIELD OFFICE**

### **5.5.1**

THE CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENTS FOR FIELD OFFICE AND STORES FOR ACCOMMODATING NECESSARY EQUIPMENTS, TOOLS ROOM FOR EXECUTION OF THE WORK. ONLY OPEN SPACE WILL BE PROVIDED BY BHEL / CUSTOMER, FREE OF CHARGES AS PER THE AVAILABILITY OF SPACE.

### **5.5.2**

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.

## **5.6 AREA LIGHTING**

### **5.6.1**

CONTRACTOR SHALL ARRANGE ADEQUATE FLOODLIGHTS, HAND LAMPS AND AREA LIGHTING. CONTRACTOR SHALL USE HIS OWN MATERIALS LIKE CABLES, FUSES, SWITCH-BOARDS ETC. BHEL/CLIENT WILL NOT PROVIDE ANYTHING IN THIS REGARD.

## **5.7 CONSTRUCTION POWER & WATER**

### **5.7.1**

CONSTRUCTION POWER (THREE PHASE, 50 Hz, 415V) WILL BE PROVIDED AT ONE POINT NEAR THE SITE APPROXIMATELY 500 METERS FROM ERECTION SITE FREE OF CHARGE, HOWEVER ALL TAXES, DUTIES, LEVIES ETC. SHALL BE BORNE BY THE CONTRACTOR. REQUIRED ENERGY METER, ALL CABLES, FUSES, DISTRIBUTION BOARDS, SWITCHES, SWITCHBOARDS, BUS BARS, EARTHING ARRANGEMENTS, PROTECTION DEVICES e.g. ELCB, IF ANY, AND ANY OTHER INSTALLATION AS SPECIFIED BY STATUTORY AUTHORITY, CLIENT IN THIS REGARD, FOR DRAWL OF CONSTRUCTION POWER SHALL BE ARRANGED BY THE CONTRACTOR. OBTAINING APPROVALS, PAYMENT OF NECESSARY FEES, DUTIES ETC TOWARDS THE CLEARANCE OF SUCH INSTALLATIONS, PRIOR TO THESE BEING PUT TO USE OR AS MAY BE SPECIFIED, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

### **5.7.2**

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. ALL CABLING AND INSTALLATIONS SHALL COMPLY IN ALL RESPECTS WITH THE APPROPRIATE STATUTORY REQUIREMENTS. THE INSTALLATION AND MAINTENANCE OF THIS SHALL BE DONE BY LICENSED AND EXPERIENCED ELECTRICIAN.

### **5.7.3 CONSTRUCTION WATER**

THE CUSTOMER WILL PROVIDE WATER FOR CONSTRUCTION PURPOSE AT A SINGLE POINT FREE OF CHARGE. HOWEVER, TAXES, DUTIES, LEVIES, CHARGES, IF ANY, SHALL BE BORNE BY THE CONTRACTOR. ALL ARRANGEMENTS FOR FURTHER DISTRIBUTION BEYOND THIS POINT HAVE TO BE MADE BY THE CONTRACTOR.

### **5.7.4**

CONTRACTOR SHALL BE WELL EQUIPPED WITH BACK-UP POWER SUPPLY ARRANGEMENT LIKE DG SET AND DIESEL OPERATED WELDING MACHINE ETC TO TACKLE SITUATIONS ARISING DUE TO FAILURE OF CUSTOMER SUPPLIED POWER, SO AS TO ENSURE CONTINUITY AND COMPLETION OF CRITICAL PROCESSES THAT ARE UNDERWAY AT THE TIME OF POWER FAILURE OR IMPORTANT ACTIVITIES PLANNED IN IMMEDIATE FUTURE.

5.7.5

BHEL IS NOT RESPONSIBLE FOR ANY LOSS OR DAMAGE TO THE CONTRACTOR'S EQUIPMENT AS A RESULT OF VARIATIONS IN VOLTAGE OR FREQUENCY OR INTERRUPTIONS IN POWER SUPPLY.

## **5.8 RESPONSIBILITIES WITH REGARD TO LABOUR EMPLOYMENT ETC.**

REFER CLAUSE 2.8 OF GENERAL CONDITIONS OF CONTRACT ALSO IN THIS REGARD.

5.8.1

CONTRACTOR SHALL ALSO COMPLY WITH THE REQUIREMENTS OF LOCAL AUTHORITIES/ PROJECT AUTHORITIES CALLING FOR POLICE VERIFICATION OF ANTECEDENTS OF THE WORKMEN, STAFF ETC.

5.8.2

BHEL / CUSTOMER MAY INSIST FOR 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.

5.8.3

IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ARRANGE GATE PASS FOR ALL HIS EMPLOYEES, T&P ETC FOR ENTERING THE PROJECT PREMISES. 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 PERMITS FOR WORKING BEYOND NORMAL WORKING HOURS.

5.8.4.

CONTRACTOR SHALL PROVIDE AT DIFFERENT ELEVATION SUITABLE ARRANGEMENT FOR URINAL AND DRINKING WATER FACILITY WITH NECESSARY PLUMBING & DISPOSAL ARRANGEMENT INCLUDING CONSTRUCTION OF SEPTIC TANK. THESE INSTALLATIONS SHALL BE MAINTAINED IN HYGINIC CONDITION AT ALL TIMES.

5.9

IF AT ANY TIME DURING THE EXECUTION OF WORK, IT IS NOTICED THAT THE WORK IS SUFFERING ON ACCOUNT OF NON-AVAILABILITY/SHORTFALL IN PROVISION OF RESOURCES FROM THE CONTRACTOR'S SIDE, BHEL WILL MAKE SUITABLE ALTERNATE ARRANGEMENTS AT THE RISK AND COST OF CONTRACTOR. THE EXPENDITURE INCURRED WITH OVERHEADS THEREON SHALL BE RECOVERED FROM THE CONTRACTOR.

## **5.10 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.

**5.10.1**

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.

### **5.10.2 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 has to mention in their RA Bill service tax registration number and remittance record of such tax immediately after depositing the tax with concerned authorities.** 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.

### **5.10.3 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.

### **5.10.4 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.

### **5.10.5 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.

#### 5.11 SUBMISSION OF PERIODICAL REPORTS

CONTRACTOR SHALL SUBMIT PERIODICAL REPORTS IN RESPECT OF FOLLOWING ASPECTS OF OPERATION:

- 1) CONSUMPTION OF CONSUMABLES LIKE WELDING ELECTRODES, GASES AND PAINTS
- 2) CONSUMPTION OF CONSTRUCTION POWER
- 3) AVAILABILITY AND UTILIZATION OF BHEL'S TOOLS & PLANTS
- 4) AVAILABILITY AND UTILIZATION OF CONTRACTOR'S TOOLS & PLANTS
- 5) DAILY MANPOWER REPORTS
- 6) DAILY PROGRESS REPORTS OF ACTIVITIES & INCIDENTS
- 7) CALIBRATION REPORTS
- 8) RECORDS OF WAGES PAYMENT
- 9) ANY OTHER REPORT/RECORD AS MAY BE SPECIFIED BY BHEL/CLIENT.

## **SECTION-6**

### **SPECIAL CONDITIONS OF CONTRACT**

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

6.1

THE CONTRACTOR SHALL DEPLOY ALL THE SKILLED/SEMISKILLED/ UNSKILLED LABOUR INCLUDING HIGHLY SKILLED WORKMEN 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 RELEVANT APPENDIX. 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 OR BHEL'S CLIENT.

6.6

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.

6.7 SITE ORGANISATION

THE CONTRACTOR SHALL PROVIDE ADEQUATE STAFFING IN THE FOLLOWING AREAS IN ADDITION TO THE STAFFING REQUIREMENTS OF EXECUTION AS INSTRUCTED/INFORMED BY BHEL FROM TIME TO TIME:

- OVERALL PLANNING, MONITORING & CONTROL
- QUALITY CONTROL AND QUALITY ASSURANCE
- MATERIALS MANAGEMENT
- SAFETY, FIRE & SECURITY
- INDUSTRIAL RELATIONS AND FULFILLMENT OF LABOUR LAWS AND OTHER STATUTORY OBLIGATIONS.

**SECTION-7**  
**SPECIAL CONDITIONS OF CONTRACT**  
**OBLIGATIONS OF BHEL**

**7.1 FACILITIES TO BE PROVIDED BY BHEL**

7.1.1 SPACE FOR SITE OFFICE / STORES  
REFER SECTION-5 IN THIS REGARD.

7.1.2 CONSTRUCTION POWER & WATER  
REFER SECTION-5 IN THIS REGARD.

7.1.3 OTHER MATERIALS AND CONSUMABLES:

BHEL SHALL NOT PROVIDE ANY MATERIAL / CONSUMABLES EXCEPT THOSE SPECIFICALLY MENTIONED AS BHEL SCOPE IN THESE SPECIFICATIONS.

7.1.4 MATERIALS FOR IBR WELDER SITE QUALIFICATION TEST ( PIPES)

BHEL WILL PROVIDE ONLY THE TUBES/PIPES FREE OF CHARGES FOR PREPARATION OF TEST PIECES FOR CONDUCTING THE SITE QUALIFICATION TEST OF HIGH PRESSURE IBR WELDERS. CONTRACTOR SHALL PREPARE THE REQUIRED TEST PIECES FROM SUCH RAW MATERIALS. CONTRACTOR SHALL ARRANGE ALL THE MATERIALS AND PREPARE TEST COUPONS FOR SITE QUALIFICATION TEST OF ALL OTHER WELDERS.

7.2 FILLER WIRE FOR TIG WELDING AND WELDING ELECTRODES FOR WELDING OF T-91/P-91 MATERIAL TUBES/PIPES  
REFER SECTION-5 IN THIS REGARD.

7.3 EQUIPMENTS – TOOLS & PLANTS

BHEL WILL MAKE AVAILABLE T&P LISTED IN THE RELEVANT APPENDIX FREE OF CHARGE. FURTHER DETAILS ARE AS UNDER:

7.3.1 CRANES TO BE PROVIDED BY BHEL

7.3.1.1

BHEL WILL MAKE AVAILABLE THE CRANES (AS PER RELEVANT APPENDIX) FREE OF CHARGE TO THE CONTRACTOR ON SHARING BASIS MAINLY FOR THE PURPOSES ENUMERATED VIDE NOTES IN THE ABOVE REFERRED APPENDIX. BHEL CRANES HAVE TO BE SHARED WITH OTHER AGENCIES / CONTRACTORS OF BHEL. THE ALLOCATION OF CRANES SHALL BE THE DISCRETION OF BHEL ENGINEER, WHICH SHALL BE BINDING ON THE CONTRACTOR.

7.3.1.2

CONTRACTOR SHALL LAY NECESSARY SLEEPER BEDS, BACKFILLING OF APPROACHES WHEREVER NECESSARY FOR SAFE MOVEMENT OF THE CRANES AS DIRECTED BY BHEL. CONTRACTOR SHALL TRANSPORT THE EQUIPMENTS AND COMPONENTS/SUB ASSEMBLIES/ATTACHMENTS OF BHEL EQUIPMENTS TO & FRO BETWEEN BHEL STORES AND SITE.

7.3.1.3

CRANES, INCLUDING THE CRANES HIRED BY BHEL, WILL BE INITIALLY ISSUED IN BASIC ASSEMBLED CONDITION. ANY ALTERATION/ADDITION LIKE BOOM REDUCTION/EXTENSION, ASSEMBLY OF COMPONENTS/SUB-ASSEMBLIES NEEDED FOR MODULATING THE CAPACITY/REACH/OTHER FEATURES OF CRANES AND RESTORATION TO THE STATE AS DIRECTED BY BHEL SHALL BE THE CONTRACTOR'S RESPONSIBILITY. ALSO REFER SECTION-5 IN THIS REGARD.

7.3.1.4

THE DAY-TO-DAY UPKEEP AND RUNNING MAINTENANCE LIKE FILLING / TOPPING UP OF LUBRICANTS, CHANGING FILTERS ETC, OF BHEL CRANES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. SPARES IF ANY, REQUIRED IN NORMAL COURSE WILL BE PROVIDED BY BHEL.

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MAJOR BREAKDOWNS WILL BE ATTENDED TO BY BHEL. FOR HIRED CRANES THESE RESPONSIBILITIES WILL BE IN THE SCOPE OF CRANE HIRING AGENCY. THE CRANES PROVIDED BY BHEL (INCLUDING THE HIRED CRANES) WILL BE WITHDRAWN FOR REGULAR AND CAPITAL MAINTENANCE AS PER THE RESPECTIVE SCHEDULE OF MAINTENANCE. AS FAR AS POSSIBLE SUCH SCHEDULES WILL BE INTIMATED TO THE CONTRACTOR IN ADVANCE AND MAY BE ADJUSTED DEPENDING ON THE WORK REQUIREMENTS AT SITE. HOWEVER NO CLAIM WHATSOEVER WILL BE ENTERTAINED ON ACCOUNT OF NON-AVAILABILITY OF CRANE(S).

#### 7.3.1.5

CONTRACTOR SHALL PROVIDE FUEL FOR THE CRANES PROVIDED BY BHEL FOR HIS USE. OPERATOR FOR HIRED CRANES WILL BE PROVIDED BY THE CRANE HIRING AGENCY OF BHEL.

#### 7.3.1.6

WHERE THE SERVICES OF THE CRANES PROVIDED BY BHEL ARE TO BE SHARED BY OTHER AGENCIES/ CONTRACTORS OF BHEL, THE CONTRACTOR'S RESPONSIBILITIES DEFINED ABOVE WILL ALSO BE APPORTIONED ACCORDINGLY TO THE BENEFICIARY AGENCY. WORKING ARRANGEMENTS IN THIS REGARD WILL BE DONE AT SITE BY BHEL ENGINEER AND IN ANY CASE HIS DECISION SHALL BE FINAL AND BINDING.

### **7.4 OTHER T&P**

#### 7.4.1

THE RESPONSIBILITIES OF CONTRACTOR DEFINED ABOVE FOR BHEL CRANES SHALL ALSO BE APPLICABLE, MUTATIS – MUTANDIS, IN RESPECT OF OTHER TOOL & PLANTS PROVIDED BY BHEL.

#### 7.4.2

CHEMICAL CLEANING EQUIPMENTS PROVIDED BY BHEL WILL HAVE TO BE RETURNED AFTER USE TO BHEL AFTER DUE SERVICING AND PRESERVATION.

#### 7.4.3

SPECIAL TOOLS WHICH ARE SUPPLIED BY BHEL AS PART OF MAINTENANCE TOOLS TO BE HANDED OVER TO CUSTOMER UNDER REGULAR DU / DESS NUMBERS IN VARIOUS PRODUCT GROUPS MAY BE ISSUED TO THE CONTRACTOR FREE OF CHARGES FOR SPECIFIC ACTIVITIES, AT THE DISCRETION OF BHEL. CONTRACTOR SHALL RETURN THEM AFTER THE COMPLETION OF THE SPECIFIC ACTIVITY FOR WHICH THE TOOLS WERE SPARED, IN GOOD WORKING ORDER.

#### 7.4.4

LUBRICANTS LIKE ENGINE OIL, CARDIUM COMPOUND, HYDRAULIC OIL, GEAR OIL, AND GREASE ETC FOR HIRED CRANES WILL BE PROVIDED BY THE CRANE HIRING AGENCY. SIMILARLY FILTERS FOR HIRED CRANES WILL BE PROVIDED BY THE CRANE HIRING AGENCY.

#### 7.4.5

THE CONTRACTOR MUST NOT USE THESE EQUIPMENTS FOR ANY PURPOSE OTHER THAN WHAT THEY ARE INTENDED FOR.

#### 7.4.6

IF THE ABOVE ITEMS ISSUED TO CONTRACTOR ARE FOUND NOT UTILISED / NOT MAINTAINED TO THE SATISFACTION OF BHEL ENGINEER OR MISUSED, THESE WILL BE WITHDRAWN AND NO REPLACEMENT WILL BE DONE FOR SUCH ITEMS.

#### 7.4.7

REQUIRED TEMPORARY STRUCTURAL STEEL, PIPES & FITTINGS, VALVES FOR DRUM LIFTING, CONDUCT OF HYDRAULIC TEST, CHEMICAL CLEANING / STEAM BLOWING / OIL FLUSHING / ACID CLEANING ETC SHALL BE PROVIDED BY BHEL.

## **7.5 CHEMICALS, GASES AND LUBRICANTS FOR PRE-COMMISSIONING AND COMMISSIONING**

### **7.5.1**

ALL LUBRICANTS AND CHEMICALS REQUIRED FOR TESTING, PRESERVATION, CHEMICAL CLEANING / ACID CLEANING, OIL FLUSHING, AND THE LUBRICANTS FOR TRIAL RUNS OF THE EQUIPMENTS AND TRIAL OPERATION OF THE UNIT WILL BE SUPPLIED BY BHEL FREE OF CHARGES.

**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 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 authority 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 BHEL 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 its 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

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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 administrators 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

SI 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 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 SEWAGE 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

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IS No	YEAR	Amd upto	DESCRIPTION
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 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

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IS No	YEAR	Amd upto	DESCRIPTION
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 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

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IS No	YEAR	Amd upto	DESCRIPTION
			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.

##### 10.6

In case of any conflict between general instructions to tenderness, general conditions of contract contained in sections 1 & 2 respectively and special conditions of contract contained in sections 4 to 15 and appendices, provisions contained in special conditions of contract in sections 4 to 15 and appendices shall prevail.

##### 10.7

In case of discrepancy between quoted item rate and corresponding amount in the rate schedule, the **quoted item rates shall be reckoned as correct and amount recalculated.** Quoted item rates shall also prevail for arriving at the total price quoted for offer evaluation. Offers will be evaluated on the total amount for the entire Rate Schedule and the work will be awarded without splitting the scope.

##### 10.8

Bank Guarantees to be furnished by the contractor towards Security Deposit and Performance Guarantee (last 5% payment against workmanship warranty/defect liability) shall have a claim period of six months over and above the validity period required for the respective cases. BG for advance payment shall be kept valid for a period of two more months beyond the recovery period of the advance with interest thereof.

## SECTION-11

### SPECIAL CONDITIONS OF CONTRACT

#### TIME SCHEDULE, MOBILIZATION, PROGRESS MONITORING, OVER RUN, VARIATION ETC.

##### 11.1 TIME SCHEDULE & MOBILIZATION

###### 11.1.1 INITIAL MOBILIZATION AND TENTATIVE SCHEDULE

CONTRACTOR SHALL REACH SITE WITHIN THREE WEEKS FROM THE DATE OF FAX LETTER OF INTENT, MAKE HIS SITE ESTABLISHMENT AND BE READY TO COMMENCE THE WORK AS PER DIRECTIONS OF BHEL ENGINEER.

THE CONTRACTOR HAS TO SUBSEQUENTLY AUGMENT HIS RESOURCES IN SUCH A MANNER THAT THE ENTIRE WORK IS COMPLETED TO ACHIEVE THE FOLLOWING SCHEDULE:

SN	MAJOR MILESTONE (FOR U#1)	TENTATIVE COMPLETION SCHEDULE FROM START OF BOILER ERECTION
02	BOILER DRUM LIFTING	4 <sup>th</sup> MONTH
03	BOILER HYDRAULIC TEST (DRAINABLE)	14 <sup>th</sup> MONTH
05	BOILER LIGHT UP	18 <sup>th</sup> MONTH
07	STEAM BLOWING COMPLETION & SAFETY VALVE FLOATING	22 <sup>ND</sup> MONTH
09	SYNCHRONIZATION WITH COAL FIRING	23 <sup>rd</sup> MONTH
10	TRIAL OPERATION COMPLETION	25 <sup>th</sup> MONTH

**THE COMPLETION SCHEDULE OF UNIT # 2 WILL HAVE A PHASE SHIFT OF 3 MONTH WITH REFERENCE TO UNIT#1. COMPLETION OF ALL FACILITIES WITHIN 1 MONTH OF TRIAL OPERATION COMPLETION OF RESPECTIVE UNITS.**

###### 11.1.2 CONTRACT PERIOD

THE TOTAL CONTRACT PERIOD FOR COMPLETION OF ENTIRE WORK UNDER SCOPE SHALL BE **29(TWENTY NINE MONTHS)** FROM THE START OF ERECTION OF BOILER.

PERMANENT ERECTION OF THE FIRST COLUMN SEGMENT OR MAJOR SUB-ASSEMBLY/MAIN ASSEMBLY OF ANY OTHER EQUIPMENT ON ITS DESIGNATED FOUNDATION FOLLOWING DUE PROCESS OF PRE-ASSEMBLY AND QUALITY CHECKS AS PER APPROVED FIELD QUALITY PLAN (FQP) SHALL BE CONSIDERED AS THE START OF CONTRACT PERIOD FOR THIS CONTRACT. PLACEMENT OF PACKER PLATES ETC. SHALL NOT BE CONSIDERED FOR THIS PURPOSE.

###### 11.1.3 GRACE PERIOD

GRACE PERIOD OF 5 (FIVE) MONTHS BEYOND THE CONTRACT PERIOD MAY BE PROVIDED FOR THIS CONTRACT AT THE DISCRETION OF BHEL.

###### 11.1.4 CONSEQUENCE OF DELAY

IT MAY BE NOTED THAT IN THE EVENT DELAY IN COMPLETION IS ATTRIBUTABLE TO THE CONTRACTOR AND LEADS TO IMPOSITION OF LIQUIDATED DAMAGES BY BHEL'S CLIENT, BHEL WILL IMPOSE LD ON THE CONTRACTOR AS PER GCC.

## 11.2 PROGRESS MONITORING, CONTRACT EXTENSION AND OVERRUN

### 11.2.1 PROGRESS MONITORING

PROGRESS WILL BE REVIEWED PERIODICALLY (DAILY/WEEKLY/MONTHLY) INCLUDING MONTH END REVIEW VIS-A-VIS THE PLANS DRAWN AS ABOVE. THE CONTRACTOR SHALL SUBMIT PERIODICAL PROGRESS REPORTS AND OTHER REPORTS/INFORMATION INCLUDING MANPOWER, CONSUMABLES ETC AS DESIRED BY BHEL.

### 11.2.2 ASCERTAINING AND ESTABLISHING THE REASONS FOR SHORTFALL

THE ONUS PROBANDI THAT THE CAUSES LEADING TO EXTENSION OF THE CONTRACT PERIOD IS NOT DUE TO ANY REASONS ATTRIBUTABLE TO THE CONTRACTOR IS ON HIM (THE CONTRACTOR). REVIEW OF THE PERFORMANCE AS STATED VIDE CL. 11.2.1 ABOVE WILL BE MADE CONSIDERING THE AVAILABILITY OF COMPONENTS TO BE ERRECTED AND OTHER INPUTS / CONSTRAINTS OVER WHICH THE CONTRACTOR HAS NO CONTROL. THE PROGRAMME WILL BE REVIEWED AREA-WISE AND THE FOLLOWING FACTS WILL BE RECORDED IN CASE OF SHORTFALL AT THE END OF EVERY MONTH:

- A) ERECTION / COMMISSIONING PROGRAMME NOT ACHIEVED OWING TO NON-AVAILABILITY OF FRONTS.
- B) ERECTION / COMMISSIONING PROGRAMME NOT ACHIEVED OWING TO NON-AVAILABILITY OF MATERIALS.
- C) ERECTION/COMMISSIONING PROGRAMME NOT ACHIEVED OWING TO NON-AVAILABILITY OF TOOLS AND PLANTS, MANPOWER AND CONSUMABLES BY THE CONTRACTOR OR ANY OTHER REASON ATTRIBUTABLE TO THE CONTRACTOR.
- D) ERECTION / COMMISSIONING PROGRAMME NOT ACHIEVED DUE TO ANY OTHER REASONS NOT ATTRIBUTABLE TO THE CONTRACTOR.

### 11.2.3 CONTRACT EXTENSION

IF THE COMPLETION OF WORK AS DETAILED IN THESE SPECIFICATION GETS DELAYED BEYOND THE END OF CONTRACT PERIOD AND GRACE PERIOD THEN DEPENDING ON THE BALANCE WORK LEFT OUT, BHEL AT ITS DISCRETION MAY EXTEND THE CONTRACT.

### 11.2.4

A JOINT PROGRAMME SHALL BE DRAWN FOR THE WORK TO BE COMPLETED DURING THE EXTENDED CONTRACT PERIOD. REVIEW OF THE PROGRAM AND RECORD OF SHORTFALL AS DESCRIBE VIDE CLAUSE NO. 11.2.2 SHALL BE DONE DURING THE EXTENDED PERIOD. THE OVER RUN CHARGES WILL BE PAID IN PROPORTION TO THE ACHIEVEMENT OF THE RESPECTIVE MONTH VIS-À-VIS THE PLAN FOR THE MONTH (FOR ASSESSING THE PERFORMANCE, THE AGREED PLAN SHALL BE REDUCED BY SHORTFALL ATTRIBUTABLE TO THE BHEL). BHEL MAY DISALLOW CONTRACTOR'S CLAIM FOR OVER RUN CHARGES IF THE MONTHLY PROGRAMME AS MENTIONED IN THESE SPECIFICATIONS ARE NOT MADE BY HIM.

### 11.2.5

THE PART OF EXTENSION ATTRIBUTABLE TO THE CONTRACTOR, IF ANY, IN TOTAL CONTRACT EXTENSION SHALL BE EXHAUSTED FIRST i.e., IMMEDIATELY AFTER END OF GRACE PERIOD. THIS SHALL BE FOLLOWED BY THE EXTENSION ON ACCOUNT OF FORCE MAJEURE CONDITIONS, IF ANY, AND LASTLY ON ACCOUNT OF BHEL.

### 11.2.6 OVERRUN COMPENSATION

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IF THE CONTRACT IS EXTENDED BEYOND THE CONTRACT AND GRACE PERIOD FOR ANY REASON OTHER THAN THOSE ATTRIBUTABLE TO THE CONTRACTOR OR FORCE MAJEURE CONDITIONS, THE CONTRACTOR WILL BE COMPENSATED BY PAYMENT OF OVERRUN CHARGES AT THE RATE OF RS.100000/- (One Lakh Only) PER MONTH. OVERRUN COMPENSATION WILL BE PAID FOR THE EXTENSION ATTRIBUTABLE TO BHEL ONLY. NO OVERRUN COMPENSATION WILL BE PAYABLE FOR THE EXTENSION ON ACCOUNT OF REASONS ATTRIBUTABLE TO CONTRACTOR AND/OR FORCE MAJEURE CONDITIONS. OVERRUN COMPENSATION FOR ELIGIBLE PERIOD SHALL BE IN PROPORTION TO THE PROGRESS ACHIEVED AGAINST THE PLAN FOR RESPECTIVE PERIOD.

### 11.3 PRICE VARIATION

In order to take care of variation in cost of execution of work on either side, due to variation in the index of LABOUR, DIESEL and ELECTRODE, Price Variation Formula as described herein shall be applicable

#### 11.3.1

85% component of Contract Value shall be permitted to be adjusted for variation in various relevant indices during execution of work. The remaining 15% shall be treated as fixed component.

#### 11.3.2

The basis for calculation of price variation in each category, their component, Base Index, Base Date of accounting shall be as under:

.SL NO.	CATEGORY	COMPONENT ('K')	BASE INDEX	BASE DATE
A)	LABOUR (ALL CATEGORIES)	40%	CONSUMER PRICE INDEX FOR INDUSTRIAL WORKERS (GENERAL), APPLICABLE TO 'ALL INDIA' AS PUBLISHED BY LABOUR BUREAU, SHIMLA	Base date shall be calendar month of last date of submission of Tender (including extended date of submission if any)
B)	H.S. DIESEL OIL	5%	WHOLE SALE PRICE INDEX (FOR COMMODITY :HIGH SPEED DIESEL) PUBLISHED BY MINISTRY OF COMMERCE AND INDUSTRY ( <a href="http://www.eaindustry.nic.in">www.eaindustry.nic.in</a> )	...DO...
C)	WELDING ELECTRODE	40%	WHOLE SALE PRICE INDEX (FOR COMMODITY:ELECTRODES) PUBLISHED BY MINISTRY OF COMMERCE AND INDUSTRY ( <a href="http://www.eaindustry.nic.in">www.eaindustry.nic.in</a> )	...DO...

#### 11.3.3

Payment/recovery due to variation in index shall be determined on the basis of the following notional formula without any initial absorption, in respect of the identified components viz LABOUR, HS DIESEL and ELECTRODE

$$A = K \times R \times \frac{(X_N - X_0)}{X_0}$$

Where

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A = Amount to be paid/recovered due to variation in the Index for Labour, Electrode and HS Diesel

K = Percentage component applicable for Labour, Electrode and HS Diesel

R = Value of work done for the billing month

XN = Revised Index No for Labour, Electrode and HS Diesel for the billing month under consideration

Xo = Index no for Labour, Electrode and HS Diesel as on the Base date. Base date for each of the category is defined in the table above

#### 11.3.4

The above Price Variation formula is applicable for the entire Contract period, Grace period, and the extended contract period if any. However for the period extended on account of reasons attributable to the contractor and/or Force Majeure conditions, the price variation will be applied based on the respective indices/prices frozen at the calendar month preceding the start of such extended period.

#### 11.3.5

The price Variation is not applicable to Over Run Charges, Manday rates for extra works etc.

Similarly Price Variation shall not be applicable for the respective % assigned to milestone activities viz Oil Flushing, Barring Gear, Commissioning of Condensate System, Commissioning of Feed Water System and Synchronisation

#### 11.3.6

The contractor shall furnish necessary monthly bulletins for WHOLE SALE PRICE INDEX (for Commodity :ELECTRODES and HS DIESEL) Published by Ministry of Commerce and Industry ([www.eaindustry.nic.in](http://www.eaindustry.nic.in)) and CONSUMER PRICE INDEX for INDUSTRIAL WORKERS (GENERAL), applicable to 'All India' as published by Labour Bureau, Shimla.

#### 11.3.7

The contractor will be required to raise the bills for price variation payments on a monthly basis along with the running bills irrespective of the fact whether any increase/decrease in the consumer price index for Labour, HS Diesel and Electrode has taken place or not. In case there is delay in publication of bulletins (final figure), the provisional values as published can be considered for payments and arrears shall be paid/recovered on getting the final values.

#### 11.3.8

The Total Quantum of Price Variation shall not exceed fifteen percentage (15%) of executed Contract Value. Executed Contract value for this 15% cap shall not include Overrun charges, Extra works.

#### 11.3.9

With the above provision, the clause no. 2.15 of General Conditions of Contract section-2 is not applicable.



#### 11.4 CONTRACT VARIATIONS

##### 11.4.1 VARIATION IN WEIGHT

WEIGHT OF VARIOUS EQUIPMENTS, QUANTITIES OF VARIOUS ITEMS OF WORK COVERED UNDER THESE SPECIFICATIONS, & INDICATED IN RELEVANT APPENDICES ARE LIKELY TO VARY. FOR ANY UPWARD OR DOWNWARD VARIATION IN THE QUANTITIES, THE RATES ACCEPTED SHALL BE APPLICABLE WITHOUT ANY VARIATION.

##### 11.5 INTREST BEARING ADVANCE

Interest bearing (rate of interest shall be prime leading rate of SBI plus 2% per annum, on monthly reducing balance basis) recoverable advance limited to 5% of the contract value may be paid by BHEL at its discretion depending on the merit of the case against receipt & acceptance of bank guarantee from the contractor for the amount sought. This bank guarantee (BG) shall be valid at least for one year or the recovery duration. In case recovery of dues does not get completed within the aforesaid BG validity period, the contractor must renew the validity of BG or submit fresh BG for the outstanding amount and remaining recovery period. BHEL is entitled to make recovery of the entire outstanding amount in case the contractor fails to comply with the BG requirement as above.

Recovery of dues will be made minimum @ 10% of the admitted gross running bill amount from the first applicable running bill onwards till entire due (principal plus interest) is recovered. In the event sufficient time duration is not left for recovery @10%, the rate of recovery shall be suitably enhanced so that entire due is recovered by the time contractor reaches 90% billing of total value of work executed & within the contract period (including extensions granted or foreclosure if any).

##### 11.6 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.

##### 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.

The 5% thus remaining shall be on account of workmanship guarantee of work executed. The same will be released after completion of the guarantee period of **12 months** from the date of completion of entire work as certified by BHEL.

However, on specific request of vendor, this amount may be released on pro rata basis for the value of work executed and accepted by BHEL, along with any RA Bill and onwards, subject to receipt and acceptance of bank guarantee of equal amount in BHEL's prescribed format. The BG shall be kept valid till completion of such guarantee period and an additional six months claim period. This is also subject to the condition that the contractor has started the work and also furnished/remitted the initial Security Deposit as per contract.

##### 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:

9. Name of the Company
10. Name of Bank
11. Name of Bank Branch
12. City/Place
13. Account Number
14. Account type
15. IFSC code of the Bank Branch
16. MICR Code of the Bank Branch

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

## 12.1 STAGES OF PROGRESSIVE PRO-RATA PAYMENTS

100% OF ITEM RATE FOR VARIOUS ITEMS OF WORK UNDER THESE SPECIFICATIONS WILL BE RELEASED, BASED ON CERTIFIED COMPLETION BY BHEL ENGINEER, AS PRO-RATA PROGRESSIVE PAYMENT AS PER THE STAGE BREAK UP GIVEN HEREAFTER:

### 12.1.1 E & C OF BOILER AND AUXILIARIES, PIPING, FABRICATED STRUCTURES ETC (REFER SL No.-"A" TO "F" OF RATE SCHEDULE.)

SN	PART OF THE ACTIVITY COMPLETED	PERCENTAGE BREAK UP OF ACCEPTED ITEM RATES					
		NON-PR PARTS	STRUC-TURES	PR. PARTS	ROTATING M/c	E S P	INSULA-TION
A	TRANSPORT, ERECTION / PLACEMENT/APPLICATION	40	40	40	40	40	40
B	ALIGNMENT, BOLTING/ FASTENING, GROUTING & WELDING,	45	45	40	45	45	45
C	GAS TIGHTNESS TEST / KEROSENE LEAK TEST / LPI TEST ETC	5	---	---	---	5	----
D	NDE AND HEAT TREATMENT	---	3	10	---	--	--
E	TRIAL RUN OF ROT. M/C	---	---	---	5	--	--
F	ON COMPLETION OF DRUM LIFTING	---	3	---	---	--	--
G	ON COMPLETION OF HYDRAULIC TEST OF BOILER (DRAINABLE)	---	2	3	---	--	--
H	ON COMPLETION OF HYDRAULIC TEST OF BOILER (NON-DRAINABLE)	---	---	2	---	--	--
I	ON COMPLETION OF BOILER LIGHT UP AND ABO	2	2	2	2	2	5
J	ON COMPLETION OF FINAL PAINTING	2	3	---	1	1	1
K	ON COMPLETION OF SVF & STEAM BLOWING	1	1	1	2	1	3
L	COAL FIRING	4	---	1	4	5	5
M	TRIAL OPERATION	1	1	1	1	1	1
	<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

### **12.1.2 PIPING (ITEM No. "G" OF RATE SCHEDULE)**

- (A) 25% OF THE CONTRACT RATE ON PRORATA BASIS AFTER PLACEMENT IS COMPLETED.
- (B) 30% OF THE CONTRACT RATE ON PRORATA BASIS AFTER ALIGNMENT & JOINT FIT-UP IS COMPLETED.
- (C) 25% OF THE CONTRACT RATE ON PRORATA BASIS AFTER COMPLETION OF WELDING
- (D) 10% OF THE CONTRACT RATE ON PRORATA BASIS AFTER COMPLETION OF NDE & POST WELD HEAT TREATMENT, IF ANY.
- (E) 4% OF THE CONTRACT RATE ON PRORATA BASIS AFTER COMPLETION OF HYDRAULIC TEST
- (F) 3% OF THE CONTRACT RATE ON PRORATA BASIS AFTER FLOATING OF LINE ON PERMANENT SUPPORTS AND REMOVAL OF TEMPORARY SUPPORT
- (G) 2% OF THE CONTRACT RATE ON PRORATA BASIS AFTER FINAL ADJUSTMENT OF SUPPORTS FOR COLD AND HOT VALUES FOR BOILER TRIM, INTEGRAL PIPING AND CRITICAL PIPING.
- (H) 1% OF CONTRACT RATE AFTER COMPLETION OF FINAL PAINTING & COLOUR BANDING.

### **12.1.3 RADIOGRAPHY TEST (ITEM No. "H" OF RATE SCHEDULE)**

FOR RADIOGRAPHY TEST (RT) THE PAYMENT SHALL BE 100% OF THE CONTRACT RATE ON PRORATA BASIS ON ACCEPTANCE OF THE SAME. IN THE CASE OF SUBSTITUTION OF 'RT' WITH ULTRASONIC TEST, THE RATES WILL BE LIMITED TO THAT OF RADIOGRAPHY.

## **12.2 GENERAL**

### **12.2.1**

WEIGHT OF PACKERS AND SHIMS WHICH BECOME PERMANENT PART OF EQUIPMENT, BOTH FIGURING IN SHIPPING LIST AND THOSE FABRICATED AT SITE WILL BE PAID FOR ON SHIPPING LIST BASED ACTUAL WEIGHT.

### **12.2.2**

CERTAIN OPTIMIZED ASSEMBLIES / OR MODULES MAY BE MADE, ASSEMBLING PRODUCTS FROM TWO OR MORE DIFFERENT PRODUCT GROUP MAIN ASSEMBLY AND DISPATCHED. PAYMENT FOR ERECTION OF THESE OPTIMIZED ASSEMBLIES / OR MODULES WILL BE REGULATED AS PER THE WEIGHT OF INDIVIDUAL PRODUCT GROUP MAIN ASSEMBLIES CONTRIBUTING TO THE TOTAL WEIGHT OF THE MODULE OR OPTIMIZED ASSEMBLY AT THE QUOTED RATE FOR THE RESPECTIVE PRODUCT GROUP MAIN ASSEMBLIES, IN THE RATE SCHEDULE.

### **12.2.3**

FOR PAYMENT OF TEMPORARY SYSTEM FOR CHEMICAL CLEANING AND STEAM BLOWING OF BOILER AND PIPING THE MEASUREMENT FOR THE PIPING, FITTING, VALVES ETC AND EQUIPMENTS LIKE TANKS, STRUCTURES PROVIDED BY BHEL & NOT FIGURING IN SHIPPING LIST WILL BE BASED ON JOINTLY MEASURED QUANTITY AND CORRESPONDING STANDARD WEIGHTS. PAYMENT WILL BE MADE AT THE RATE APPLICABLE FOR **NON-PRESSURE PARTS** FOR ITEMS. NO PAYMENT WILL BE MADE FOR THE EQUIPMENTS BROUGHT BY THE CONTRACTOR SUCH AS PUMPS ETC AND FOUNDATIONS MADE BY THE CONTRACTOR FOR TEMPORARY SYSTEMS.

12.3 MEASUREMENT OF THE WORK COMPLETED

- A) WHERE PAYMENT IS TO BE MADE ON THE BASIS OF WEIGHT, THE WEIGHT PER UNIT GIVEN IN THE BHEL DOCUMENT ONLY SHALL BE TAKEN IN TO CONSIDERATION. IN CASE SUCH INFORMATION IS NOT AVAILABLE IN BHEL DOCUMENTS, THEN THE LATEST RELEVANT INDIAN STANDARDS IN THIS REGARD MAY BE APPLIED.
- B) SPARES, SURPLUS QUANTITY, ERECTION CONTINGENCY MATERIALS WILL NOT BE PAID FOR UNLESS THE SAME HAS BEEN CONSUMED IN PLACE OF REGULAR ITEM OF MEASURABLE WORK AS PER THE RATE SCHEDULE.
- C) WHERE THE PAYMENT IS MADE ON THE BASIS OF ITEM RATE, ACTUAL EXECUTED QUANTITY MEASURED JOINTLY SHALL ONLY BE PAID FOR.
- D) IT IS CLARIFIED THAT AS FAR AS WEIGHT CONSTITUTED BY WELDING CONSUMABLES AND OTHER CONSUMABLES SUPPLIED BY BHEL AS WELL AS BY THE CONTRACTOR, SHALL NOT BE CONSIDERED FOR PAYMENT.
- E) BHEL ENGINEER'S DECISION REGARDING STAGE OF PAYMENT CORRESPONDING TO PROGRESS OF WORK, CALCULATION OF WEIGHT ETC WILL BE FINAL AND BINDING ON THE CONTRACTOR.
- F) NO SEPARATE PAYMENT SHALL BE MADE FOR GROUTING OF EQUIPMENTS, STRUCTURES ETC SPECIFIED ELSEWHERE IN THESE SPECIFICATIONS.
- G) NO SEPARATE PAYMENT WILL BE MADE FOR THE WEIGHT/VOLUME OF LUBRICANT, OILS, CHEMICALS, GASES, WATER, AND PRESERVATIVES ETC.
- H) NO PAYMENT WILL BE MADE FOR THE SPECIAL TOOLS ETC USED IN VARIOUS ACTIVITIES OF THIS WORK.
- I) NO PAYMENT WILL BE MADE FOR WEIGHT OF RUBBER LINING.

## **SECTION-13**

### **SPECIAL CONDITIONS OF CONTRACT**

#### **13.0 EXTRA CHARGES FOR RECTIFICATION AND MODIFICATION**

13.1

IF EXTRA WORKS (REQUIRING LESS THAN **100 MAN-HOURS**) FOR MODIFICATION, REWORK, REVAMPING, IN BRIEF, ANY WORK DONE TO CHANGE THE STATE EXISTING TO A STAGE DESIRED AND ALSO FABRICATION, ALL OR ANY, ARE NEEDED DUE TO ANY CHANGE IN OR DEVIATION FROM THE DRAWINGS AND DESIGN OF EQUIPMENT, OPERATION/ MAINTENANCE REQUIREMENTS, MISMATCHING, TRANSIT DAMAGES AND OTHER ALLIED WORKS WHICH ARE NOT VERY SPECIFICALLY INDICATED IN THE DRAWINGS, BUT ARE FOUND ESSENTIAL FOR SATISFACTORY COMPLETION OF THE WORK, ARE DONE, NO EXTRA CHARGES WILL BE PAID. THE TENDERERS ARE REQUESTED TO TAKE THIS ASPECT INTO ACCOUNT AND THE QUOTED RATE SHOULD INCLUDE ALL SUCH CONTINGENCIES.

13.2

IT MAY ALSO BE NOTED THAT IF ANY SUCH SAID EXTRA WORKS ARISE ON ACCOUNT OF THE CONTRACTOR'S FAULT, IRRESPECTIVE OF TIME CONSUMED IN RECTIFICATION OF THE DAMAGE/LOSS, IT WILL HAVE TO BE CARRIED OUT BY THE CONTRACTOR FREE OF COST. UNDER SUCH CIRCUMSTANCES, ANY MATERIAL AND CONSUMABLE REQUIRED FOR THIS PURPOSE WILL ALSO HAVE TO BE ARRANGED BY THE CONTRACTOR AT HIS COST.

13.3

HOWEVER, BHEL MAY CONSIDER FOR PAYMENT AS EXTRA, FOR SUCH OF THOSE WORKS DETAILED IN CLAUSE 13.1 WHICH REQUIRE MORE THAN **100 MAN-HOURS** AND SUCH PAYMENT WILL BE REGULATED BY THE TERMS, CONDITIONS AND STIPULATIONS CONTAINED IN THE CLAUSES 13.4 TO 13.8 AND/OR 14.2.1 TO 14.2.10 AS THE CASE MAY BE. IT MAY BE SPECIFICALLY NOTED THAT THE DECISION OF BHEL AS TO WHETHER SUCH PAYMENT IS DUE SHALL BE FINAL AND BINDING ON THE CONTRACTOR. IT MAY ALSO BE NOTED THAT ONLY THOSE WORKS THAT ARE IDENTIFIED AS MAJOR AND WARRANT EXTRA PAYMENT AND CERTIFIED AS SUCH BY THE SITE ENGINEER AND ACCEPTED BY THE DESIGNERS AND/OR COMPETENT AUTHORITY OF BHEL, WILL BE CONSIDERED FOR EXTRA PAYMENT.

13.4

FOR EXTRA WORKS ARISING OUT OF TRANSIT, STORAGE AND ERECTION DAMAGES, PAYMENT, IF FOUND DUE, WILL BE REGULATED BY CLAUSES 14.2.1 TO 14.2.10.

13.5

ALL THE EXTRA WORK SHOULD BE CARRIED OUT BY A SEPARATELY IDENTIFIABLE GANG, WITHOUT AFFECTING ROUTINE ACTIVITIES. DAILY LOG SHEETS IN THE PRO-FORMA PRESCRIBED BY BHEL SHOULD BE MAINTAINED AND SHALL BE SIGNED BY THE CONTRACTOR'S REPRESENTATIVE AND BHEL ENGINEER. NO CLAIM FOR EXTRA WORK WILL BE CONSIDERED/ENTERTAINED IN THE ABSENCE OF THE SAID SUPPORTING DOCUMENTS I.E. DAILY LOG SHEETS. IT MAY, HOWEVER BE NOTED THAT SIGNING OF LOG SHEETS BY BHEL ENGINEER DOES NOT MEAN THE ACCEPTANCE OF SUCH WORKS AS EXTRA WORKS. ALL ADMISSIBLE CLAIMS SHALL BE SUBMITTED TO BHEL

13.6

BHEL RETAINS THE RIGHT TO AWARD OR NOT TO AWARD ANY OF THE MAJOR REPAIR/REWORK/MODIFICATION/RECTIFICATION/FABRICATION WORKS UNDER CLAUSES 13.1 TO 13.6 TO THE CONTRACTOR, AT THEIR DISCRETION WITHOUT ASSIGNING ANY REASON FOR THE SAME.

13.7

EXTRA WORKS THAT ARISE ON ACCOUNT OF CONTRACTOR'S FAULT WILL HAVE TO BE CARRIED OUT BY THE CONTRACTOR FREE OF COST INCLUDING THE SUPPLY OF MATERIAL AND CONSUMABLES

13.8

AFTER ELIGIBILITY OF EXTRA WORKS IS ESTABLISHED AND FINALLY ACCEPTED BY BHEL ENGINEER/DESIGNER, PAYMENT WILL BE RELEASED ON COMPETENT AUTHORITY'S APPROVAL AT THE FOLLOWING RATE.

**MAN-DAY RATE FOR ELIGIBLE EXTRA WORKS :**

SINGLE AVERAGE MAN-DAY RATE, INCLUDING OVERTIME IF ANY, AND OTHER SITE EXPENSES AND INCIDENTALS, INCLUDING CONSUMABLES, TOOLS AND TACKLES, FOR CARRYING OUT ANY MAJOR REWORK/ REPAIRS/ RECTIFICATION/ MODIFICATION/ FABRICATION OF 8 HOURS AS MAY ARISE DURING THE COURSE OF ERECTION. (REFER CLAUSES 13.1 TO 13.8 AND 14.2.1 TO 14.2.10) WILL BE **RS. 320/- (RUPEES THREE HUNDRED AND TWENTY ONLY).**

NO PAYMENT WILL BE MADE IF AN ITEM OF WORK LASTS LESS THAN 100 MANHOURS.

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

### SPECIAL CONDITIONS OF CONTRACT

#### INSURANCE

##### 14.1 Marine, Storage cum Erection (MCE) Insurance and Repairing Damages

BHEL/client has an MCE insurance cover, inter-alia, for all the permanent project equipments/components supplied by BHEL under scope of this work by way of a transit and storage cum erection policy covering liability against damages/ losses etc.

##### 14.2

The contractor has to arrange on his own, insurance cover for all the T&P and other construction equipments deployed at site. Such assets are not covered in insurance policy taken by BHEL.

##### 14.3

It shall also be the responsibility of the contractor to arrange for accident risk policy/workmen compensation policy for the staff and workmen.

##### 14.4

The contractor has to provide assistance in lodging and realizing the insurance claims covered by the MCE insurance policy that is taken by BHEL. Scope shall include receipt inspection (shortage/damage/loss reporting) immediately on arrival of consignment, recording such damage/loss/shortage intimation on the LR/RR/LWB duly countersigned by the driver/transporter's representative while acknowledging receipt of consignment to the concerned transporter, intimating the loss/damage/shortage to BHEL, providing assistance for inspection of the reported consignment at the time of insurance survey, liaisoning with the transporter and insurance company etc.

##### 14.5

In case of theft / damage / loss of materials due to **repeated/continued instances of negligence/failure** attributable to the contractor, the expenses incurred on account of repair/ replacement of such components including BHEL's overhead expenses as applicable (presently @ 30%) in excess of the amount realized from the underwriters, if any, shall be recovered from the contractor. Recovery will be limited to Normal Deductible Franchise (DF)/Excess for every incidence of loss/damage.

##### 14.6

In case any insurance claim does not become tenable due to **willful** negligence/ damage/loss attributable to the contractor, the total cost of repair/replacement including BHEL overhead expenses shall be recovered from the contractor.



**SECTION-15 (Rev dated 12/1/2009)**  
**SPECIAL CONDITION OF CONTRACT**

**15.0 EARNEST MONEY DEPOSIT, SECURITY DEPOSIT & BANK GUARANTEE**

**15.1 Earnest Money Deposit:**

- i) EMD for this tender is Rs. 2,00,000/- (Rupees Two lakhs only).
- ii) Bidders who have already deposited One Time EMD of Rs. 2.00 lakh are exempted from submission of EMD for this tender. However a copy of 'One Time EMD' certificate issued by BHEL/PSWR, Nagpur shall be enclosed along with the Offer.
- iii) EMD is to be paid in cash (as permissible under Income Tax Act), Pay order or Demand Draft in favour of Bharat Heavy Electricals Limited and payable at Nagpur.
- iv) No other form of EMD remittance shall be acceptable to BHEL.

**15.1.1** EMD by the bidder will be forfeited as per Tender Documents if

- i) After opening the tender, the bidder revokes his tender within the validity period or increases his earlier quoted rates.
- ii) The bidder does not commence the work within the period as per LOI/Contract. In case the LOI / contract is silent in this regard then within 15 days after award of contract.

**15.1.2** EMD shall not carry any interest.

**15.1.3** In the case of unsuccessful bidders, the Earnest Money will be refunded to them after acceptance of tender by successful bidder

**15.2 Security Deposit**

**15.2.1** Security Deposit shall be furnished by the successful bidder. The rate of Security Deposit will be as below:

<b>SN</b>	<b>Contract Value</b>	<b>Security Deposit Amount</b>
1	Up to Rs. 10 lakhs	10% of Contract Value
2	Above Rs. 10 lakhs upto Rs.50 lakhs	1 lakh + 7.5% of the Contract Value exceeding Rs. 10 lakhs.
3	Above Rs. 50 lakhs	Rs 4 lakhs + 5% of the Contract Value exceeding Rs. 50 lakhs.

The security Deposit should be furnished before start of the work by the contractor.

**15.2.2** Security Deposit may be furnished in any one of the following forms

- i. Cash (as permissible under the Income Tax Act)
- ii. Pay Order, Demand Draft in favour of BHEL.
- iii. Local cheques of scheduled banks, subject to realization.
- iv. Securities available from Post Offices such as National Savings Certificates, Kisan Vikas Patras etc. (Certificates should be held in the name of Contractor furnishing the security and duly pledged in favour of BHEL and discharged on the back).

- v. Bank Guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format should have the approval of BHEL.
- vi. Fixed Deposit Receipt issued by Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The FDR should be in the name of the contractor, A/C BHEL, duly discharged on the back.
- vii. Security deposit can also be recovered at the rate of 10% from the running bills. However in such cases at least 50% of the Security Deposit should be remitted (either by cash/DD or **BG for maximum 50%** of total SD) before start of the work and the balance 50% may be recovered from the running bills.
- viii. EMD of the successful bidder shall be converted and adjusted against the cash Security Deposit excepting for such bidder who has remitted One Time EMD.
- ix. The Security Deposit shall not carry any interest.

**NOTE:** Acceptance of Security Deposit against Sl. No. (iv) and (vi) above will be subject to hypothecation or endorsement on the documents in favour of BHEL. However, BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith.

### **15.2.3 SECURITY DEPOSIT SHALL NOT BE REFUNDED TO THE CONTRACTOR EXCEPT IN ACCORDANCE WITH THE TERMS OF THE CONTRACT**

### **15.3 BANK GUARANTEE**

- i. It is the responsibility of the bidder to get the Bank Guarantees revalidated/extended for the required period as per the advice of BHEL Site Engineer / Construction Manager. BHEL shall not be held liable for issue of any reminders regarding expiry of the Bank Guarantees.
- ii. In case extension/further extensions of any Bank Guarantees are not required, the bidders shall ensure that the same is explicitly conveyed through the Construction Manager to BHEL PSWR/HQ, Nagpur
- iii. In case the Bank Guarantees are not extended before the expiry date, BHEL reserves the right to invoke the same by informing the concerned Bank in writing, without any advance notice/communication to the concerned bidder.
- iv. **Bidders to note that any corrections to Bank Guarantees shall be done by the issuing Bank, only through an amendment in an appropriate non judicial stamp paper.**
- v. Bidders to ensure that the Bank Guarantees submitted are exactly as per format given in the Tender documents.
- vi. The Original Bank Guarantee shall be sent directly by the Bank to BHEL under Registered Post (Acknowledgement Due). However, in exceptional cases, where guarantee is directly received by Vendor, the Vendor shall instruct the Bank to send an unstamped duplicate copy of the guarantee directly to BHEL under Registered Post (Acknowledgement Due).

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 Hyderabad
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 bank guarantees .
- In case Bank Guarantees given by non consortium banks (Private sector or Public sector), the bank Guarantees shall be enforceable at Nagpur, Maharashtra.

**APPENDIX-I**  
**ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WR**

<b>1. PRESSURE PARTS</b>			
<b>PG</b>	<b>MA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg/Boiler</b>
04	126	UPPER DRUM WITHOUT I	132965
04	136	UPPER DRUM INTERNALS	4056
04	146	UPPER DRUM SSPN ID 6	13794
05	137	INLET FRONT LOWER WW	13617
05	147	INLET REAR LOWER WW	13617
05	155	INLET SIDE LOWER WW	16704
05	175	INLET EXTENDED SIDE	1284
05	227	WATERWALL REAR HANGE	2700
05	229	WATERWALL REAR SCREE	5263
05	231	OUTLET FRONT UPPER W	3748
05	251	OUTLET SIDE UPPER WW	6817
06	400	UNCLASSIFIED BURNER	15670
04	126	UPPER DRUM WITHOUT I	132965
04	136	UPPER DRUM INTERNALS	4056
06	631	FRONT UPPER WW PNL	29538
06	634	FRONT INTERMEDIATE W	39054
06	637	WATERWALL LOWER FRON	21253
06	644	REAR INTERMEDIATE WW	41043
06	647	REAR LOWER WW PNL	21253
06	651	SIDE UPPER WW PNL	60885
06	655	SIDE LOWER WW PNL	54690
06	670	EXTENDED SIDE WW PNL	8380
07	108	DOWN COMER PIPING UP	64745
07	109	DOWN COMER PIPING LO	86286
07	215	RELIEF TUBES FROM SI	21800
07	216	RELIEF TUBES FROM RE	20220
07	218	RELIEF TUBES FROM FR	6564
07	223	FURNACE SCREEN TUBES	21185
07	225	FURNACE REAR HANGER	9668
07	226	FURNACE REAR ARCH TU	16442
07	231	LOWER CORNER TRANSIT	1780
07	232	UPPER CORNER TRANSIT	543
07	401	WATERWALL SUSPENSION	16017
07	410	DOWNCOMER SUSPENSION	7610
07	420	DOWNCOMER GUIDES	3306
07	431	RISER TUBE SUPPORT	2186
07	500	MISC COMPONENTS - PR	328
07	501	FURNACE INSERT TUBES	2009
07	601	PRESSURE SEALS	772
07	700	BULKED BPS ITEMS FOR	896
10	135	HORIZONTAL SPACED SH	7209
10	174	VERTICAL SPACED SH C	11024
10	178	VERTICAL PLATEN SH 1	6896
10	182	SH REAR WALL INLET H	3752
10	183	SH FRONTWALL INLET	5327
10	184	SH EXTENDED SIDE WAL	620

Bharat Heavy Electricals Limited: PSWR: NAGPUR

Tender Specs No. BHE/PW/PUR/BINT-BLR Vertical Pkg/648

**APPENDIX-I**  
**ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WR**

10	185	SH REAR ROOF INLET H	3678
10	191	SH RADIANT WALL ROOF	2839
10	235	HORIZNTL SPACED SH O	8552
10	274	VERTICAL SPACED SH C	15361
10	278	VERTICAL PLATEN SH O	7802
10	283	SH FRONTWALL OUTLET	4879
10	284	SH EXTENDED SIDE WAL	1000
10	291	SH RADIANT WALL ROOF	5777
10	687	SH RADIANT WALL JUNC	3168
11	236	SH HOR SPACED UPPER	101439
11	237	SH HOR SPACED INTER	131186
11	274	SH VERTICAL SPACED C	159542
11	278	VERT PLATEN CENTRE S	95206
11	616	SH REAR UPPER PANELS	14565
11	618	SH REAR LOWER PANELS	7204
11	684	SH EXTENDED SIDE WAL	3608
11	685	SH FRONT WALL PANELS	12652
11	686	SH ROOF PANELS	13290
11	687	SH REAR ROOF PANELS	10425
11	688	SH CENTER ROOF PANEL	15670
11	691	SH RADIANT WALL ROOF	20602
11	694	S.H.EXTENDED BOTTOM	2692
12	174	VERTICAL SPACED SH I	7711
12	184	ROOF INLET SH PIPES	2194
12	187	SH INLET REAR ROOF P	1250
12	535	SH HOR SPACED HANGER	34550
12	803	SH STEAM COOLED SPAC	750
12	805	SUPER HEATER HANGER	5100
12	850	SH CONN PIPES-SATURA	5300
12	852	SH DESH LINKS	10900
12	900	SH DESH	2350
12	903	SH MISCL COMPONENTS	25800
12	906	SH SUPRTS FOR LINES	4500
12	914	SUSPENSION OF SH RAD	645
12	917	SUSPENSION OF RADIAN	3900
12	924	SUSPENSION OF SH BAC	12800
12	927	SUSPENSION OF REAR R	2125
12	928	SUSPENSION OF SH REA	5100
12	944	SUSPENSION OF SH PLA	1710
12	948	SUSPENSION OF VERTIC	18350
12	954	SUSPENSION OF VERTIC	4200
12	968	SUSPENSION OF PLATEN	11800
12	992	IMPORTED ELECTRODES	75
12	993	CONSUMABLES & ERECTI	318
15	174	REHEATER VERT SPACED	4750
15	274	REHEATER VERT SPACED	16655
16	275	RH VERTICAL SPACED F	61130
16	277	VERT REAR PLATEN RHC	75180
17	904	RH HDR SUPRTS & SUSP	5365
17	919	RH FRONT SUSPENSION	7750

**APPENDIX-I**  
**ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WR**

17	929	RH REAR SUSPENSION	13250
17	992	RH SITE ELECTRODES I	58
19	114	COILS AND SUPPORTS O	123760
19	124	COILS AND SUPPORTS O	79950
19	701	INLET ECO HEADERS	5625
19	702	OUTLET ECO HEADERS	4730
19	753	HEADERS OF REAR IN	2710
19	763	HEADERS OF FRONT IN	2710
19	783	HEADERS OF CENTRE IN	2703
19	802	ECO HANGER TUBES	13882
19	850	ECO FEED PIPE	2953
19	851	ECO LINKS TO DRUM	10260
19	904	ECO SUPRTS & SUSPENS	11800
19	905	ECO SUPRTS & SUSPENS	6825
19	906	ECO SUPRTS FOR LINES	1200
21	600	SOOT BLOWER PIPING A	6610
21	601	SOOTBLOWER PIPING SU	5700
21	700	BULKED BPS COMPONENT	800
21	800	SB VALVES (BHEL)	470
21	825	SB VALVES (SUB DELIV	325
21	850	SOOT BLOWER SAFETY V	25
24	200	BOILER TRIM PIPING A	36000
24	201	SUPPORTS FOR TRIM PI	6670
24	215	SPRAY WATER SYSTEM	2000
24	260	VALVES (BHEL) RH U	13000
24	265	VALVES & FITTINGS (S	5560
24	273	DIRECT WATER LEVEL G	250
24	275	HEADERS FOR TRIM PIP	870
24	280	ERV AND SAFETY VALVE	3500
24	350	BOILER FILLING PIPIN	400
24	351	HANGERS AND SUPPORTS	300
24	700	BULKED BPS COMPONENT	320
24	994	NAME PLATES	220
42	120	PIPING, PUMP HOUSE-F	8300
42	128	PIPING,PUMP HOUSE ST	500
42	152	PIPING,OPR'G FLOOR L	1000
42	153	PIPING,OPR'G FLOOR H	3000
42	154	PIPING,OPR'G FLOOR D	1200
42	157	PIPING,OPR'G FLOOR A	900
42	158	PIPING,OPR'G FLOOR S	2500
42	200	SUBDELIVERY FUEL OIL	500
42	300	BHEL VALVE F.O. SYST	600
42	358	BHEL VALVE,OPR'G FLO	300
42	700	BPS FASTENERS	500
97	088	ELECTRONIC LVL INDR	1500
97	297	MTM CLAMPS AND PADS	100
		<b>TOTAL OF PRESSURE PARTS</b>	<b>2320268</b>

**APPENDIX-I**  
**ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WR**

		<b>TOTAL OF PRESSURE PARTS (U#1&amp;2)</b>	<b>4640536</b>
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<b>2. NON-PRESSURE PARTS</b>			
	<b>PGMA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg/Boiler</b>
08	101	FURNACE UPPER BUCKST	60200
08	104	FURNACE INTERMEDIATE	49500
08	107	FURNACE LOWER BUCKST	34500
08	111	FURNACE REAR ARCH BU	2700
08	380	FURNACE BOTTOM SUPPO	38800
08	400	FURNACE GUIDE	14600
08	500	FURNACE BACK PASS BU	73100
08	700	EX.MOVEMENT MEASUREM	500
08	900	FURNACE KEY BUCKSTAY	3600
09	001	SEAL BOXES FOR FURNA	5918
09	002	SEAL BOXES FOR INSTR	1606
09	003	MATERIAL FOR INSTRUM	175
18	001	FURNACE ROOF SKIN CA	10425
18	010	PR PTS ATTACHMNTS IN	2080
18	020	VIBRATION SNUBBERS	300
20	051	LONG RETRACT SB M11E	23381
20	054	WALL BOX NPR LRSB MI	518
20	201	WALL DESLAGGER RW5E	8916
20	204	WALL BOX NPR - RW5E	1107
20	511	DA HEAD VALVE ASSY	112
20	794	WALL BOX NPR FOR TP	63
20	972	TEMP PROBE DUPLTC	1554
24	220	SAFETY VALVE ESC PIP	16000
24	240	SAMPLE COOLER AND SU	560
24	285	SAFETY VALVE/ERV SIL	25150
28	220	DOORS	4600
28	700	BPS FASTENERS	700
30	103	SEAL PLATE ASSY	2700
30	105	FURNACE BOTTOM ENCLO	5100
30	211	FURNACE REAR ARCH EN	1850
30	212	FURNACE EXTD SIDE BO	7900
30	215	MAIN BOILER	4000
30	219	VERTICAL ROOF ENCLOS	41000
30	220	DECK SUPPORT AND SEA	25300
31	010	SKIN CASING COMPS WE	3400
31	102	FORNACE BOTTOM SKIN	1000
31	104	FURNACE REAR ARCH SK	5500
31	105	SECOND PASS SKIN CAS	300
41	350	AIR COOLED OIL GUN A	850
41	390	OIL GUN VICE ASSY AN	800
41	500	HIGH ENERGY ARC IGNI	300
42	001	PNEUMATIC FITTINGS	50
42	002	STEAM BLOW MATERIALS	750
42	005	INSTRUMENT FITTINGS	300

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Tender Specs No. BHE/PW/PUR/BINT-BLR Vertical Pkg/648

**APPENDIX-I**  
**ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WR**

42	010	LFO PUMP SET	3100
42	020	HFO PUMP SET	4750
42	030	HFO HEATER SET	8500
42	046	DRAIN OIL PUMP-MOTOR	375
42	065	DRAIN OIL TANK	1500
42	070	BURNER STATION SKID	3500
43	004	ASSY COMP SCANNER &	1650
43	005	ASSY COMP MILL SEAL	2500
43	104	M/C COMP SCANNER & G	8200
43	105	M/C COMP MILL SEAL A	16500
43	200	SUBDEL,IGNITOR&SCANN	2750
45	220	WIND BOX ASSEMBLY 22	62500
45	221	WIND BOX SUPPORT 22-	6000
47	221	FUEL PIPING SUPPORTS	14500
47	223	PIPE COUPLINGS,ORIFI	20600
47	229	ST PIPES,SHOP BENDS	250000
47	XXX	CERALIN BENDS-EPD SCOPE	125000
48	012	RECT DUCT BET F.D F	36400
48	014	EXPN PIECESBET F.D F	5000
48	015	SUPPORTSETCBET F.D F	7100
48	022	RECT DUCT SEC.AIR I	26200
48	112	RECT DUCTS PRI FAN T	42100
48	114	EXPN PIECESPRI FAN T	2300
48	115	SUPPORTSETCPRI FAN T	5500
48	141	SEAL AIR HAG AND ID	2100
48	142	RECT DUCT COLDAIRBU	38500
48	144	EXPN PIECESCOLDAIRBU	3000
48	145	SUPPORTSETCCOLDAIRBU	5000
48	200	INSTRUMENT TAPPINGS	2500
48	202	RECT DUCTSAIRHEATER	55400
48	204	EXPN PIECESAIRHEATER	13100
48	205	SUPPORTSETCAIRHEATER	2900
48	207	FLOWMETERS FOR SECON	7500
48	212	WIND BOX CONNECTING	12600
48	214	EXPN PIECESWINDBOX C	3500
48	222	RECT DUCT-AIRHEATER	42300
48	224	EXPN PIECESAIRHEATER	5200
48	225	SUPPORTS FOR HOT P.A	5700
48	382	RECT DUCT ECONOMISE	70500
48	384	EXPN PIECESECONOMISE	12300
48	385	SUPPORTSETCECONOMISE	16400
48	432	RECT DUCT AIRHEATER	56000
48	434	EXPN PIECESAIRHEATER	6500
48	435	SUPPORTSETCAIRHEATER	7900
48	462	RECT DUCT BOILER OU	207300
48	464	EXPN PIECESBOILER OU	24400
48	465	BOF TO EP DUCTING SU	29800
48	482	RECT DUCTS-ELEC PRPT	112000
48	484	EXPN PIECESELEC PRPT	11800
48	485	SUPPORTSETCELEC PRPT	11200



**APPENDIX-I**  
**ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WR**

48	494	EXPN PIECESIND DRAFT	6100
48	495	I.D.SYSTEM DUCT SUPP	10500
48	499	CHIMNEY WALL FRAME	1000
48	662	RECT DUCT HOT AIR B	102500
48	664	EXPN PIECESHOT AIR B	7500
48	665	SUPPORTS FOR HOT PA	6900
48	667	VENTURI-PRIMARY AIR	8300
48	700	BULKED BPS COMPONENT	2000
48	993	ERECTION MATERIALS	2800
67	272	COAL VALVE-36 INCH M	5700
67	276	RAW COAL GATE CHAIN	6100
67	283	FEEDER OUTLET ISOLAT	7500
67	801	DOWN SPOUT	15500
67	802	BUNKER EMPTYING CHUT	15500
67	803	FEED PIPE TO MILL	7000
97	594	PNEUMATIC ACTUATOR-M	1000
97	599	PNEUMATIC ACTUATOR A	4100
		<b>TOTAL OF NON-PRESSURE PARTS</b>	<b>2113690</b>
		<b>TOTAL OF PRESSURE PARTS (U#1&amp;2)</b>	<b>4227380</b>

<b>3. PIPING-PC CHENNAI SCOPE</b>		
<b>PGMA</b>	<b>DESCRIPTION OF PGMA</b>	<b>WEIGHT IN Kg/Boiler</b>
80300	MS FROM SUPERHEATER TO BOILER STOP VALVE	10,200
<b>80992</b>	<b>IMPORTED ELECTRODES</b>	<b>1,900</b>
80993	MISC ERECTION MATLS	600
80920	H&S FOR HYDRO TEST	4,600
80340	AUX STEAM HEADER	5,000
80341	AUX STEAM HEADER INTERCONN BETWEEN UNITS(COMMON FOR BOTH THE UNITS - INCLUDED IN UNIT#1 SCOPE)	12,100
80342	AUX STEAM TO SCAPH	4,200
80343	AUX STEAM TO AH SOOT BLOWERS	1,300
80344	AUX STEAM TO FO SYSTEM TP(COMMON FOR BOTH THE UNITS - INCLUDED IN UNIT#1 SCOPE)	40,000
80345	AUX STEAM TO DEAERATING HEATER	1,600
80355	STEAM TRACING PIPING(COMMON FOR BOTH THE UNITS - INCLUDED IN UNIT#1 SCOPE)	7,300
80366	IBD TANK VENT TO ATMOSPHERE	7,300
80373	AUX STEAM HEADER SV EXHAUST	3,500
80395	AUX STEAM TO FUEL OIL ATOMISING	200
80418	ERECTION MATERIALS FOR INSTRUMENTS	300

**APPENDIX-I**  
**ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WR**

80420	BOILER FEED PUMP SUCTION	9,200
80421	BOILER FEED PUMP RECIRCULATION	6,300
80423	BOILER FEED PUMP TO HPH INCLUDING BYPASS	36,000
80424	BFD BETWEEN HTRS & GROUP PROTECTION VLV	26,000
80425	BFD FROM FINAL HPH TO SG TP	47,000
80430	SPRAY WATER TO HPBP	1,500
80431	SPRAY WATER TO AUX PRDS	600
80432	SPRAY WATER TO BOILER DESH UPTO SG TP	1,500
80446	DEAERATING HEATER OVER FLOW AND DRAIN	3,300
80450	CBD AND EMERGENCY DRUM DRAIN	2,600
80451	BOILER INTEGRAL PIPING DRAINS	3,400
80452	HP PIPING DRAINS - SG SCOPE	9,100
<b>80453</b>	<b>LP PIPING DRAINS - SG SCOPE</b>	<b>2,500</b>
80454	SCAPH DRAINS	900
80455	DRAIN FROM UNLISTED EQPT/VESSEL-SG SCOPE	2,400
80460	SG AUX COOLING WATER UNIT SYSTEM	23,000
80471	BOILER WATER WASH TO & FROM UNIT	3,500
80480	FIRE WATER-OTHER AREAS	4,200
80600	HIGH PRESSURE DOSING PIPING	700
80601	LOW PRESSURE DOSING PIPING	800
80604	ACID CLEANING PIPING-TEMPORARY(COMMON FOR BOTH THE UNITS – INCLUDED IN UNIT#1 SCOPE)	27,000
80612	SERVICE AIR FOR INDIVIDUAL UNITS	4,000
<b>80616</b>	<b>INSTRUMENT AIR FOR INDIVIDUAL UNIT</b>	<b>9,400</b>
80650	FUEL OIL SUPPLY AND RETURN PIPING(COMMON FOR BOTH THE UNITS – INCLUDED IN UNIT#1 SCOPE)	60,000
80673	LUBE OIL PIPING SYSTEM	5,200
80901	SUB DELIVERY VALVES FOR LIGHT UP	1,200
80905	BHEL VALVES FOR LIGHT UP	6,500
80917	BHELVALVE-ACID CLEANING ALKALI FLUS-TEMP(COMMON FOR BOTH THE UNITS – INCLUDED IN UNIT#1 SCOPE)	5,600
<b>80921</b>	<b>H&amp;S FOR LIGHT UP STEAM LINE</b>	<b>30,000</b>
80922	H&S FOR LIGHT UP - NON STEAM LINES	68,000
80926	H&S FOR TEMPORARY PIPING ACID AND ALKALI(COMMON FOR BOTH THE UNITS – INCLUDED IN UNIT#1 SCOPE)	4,100
80933	H & S FOR LP PIPING	12,000
80934	STANDARD HANGER COMPONENTS	22,000
81003	CONTINUOUS BLOW DOWN EXPANDER-D1500 MM	2,400
81009	INTERMITTENT BLOW DOWN EXPANDER-D2500 MM	6,500
81411	DIRECT GAUGES FOR STEAM LINES	600
81412	DIRECT GAUGES FOR NON-STEAM LINES	600
81414	LOCAL CONTROL EQPT FOR NON-STEAM	100

**APPENDIX-I**  
**ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WR**

	LINES	
81415	TEST THERMOWELLS	500
80301	MS FROM BOILER STOP VALVE TO ESV	75,000
80303	MS HEADER TO AUX PRDS	9,300
80304	MS HEADER TO HPBP VALVE	5,100
80310	HRH FROM REHEATER TO INTERCEPTOR VALVE	141,000
80312	LPBP VALVE UPSTREAM & DOWNSTREAM	31,000
80320	CRH FROM TURBINE TO REHEATER	57,000
80321	HPBP VALVE TO CRH PIPING	5,400
80324	CRH HEADER TO AUX.PRDS	1,100
80399	STEAM BLOWING PIPING- TEMPORARY (COMMON FOR BOTH THE UNITS - INCLUDED IN UNIT#1 SCOPE)	28,000
80918	BHEL VALVES-TEMPORARY PIPING FOR SB (COMMON FOR BOTH THE UNITS - INCLUDED IN UNIT#1 SCOPE)	5,200
80923	H&S FOR STEAM BLOWING	113,000
80927	H&S FOR TEMPORARY PIPING - STEAM BLOWING (COMMON FOR BOTH THE UNITS - INCLUDED IN UNIT#1 SCOPE)	6,000
80307	HP & LP BYPASS WARM UP	1,400
80322	CRH PIPING TO DEAERATING HEATER	5,300
80330	EXTRACTION STEAM TO LP HEATER-1	6,300
80331	EXTRACTION STEAM TO LP HEATER-2	3,500
80332	EXTRACTION STEAM TO LP HEATER-3	4,700
80335	EXTRACTION STEAM TO DEAERATING HEATER	13,000
80336	EXTRACTION STEAM TO HP HEATER NO.1	2,400
80337	EXTRACTION STEAM TO HP HEATER-2	1,500
80348	AUX STEAM TO GLAND SEALS - SG SCOPE	900
80351	AUX STEAM TO UNLISTED USERS - SG SCOPE	5,300
80364	CBD TANK VENT TO SYSTEM	1,400
80365	CBD TANK VENT/SV EXHAUST TO ATMOSPHERE	1,100
80369	HP DRAIN FLASH TANK VENT TO SYSTEM	3,000
80307	HP & LP BYPASS WARM UP	1,400
80924	H&S FOR SYNCHRONISATION-STEAM LINES	13,000
80925	H&S FOR SYNCHRONISATION-NON STEAM LINES	7,100
81416	PERFORMANCE GUARANTEE TEST MATERIALS	900
	<b>TOTAL OF ALL PIPING</b>	<b>1,099,600</b>
	<b>TOTAL OF ALL PIPING (U#1&amp;2)</b>	<b>2,199,200</b>

**APPENDIX-I**  
**ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WR**

<b>4. STRUCTURES:</b>			
<b>PG</b>	<b>MA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg/Boiler</b>
35	110	MAIN COLUMNS LEFT	194600
35	120	MAIN COLUMNS RIGHT	194600
35	130	MAIN COLUMNS MIDDLE	95600
35	140	AUXILIARY COLUMNS-LE	68900
35	150	AUXILIARY COLUMNS-RI	68900
35	190	GIRDER PIN CONNECTIO	4900
35	210	BOILER CEILING STRUC	324100
35	220	BOILER CEILING STRUC	58200
35	230	BOILER CEILING STRUC	25500
35	310	HORIZONTAL BRACING I	20500
35	320	HORIZONTAL BRACING I	19400
35	330	HORIZONTAL BRACING I	18600
35	340	HORIZONDAL BRACING I	21000
35	350	HORIZONDAL BRACING V	15700
35	360	HORIZONDAL BRACING V	18300
35	380	LANDING PLATFORMS	41700
35	390	PLATFORM AT DRUM FLO	30200
35	441	HORIZONTAL BEAMS-LOW	124700
35	443	HORIZONTAL BEAMS-UPP	94000
35	511	FRONT BRACING-LOWER	25500
35	513	FRONT BRACING-UPPER	17300
35	521	SIDE BRACING-LOWER	63800
35	523	SIDE BRACING-UPPER	27600
35	531	REAR BRACING-LOWER	52900
35	533	REAR BRACING-UPPER	18300
35	610	BOILER ROOF STRUCTUR	6900
35	611	BOILER ROOF SHEETING	84300
35	700	HSFG FASTENERS FOR P	6700
35	811	FLOOR GRILLS AND GUA	8200
35	820	STAIRS	25600
35	851	HAND RAILS AND POSTS	18500
35	993	CONSUMABLESANDERECTI	18200
35	995	CHUTE PIPE AND LADDE	20300
36	110	COLUMNS NEAR AIR PRE	28300
36	310	MAIN MBL FLOOR 11TH	65900
36	311	MAIN FLOOR I MBL 1ST	41200
36	320	MAIN FLOOR 12TH LEVE	49200
36	321	MAIN FLOOR II MBL IS	27600
36	322	MAIN FLOOR II MBL 2N	87300
36	330	MAIN FLOOR 13TH LEVE	35800
36	331	MAIN FLOOR III MBL 1	34000
36	332	MAIN FLOOR III MBL 2	45100
36	340	MAIN FLOOR 14TH LEVE	28700
36	341	MAIN FLOOR IV MBL 1S	26700
36	350	MAIN FLOOR 15TH LEVE	32800

**APPENDIX-I**  
**ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WR**

36	351	MAIN FLOOR V MBL IST	25800
36	352	MAIN FLOOR V MBL II	25400
36	360	MAIN FLOOR 16TH LEVE	16100
36	361	MAIN FLOOR VI MBL 1S	19500
36	391	MISCELLANEOUS PLATFO	107900
36	392	MISCELLANEOUS PLATFO	29700
36	393	MISCELLANEOUS PLATFO	9700
36	610	BOILER ROOF STRUCTUR	67600
36	611	BOILER ROOF SHEETING	19000
36	612	WEATHER PROTECTION F	18600
36	620	BOILER SIDE CLADDING	31300
36	621	BOILER SIDE CLADDING	10700
36	740	POSTS AND HANGERS	30000
36	811	FLOORGRILLSANDGUARDP	24000
36	813	FLOORGRILLSANDGUARDP	53500
36	820	STAIRS AND LADDERS	9900
36	851	HANDRAILS AND POSTS	27000
38	110	LIFT COLUMNS	56800
38	210	INTER CONN PLATFORMS	11500
38	299	MILL HANDLING MONORA	57000
38	310	CONN PLATFORMS TO MI	7000
38	410	MILL MAINTANANCE PLA	79000
38	510	LIFT BEAMS AND BRACI	38000
38	610	ELEVATOR CLADDING ST	16800
38	611	ELEVATOR CLADDING SH	16800
38	710	LIFT MACHINE ROOM DE	4500
38	810	FLOORGRILLS AND GUAR	73700
38	820	STAIRS AND LADDERS	2900
38	850	HAND RAILS AND HAND	17900
38	993	CONSUMABLES AND EREC	3100
39	012	FOUNDATION MATERIALS	8200
39	101	COLUMNS FRAMES BEFOR	29200
39	102	COLUMNS FRAMES BEFOR	54500
39	140	COLS FRAMES NEAR I.D	192500
39	150	COL FRAMES BETN I.D.	33300
39	300	PLATFORMS - EXTERNAL	170000
39	301	STRUC AND PLATFORM F	5000
39	302	STRUC FOR MOTOR HOOD	7200
39	303	MONORAIL BEAMS FOR F	41600
39	304	FAN HANDLING STRUCTU	36600
39	305	FAN HANDLING STRUCTU	21000
39	810	FLOOR GRILL	20700
39	820	STAIRS	5300
39	850	HAND RAIL AND HAND R	7400
39	993	CONSUMABLES AND EREC	12500
99	100	FAN HANDLING EQUIPME	10500
99	400	AIRHEATER,STEAMCOIL	1100
99	512	FURNACE CRADLE 2 WAL	1200

**APPENDIX-I**  
**ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WR**

		<b>TOTAL OF STRUCTURES</b>	<b>3941100</b>
		<b>TOTAL OF STRUCTURES (U#1&amp;2)</b>	<b>7882200</b>

<b>5. ELECTROSTATIC PRECIPITATOR</b>			
<b>PG</b>	<b>MA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg/Boiler</b>
79	201	ESP SUPPORTS	12000
79	205	SUBDELIVERY COMPONENTS OF ESP	320
79	206	INSULATOR HOUSING ASSEMBLY	24000
79	208	GAS DISTRIBUTOR ASSEMBLY(3 <sup>RD</sup> SCREEN ARRANGEMENT)	52000
79	209	GD RAPPING MECHANISM	8400
79	210	GD DRIVE ARRANGEMENT	500
79	211	GAS SCREENING	18000
79	213	EMITTING SYSTEM SUSPENSION	9000
79	214	SUPPORT INSULATOR	3840
79	215	EMITTING ELECTRODE	16600
79	216	EMMITING ELECTRODE RAPPING	23000
79	217	DRIVE ARRANGEMENT FOR EMMITING SYSTEM	17000
79	219	SUSPENSION ARRANGEMENT FOR COLLECTING ELECTRODE	82000
79	220	COLLECTING ELECTRODE-1.5 mm thick	768000
79	221	FRAME OF EMMITING SYSTEM -TOP	77000
79	222	FRAME OF EMMITING SYSTEM -BOTTOM	95000
79	223	INSPECTION DOORS	6900
79	224	SHOCK BARS	61000
79	225	COLLECTING ELECTRODE RAPPING MECHANISM	57000
79	226	DRIVE ARRANGEMENT FOR COLLECTING RAPPING	3700
79	228	ESP ROOF BEAM	91000
79	230	ELECTRICAL SUB DELIVERY COMPONENTS OF ESP	7400
79	231	GEARED MOTORS FOR RAPPING MECHANISM	12000
79	232	FRAME OF EMMITING SYSTEM -MIDDLE	140000
79	237	JUNCTION BOX & PBSTN	2000
79	242	OUTER ROOF	160000
79	243	HOPPER RIDGES	43000
79	244	HOPPER UPPER PART	198000
79	245	HOPPER MIDDLE & LOWER PART	252000
79	246	INSULATOR SUPPORT PANELS	60000
79	247	ROOF PANEL ASSEMBLY	92000
79	248	CASING STRUCTURE	302000
79	249	CASING SHELL	290000
79	250	ESP FUNNELS	128000
79	255	PENT HOUSE	180000

**APPENDIX-I**  
**ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WR**

79	257	SPLITTER & GUIDE VANES	13000
79	259	SUPPORTS FOR TRAY, PANEL, JB, PB-STN&ALI	5000
79	260	CABLES	45000
79	261	ESP TEST EQUIPMENT	500
79	262	EARTHING,CABLE TRAYS,TRAYS SUPPORTS, CHANNELS & ANGLES	34000
79	263	ASH LEVEL INDICATOR	900
79	265	HOPPER APPROACH PLATFORM	21000
79	266	WATER WASHING SYSTEM	3200
79	272	INTERLOCKS-EP	1300
79	273	ELEC OPERATED HOIST	5000
79	280	FOUN MATERIALS	8000
79	281	SUP. STRUCTURE	250000
79	290	HEATING ELEMENTS	2000
89	610	EP GALLERIES&STAIRS	50540
89	611	ESP ROOF HAND RAILS	6100
		<b>TOTAL OF ESP</b>	<b>3738200</b>
		<b>TOTAL OF ESP (U#1 &amp; 2)</b>	<b>7476400</b>

<b>6. ROTATING MACHINES</b>			
<b>PG</b>	<b>MA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg/Boiler</b>
52	000	SPECIAL TOOLS/CONTRA	430
52	010	LARG AH-ROTOR ASSY	345200
52	011	ROTOR POST&TRUN.ASSY	15560
52	012	LARG AH-ROTOR PINRACK	3800
52	013	LARG AH-ROTOR SEALS	4600
52	030	LARG AH-ROTOR HOUSING	42800
52	041	HOT END CONN PLATE	39750
52	042	COLD END CONN PLATE	57800
52	054	LARG AH-AXIAL SEAL	420
52	055	LARG AH-BY PASS SEAL	880
52	100	LARGE AH ROTOR DRIVE	3800
52	211	LARG AH-AIRSEAL PIPE	680
52	212	LARG AH-OBSER. PORTS	85
52	220	LARG AH-GENS DETAILS	2300
52	261	LARG AH-GUIDE BEARNG	2930
52	262	LARG AH-SUPRT BEARNG	4260
52	271	OIL PIPING GUIDE BRG	520
52	272	OIL PIPING SUPRT BRG	540
52	274	LUB OIL CIRCULN UNIT	1225
52	301	WASH MANIFLD GAS INL	510
52	302	WASH MANIFLD GAS OUT	480
52	326	CLEANG EQPT GAS OUT	335
52	329	CLE EQPT DRIVE UNIT	1560
52	988	LARG AH COMMG SPARE	300

**APPENDIX-I**  
**ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WR**

55	011	FD FDN. MATERIAL	1,550
55	017	FD FAN C&I ITEMS	50
55	031	P FAN FDN. MATERIAL	1,600
55	037	PA FAN C&I ITEMS	50
55	214	FD FAN	13,550
55	334	PA FAN	18,550
55	810	FD FAN COUPLING	575
55	830	PA FAN COUPLING	1,200
55	910	FD FAN FOLS	2,000
55	911	FD FAN SILENCER	24,150
55	930	PA FAN FOLS	2,000
55	931	PA FAN SILENCER	30,250
56	000	TOOLS	450
56	021	ID FAN FDN. MATERIAL	2,650
56	027	ID FAN C&I ITEMS	50
56	161	PENT HOUSE VENTILATION FAN	850
56	171	SEAL AIR FAN	5,250
56	077	SEAL AIR FAN C&I ITEMS	50
56	228	ID FAN	80,150
56	670	SEAL AIR FAN MOTOR	950
56	820	ID FAN COUPLING	12,450
56	870	SEAL AIR FAN COUPLING	50
56	920	ID FAN FOLS	2,500
56	988	COMMISSIONING SPARES	50
56	997	MANDATORY SPARES	6,500
61	XXX	BOWL MILLS(6 NOS./BOILER)	435000
65	736	36GRAVIMETRIC FEEDER	43000
		<b>TOTAL OF ROTATING MACHINES</b>	<b>1216240</b>
		<b>TOTAL OF ROTATING MACHINES (UNIT-1&amp;2)</b>	<b>2432480</b>

<b>7.GATES &amp; DAMPERS</b>		
<b>PGMA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg/Boiler</b>
57013	DAMPERS BET FD FAN & APH	4000
57030	GATE-SAH AIR BYPASS	6500
57033	DAMPERS AH BY PASS SE	2500
57110	GUILLOTENE GATE PA FA	10500
57113	DAMPERS BETWEEN PAFAN	3750
57141	SEAL AIR HAG AND ID FAN OUTGATE	4000
57143	DAMPER COLD AIR BUS(TEMP AIR TO MILL)	2750
57160	COLD AIRGATE COLD AIRBUS TO MILLS(TEMPAI)	10000
57203	DAMP APH TO WINDBOX D	9500
57209	LINKAGE FOR DAMPERS	8000
57223	DAMP APH PRIMARY SIDE	4500
57270	GUILLOTENE GATE DUCT	21500
57383	DAMPER ECONOMISER TO	15750
57433	DAMPER APH BOILER OUT	15700



**APPENDIX-I**  
**ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WR**

57460	GUILLOTENE GATE EP IN	18500
57466	PLATFORMS & LADDERS FOR GATES	20000
57470	ESP OUTLET GATE	18500
57480	GUILLOTENE GATE EP OU	17000
57490	GUILLOTENE GATE ID FA	23500
57491	BLOWER WITH MOTOR	2500
57577	ELECT ACTUATOR FOR GA	11000
57663	DAMPER HOT AIR BUS TO MILLS	6000
57988	COMMISSIONING SPARES	20
<b>TOTAL OF GATES &amp; DAMPERS</b>		<b>235970</b>
<b>TOTAL OF GATES &amp; DAMPERS (UNIT-1&amp;2)</b>		<b>471940</b>

**8. INSULATION**

**A. TRICHY SCOPE OF SUPPLY**

<b>PG</b>	<b>MA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg/Boiler</b>
32	010	FIXING COMP FOR BLR	7000
32	110	FIXING COMP FOR BLR	2500
32	120	FIXING COMP FOR SB P	1500
32	310	FIXING COMP FOR AIR	30000
32	410	FIXING COMP FOR AH A	7000
32	510	FIXING COMP FOR ID D	42000
32	710	FIXING COMP FOR OIL	1500
33	021	BLR PR PARTS MINERAL	90000
33	121	BLR MOUNTINGS MINERA	5000
33	126	SB PIPES MINERAL WOO	2800
33	201	MAIN BLR FORMED REFR	500
33	212	MAIN BLR CASTABLE RE	70000
33	230	MAIN BLR POURABLE IN	140000
33	321	AIR DUCTS MINERAL WO	100000
33	421	AIR HEATER AND GAS D	25000
33	521	ID DUCTS MINERAL WOO	40000
33	721	OIL SYSTEM MINERAL W	3700
33	924	MISC EQPTS ASBESTOS	200
33	970	MISC EQPTS EXPANDED	7000
33	971	MISC EQPTS WOVEN WIR	650
33	975	MISC EQPTS SEALING C	300
37	010	BLR OUTER CASING COM	16500
37	810	BLR OUTER CASING	20000
		<b>TOTAL FOR INSULATION</b>	<b>613150</b>
		<b>TOTAL FOR INSULATION(UNIT#1&amp;2)</b>	<b>1226300</b>

**APPENDIX-I**  
**ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WR**

**B. RANIPET SCOPE OF SUPPLY**

<b>PG</b>	<b>MA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg/Boiler</b>
79	267	MINERAL WOOL FOR ESP INSULATION	17000
79	268	FIXING COMPONENTS FOR ESP INSULATION	17000
		<b>TOTAL FOR INSULATION</b>	<b>34,000</b>
		<b>TOTAL FOR INSULATION(UNIT#1&amp;2)</b>	<b>68,000</b>

**C. PEM SCOPE OF SUPPLY**

**-700 MT (TOTAL FOR 2 UNITS)**

**D. PC CHENNAI SCOPE OF SUPPLY**

**- 62 MT (TOTAL FOR 2 UNITS)**

**E. HYDERABAD SCOPE OF SUPPLY FOR TG EQUIPMENT - 62 MT (TOTAL FOR 2 UNITS)**

**NOTES:**

- BESIDES PRODUCT GROUPS INDICATED HEREIN, THERE IS LIKELIHOOD OF ADDITION OF NEW PRODUCT GROUPS BY BHEL' s UNIT FOR RELEASE OF SOME ITEMS, INTEGRAL TO THIS WORK. TENDERERS' QUOTED UNIT RATES SHALL BE APPLICABLE FOR SUCH PRODUCT GROUPS ALSO.
- BHEL's DECISION WITH REGARD TO CLASSIFICATION OF A PARTICULAR PRODUCT GROUP FOR APPLICABLE RATE CATEGORY SHALL BE FINAL & BINDING ON THE CONTRACTOR.
- BESIDES THE ABOVE, WEIGHT OF ALL TEMPORARY PIPING, VALVES, PUMPS, TANKS AND OTHER MISCELLANEOUS EQUIPMENTS ETC FOR CARRYING OUT HYDRAULIC TEST, CHEMICAL CLEANING, STEAM BLOWING AND OTHER TESTS, AS STATED ELSEWHERE WILL GET ADDED.
- # - ELECTRICAL & C&I ITEMS OF HANDLING SYSTEM (PG99) IS EXCLUDED FROM THE SCOPE OF WORK.

## **APPENDIX-II**

### **DRAWINGS ATTACHED AS PART OF TENDER DOCUMENT**

1. GENERAL ARRANGEMENT OF BOILER ELEVATION – 0-00-022-74783/REV01
2. GENERAL ARRANGEMENT OF BOILER PLAN – 0-00-022-74784/REV01

**NOTE:**

THE ABOVE DRAWINGS ARE PROVIDED ONLY FOR INFORMATION AND WORK HAS TO BE DONE WITH REFERENCE TO THE LATEST APPLICABLE DRAWING

**Above drawings are not hosted in the web-page. Bidders are requested to obtain these drawings from BHEL PSWR Nagpur.**

### APPENDIX-III

#### LIST OF T&P TO BE PROVIDED BY BHEL FREE OF HIRE CHARGES ON SHARING BASIS

SL.NO.	DESCRIPTION & CAPACITY OF T&P	QUANTITY	REMARKS
01	300 T CRAWLER CRANE	01 No.	THIS WILL BE HIRED BY BHEL. REFER NOTE 1-6 BELOW FOR UTILIZATION.
03	100 T CRAWLER CRANE	01 No.	-DO-
04	75 T CRAWLER CRANE	01 No.	-DO-
05	INDUCTION HEATING M/C	04 SET	FOR DETAILS REFER CLAUSE NO. 4.4.2.7
06	HUCK BOLTING MACHINE COMPLETE SET	02 SET	FOR HUCK BOLTING OF SHOCK BARS AND SHOCK PADS.
07	AIR LEAK TEST EQUIPMENTS WITH ALL AUXILIARIES	01 SET	FOR AIR LEAK TEST OF ESP AND DUCTING ETC.

NOTE: 1. THIS CRANE (300 T CAP) IS TO BE USED FOR ERECTION OF BOILER CEILING STRUCTURES AND EQUIPMNET/ COMPONENTS ABOVE BOILER CEILING STRUCTURE THAT REQUIRE SERVICES OF THIS CRANE AS DECIDED BY BHEL. THIS CRANE WILL ACCORDINGLY BE DEPLOYED AT APPROPRIATE TIME AS DECIDED BY BHEL FOR SUITABLE DURATION AND INTENDED PURPOSE.

2. 75T CRAWLWER CRANE WILL BE PROVIDED AT THE TIME OF START OF ERECTION OF BOILER UNIT-2. THE 100T CRAWLER CRANES WILL BE PROVIDED PROGRESSIVELY IN A PHASED MANNER SO AS TO SUIT THE ERECTION REQUIREMENTS AS DECIDE BY BHEL ENGINEER.

3. OPERATORS FOR HIRED CRANE WILL BE PROVIDED BY THE HIRING AGENCY.

4. CONTRACTOR SHALL PROVIDE THE FUEL FOR BHEL PROVIDED CRANES FOR HIS USE.

5. BHEL WILL MAKES AVAILABLE THE CRAWLER CRANE ON SHARING BASIS MAINLY FOR THE PURPOSE OF:

- (i) UNLOADING AND RE-HANDLING OF MATERIALS AT ERECTION SITE
- (ii) LOADING AT ERECTION SITE FOR RETURN OF EXCESS MATERIALS
- (iii) PRE-ASSEMBLY AND ERECTION.
- (iv) ANY OTHER ERECTION RELATED ACTIVITY AT THE DISCRETION & APPROVAL OF BHEL SITE INCHARGE.

6. ALSO REFER SECTION-7.

BHEL CRANES HAVE TO BE SHARED WITH OTHER AGENCIES / CONTRACTORS OF BHEL. THE ALLOCATION OF CRANES SHALL BE THE DISCRETION OF BHEL ENGINEER, WHICH SHALL BE BINDING ON THE CONTRACTOR.

Bharat Heavy Electricals Limited: PSWR: NAGPUR

Tender Specs No. BHE/PW/PUR/BINT-BLR Vertical Pkg/648

**APPENDIX-IV**

**LIST OF T & Ps AND MMDs TO BE DEPLOYED BY THE CONTRACTOR**

A: TOOL & PLANTS

<b>SN</b>	<b>DESCRIPTION OF EQUIPMENTS</b>	<b>CAPACITY (MINIMUM)</b>	<b>TOTAL QUANTITY</b>	<b>DEPLOYMENT SCHEDULE/REMARKS</b>
1	CRAWLER CRANE	75 T	01	01 No. -TO BE DEPLOYED FROM BEGINNING AT ERECTION SITE..
2	CRAWLER CRANE	18/20/25 T	02	01No. -TO BE DEPLOYED FROM BEGINNING AT ERECTION SITE. 01 No.- SHOULD BE DEPLOYED FORM 3 <sup>RD</sup> MONTH FROM THE START OF ERECTION OF U-1.
3	PICK AND CARRY MOBILE CRANE	8 /10 T	03	01 No. AT STORAGE YARD, FROM BEGINNING. 2 No. AT ERECTION SITE FROM THE BEGINNING.
4	TRAILER WITH HORSE	ADEQUATE CAP TO HANDLE HEAVY COMPONENTS OF BOILER ETC	01	
5	TRACTOR TROLLEY	15 T	02	
<b>6</b>	<b>STRAND AND JACK SET-UP FOR LIFTING OF BOILER DRUM</b>	<b>SUITABLE</b>	<b>1 SET</b>	
07	HYDRAULIC TEST PUMP WITH DRIVE MOTOR AND STARTER	250 Kg/CM <sup>2</sup> 450/600 Kg/CM <sup>2</sup>	01 NO. 01 NO.	NECESSARY CABLES ETC FOR CONNECTION TO POWER SOURCE SHALL BE ARRANGED BY THE CONTRACTOR.
08	<b>CHEMICAL CIRCULATION PUMPS TO HANDLE ACID SOLUTION, OPR TEMP 80 DEG CEL, WITH DRIVE MOTORS, STARTER PANEL, CABLE, SWITCH FUSE UNIT etc.</b>	<b>SUGGESTED RATING:</b> 150 M <sup>3</sup> . 120 – 150M WC, WITH 90 KW, 3000 RPM, 150 AMPS MOTOR. <b>HOWEVER,</b>	4 SETS	

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SN	DESCRIPTION OF EQUIPMENTS	CAPACITY (MINIMUM)	TOTAL QUANTITY	DEPLOYMENT SCHEDULE/REMARKS
		<b>CONTRACTOR SHALL DEPLOY THE REQUIRED CAPACITY PUMP WITH ACCESSORIES AFTER OBTAINING WRITTEN APPROVAL OF BHEL.</b>		
09	AIR COMPRESSOR (ELECTRIC/DIESEL) – 7 Kg/cm <sup>2</sup>	140 CFM	02 SET	
10	TIG WELDING SET	-	AS REQUIRED	
11	3 Ph DISTRIBUTION BOARD WITH COMPLETE SET UP FOR DRAWL OF CONSTRUCTION POWER	600 Amp, 415 Volt	AS PER REQMT	
12	PRE HEATING / STRESS RELIEVING SET (HEATING CONTROL PANEL, CABLES, HEATING ELEMENTS ETC.)	AS PER REQUIREMENT	2 SETS	
13	RADIOGRAPHY ARRANGEMENT INCLUDING THE SOURCE	IR 192 & COBALT 60	2 SET EACH	
14	THEODOLITE OF REQUIRED ACCURACY	-	01No.	
15	SELF DRILLING CUM TAPPING MACHINE FOR SCREWS OF FLOOR GRILL & BOILER ROOF SHEETS	-	02 Nos.	
16	ARRANGEMENT FOR UT OF HIGHER THICKNESS JOINTS WITH RECORDING FACILITY.	TYPE USN 50 OR EQUAVALANT/ UPGRADED TYPE	01 SET	
17	ELECTRO-HYDRAULIC PIPE BENDING MACHINE	2" Nb X 12 mm THICK PIPES	AS PER SITE REQUIREMENT	
18	WELDING GENERATOR (ELECTRIC & DIESEL)	300 AMPS	AS REQUIRED	
19	RADIOGRAPHY FILM VIEWER	HI INTENSITY	2 NOS.	
20	ELECTRIC CABLE FOR DRAWAL & DISTRIBUTION OF CONSTRUCTION POWER	AS PER SITE REQUIREMENT	AS PER SITE REQUIREMENT	
21	PIPE BENDING MACHINE –	UP TO 50 mm	AS PER SITE	

<b>SN</b>	<b>DESCRIPTION OF EQUIPMENTS</b>	<b>CAPACITY (MINIMUM)</b>	<b>TOTAL QUANTITY</b>	<b>DEPLOYMENT SCHEDULE/REMARKS</b>
	HAND OPERATED	Nb PIPES	REQUIEREMENT	
22	BAKING OVEN AND HOLDING OVEN WITH THERMOSTAT AND TEMPERATURE GAUGE FOR BAKING COATED WELDING ELECTRODES	AS PER REQUIREMENT	02 NOS.	
23	PORTABLE OVEN FOR COATED WELDING ELECTRODES	AS PER SITE REQUIREMENT	35 NOS.	
24	FURNACE MAINTENANCE PLATFORM	AS PER SITE REQUIREMENT	01 SET	
25	ELECTRIC WINCH	3 MT 1 MT	08 NOS. 06 NOS.	
26	HAND WINCH	>= 1 MT	04 NOS.	
27	ALU. SHEET CLAD PROFILE MAKING MACHINE		REQUIRED NOS	
28	SCAFFOLDING MATERIALS	ADEQUATE	ADEQUATE	REFER SECTION-5 SPECIAL CONDITIONS OF CONTRACT IN THIS REGARD
30	NIBBLING MACHINE		REQUIRED NOS	
29	SHEARING MACHINE		REQUIRED NOS	
30	PORTABLE GRINDING M/C	AS REQUIRED	AS REQUIRED	
31	PORTABLE DRILLING M/C	AS REQUIRED	AS REQUIRED	
32	WATER PUMP (ADEQUATE CAPACITY TO LIFT UPTO BOILER TOP)		02 SET	
33	VARIPUS TYPE OF LIFTING DEVICES LIKE PULLEY BLOCKS, CHAIN PULLEY BLOCKS , ETC		REQUIRED NOS	
34	FIRE EXTINGUISHERS		REQUIRED NOS	
35	FIRE RETARDANT TARPAULINES	AS REQUIRED	AS REQUIRED	

B: MEASURING AND MONITORING DEVICES (MMD):

AS PER REQUIREMENT TO BE FINALIZED AT SITE, SHALL MEET THE REQUIREMENTS AS PER FIELD QUALITY PLAN AND OTHER ERECTION, TESTING RELATED ACTIVITIES.

NOTE:

THE LIST INDICATED ABOVE IS ONLY SUGGESTIVE AND NOT EXHAUSTIVE. CONTRACTOR SHALL DEPLOY ALL OTHER T&P AND MMD AS WELL THAT ARE NECESSARY FOR PROPER EXECUTION OF THE SCOPE OF WORK.



**APPENDIX-V**

ANALYSIS OF UNIT RATE QUOTED

SL.N O.	DESCRIPTION	% OF QUOTED RATE	REMARKS
01	SITE FACILITIES VIZ., ELECTRICITY, WATER OTHER INFRASTRUCTURE.		
02	SALARY AND WAGES + RETRENCHMENT BENEFITS		
03	CONSUMABLES		
04	T&P DEPRECIATION & MAINTENANCE		
05	ESTABLISHMENT & ADMINISTRATIVE EXPENSES		
06	OVERHEADS		
07	PROFIT		

SIGNATURE OF THE TENDERER

DATE:

APPENDIX-VI  
 FORMAT FOR MONTH-WISE 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	SO ON	
01	RESIDENT ENGINEER												
02	ERECTION ENGINEERS												
03	ERECTION SUPERVISORS												
04	QUALITY ASSURANCE ENGINEER												
05	SAFETY ENGINEER												
06	MATERIALS MANAGEMENT SUPERVISORS												
07	HIGH PRESSURE WELDERS												
08	STRUCTURAL & OTHER WELDERS												
09	FITTERS												
10	CRANE OPERATOR												
11	TRUCK/TRAILER DRIVERS												
12	STORE KEEPERS												
13	ELECTRICIANS												
14	SEMISKILLED/ UNSKILLED WORKERS												
SO ON													
	MONTH WISE TOTAL												

SIGNATURE OF TENDERER

DATE:



17	ELECTRIC MOTOR DRIVEN HYDRAULIC TEST PUMP WITH DRIVE AND STARTER ETC – 400/600 Kg/CM <sup>2</sup>	1 No.												
18	ELECTRIC MOTOR DRIVEN HYDRAULIC TEST PUMP WITH DRIVE AND STARTER ETC -250 Kg/CM <sup>2</sup>	1 No.												
19	PORTABLE ELECTRODE CARRYING OVENS	35 Nos.												
20	BAKING OVEN AND HOLDING OVEN WITH THERMOSTAT AND TEMPERATURE GAUGE FOR BAKING COATED WELDING ELECTRODES	02 Nos.												
21	SCAFFOLDING PIPES WITH CLAMPS ETC FOR APPLICATION OF LINING & INSULATION	Adequate	2000	4000	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000

SIGNATURE OF THE TENDERER

DATE:

APPENDIX-VIII

**CONCURRENT COMMITMENTS**

SL.N O.	FULL POSTAL ADDRESS 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	REMARKS

DATE

SIGNATURE OF THE TENDERER

**APPENDIX-IX**

**DETAILS OF SIMILAR WORK DONE DURING THE LAST SEVEN YEARS**

<b>SL. NO.</b>	<b>FULL POSTAL ADDRESS OF CLIENT &amp; NAME OF OFFICER IN CHARGE</b>	<b>DESCRIPTION OF WORK</b>	<b>VALUE OF CONTRACT</b>	<b>DATE OF AWARD OF WORK</b>	<b>DATE OF COMMENCEMENT OF WORK</b>	<b>ACTUAL COMPLETION TIME (MONTHS)</b>	<b>DATE OF ACTUAL COMPLETION OF WORK</b>	<b>REMARKS</b>
1								
2								
3								
4								
5								
6								

BIDDERS SHALL ENCLOSE COPIES OF DETAILED WORK ORDER (GIVING BILL OF QUANTITIES AND SCOPE OF WORK) AND COMPLETION CERTIFICATE IN SUPPORT OF THIS STATEMENT.

DATE

SIGNATURE OF TENDERER WITH SEAL

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