

# TENDER SPECIFICATION

No. - BHE/PW/PUR/TRT-BLE/466

FOR

COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD;  
TRANSPORTATION TO SITE; ERECTION, TESTING, ASSISTANCE FOR  
COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF BOILER AND  
AUXILIARIES INCLUDING ESP, ROTATING MACHINES, DUCTS & DAMPERS, FUEL  
PIPING, BOILER PIPING, POWER CYCLE PIPING ETC OF 1x250 MW UNIT # 8

AT

TROMBAY THERMAL POWER PLANT

TATA POWER COMPANY LTD

MAHUL ROAD

CHEMBUR, MUMBAI-400074

MAHARASHTRA

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



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

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### **LEGEND:**

**\$:** PLACED BEFORE 'GENERAL CONDITIONS OF CONTRACT' IN BOTH HARD AND SOFT COPY DOCUMENTS.

**#:** ATTACHED AT THE END OF HARD COPY OF TENDER SPECS. PART-I (TECHNICAL BID) AND AS A SEPARATE FILE TITLED 'WEB\_NIT\_GCC' AS SOFT COPY HOSTED IN WEB PAGE.

**@:** ISSUED AS SEPARATE BOOKLET IN HARD COPY AS PART-II (PRICE BID) AND AS SEPARATE FILE TITLED 'PRICE\_BID' AS SOFT COPY HOSTED IN WEB PAGE.

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

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**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 (PRICE BID), ARE  
ISSUED TO:

M/s. ....

.....

PLEASE NOTE:  
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.  
BIDDER SHALL NOTE THAT THEIR OFFER WILL BE CONSIDERED SUBJECT TO THE APPROVAL OF  
BHEL'S CUSTOMER.

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 -KINGS WAY, NAGPUR -40 001  
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### **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.

#### **EARNEST MONEY DEPOSIT (EMD)**

EMD shall be included in the Technical Bid. **EMD shall be paid by bidders only in the form of account payee Demand Draft payable at Nagpur in favour of Bharat Heavy Electricals Limited.** No other mode of payment of EMD shall be acceptable.

Bidder may opt to deposit "One Time EMD" of Rs. 2.0 lacs with this office (BHEL:PSWR:Nagpur) which will enable them to participate in all the future tender enquiries in respect of Erection and Commissioning services issued from this office. Interested bidders may clearly send their consent for converting the present EMD into an "One Time EMD" in their offer.

Bidders who have already submitted such "One Time EMD" will be exempted from submission of any EMD for this tender. However bidder shall furnish details of the "One Time EMD" in his offer including the Check List furnished herein.

#### **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. GENERAL 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:

- 1.CONTRACTOR SHOULD HAVE ADEQUATE RESOURCES INCLUDING MAJOR T&P AT HIS DISPOSAL FOR THIS JOB.
- 2.CONTRACTOR SHOULD HAVE SOUND FINANCIAL STABILITY.
- 3.TENDERER SHOULD MEET QUALITY REQUIREMENT REGARDING WORKMANSHIP, DEPLOYMENT OF PERSONNEL, ERECTION TOOLS AND NECESSARY INSPECTION, MEASUREMENT & TESTING INSTRUMENTS.

4. BIDDER SHALL MEET ALL THE QUALIFYING REQUIREMENTS AS MENTIONED IN THE NOTICE INVITING TENDER.
5. ALL INFORMATION AS CALLED FOR IN VARIOUS APPENDICES AND CLAUSES OF TENDER SPECIFICATION, SHOULD BE FURNISHED. PLEASE REFER THE CHECKLIST. THE DETAILS SO FURNISHED BY TENDERER SHOULD BE COMPLETE IN ALL RESPECTS AND AS PER FORMATS SPECIFIED IN TENDER SPECIFICATION.
6. 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.
7. **TENDERER SHALL NOTE THAT THEIR OFFER WILL BE CONSIDERED SUBJECT TO THE APPROVAL OF BHEL'S CUSTOMER.**

## PROJECT INFORMATION

### 1.00.00 BACKGROUND

Tata Power Company Limited as part of expansion plan is installing the 1x250 MW Unit#8 Trombay Thermal Generating Station within the existing premises of their Trombay Thermal Power Station, Mahul Road, Mumbai (Maharashtra).

### 1.01.00 Location and Approach

The site is located at Trombay, Mumbai and is connected by Rail to Kurla Marshaling Yard. Trombay is accessible by Road & Rail.

### 1.02.00 Climatic conditions:

- (a) Maximum dry bulb temperature – 36.7 Degree Centigrade
- (b) Minimum dry bulb temperature – 18.3 Degree Centigrade

### 1.03.00 Relative humidity:

- (a) Maximum during monsoon – 100 %
- (b) Minimum during December to January – 22 %

### 1.04.00 Rainfall : Annual average rainfall is about 2099 mm (Most of which occurs during the monsoon season from June to September)

### 1.05.00 Wind Data : Basic wind speed-44 M/sec (in accordance with IS 875-1987 (Parts-3))

### 1.06.00 Seismic conditions : The proposed site is located in seismic ZONE III as per the Indian Standard IS 1893 and importance factor of 1.5

### 1.07.00 Air Quality : Atmosphere polluted with industrial gases and wastes because of proximity to petroleum refineries and fertilizer complex.

**Contractor is advised to visit the site and appraise himself about the conditions of site and infrastructure available in the area for fulfilling their commitments under the contract. BHEL will not admit any claims whatsoever on account of Contractor's non-familiarization of local conditions.**

<b>Check List</b>			
(Vide Para 1.3 Of Section-I of General Conditions Of Contract)			
1	Name of the Bidder with Postal Address for Correspondence		
2	Name of Contact Person with Telephone & Fax No.	Mr./Ms Tel No. Fax No.	
3	Nature of the firm	PROPRIETARY / PARTNERSHIP / LIMITED CO.	
4	Details of EMD Please Indicate whether 1) One Time EMD or, 2) Only for this Tender	DD No. .... DD Date..... Name of Bank..... Amount: Rs.....	
5	Validity of Offer (BHEL's Requirement: 180 days from Due Date)	Validity _____ days	
6	Mobilization Time (Please refer Section-11 of SCC)	Mobilization Time _____	
7	Whether any conditions stipulated?	<b>Yes</b> (vide Document reference:	<b>No</b>
		<b>Bidder to note that tender with conditions unacceptable to BHEL shall be rejected.</b>	
8	Bidder has visited the project site and acquainted with the site conditions	Yes	No
9	Details of <b>concurrent jobs (Appendix-VIII)</b> are furnished	Yes	No
10	Headquarters organization is furnished	Yes	No
11	Proposed site organization is furnished	Yes	No
12	Names and particulars of directors/partners are furnished	Yes	No
13	Financial status of the firm ( <b>Annexure 'A' of GCC</b> ) is furnished	Yes	No
14	<b>Audited Profit &amp; Loss Account</b> for preceding three years authenticated by Bidder's Chartered Accountants is furnished	Yes	No

<b>Check List</b>			
(Vide Para 1.3 Of Section-I of General Conditions Of Contract)			
15	<b>Latest Certificate by Bidder's Banker for Overdraft &amp; BG Limits</b> is Furnished (Certificate shall not be older than six months from the Last Date for offer submission)	Yes	No
16	Copy of <b>IT Return</b> of last three financial years along with copy of <b>PAN Card</b> are Furnished	Yes	No
17	Month-wise <b>Manpower Deployment Plan (Appendix-VI)</b> is furnished	Yes	No
18	<b>Analysis of Unit Rates (Appendix-V)</b> quoted is furnished	Yes	No
19	<b>Month-wise deployment plan for major T&amp;P (Appendix-VII)</b> furnished	Yes	No
20	Whether all the pages of the <b>Tender Specification</b> documents are <b>read, understood and signed</b>	Yes	No
21	<b>Power of Attorney</b> enclosed in favour of person making offer	Yes	No
22	Bidder has familiarized himself with all Relevant Local Laws & Local Conditions	Yes	No
23	Safety Requirement of this work in a Running plant Premises has been understood.	Yes	No
24	Erection and Commissioning programme furnished	Yes	No
25	<b>List of Jobs completed (Appendix-IX)</b> in last seven years is furnished	Yes	No
26	Whether <b>copies of detailed Work Orders (with Scope and BOQ) and Completion Certificates</b> in support of above furnished	Yes	No
27	Whether contractor has left any job unfinished? If so, give reasons.	Yes	No
28	Whether any client has terminated the contractor's work before completion? If so, furnish reasons for the same	Yes	No

NOTE : STRIKE OFF YES OR NO, AS APPLICABLE

DATE :

SIGNATURE OF BIDDER

## 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/TRT-BLE/466 ARE 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:

BIDDER'S NAME AND ADDRESS

## **CERTIFICATE OF NO-DEVIATION**

**TENDER SPECIFICATION No. BHE/PW/PUR/TRT-BLE/466**

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

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

DATE:

SIGNATURE OF THE BIDDER

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

DGM (Purchase)  
BHARAT HEAVY ELECTRICALS LIMITED  
POWER SECTOR - WESTERN REGION  
SHREEMOHINI COMPLEX  
345, KINGSWAY  
NAGPUR- 440 001

DEAR SIR,

I/WE HEREBY OFFER TO CARRY OUT THE WORK DETAILED IN TENDER SPECIFICATION NO. BHE/PW/PUR/PST-BLE/ 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 TENDERERS
2. GENERAL CONDITIONS OF CONTRACT
3. SPECIAL CONDITIONS OF CONTRACT
4. OTHER SECTIONS, APPENDICES, SCHEDULES AND DRAWINGS.

I/WE HAVE DEPOSITED / FORWARDED HERewith THE EARNEST MONEY DEPOSIT. 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 TENDERER:  
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, ALIGNMENT AND WELDING, BOLTING, FASTENING, GROUTING AS APPLICABLE 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, BLOWERS etc. WITH THEIR DRIVES & LUBE OIL SYSTEM ETC.)
  - g) ELECTROSTATIC PRECIPITATOR
  - h) PULVERISED FUEL PIPING
  - i) EXTERNAL STRUCTURES
  - j) HANDLING ARRANGEMENTS FOR ROTATING MACHINES
  - k) STEAM GENERATOR PIPING & POWER CYCLE PIPING
- 4) NON-DESTRUCTIVE EXAMINATION & POST WELD HEAT TREATMENT.
- 5) PRE-COMMISSIONING CHECKS/TESTS, TRIAL RUNS/TESTING AND ASSISTANCE FOR COMMISSIONING.
- 6) TRIAL OPERATION AND ASSOCIATED TESTS.
- 7) COMPLETION OF FACILITY/SYSTEMS.
- 8) 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

IT IS TO BE NOTED THAT THIS PROJECT IS BEING INSTALLED IN A VERY LIMITED SPACE/ AREA. THUS, THE WORK SHALL BE EXECUTED UNDER MORE DIFFICULT THAN 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

THE WORK COVERED UNDER THIS SPECIFICATION IS OF HIGHLY SOPHISTICATED NATURE, REQUIRING THE BEST QUALITY WORKMANSHIP, SUPERVISION, ENGINEERING AND CONSTRUCTION MANAGEMENT. THE CONTRACTOR SHOULD ENSURE PROPER PLANNING AND SUCCESSFUL & TIMELY COMPLETION OF THE WORK TO MEET THE OVERALL PROJECT SCHEDULE. THE CONTRACTOR MUST DEPLOY ADEQUATE QUANTITY OF TOOLS & PLANTS, MODERN / LATEST CONSTRUCTION AIDS ETC. HE MUST ALSO DEPLOY ADEQUATE TRAINED, QUALIFIED AND EXPERIENCED SUPERVISORY STAFF AND SKILLED PERSONNEL.

#### 4.1.1.5

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.

#### 4.1.1.6

ALL NECESSARY CERTIFICATES AND LICENSES, PERMITS & CLEARANCES REQUIRED TO CARRY OUT THIS WORK FROM THE RESPECTIVE STATUTORY/ LOCAL AUTHORITIES ARE TO BE ARRANGED BY THE CONTRACTOR AT HIS COST IN TIME TO ENSURE SMOOTH PROGRESS OF WORK.

#### 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. ALL EXPENDITURE INCLUDING TAXES AND INCIDENTALS IN THIS CONNECTION WILL HAVE TO BE BORNE BY HIM UNLESS OTHERWISE SPECIFIED IN THE RELEVANT CLAUSES. THE CONTRACTOR'S QUOTED RATES SHOULD BE INCLUSIVE OF ALL SUCH CONTINGENCIES.

4.1.1.13

DURING THE COURSE OF ERECTION, TESTING AND ASSISTANCE FOR 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 MAKE ALL FIXTURES, TEMPORARY SUPPORTS, STEEL STRUCTURES REQUIRED FOR JIGS & FIXTURES, ANCHORS FOR LOAD AND GUIDE PULLEYS REQUIRED FOR THE WORK. CONTRACTOR SHALL ARRANGE NECESSARY STEEL FOR SUCH USAGE. ONLY THE STEEL FOR DRUM LIFTING TEMPORARY STRUCTURE WILL BE PROVIDED BY BHEL IN RANDOM SIZE MATERIALS AVAILABLE AT SITE.

4.1.1.16

**IT IS TO BE NOTED THAT THE STORAGE YARD/ STORES OF BHEL IS LOCATED APPROX 3 KM AWAY FROM THE PROJECT SITE. ACCORDINGLY CONTRACTOR SHALL PLAN AND DEPLOY ADEQUATE RESOURCES FOR MATERIAL HANDLING AND TRANSPORTATION TO SITE.** 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 REQUISITION CUM ISSUE VOUCHER 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

AS MENTIONED HEREIN, THERE IS SEVERE RESTRICTION OF SPACE, CONTRACTOR SHALL PLAN AND TRANSPORT EQUIPMENTS, COMPONENTS FROM STORAGE TO ERECTION SITE AND ERECT THEM IN SUCH A MANNER AND SEQUENCE THAT THERE IS NO UNDUE MATERIAL ACCUMULATION AT SITE LEADING 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 RELEVANT APPENDICES. 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 AS INCIDENTAL TO WORK.

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

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.

#### 4.1.1.25

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.

#### 4.1.1.26

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.

#### 4.1.1.27

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.

#### 4.1.1.28

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.

#### 4.1.1.29

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.

#### 4.1.1.30

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.

### 4.2 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) INSTALLATION OF TEMPORARY STRUCTURE FOR DRUM LIFTING IS IN THE SCOPE OF THE CONTRACTOR'S WORK. THE REQUIRED STEEL FOR THE PURPOSE WILL BE PROVIDED IN RANDOM SIZES BY BHEL FREE OF CHARGE. THESE SHALL BE FABRICATED TO SUIT THE REQUIREMENT, ERECTED AND WELDED AS PART OF WORK. NDT HAS TO BE CARRIED OUT AS PER INSTRUCTIONS. THESE STRUCTURES HAVE TO BE DISMANTLED AT APPROPRIATE STAGE AND RETURNED TO BHEL AS PER THE INSTRUCTIONS OF BHEL ENGINEER. ALSO, THE RELEVANT AREA OF PERMANENT STRUCTURES HAVE TO BE FINISHED AS INSTRUCTED/ AS PER RELEVANT CODES OF PRACTICE. PAYMENT FOR ABOVE 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 : BOILER DRUM MAY NEED TO BE LED FROM THE POINT OF UNLOADING TO THE CAVITY OF BOILER. THE SAME IS IN THE CONTRACTOR'S SCOPE AND SHALL MAKE ALL ARRANGEMENTS, INCLUDING FABRICATION OF SADDLE IF REQUIRED. STRUCTURAL MATERIALS REQUIRED FOR THE SAME WILL BE PROVIDED BY BHEL ON FREE -RETURNABLE BASIS.
- 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 PIPING OF BOILER AND CRITICAL PIPING

### 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, FLANGES ETC WILL BE SUPPLIED AS LOOSE ITEMS. HOWEVER, BENDS OF TUBE SIZE UP TO Nb. 65mm 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 HAVE 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

(i) MAIN STEAM PIPING UPTO TURBINE STOP VALVE AND SOME OTHER STEAM LINES INCLUDED IN THE SCOPE OF WORK ARE OF SA-335 P-91 MATERIAL 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.

(ii) HRH PIPING FROM INTERCEPTOR VALVE TO TURBINE IS ALSO INCLUDED WITHIN THE SCOPE OF WORK.

#### 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, NDE AND STRESS RELIEVING OF CERTAIN EQUIPMENTS, E.G. 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. NO SEPARATE/ ADDITIONAL PAYMENT IS ENVISAGED FOR CUTTING, WELDING 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 INORDER TO MEET CERTAIN COMPLETION COMMITMENTS.

#### 4.2.2.11

THE LOCATION OF DRAIN HEADERS, VALVES, STATIONS, 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

THE RATE QUOTED IN RATE SCHEDULE IS ALSO INCLUSIVE OF PRE-HEATING, WELDING, POST HEATING, POST WELD HEAT TREATMENT/ STRESS RELIEVING AND NDE OF PIPING.

#### 4.2.2.13

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.

#### 4.2.2.14

WHILE ERECTING THE FIELD RUN PIPES, THE CONTRACTOR SHALL CHECK THE ACCESSIBILITY OF VALVES, INSTRUMENTS TAPPING POINTS AND MAINTAIN MINIMUM HEAD ROOM REQUIREMENT AND OTHER NECESSARY CLEARANCE FROM THE ADJOINING WORK AREAS TO AVOID INTERFERENCES.

#### 4.2.2.15

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.

#### 4.2.2.16

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.

#### 4.2.2.17

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.

#### 4.2.2.18

IN PIPELINES LIKE CRH LINES, EXTRACTION LINES, ETC., THE NRVS, STRAINERS ETC WILL BE ERECTED BY OTHER ERECTION AGENCY. ALIGNMENT OF THESE VALVES TO MATCH THE PIPE ENDS (BOTH SIDES), WELDING, HEAT TREATMENT AND NDE ETC IS IN THE SCOPE AS INCIDENTAL TO WORK.

#### 4.2.2.19

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 NECESSITATE DISCONNECTION OF CABLING, REMOVAL OF CERTAIN INSTRUMENTS ETC AND RESTORATION THEREAFTER.
- G) PROTECTIVE LUBRICANT COATS / FILL PROVIDED ON / IN THE CRITICAL AREA OF EQUIPMENTS HAVE TO 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 INCIDENTAL TO WORK.

#### 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 HAVE 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

APPLICATION OF THERMAL INSULATION (MINERAL WOOL MATTRESSES) BETWEEN THE INNER ROOF AND OUTER ROOF IS PART OF WORK UNDER THIS SOCPE. PAYMENT WILL BE MADE FOR THIS INSULATION AT THE ACCEPTED RATE FOR ESP.

##### 4.2.4.11 AIR LEAK-IN TEST

AFTER ERECTION OF ESP AND BEFORE CLEARING FOR INSULATION, AIR LEAK-IN 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

THE FLOOR GRILLS, HANDRAILS & POSTS FOR THIS WORK ARE GALVANISED TYPE. THESE MAY HAVE TO BE CUT TO SUIT LAYOUT REQUIREMENTS. CUTTING SHALL BE DONE ONLY BY MECHANICAL CUTTERS **AND NOT BY GAS CUTTING**. CUT EDGES MAY HAVE TO BE FINISHED BY FIT UP AND SUITABLE WELDING OF GI FLAT/STRIP (SUPPLIED BY BHEL). GRILLS, RAILS AND POSTS ARE TO BE WELDED TO THE SUPPORTING STRUCTURE / MATCHING COMPONENT. COLD GALVANIZING PAINT IS TO APPLIED ON SUCH CUT AND WELDED AREA AND SAME SHALL BE SUPPLIED BY THE CONTRACTOR.

#### 4.2.5.10

FIXING OF BOILER ROOF SHEETING AND SIDE CLADDING SHALL BE DONE BY SELF-TAPPING SCREWS. 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.

#### 4.2.5.11

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.

#### 4.2.5.12

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) ID FANS ARE PROVIDED WITH VARIABLE FREQUENCY DRIVES. CONTRACTOR HAS TO ERECT & COMMISSION THE ONLY THE MOTOR AND OTHER MECHANICAL COMPONENTS LIKE COUPLING ETC. PANELS, TRANSFORMERS, CABLING ETC ARE NOT IN THIS WORK SPECIFICATION.

E) 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.

F) 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.

D) 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

#### 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 P91 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, CONTRACTOR 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

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

##### 4.4.3.6

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.

#### 4.4.3.8

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.

#### 4.4.3.9

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.

#### 4.4.3.10

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.

#### 4.4.3.11

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.

#### 4.4.3.12

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.

### 4.5 TESTING, PRE-COMMISSIONING AND ASSISTANCE FOR COMMISSIONING

#### 4.5.1

TESTING, PRE-COMMISSIONING, & ASSISTANCE FOR 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 & ALKALI 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 ASSISTANCE FOR COMMISSIONING OF THE SET, AS INFORMED BY BHEL FROM TIME TO TIME SHALL BE COMPLETED.

#### 4.5.2

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.

#### 4.5.3

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.

#### 4.5.4

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.

#### 4.5.5

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.

#### 4.5.6

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.

#### 4.5.7

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.

#### 4.5.8

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 ASSISTANCE FOR 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 / ASSISTANCE FOR 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.

#### 4.5.9

DURING TRIAL RUNS/ TESTS, PRE-COMMISSIONING / ASSISTANCE FOR 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.

#### 4.5.10

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.

4.5.11

- 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 13.1 TO 13.7.

4.5.12

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.

4.5.13

ASSISTANCE FOR 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.

4.5.14

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.

4.5.15

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 ASSISTANCE FOR COMMISSIONING, TO DEMONSTRATE THE COMPLETION OF ANY PART OR WHOLE OF WORK PERFORMED BY THE CONTRACTOR.

4.5.16

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.

4.5.17

ASSISTANCE FOR 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.

#### 4.5.18

IT SHALL BE SPECIFICALLY NOTED THAT THE CONTRACTOR MAY HAVE TO WORK ROUND THE CLOCK DURING THE PRE-COMMISSIONING AND ASSISTANCE FOR 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.

#### 4.5.19

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.

#### 4.5.20

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 ASSISTANCE FOR COMMISSIONING, TO DEMONSTRATE THE COMPLETION OF ANY PART OR WHOLE OF WORK PERFORMED BY THE CONTRACTOR.

### 4.6 GENERAL RESPONSIBILITY OF THE CONTRACTOR

#### 4.6.1

THE CONTRACTOR SHALL HAVE TOTAL RESPONSIBILITY FOR ALL EQUIPMENT AND MATERIALS IN HIS CUSTODY AT CONTRACTOR'S STORES, LOOSE, SEMI-ASSEMBLED, ASSEMBLED OR ERECTED BY HIM AT SITE. HE SHALL EFFECTIVELY PROTECT THE FINISHED WORKS FROM ACTION OF WEATHER AND FROM DAMAGES OR DEFACEMENT AND SHALL ALSO COVER THE FINISHED PARTS IMMEDIATELY ON COMPLETION OF WORK AS PER BHEL ENGINEER'S INSTRUCTIONS. THE MACHINE SURFACES/FINISHED SURFACES SHOULD BE GREASED AND COVERED.

#### 4.6.2 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 INCLUDING THE PRIMER & PAINT, FOR THE ABOVE WORK SHALL BE PROVIDED BY THE CONTRACTOR.

#### 4.6.3

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.

#### 4.6.4

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.

#### 4.6.5

THE ENTIRE SURPLUS, DAMAGED, UNUSED MATERIALS, PACKAGING MATERIALS / CONTAINERS, SPECIAL TRANSPORTING FRAMES, GUNNY BAGS, ETC SHALL BE RETURNED TO BHEL STORES BY THE CONTRACTOR.

#### 4.6.6

THE CONTRACTOR SHALL NOT WASTE ANY MATERIALS ISSUED TO HIM. IN CASE IT IS OBSERVED AT ANY STAGE THAT THE WASTAGE/EXCESS UTILISATION OF MATERIALS IS NOT WITHIN THE PERMISSIBLE LIMITS, RECOVERY FOR THE EXCESS QUANTITY USED OR WASTED WILL BE EFFECTED WITH DEPARTMENTAL CHARGES FROM THE CONTRACTOR. DECISION OF BHEL ON THIS WILL BE FINAL AND BINDING ON THE CONTRACTOR.

#### 4.6.7

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.

#### 4.6.8

AREA FOR PRE-ASSY OF COMPONENTS WILL BE PROVIDED AT SITE AS PER THE SITE CONDITION. ANY PREPARATION OF AREA, DRESSING, CLEARING THE AREA OF BUSHES ETC SHALL BE DONE BY THE CONTRACTOR AS INCIDENTAL TO THE WORK.

#### 4.7

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.

#### 4.8 EXCLUSIONS

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

- I) SOME SUB-DELIVERY ITEMS AND ELECTRICAL COMPONENTS SUCH AS PUSH-BUTTONS, JUNCTION BOXES ETC.
- II) E&C WORK OF CABLE TRAYS, CABLES AND EARTHING ETC
- III) CONTROL PANELS, EPMS, MCC ETC.
- IV) ELECTRICAL & C&I ITEMS OF HANDLING SYSTEM (PG 99)
- V) ALL ELECTRICAL AND CONTROL & INSTRUMENTATION ITEMS EXCEPT THOSE SPECIFIED ELSEWHERE IN THESE SPECIFICATIONS.
- VI) CIVIL WORKS EXCEPT TO THE EXTENT SPECIFICALLY INDICATED ELSEWHERE IN THIS TENDER.
- VII) REFRACTORY & INSULATION (Excepting insulation between ESP Inner and Outer roofs).
- VIII) PNEUMATIC COPPER TUBING AND FITTINGS THEREOF.
- IX) ELECTRONIC PROBE/ELECTRONIC COMPONENTS OF ASH LEVEL INDICATORS.
- X) TESTING AND COMMISSIONING OF HEATING ELEMENTS, THERMOSTATS, HV RECTIFIER TRANSFORMERS.
- XI) ELECTRICAL AND C&I ITEMS OF VARIABLE FREQUENCY DRIVES AS PROVIDED ELSEWHERE IN THESE SPECIFICATIONS.
- XII) FINAL PAINTING

## 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

CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENTS FOR LABOUR COLONY AND STAFF QUARTERS INCLUDING LIGHTING, WATER, SANITATION ETC WITH HYGENE AND COMPLY WITH ALL REQUIREMENTS. ALSO, THE CONTRACTOR HAS TO MAKE HIS OWN ARRANGEMENT FOR TRANSPORTATION OF HIS WORKMEN AND OTHER EMPLOYEES. BHEL/CLIENT SHALL NOT PROVIDE ANY FACILITY WITH REGARD TO ABOVE.

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 SHALL DEPLOY SUITABLE CRANE(S) FOR HANDLING MATERIAL ISSUED TO HIM 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 WITH ASSOCIATED NOTES.

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

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.

5.2.6

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%.

#### 5.2.7

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.

#### 5.2.8

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

#### 5.2.9

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.

#### 5.2.10

BHEL/BHEL HIRED 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 PROVIDED 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.

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

**CONTRACTOR SHALL ARRANGE COMPLETE SET UP OF STRAND AND JACK ARRANGEMENT FOR ERECTION OF BOILER DRUM TO ITS DESIGNED ELEVATION INCLUDING THE SERVICES OF EXPERT EXECUTION AND SUPERVISION. BHEL WILL NOT PROVIDE THE CONVENTIONAL ELECTRIC WINCH AND PULLEY BLOCK SET UP FOR THIS PURPOSE.**

#### **5.2.12 TEMPORARY PASSENGER CUM GOODS ELEVATOR**

**CONTRACTOR, AS PART OF HIS T&P, SHALL ARRANGE, INSTALL, OPERATE AND MAINTAIN 1MT CAPACITY PASSANGER-CUM-GOODS ELEVATOR IN BOILER TO FACILITATE ACCESS TO VARIOUS PLATFORM ELEVATIONS UPTO BOILER DRUM FLOOR. THE ELEVATOR SHALL CONFORM TO THE NATIONAL STANDARD AND INDUSTRIAL SAFETY CODE AS APPLICABLE. THESE SHALL BE DEPLOYED SHORTLY AFTER BOILER DRUM ERECTION/START OF BOILER PRESSURE PARTS ERECTION IN CONSULTATION WITH BHEL SITE ENGINEER.**

THE PROBABLE SUPPLIERS FOR THE ELEVATOR ARE:

1. M/S AVON CRANES PVT LTD, GURGAON
2. M/S MEKASTER ENGINEERING & EQUIPMENT PVT LTD, HALOL

#### 5.2.13

IN CASE THE CONTRACTOR DELAYS THE DEPLOYMENT MAJOR T&P SUCH AS CRANES AND TEMPORARY ELEVATOR IN DEVIATION OF THE SCHEDULE SPECIFIED IN THE RELEVANT APPENDIX, BHEL WILL LEVY NON-REFUNDABLE PENALTY IN THE FOLLOWING MANNER:

1. IN RESPECT OF 30T / 35T CAPACITY MOBILE CRANE: @Rs. 2,000/- PER DAY OF DELAY
2. IN RESPECT OF 18T/ 25T CAPACITY CRAWLER CRANE: @Rs. 1000/- PER DAY OF DELAY
3. IN RESPECT OF 8/10T CAPACITY MOBILE CRANE: @Rs. 500/- PER DAY OF DELAY
4. IN RESPECT OF 100T CAPACITY MOBILE CRANE: @Rs. 10000/- PER DAY OF DELAY
5. IN RESPECT OF 1MT CAPACITY PASSANGER CUM GOODS ELEVATOR: @ Rs. 2,000/- PER DAY OF DELAY

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

### 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 SUPLLIED 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 (PROPORTIONATELY WHERE CERTAIN PIPING WORK ARE BEING DONE BY OTHER AGENCY) 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 FILLING OF BOILER WITH NITROGEN 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. FURTHER, CONTRACTOR SHALL OBTAIN CONCERNED LOCAL ADMINISTRATIVE AUTHORITY'S APPROVAL AS APPLICABLE FOR CONSTRUCTION OF HIS FIELD OFFICE AND PAY ALL FEES AND CHARGES AS MAY BE APPLICABLE.

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, 415V / 440V) WILL BE PROVIDED AT ONE POINT NEAR THE SITE APPROXIMATELY 500 METERS FROM ERECTION SITE FREE OF COST, 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 AND DISTRIBUTION 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 & DRINKING WATER AT SITE

CLIENT WILL PROVIDE AT ONE POINT EACH THE CONSTRUCTION WATER AND DRINKING WATER FREE OF COST. CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENT FOR FURTHER DISTRIBUTION AS MAY BE REQUIRED.

#### 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

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 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.

6.7

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.

6.8 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**

7.0 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 CRANE (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 PROVIDED 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 PROVIDE SLEEPERS AND 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.

#### 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. 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 THE FUEL FOR ALL THE CRANES. 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 THAT HAVE TO BE USED IN TEMPORARY INSTALLATIONS FOR THE RESPECTIVE PURPOSE HAVE TO BE SERVICED BY THE CONTRACTOR PRIOR TO USE. BHEL WILL PROVIDE NECESSARY SPARES, PACKING ETC FREE OF CHARGE FOR THE SAME. THESE HAVE TO BE RETURNED 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.

#### 7.4.5

LUBRICANTS LIKE ENGINE OIL, CARDIUM COMPOUND, HYDRAULIC OIL, GEAR OIL, 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.

#### 7.4.6

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

#### 7.4.7

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.

7.4.8

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

### SPECIAL CONDITIONS OF CONTRACT

#### 7.0 INSPECTION / QUALITY ASSURANCE / STATUTORY INSPECTION

##### 8.1

VARIOUS INSPECTION / QUALITY ASSURANCE PROCEDURES / METHODS AT VARIOUS STAGES OF ERECTION AND COMMISSIONING WILL BE AS PER BHEL / CUSTOMER QUALITY PLANS / CODES / IBR 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 AND POST WELD HEAT TREATMENT RECORDS, TESTING & CALIBRATION RECORDS AND OTHER 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.

##### 8.3

A DAILY LOGBOOK OF ALL MEASUREMENTS AND TESTING/CALIBRATION SHOULD BE MAINTAINED BY CONTRACTOR ON THE JOB FOR DETAILING INSPECTION DETAILS OF VARIOUS EQUIPMENTS.

##### 8.4

THE PERFORMANCE OF HP WELDERS WILL BE REVIEWED FROM TIME TO TIME AS PER THE BHEL/IBR STANDARDS. HIGH PRESSURE WELDERS' PERFORMANCE RECORD SHALL BE FURNISHED PERIODICALLY. 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 INCLUDING HP WELDERS SHALL CARRY IDENTITY CARDS AS PER THE PROFORMA PRESCRIBED BY BHEL ONLY WELDERS DULY AUTHORISED BY BHEL/BOILER INSPECTOR/CUSTOMER/CONSULTANT SHALL BE ENGAGED ON THE WORK.

##### 8.6

CONTRACTOR SHALL PROVIDE ALL THE MEASURING AND MONITORING DEVICES (MMD) REQUIRED FOR COMPLETION OF THE WORK SATISFACTORILY. THESE MMDS SHALL CONFORM TO JOB REQUIREMENT IN RESPECT OF MEASUREMENT RANGE, ACCURACY LEVEL & ANY OTHER SPECIFICATION.

##### 8.7

THE MMD DEPLOYED BY THE CONTRACTOR SHALL, AT ALL STAGES OF WORK, HAVE VALID AND CURRENT CALIBRATION CERTIFICATE. THE CALIBRATION OF THESE MMDS SHALL BE GOT DONE FROM THE AGENCIES ACCREDITED/ APPROVED BY BHEL/EIL. COPY OF CALIBRATION CERTIFICATES IN RESPECT OF THESE MMD HAS TO BE SUBMITTED TO BHEL. PERIODICAL STATUS REPORT REGARDING VALIDITY OF CALIBRATION HAS TO BE SUBMITTED TO BHEL. RE-CALIBRATION/ RE-VALIDATION SHALL BE DONE FOR THE CONTINUITY OF USAGE , AS PER BHEL SPECIFICATIONS. CONTRACTOR SHALL CONFORM TO THE SPECIFICATIONS OF BHEL REGARDING STORAGE OF THE MMD.

##### 8.8

RE-WORK NECESSITATED ON ACCOUNT OF USE OF INVALID MMD 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.

8.9

IN THE COURSE OF WORK BHEL MAY COUNTER/ FINALLY CHECK THE MEASUREMENTS WITH THEIR OWN MMDS. CONTRACTOR SHALL RENDER ALL ASSISTANCE IN CONDUCT OF SUCH COUNTER CHECK / FINAL MEASUREMENTS.

8.10

VIBRATION INDICATORS/VIBRATION RECORDERS/VIBRATION ANALYSERS WILL BE PROVIDED BY BHEL FOR CHECKING AND ANALYSING VIBRATION LEVELS OF ROTATING EQUIPMENTS WITH QUALIFIED OPERATORS. CONTRACTOR SHALL PROVIDED NECESSARY MANPOWER FOR CARRYING OUT SUCH TESTS. SIMILARLY, BHEL WILL PROVIDE THE OSCILLOSCOPE FOR ANY SPECIFIC REQUIREMENT.

8.11

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 SHOULD ENGAGE WELL-QUALIFIED AND EXPERIENCED ENGINEER FOR QUALITY ASSURANCE AND NDT SERVICES.

8.12 STAGE INSPECTION BY FES / QA ENGINEERS

8.12.1

APART FROM DAY-TO-DAY INSPECTION BY BHEL ENGINEERS STATIONED AT SITE AND ALSO BY CUSTOMER'S ENGINEERS, STAGE INSPECTION OF EQUIPMENTS UNDER ERECTION AND COMMISSIONING AT VARIOUS STAGES OF ERECTION AND COMMISSIONING BY TEAMS OF ENGINEERS FROM FIELD ENGINEERING SERVICES OF BHEL'S MANUFACTURING UNITS AND QUALITY ASSURANCE TEAMS FROM FIELD QUALITY ASSURANCE, FACTORY QUALITY ASSURANCE AND COMMISSIONING ENGINEERS FROM TECHNICAL SERVICES OF BHEL / CONSULTANT WILL ALSO BE CONDUCTED. CONTRACTOR SHALL ARRANGE ALL LABOUR, TOOLS AND TACKLES ETC FOR SUCH STAGE INSPECTIONS AS PART OF WORK.

8.13 STATUTORY INSPECTION OF WORK

8.13.1

THE WORK TO BE EXECUTED UNDER THESE SPECIFICATIONS HAS TO BE OFFERED FOR INSPECTION, AT APPROPRIATE STAGES OF WORK TO STATUTORY AUTHORITIES TO COMPLY WITH APPLICABLE REGULATIONS.

8.13.2

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.

8.13.3

THE CONTRACTORS SHALL PAY ALL FEES CONNECTED WITH TESTING OF HIS WELDERS / WORKERS AND TESTING, INSPECTION & CALIBRATION OF HIS MMD AND T&P.

8.13.4

IT SHALL BE CONTRACTOR'S RESPONSIBILITY TO OBTAIN APPROVAL OF STATUTORY AUTHORITIES, WHENEVER APPLICABLE, FOR THE CONDUCTING OF ANY WORK WHICH COMES UNDER THE PURVIEW OF THESE AUTHORITIES. ANY COST ARISING FROM THIS SHALL BE CONTRACTOR'S ACCOUNT.

8.13.5

CONTRACTOR SHALL PAY FEES FOR VISITS, INSPECTION FEES ETC OF IBR AUTHORITIES IN ADDITION TO ALL OTHER EXPENSES IN THIS REGARD.

8.13.6

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.

8.14.0

THE QUALITY MANAGEMENT SYSTEM OF BHEL, POWER SECTOR – WESTERN REGION (PSWR) HAS ALREADY BEEN CERTIFIED AND ACCREDITED UNDER ISO 9001: 2000 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.

## SECTION-9

### Special Conditions of Contract

#### Safety, Occupational Health and Environmental Management

##### Introduction:-

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.

##### **Responsibility of the Contractor in Respect of Safety of Men, Equipment, Material And Environment.**

##### **The Contractor Shall**

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

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 authorised 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 sign board giving the following information and display it near the work site:

Name of Contractor

Name of Contractor Site -in-charge & Telephone number

Job Description in short

Date of start of job

Date of expected completion

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.

### SPECIAL CONDITIONS

#### Safety

#### Safety Plan

Before commencing the work, contractor shall submit a "safety plan" to the authorised 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.

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

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

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 authorised BHEL official who shall have the right to ban the use of any item found to be unsafe

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.

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.

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

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 authorised BHEL official at the site.

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.

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

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

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

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

Only authorised persons holding relevant license will drive and operate site plant and equipments eg cranes, dumpers, excavators, transport vehicles etc.

Only authorised personnel are allowed to repair, commission electrical equipments.

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

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.

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.

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

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

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.

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.

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.

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.

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 authorised 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.

### **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 neighboring
- 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.

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 aid personnel shall be included in the emergency response team. Contractor employees and workmen are encouraged to participate in first aid training programmes whenever organised 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 housekeeping 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 minimisation. The contractors shall implement the objectives for continual improvement of environmental performance. BHEL shall regularly audit environmental impacts and their improvements.

## **WASTE MANAGEMENT**

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.

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

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

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

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

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

## **SUPERVISION**

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.

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.

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.

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

## **TRAINING & AWARENESS**

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

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.

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

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.

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

## **REPORTING**

The contractor shall submit report of all accidents, fires and property damage, dangerous occurrences to the authorised 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.

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.

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.

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.

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

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.

## AUDIT REVIEW AND INSPECTION

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.

Inspections shall be carried out regularly by the contractors and by BHEL engineers on activities, facilities, equipment and 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 Co-ordinator 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

**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:**

SN	Incidence 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 Slings 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/-
14.	Accident Resulting in Partial Loss in Earning Capacity	25,000/- per victim
15	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 recognise 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 authorised representative of M/s-----

Name :

Place & Date:

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
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 No.	YEAR	Amd. upto	DESCRIPTION
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
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 No.	YEAR	Amd. upto	DESCRIPTION
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 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)

<b>IS No.</b>	<b>YEAR</b>	<b>Amd. upto</b>	<b>DESCRIPTION</b>
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 MANMADE 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**

**10.0 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 Bidders, 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 and Work Order placement. Order will be placed by BHEL for all the items under the scope of this contract to one bidder without splitting of 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 TWO 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	COMPLETION SCHEDULE FROM SOE#
01	BOILER DRUM LIFTING	4 ½ MONTHS
02	BOILER HYDRAULIC TEST (DRAINABLE)	12 <sup>th</sup> MONTH
03	BOILER LIGHT UP & ALKALI BOIL OUT	16 <sup>th</sup> MONTH
04	STEAM BLOWING COMPLETION & SAFETY VALVE FLOATING	17 ½ MONTHS
05	SYNCHRONIZATION WITH COAL FIRING	19 <sup>th</sup> MONTH
06	COMPLETION OF ALL FACILITIES	21 <sup>st</sup> MONTH

# SOE : - START OF ERECTION

###### 11.1.2 CONTRACT PERIOD

THE TOTAL CONTRACT PERIOD FOR COMPLETION OF ENTIRE WORK UNDER SCOPE SHALL BE **21 (TWENTY ONE) 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 **4 (FOUR) 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 OF CONTRACT IS ATTRIBUTABLE TO THE CONTRACTOR, BHEL WILL HAVE RIGHTS TO IMPOSE PENALTY @ ½ % PERR WEEK OR PART THEREOF ON THE VALUE OF THE UNFINISHED WORK, LIMITED TO 10% OF CONTRACT VALUE. PROVISIONS OF CLAUSE NO. 2.7.5 OF GENERAL CONDITIONS OF CONTRACT SHALL NOT BE APPLICABLE FOR THIS PURPOSE.

## 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 ERECTED 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 SPECIFICATIONS 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

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.1,00,000/- (RUPEES ONE LAKH ONLY) PER MONTH. OVERRUN COMPENSATION WILL BE PAID ONLY FOR THE EXTENSION ATTRIBUTABLE TO BHEL. 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

AGREED RATES SHALL REMAIN FIRM THROUGHOUT THE CONTRACT PERIOD AND EXTENSIONS THEREOF. PRICE VARIATION/ADJUSTMENT SHALL NOT BE APPLICABLE FOR THIS CONTRACT. ACCORDINGLY CLAUSE NO. 2.16 OF GCC SHALL NOT BE APPLICABLE FOR THIS CONTRACT.

### 11.4 CONTRACT VARIATIONS

#### 11.4.1 VARIATION IN WEIGHT /QUANTITY

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. PAYMENT WILL BE MADE FOR THE ACTUALLY EXECUTED QUANTITY.

#### 11.4.2 VARIATION IN SITE WELD JOINT QUANTITIES

THE INDICATIVE QUANTITIES OF SITE WELD JOINTS ARE FURNISHED IN RELEVANT APPENDIX. HOWEVER, FOR ANY VARIATION IN THESE QUANTITIES, NO ADDITIONAL PAYMENT/RECOVERY IS ENVISAGED IN THIS CONTRACT.

### 11.7 INTEREST BEARING ADVANCE

(A) ON SPECIFIC REQUEST OF CONTRACTOR BHEL AT ITS DISCRETION MAY PROVIDE AN INTEREST BEARING ADVANCE OF AN AMOUNT LIMITED TO 5% OF THE AWARD VALUE, APPLICABLE INTEREST RATE SHALL BE @ 12% PER ANNUM ON MONTHLY REST REDUCING BALANCE BASIS. SUCH AN ADVANCE WILL BE PAID AFTER RECEIPT & ACCEPTANCE OF BANK GUARANTEE FOR THE AMOUNT OF ADVANCE SOUGHT. THIS BANK GUARANTEE SHALL BE KEPT VALID FOR SUFFICIENT PERIOD, WITH TIMELY RENEWALS IF NEED BE, TILL THE ENTIRE LOAN AMOUNT IS RECOVERED.

(B) THE ADVANCE THUS PROVIDED SHALL BE RECOVERED @10% (OR SUITABLE HIGHER RATE) OF THE ADMITTED RUNNING BILL AMOUNT FROM THE FIRST APPLICABLE RUNNING BILL ONWARDS.

(C) OUT OF ABOVE ADVANCE AN AMOUNT OF Rs. 20 (TWENTY) LAKHS ONLY WILL BE PAID FOR A SPECIFIC PURPOSE i.e. ON COMMISSIONING OF AND MAKING OPERATIONAL THE 1MT CPACITY TEMPORARY PASSANGER CUM GOODS ELEVATOR WHICH IS TO BE DEPLOYED BY THE CONTRACTOR AS PART OF HIS T&P FOR THIS WORK.

### 11.9 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 ON ACCOUNT BILLS WITH ALL THE DETAILS REQUIRED BY BHEL ON SPECIFIED DATE EVERY MONTH COVERING PROGRESS OF WORK IN ALL RESPECTS AND AREAS FROM THE 25<sup>TH</sup> OF PREVIOUS CALENDAR MONTH TO 24<sup>TH</sup> OF THE CURRENT MONTH.

##### 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 ENGINEER. HOWEVER, THIS AMOUNT MAY BE RELEASED EARLIER ON RECEIPT AND ACCEPTANCE OF BANK GUARANTEE OF EQUAL AMOUNT IN PRESCRIBED FORMAT AND THE BG SHALL BE KEPT VALID TILL COMPLETION OF SUCH GUARANTEE PERIOD AND AN ADDITIONAL SIX MONTHS CLAIM PERIOD.

##### 12.0.4

THE PAYMENT FOR RUNNING BILLS WILL NORMALLY BE RELEASED WITHIN 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.

#### 12.1 STAGES OF PROGRESSIVE PRO -RATA PAYMENTS

THE PROGRESSIVE PRO -RATA PAYMENT WILL BE RELEASED BASED ON ACCEPTED ITEM RATES IN FOLLOWING MANNER:

##### (A)

##### 12.1.1 PROGRESSIVE PAYMENT FOR ERECTION, TESTING AND COMMISSION BOILER AND AUXILIARIES

##### 12.1.1.1 BOILER AND IT'S AUXILIARIES

PAYMENTS BASED ON ACCEPTED ITEM RATES 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:

SL. NO.	PART OF THE ACTIVITY COMPLETED	PERCENTAGE OF ACCEPTED ITEM RATES				
		NON-PRESSURE PARTS.	STRUC-TURES	PRESSURE PARTS	ROTATING M/c	ELECTROSTATIC PRECIPITATOR
A	TRANSPORT, & ERECTION / PLACEMENT	40	40	40	40	40
B	ALIGNMENT, BOLTING, GROUTING & WELDING	45	45	40	45	45
C	GAS TIGHTNESS TEST / KEROSENE LEAK TEST / LPI TEST ETC	5	---	---	---	5
D	NDE TEST (OTHER THAN RADIOGRAPHY), HEAT TREATMENT ETC	---	5	10	---	--
E	TRIAL RUN OF ROT.M/C	---	---	---	5	--
F	ON COMPLETION OF DRUM LIFTING	---	4	---	---	--
G	ON COMPLETION OF HYDRAULIC TEST OF BOILER (DRAINABLE)	---	2	3	---	--
H	ON COMPLETION OF HYDRAULIC TEST OF BOILER (NON-DRAINABLE)	---	---	3	---	--
I	ON COMPLETION OF BOILER LIGHT UP AND ABO	4	2	2	4	4
J	ON COMPLETION OF SVF & STEAM BLOWING	1	1	1	1	--

SL. NO.	PART OF THE ACTIVITY COMPLETED	PERCENTAGE OF ACCEPTED ITEM RATES				
		NON-PRESSURE PARTS.	STRUC-TURES	PRESSURE PARTS	ROTATING M/c	ELECTROSTATIC PRECIPITATOR
K	COAL FIRING	4	---	---	4	5
L	TRIAL OPERATION	1	1	1	1	1
	TOTAL	100%	100%	100%	100%	100 %

#### 12.1.1.2 PIPING INCLUDING SG PIPING & POWER CYCLE PIPING

- (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 (OTHER THAN RADIOGRAPHY) & POST WELD HEAT TREATMENT, IF ANY.
- (E) 5% 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.

#### 12.1.1.3

FOR RADIOGRAPHY TEST (RT) THE PAYMENT SHALL BE BASED ON THE ACCEPTED ITEM RATE ON PRORATA BASIS ON ACCEPTANCE OF THE SAME. IN THE CASE OF SUBSTUTION OF 'RT' WITH ULTRASONIC TEST , THE RATES WILL BE LIMITED TO THAT OF RADIGRAPHY.

#### 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 AN 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, PRESERVATIVES ETC.
- H) NO PAYMENT WILL BE MADE FOR THE SPECIAL TOOLS (e.g. FURNACE PLATFORMS – SKY CLIMBERS, PASSENGER ELEVATOR) 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**

### **SPECIAL CONDITIONS OF CONTRACT**

#### **14.0 Insurance**

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

##### 14.1.1

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 Reporting Damages and Carrying out Repairs**

##### 14.2.1

Checking all components/equipments at siding/site and reporting to transporter and /or insurance authorities of any damages/losses will be done by BHEL.

##### 14.2.2

Contractor shall render all help to BHEL in inspection including handling, re-stacking etc, assessing and preparing estimates for repairs of components damaged during transit, storage and erection, commissioning and preparing estimates for fabrication of materials lost/damaged during transit, storage and erection. Contractor shall help BHEL to furnish all the data required by railways, insurance company or their surveyors.

##### 14.2.3

Contractor shall report to BHEL in writing any damages to equipments/ components on receipt, storing, and during drawl of the materials from stores, in transit to site and unloading at place of work and during erection and commissioning. The above report shall be as prescribed by BHEL site management. Any consequential loss arising out of non-compliance of this stipulation will be borne by contractor.

##### 14.2.4

Contractor shall carry out fabrication of any material lost/damaged as per instructions from BHEL engineer.

##### 14.2.5

BHEL, however, retains the right to award or not to award to the contractor any of the rectification/rework/repairs of damages and also fabrication of components.

##### 14.2.6

All the repairs/rectification/rework of damages and fabrication of materials lost, if any, shall be carried out by a separately identifiable gang for certification of man-hours. Daily log sheets should be maintained for each work separately and should be signed by contractor's representative and BHEL engineer. Signing of log sheets does not necessarily mean the acceptance of these as extra works.

##### 14.2.7

All rectification, repairs, rework and fabrication of components lost, which are minor and incidental to erection work (consuming not more than 100 man-hours on each occasion) shall be treated as part of work without any extra cost.

#### 14.2.8

Insurance cover under this policy will generally be as per clauses 2.10.1 to 2.10.4 of General Conditions of Contract unless and otherwise specified differently in the Special Conditions.

#### 14.2.9

In case the loss/damage is not attributable to the contractor, Payments of all extra works on account of repair / rectification / reworks of damages and fabrication of materials lost will be as per provisions of Section-13 of SCC.

#### 14.2.10

In case the repairs/rectification/rework and fabrication of materials lost, the work has been done by more than one agency including the contractor, the payment towards extra charges will be on pro-rata basis and the decision of BHEL in this regard is final and binding on the contractor.

#### 14.2.11

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 as per applicable Insurance (TAC) tariff guidelines for every incidence of loss/damage.

#### 14.2.12

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.

### **14.3 Insurance by the Contractor and Indemnification of BHEL**

#### 14.3.1

BHEL has taken third party liability insurance, indicating in the proposal for such insurance that sub-contractors will be taking part in the erection work detailed in this tender specification. However, the bidder has to bear any expenses/consequences over and above the amount that may be reimbursed to BHEL by such coverage of third party liability insurance taken by BHEL.

Such additional liability will be to cover and indemnify BHEL and its customer of all liabilities which may come up and cause harm/damage to other contractors/customer/BHEL properties/ personnel or all or anybody rendering service to BHEL/customer or is connected with BHEL/ customer's work in any manner whatsoever. The bidders' specific attention is also invited to clause 2.10 of General Conditions of Contract.

#### 14.3.2

Contractor shall obtain suitable statutory as well as non-statutory insurance policies for all the properties belonging to him and also for his personnel deployed at project for execution of the contract work.

## SECTION-15

### SPECIAL CONDITION OF CONTRACT

#### 15.0 EARNEST MONEY DEPOSIT & SECURITY DEPOSIT

##### 15.1 EARNEST MONEY DEPOSIT:

EARNEST MONEY DEPOSIT FOR THIS TENDER WILL BE Rs. 2,00,000/- (RUPEES TWO LACS ONLY).

ONE TIME EMD WILL ALSO BE Rs. 2 LACS.

EMD SHALL BE DEPOSITED IN CASH (AS PERMISSIBLE UNDER INCOME TAX ACT), PAY ORDER OR DEMAND DRAFT (PAYABLE AT NAGPUR IN FAVOUR OF 'BHARAT HEAVY ELECTRICALS LIMITED') ONLY. **NO OTHER FORM OF EMD REMITTENCE SHALL BE ACCEPTABLE TO BHEL.**

15.1.1 EMD BY THE TENDERER WILL BE FORFEITED AS PER TENDER DOCUMENTS IF

- I) AFTER OPENING THE TENDER, THE TENDERER REVOKES HIS TENDER WITHIN THE VALIDITY PERIOD OR INCREASES HIS EARLIER QUOTED RATES.
- II) THE TENDERER 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.

##### 15.2 SECURITY DEPOSIT

15.2.1 SECURITY DEPOSIT SHOULD BE COLLECTED FROM THE SUCCESSFUL TENDERER. THE RATE OF SECURITY DEPOSIT WILL BE AS BELOW:

SN	Contract Value	Security Deposit Amount
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 SHALL BE REMITTED BEFORE START OF THE WORK BY THE CONTRACTOR IN THE MANNER SPECIFIED AS FOLLOWS.**

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 SUBJECT TO A MAXIMUM OF 50% OF THE TOTAL SECURITY DEPOSIT VALUE. THE BALANCE 50% HAS TO BE REMITTED EITHER BY CASH OR IN THE OTHER FORM OF SECURITY. THE BANK GUARANTEE FORMAT SHOULD HAVE THE APPROVAL OF BHEL.
- 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 ( BY BANK GUARANTEE OR DEMAND DRAFT) BEFORE START OF THE WORK AND THE BALANCE 50% MAY BE RECOVERED FROM THE RUNNING BILLS.
- VIII) EMD OF THE SUCCESSFUL TENDERER, EXCEPTING THOSE WHO HAVE REMITTED ONE TIME EMD, SHALL BE CONVERTED AND ADJUSTED AGAINST THE SECURITY DEPOSIT OR SPECIFIC REQUEST BY THE CONTRACTOR.
- 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.

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

<b>1. PRESSURE PARTS</b>			
<b>PG</b>	<b>MA</b>	<b>DESCRIPTION</b>	<b>Wt. In Kg</b>
04	126	Upper Drum Without Intl Id 61-71	136000.00
04	136	Upper Drum Internals Only For Id 61-71	4000.00
04	146	Upper Drum Suspension Id 61-71	10500.00
04	196	Upper Drum Trans Strr Id 61-71	5500.00
05	137	Inlet Front Lower WW Header	12300.00
05	147	Inlet Rear Lower WW Header	12300.00
05	155	Inlet Side Lower WW Header	17800.00
05	175	Inlet Extended Side Lower WW Header	1500.00
05	227	Water Wall Rear Hanger Outlet Header	3200.00
05	229	Water Wall Rear Screen Tube Outlet Header	5900.00
05	231	Outlet Front Upper WW Header	4200.00
05	251	Outlet Side Upper WW Header	7700.00
06	400	Unclassified Burner Panel	14400.00
06	631	Front Upper WW Panel	40700.00
06	634	Front Intermediate WW Panel	16700.00
06	637	Water Wall Lower Front Panel	19300.00
06	644	Rear Intermediate WW Panel	33700.00
06	647	Rear Lower WW Panel	19300.00
06	651	Side Upper WW Panel	55800.00
06	655	Side Lower WW Panel	42400.00
06	670	Extended Side WW Panel	7700.00
07	108	Down Comer Piping Upper Portion	60000.00
07	109	Down Comer Piping Lower Portion	59000.00
07	215	Relief Tubes From Side Wall Outlet Header	19500.00
07	216	Relief Tubes From Rear Hanger Header	18000.00
07	218	Relief Tubes From Front Outlet Header	5700.00
07	223	Furnace Screen Tubes	19700.00
07	225	Furnace Rear Hanger Tubes	8300.00
07	226	Furnace Rear Arch Tubes	15700.00
07	231	Lower Corner Transition Tubes	1800.00
07	232	Upper Corner Transition Tubes	500.00
07	401	Water Wall Suspension	17500.00
07	410	Down Comer Suspension	5000.00
07	420	Down Comer Guides	2700.00
07	431	Riser Tube Support	2400.00
07	500	Misc Components -Pressure Parts	300.00
07	501	Furnace Insert Tubes	1900.00
07	601	Pressure Seals	500.00
07	700	Bulked Bps Items For Pg04 To07	900.00
10	135	Horizontal Spaced SH inlet Header	6500.00
10	174	Vertical Spaced SH Centre Inlet Header	9500.00
10	178	Vertical Platen SH Inlet Header	6400.00
10	182	SH Rear Wall Inlet Header	2900.00
10	183	SH Front Wall Inlet Header	5100.00
10	184	SH Extended Side Wall Inlet Header	500.00
10	185	SH Rear Roof Inlet Header	2800.00
10	191	SH Radiant Wall Roof Inlet Header	2500.00
10	235	Horizontal Spaced SH Outlet Header	7400.00

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

<b>1. PRESSURE PARTS</b>			
<b>PG</b>	<b>MA</b>	<b>DESCRIPTION</b>	<b>Wt. In Kg</b>
10	274	Vertical Spaced SH Centre Outlet Header	12100.00
10	278	Vertical Platen SH Outlet Header	7000.00
10	283	SH Front Wall Outlet Header	4100.00
10	284	SH Extended Side Wall Outlet Header	900.00
10	291	SH Radiant Wall Roof Outlet Header	4300.00
10	687	SH Radiant Wall Junction Header	2900.00
11	236	SH Hor Spaced Upper Coil + Atch	120000.00
11	237	SH Hor Spaced inter Coil + Atch	120000.00
11	238	SH Hor Spaced lower Coil + Atch	120000.00
11	274	SH Vertical Spaced Coil + Attachment	150000.00
11	278	Vert Platen Centre SH Coil Assy + Attach	80000.00
11	616	SH Rear Upper Panels	20000.00
11	618	SH Rear Lower Panels	15500.00
11	684	SH Extended Side Wall Panels	5500.00
11	685	SH Front Wall Panels	22500.00
11	686	SH Roof Panels	30000.00
11	687	SH Rear Roof Panels	17500.00
11	688	SH Centre Roof Panels	19400.00
11	691	SH Radiant Wall Roof Panels	30500.00
11	694	SH Extended Bottom Panels	4100.00
12	174	Vertical Spaced SH Inlet Pipes	7500.00
12	184	Roof Inlet SH Pipes	2400.00
12	187	SH Inlet Rear Roof Pipe	1500.00
12	535	SH Hor Spaced Hanger Tube	29000.00
12	803	SH Steam Cooled Spacer Tubes	800.00
12	805	Super Heater Hanger Tubes	3800.00
12	850	SH Conn Pipes -Saturated	4900.00
12	852	SH Dsh Links	13300.00
12	900	SH Dsh	2500.00
12	903	SH Miscl Components	25400.00
12	906	SH Suprts For Lines & Links	4800.00
12	914	Suspension Of SH Radiant Roof Headers	500.00
12	917	Suspension Of Radiant Roof	3000.00
12	924	Suspension Of SH Back Pass Headers	13900.00
12	927	Suspension Of Rear Roof	1900.00
12	928	Suspension Of SH Rear Wall	3800.00
12	944	Suspension Of SH Platen Headers	2000.00
12	948	Suspension Of Vertical Spaced Assembly	13700.00
12	954	Suspension Of Vertical Spaced Headers	4400.00
12	968	Suspension Of Platen Assembly	10200.00
15	174	Reheader Vert Spaced Inlet Header Rhh1	5800.00
15	274	Reheader Vert Spaced Outlet Header Rhh	18200.00
16	275	Rh Vertical Spaced Front Coil + Att	58300.00
16	277	Vert Rear Platen Rhcoil Assy Attach	64700.00
17	900	Rh Dsh	2020.00
17	904	Rh Hdr Suprts & Suspension Above Roof	3060.00
17	919	Rh Front Suspension	6890.00
17	929	Rh Rear Suspension	9950.00

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

<b>1. PRESSURE PARTS</b>			
<b>PG</b>	<b>MA</b>	<b>DESCRIPTION</b>	<b>Wt. In Kg</b>
19	114	Coils And Supports Of Upper P.Tube Ec	118700.00
19	124	Coils And Supports Of Lower P.Tube Ec	121300.00
19	701	Inlet Eco Headers	2700.00
19	702	Outlet Eco Headers	2500.00
19	753	Headers Of Rear Intert Eco	1700.00
19	763	Headers Of Front Intert Eco	1700.00
19	783	Headers Of Centre Intert Eco	1700.00
19	802	Eco Hanger Tubes	7100.00
19	850	Eco Feed Pipe	1300.00
19	851	Eco Links To Drum	3700.00
19	904	Eco Suprts & Suspensions Above Roof	11400.00
19	905	Eco Suprts & Suspensions Below Roof	4400.00
19	906	Eco Suprts For Lines & Links	700.00
21	600	SOOT BLOWER PIPING AND FITTINGS	6500.00
21	601	SOOT BLOWER PIPING SUPPORTS	6000.00
21	700	BULKED BPS COMPONENTS FOR SB PIPING	750.00
21	800	SB VALVES (BHEL)	310.00
21	825	SB VALVES (SUB DELIVERY)	250.00
21	850	SOOT BLOWER SAFETY VALVE (BHEL)	30.00
24	200	BOILER TRIM PIPING AND FITTINGS	35000.00
24	201	SUPPORTS FOR TRIM PIPING	6750.00
24	215	SPRAY WATER SYSTEM	3100.00
24	240	SAMPLE COOLER AND SUPPORTS	600.00
24	260	VALVES (BHEL) RH UTILITY BOILER	14100.00
24	265	VALVES & FITTINGS (SD) RH UTILITY BOILER	7500.00
24	273	DIRECT WATER LEVEL GAUGE (BHEL)	250.00
24	275	HEADERS FOR TRIM PIPING	920.00
24	280	ERV AND SAFETY VALVES (BHEL)	4250.00
24	345	MAIN STEAM PIPING SH OUT TO BOILER STOP VALVE II	14000.00
24	346	HANGERS + SUPPORTS OF MAIN STEAM PIPING FOR HEADER	8500.00
24	350	BOILER FILLING PIPING	850.00
24	351	HANGERS + SUPPORTS FOR BOILER FILLING PIPING	400.00
24	994	NAME PLATES	225.00
42	120	Piping pump house fuel oil	3100.00
42	128	Piping pump house steam-IBR	600.00
42	153	Piping Operating floor HFO & Tracer	2600.00
42	152	Piping Operating floor LFO	1300.00
42	157	Piping Operating floor Atm. Air	850.00
42	158	Piping Operating floor - Steam IBR	2350.00
42	200	Sub Del. Fuel Oil Systems	720.00
42	300	BHEL Valve Fuel Oil System	550.00
42	358	BHEL Valve FOS - IBR	500.00
42	700	BPS Fasteners	500.00
		TOTAL WT OF PRESSURE PARTS	2270585.00

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

<b>2. NON-PRESSURE PARTS</b>			
<b>PGMA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg</b>	
08	101	FURN UPPER BUCKSTAYS	47100.00
08	104	FURN INTERMEDIATE BUCKSTAYS	30900.00
08	107	FURN LOWER BUCKSTAYS	26200.00
08	111	FURNACE REAR ARCH BUCKSTAYS	2200.00
08	380	FURNACE BOTTOM SUPPORT	24200.00
08	400	UNCL FURN GUIDE	8600.00
08	500	FURNACE BACK PASS BUCKSTAYS	47100.00
08	700	EX. MOVEMENT MEASUREMENT COMPONENTS	400.00
08	900	FURN KEY BUCKSTAYS	3200.00
09	001	Seal Boxes For Furnace Opening	6200.00
09	002	Seal Boxes For Instrument Inserts	1600.00
09	003	Material For Instrument Inserts	200.00
18	001	Furnace Roof Skin Casing	9910.00
18	010	Pr Pts Attachmnts In Furn Roof Skn Cas	1950.00
18	020	Vibration Snubbers	140.00
20	001	LRD 1E Main assy.	14994.00
20	004	Wall Box assy.	576.00
20	201	WB 1E Main assy.	8916.00
20	204	Wall Box assy. -WB 1E	1107.00
20	511	DA Head Valve assy.	112.00
20	794	Wall Box assy. FTP 1E	63.00
20	972	FTP 1E Main assy.	1554.00
24	220	SAFETY VAL VE ESC PIPE & DRAIN - RH UTILITY BOILER	19250.00
24	285	SAFETY VALVE / ERV SILENCERS (BHEL)	34200.00
28	220	DOORS	4400.00
28	700	BPS FASTENERS	600.00
30	103	SEAL PLATE ASSY	2200.00
30	105	FUR BOTTOM ENCL FRAM	4700.00
30	211	FUR REAR ARCH ENCL	1700.00
30	212	FUR EXTD BOT ENCL	7800.00
30	215	MAIN BOILER ENCL	3400.00
30	219	VERT ROOF ENCL	40400.00
30	220	DECK SPRT AND SEALS	19800.00
31	010	COMP WELDED TO PR	3100.00
31	102	FUR BOT SKIN CSG	1100.00
31	104	FUR REAR ARCH SKIN	5400.00
31	105	SEC PASS SKIN CSG	300.00
41	350	Oil gun Assembly Air cooled	810.00
41	390	Oil Gun Vice assembly & Rack	1100.00
41	500	High Energy Arc Ignitor	300.00
42	001	Pneumatic fittings	50.00
42	002	Steam blowing Material	600.00
42	005	Instrument Fittings	350.00
42	010	LFO Pump Set	2200.00
42	020	HFO Pump Set	3850.00
42	030	HFO heater set	6000.00
42	046	Drain Oil pump motor assembly	350.00

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

<b>2. NON-PRESSURE PARTS</b>			
<b>PGMA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg</b>	
42	065	Drain oil Tank	1510.00
42	070	Burner Station Skid assembly	4410.00
43	004	Assy. Scanner & Gun Air system	1780.00
43	005	Assy Mill Air System	2650.00
43	104	M/C SCNR & Gun Air system	9450.00
43	105	M/C Mill air system	13300.00
43	200	Sub Del Air system	2800.00
45	220	Wind Box Assembly-22" Width	46000.00
45	221	Wind Box Support -22" Width	5000.00
47	181	Fuel Piping support with 22" width	12000.00
47	183	Pipe Coupling, Orifice & Misc. Items	20000.00
47	189	St. Pipes & Shop Bends	160000.00
47	XXX	Ceralin Bends from EPD for Coal piping	110000.00
48	012	RECT.DUCT BET F.D FAN AND AIRHEATER	68000
48	014	EXCPN .PIECESBET F.D FAN AND AIRHEATER	6000
48	015	SUPOORTSETCBET F.D FAN AND AIRHEATER	10000
48	019	FOUNDATION MATERIALS	3000
48	112	RECT DUCTS PRRI FAN TO AIR HEATER PRISID	40000
48	114	EXPN PIECES PRI FAN TO AIR HEATER PRISID	3000
48	115	SUPPORTS SETCPRI FAN TO AIR HEADER PRISED	5000
48	141	SEAL AIR HAG AND ID FAN OUTGATE	5000
48	142	RECT DUCT COLD AIR BUS (TEMP AIR TO MILL)	41000
48	144	EXPN PIECES COLD AIR BUS (TEMP AIR TO MILL)	3000
48	145	SUPORTS SETC COLD AIR BUS (TEMP AIR TO MILL)	6000
48	200	INSTRUMENTS TAPPING ON DUCTING	4000
48	202	RECT DUCT AIRHEATER TO WINDBOX	77000
48	204	EXPN PIECES AIRHEATER TO WINDBOX	5000
48	205	SUPOORTSETC AIRHEATER TO WINDBOX	10000
48	207	FLOWMETERS FOR SECONDARY AIR FLOW	3000
48	212	WINDBOX CONNECTING DUCTS-RECTANGULAR	15000
48	214	EXPN PIECES WINDBOX CONNECTING DUCT	4000
48	222	RECT DUCT -AIR HEATER PRISIDE TO HOT AIR B	21000
48	224	EXPN PIECES AIR HEATER PRISIDE TO HOT AIR B	2000
48	225	SUPPORTS FOR HOT PA(AH TO HOT BUS)	3000
48	382	RECT ANGULAR DUCT ECO. TO AIRHEATER 2 NOP	77000
48	384	EXPN PIECES ECONOMISER TO AIRHEATER 2 NOP	10000
48	385	SUPOORTSETC ECONOMISER TO AIRHEATER 2NOP	12000
48	432	RECT DUCTS AIRHEATER BOILER OUTLET- GAS	51000
48	434	EXPN PIECES AIRHEATER BOILER OUTLET- GAS	3000
48	435	SUPPIORTSETC AIRHEATER BOILER OUTLET- GAS	7000
48	462	RECT DUCT BOILER OUTLET TO ELEC.PREC	182000
48	464	EXPN PIECES BOILER OUTLET TO ELEC.PREC	12000
48	465	BOF TO EP DUCTING SUPPORT	22000
48	482	RECT DUCTS -ELEC.PREC/M.S TO INDDRAFTF	97000
48	484	EXPN PIECES ELEC.PREC/M.S TO INDDRAFTF	7000
48	485	SUPPORTS ETCELEC.PREC/M.S TO INDDRAFTF	12000
48	492	RECT DUCT IND DRAFT FAN TO CHIMNEY	136000
48	494	EXPN PIECESINT DRAFT FAN TO CHIMNEY	9000

## APPENDIX-I

### ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

<b>2. NON-PRESSURE PARTS</b>			
<b>PGMA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg</b>	
48	495	I.D SYSTEM DUCT SUPPORTS	17000
48	662	RECT DUCT HOT AIR BUS TO MILLS	72000
48	664	EXPN PIECES HOT AIR BUS TO MILLS	5000
48	665	SUPPORTS FOR HOT PA TO MILLS	10000
48	667	VENTURI -PRIMARY AIR FOLW	2000
48	700	BULKED BPS COMPONENTS	3000
50	520	Steam Coil Air preheater	6000
67	272	36" Raw coal gate-Bunker outlet (Motor)	4800.00
67	276	36" raw coal gate-Feeder inlet (Chain)	5000.00
67	283	Feeder outlet Isolation gate	6250.00
67	801	Down spout	3350.00
67	803	Feed pipe to Mill	6950.00
57	013	DAMPERS BET F.D. FAN AND AIRPREHEATER	9300
57	033	DAMPERS A.H BYPASS SEC AIR SIDE	5000
57	110	GUILLOTENE GATE PA FANSTO AH	6125
57	113	DAMPERS BETWEEN PA FAN AND APH	2000
57	143	DAMPERS COLD AIR BUS (TEMP AIR TO MILL)	2000
57	160	COLD AIRGATE COLD AIRBUS TO MILLS	9000
57	161	MANUAL OPERATOR	500
57	203	DAMPERS AIRHEATER TO WINDBOXDUCT	8100
57	223	DAMPERS AIR HEATER PRISIDENTOHOT AIR B	2400
57	270	GUILLOTENE GATE DUCT TO MILLS	8000
57	383	DAMPERS ECONOMISER TO AIRHEATER2NOP	11500
57	460	GUILLOTENE GATE EP INLET	15000
57	480	GUILLOTENE GATE ID FAN OUTLET	21300
57	490	GUILLOTENE GATE ID FAN OUTLET	10300
57	491	BLOWER WITH MOTOR	500
57	577	ELECTRICAL ACTUATORS FOR GATES &	9000
57	663	DAMPERS HOT AIR BUS TO MILLS	2500
		TOTAL OF NPP	2009047

<b>3. PIPING</b>		
<b>PGMA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg</b>
80-342	AUX STEAM TO SCAPH	3,200
80-343	AUX STEAM TO AH SOOT BLOWERS	1,600
80-344	AUX STEAM TO FO SYSTEM TP	8,000
80-351	AUX STEAM TO UNLISTED USERS - SG SCOPE	5,000
80-355	STEAM TRACING PIPING	3,000
80-364	CBD TANK VENT TO SYSTEM	1,500
80-365	CBD TANK VENT/SV EXHAUST TO ATMOSPHERE	600
80-366	IBD TANK VENT TO ATMOSPHERE	7,300
80-395	AUX STEAM TO FUEL OIL ATOMISING	400
80-418	ERECTION MATERIALS FOR INSTRUMENTS	200
80-450	CBD AND EMERGENCY DRUM DRAIN	5,500
80-451	BOILER INTEGRAL PIPING DRAINS	1,300
80-452	HP PIPING DRAINS - SG SCOPE	1,000
80-453	LP PIPING DRAINS - SG SCOPE	2,500

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

<b>3. PIPING</b>		
<b>PGMA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg</b>
80-454	SCAPH DRAINS	900
80-455	DRAIN FROM UNLISTED EQPT/VESSEL-SG SCOPE	1,800
80-460	SG AUX COOLING WATER UNIT SYSTEM	26,500
80-471	BOILER WATER WASH TO & FROM UNIT	3,900
80-480	FIRE WATER-OTHER AREAS	3,500
80-612	SERVICE AIR FOR INDIVIDUAL UNITS	5,000
80-616	INSTRUMENT AIR FOR INDIVIDUAL UNIT	5,000
80-650	FUEL OIL SUPPLY AND RETURN PIPING	35,000
80-901	SUB DELIVERY VALVES FOR LIGHT UP	1,000
80-905	BHEL VALVES FOR LIGHT UP	6,200
80-907	BHEL VALVES FOR SYNCHRONISATION	1,500
80-921	H&S FOR LIGHT UP - STEAM LINES	4,000
80-922	H&S FOR LIGHT UP - NON STEAM LINES	11,000
80-924	H&S FOR SYNCHRONISATION-STEAM LINES	1,400
80-992	IMPORTED ELECTRODES	150
81-003	CONTINUOUS BLOW DOWN EXPANDER-D1500 MM	2,400
81-009	INTERMITTENT BLOW DOWN EXPANDER-D2500 MM	6,500
80-301	MS FROM BOILER STOP VALVE TO ESV	85,000
80-303	MS HEADER TO AUX PRDS	8,700
80-304	MS HEADER TO HPBP VALVE	6,300
80-307	HP & LP BYPASS WARM UP	1,100
80-310	HRH FROM REHEATER TO INTERCEPTOR VALVE	128,000
80-311	HRH FROM INTERCEPTOR VALVE TO TURBINE	12,000
80-320	CRH FROM TURBINE TO REHEATER	65,000
80-322	CRH PIPING TO DEAERATING HEATER	5,000
80-324	CRH HEADER TO AUX.PRDS	1,000
80-340	AUX STEAM HEADER	1,200
80-341	AUX STEAM HEADER INTERCONN BETWEEN UNITS	33,000
80-345	AUX STEAM TO DEAERATING HEATER	1,400
80-346	AUX STEAM TO SJAE - SG SCOPE	1,000
80-348	AUX STEAM TO GLAND SEALS - SG SCOPE	500
80-369	HP DRAIN FLASH TANK VENT TO SYSTEM	1,600
80-420	BOILER FEED PUMP SUCTION	8,500
80-421	BOILER FEED PUMP RECIRCULATION	7,600
80-423	BOILER FEED PUMP TO HPH INCLUDING BYPASS	43,100
80-424	BFD BETWEEN HTRS & GROUP PROTECTION VLV	17,500
80-425	BFD FROM FINAL HPH TO SG TP	63,500
80-430	SPRAY WATER TO HPBP	1,300
80-431	SPRAY WATER TO AUX PRDS	2,300
80-432	SPRAY WATER TO BOILER DESH UPTO SG TP	3,100
80-446	DEAERATING HEATER OVER FLOW AND DRAIN	2,900
80-452	HP PIPING DRAINS - SG SCOPE	3,000
80-453	LP PIPING DRAINS - SG SCOPE	2,000
80-600	HIGH PRESSURE DOSING PIPING	600
80-601	LOW PRESSURE DOSING PIPING	1,000
80-612	SERVICE AIR FOR INDIVIDUAL UNITS	6,000
80-616	INSTRUMENT AIR FOR INDIVIDUAL UNIT	8,000

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

<b>3. PIPING</b>		
<b>PGMA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg</b>
80-921	H&S FOR LIGHT UP STEAM LINE	24,000
80-922	H&S FOR LIGHT UP - NON STEAM LINES	13,000
80-923	H&S FOR STEAM BLOWING	12,000
80-924	H&S FOR SYNCHRONISATION-STEAM LINES	3,000
80-925	H&S FOR SYNCHRONISATION-NON STEAM LINES	6,000
80-933	H & S FOR LP PIPING	7,000
81-415	TEST THERMOWELLS	300
81-416	PERFORMANCE GUARANTEE TEST MATERIALS	400
	<b>TOTAL OF PIPING</b>	<b>743,750</b>

<b>4. STRUCTURES:</b>			
<b>PGMA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg</b>	
24	225	SILENCER SUPPORT - SAFETY VALVES	18250.00
24	235	SILENCER & SUPPORT - STARTING VENT - RH UTILITY BOILER	1150.00
35	110	MAIN COLUMNS LEFT	161500.00
35	120	MAIN COLUMNS RIGHT	161400.00
35	130	MAIN COLUMNS MIDDLE	65800.00
35	140	AUX.COLUMNS LEFTSIDE	51400.00
35	150	AUX.COLUMNS RT.SIDE	61500.00
35	160	AIRHEATER COLUMNS	10700.00
35	190	GIRDER PIN CONNECNS	6100.00
35	210	CEILING STRUCT FABD	237500.00
35	220	CEILING STRUCT ROLLD	49900.00
35	230	CEILING S TRUCT BRCG	11200.00
35	311	HORIZONTAL BRACING I PASS I MBL	17200.00
35	321	HORIZONTAL BRACING I PASS II MBL	16000.00
35	331	HORIZONTAL BRACING I PASS III MBL	20900.00
35	341	HORIZONTAL BRACING I PASS IV MBL	20600.00
35	351	HORIZONTAL BRACING I PASS V MBL	13900.00
35	361	HORIZONTAL BRACING I PASS VI MBL	14200.00
35	380	LANDING PLATFORMS	74900.00
35	390	PLATFORM AT DRUM FLOOR LEVEL	33800.00
35	441	HORIL BEAMS-LOWER	78200.00
35	443	HORIL BEAMS-UPPER	63400.00
35	511	FRONT BRACING-LOWER	12500.00
35	513	FRONT BRACING-UPPER	14100.00
35	521	SIDE BRACING-LOWER	21300.00
35	523	SIDE BRACING-UPPER	26700.00
35	531	REAR BRACING-LOWER	22900.00
35	533	REAR BRACING-UPPER	16700.00
35	700	BULK BPS COM PG35,36	5500.00
35	811	FLOOR GRILLS&GUARDPL	74300.00
35	821	STAIRS LOWER	10800.00
35	823	STAIRS UPPER	11800.00
35	851	HANDRAILS AND POSTS	24200.00

## APPENDIX-I

### ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

4. STRUCTURES:			
PGMA		PGMA DESCRIPTION	Wt. In Kg
35	993	CONSUMABLE&ERN MATLS	11200.00
35	995	CHUTE PIPE AND LADDERS	18200.00
36	310	MAIN FLOOR 11 LEVEL	95300.00
36	311	M.FLOOR 11LEV 1PASS	23100.00
36	320	MAIN FLOOR 12 LEVEL	61900.00
36	321	MAIN FLOOR 12LEV 1PASS	30400.00
36	322	MAIN FLOOR II MBL 2nd PASS	25200.00
36	330	MAIN FLOOR 13 LEVEL	36200.00
36	331	M.FLOOR 13LEV 1PASS	16200.00
36	340	MAIN FLOOR 14 LEVEL	34900.00
36	341	M.FLOOR 14LEV 1PASS	14500.00
36	342	M.FLOOR 14LEV 2nd PASS	29500.00
36	350	MAIN FLOOR 15 LEVEL	14900.00
36	351	MAIN FLOOR V MBL 1 PASS	23900.00
36	352	MAIN FLOOR V MBL 2nd PASS	21900.00
36	360	MAIN FLOOR 16 LEVEL	8100.00
36	361	MAIN FLOOR VI MBL 2nd PASS	28100.00
36	390	MISC PLAT -PART I	41500.00
36	391	MISC PLAT -PART II	10500.00
36	610	BOILER ROOF STRUCTURE	47300.00
36	611	BOILER ROOF SHEETING	14000.00
36	613	RAIN WATER PIPES AND GUTTER	12600.00
36	620	BOILER SIDE CLADDING STRUCTURE	32800.00
36	621	BOILER SIDE CLADDING SHEETING	8200.00
36	740	POSTS & HANGERS	24200.00
36	811	FLOORGRILLS&GUARD PL LOWER	46100.00
36	813	FLOORGRILLS&GUARD PL UPPER	18400.00
36	820	STAIRS & LADDERS	2300.00
36	851	HANDRAILS AND POSTS LOWER	16200.00
36	853	HANDRAILS&POST UPPER	11800.00
36	993	CONSUMABLE&ERN MATLS	9300.00
38	110	COLS -INTERCON WALKS	27400.00
38	210	CONN PLFM BLR&ELVR	1900.00
38	299	MILL HANDLG MONORAIL	30300.00
38	310	CONN PLFM BLR&MILL	20300.00
38	410	MILL MAIN.PLATFORMS	47100.00
38	510	COLUMN BRACINGS	29800.00
38	610	ELEVATOR CLADDING	12500.00
38	611	ELEVATOR CLADDING	10000.00
38	710	ELEVATOR CLAD STRUCT	4700.00
38	810	FLOORGRILLS&GUARD PL	7500.00
38	850	HAND RAILS & POSTS	5000.00
38	993	CONSUMABLE&ERN MATLS	3600.00
39	012	ID DUCT SUP FDN MATL	7200.00
39	101	COL&FRAMES BEFORE EP LEFT	98900.00
39	102	COL&FRAMES BEFORE EP RIGHT	38900.00
39	140	COLUMNS NEAR ID FAN	116300.00
39	150	COL BET IDFAN&CHIMNY	63900.00
39	300	PLATFORMS EXTL STRUC	143200.00

## APPENDIX-I

### ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

<b>4. STRUCTURES:</b>			
<b>PGMA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg</b>	
39	301	STRUC&PLATFORM-FANS	2400.00
39	302	STRUC MOTOR HOOD	7400.00
39	303	FAN HANDLING STRUCT	39200.00
39	700	BULK BPS COM PG38,39	300.00
39	810	FLOOR GRILLS&GUARDPL	18700.00
39	820	STAIRWAYS & LADDERS	4300.00
39	850	HAND RAIL & POSTS	4300.00
99	100	Fan handling Arrangement	15100.00
99	400	APH handling arrangement	1500.00
		TOTAL WEIGHT OF STRUCTURES	2980700.00

<b>5. ELECTROSTATIC PRECIPITATOR</b>		
<b>PG MA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg</b>
75 - 301	ESP SUPPORTS	11500
75 - 305	SUB-DELIVERY COMPONENTS OF ESP	1100
75 - 306	INSULATOR HOUSING ASSEMBLY	14500
75 - 308	GAS DISTRIBUTOR ASSEMBLY	32000
75 - 309	GD RAPPING MECHANISM	6700
75 - 310	GD DRIVE ARRANGEMENT	500
75 - 311	GAS SCREENING	10000
75 - 313	EMITTING SYSTEM SUSPENSION	5500
75 - 314	SUPPORT INSULATOR	2400
75 - 315	EMITTING ELECTRODE	7700
75 - 316	EMITTING ELECTRODE RAPPING	11400
75 - 317	DRIVE ARRANGEMENT FOR EMITTING SYSTEM	10600
	SUSPENSION ARRANGEMENT FOR COLLECTING ELECTRODE	39000
75 - 319	COLLECTING ELECTRODE	360000
75 - 321	FRAME OF EMITTING SYSTEM TOP	31000
75 - 322	FRAME OF EMITTING SYSTEM - BOTTOM	45000
75 - 323	INSPECTION DOORS	4600
75 - 324	SHOCK BARS	31000
75 - 325	COLLECTING ELECTRODE RAPPING MECHANISM	30000
75 - 326	DRIVE ARRANGEMENT FOR COLLECTING RAPPING	2200
75 - 328	ESP ROOF BEAMS	50000
75 - 331	GEARED MOTORS FOR RAPPING MECHANISM	4700
75 - 332	FRAME OF EMITTING SYSTEM MIDDLE	65000
75 - 342	OUTER ROOF	78000
75 - 343	RIDGES	25000
75 - 344	HOPPER UPPER PART	110000
75 - 345	HOPPER LOWER & MIDDLE PART	115000
75 - 346	INSULATOR SUPPORT PANEL	32000
75 - 347	ROOF PANEL ASSEMBLY	59000
75 - 348	CASING (STRUCTURE)	110000
75 - 349	CASING (SHELL, SIDE PANELS, GABLES, & GD HOUSING)	171000
75 - 350	ESP FUNNELS	85000
75 - 355	PENT HOUSE	90000

## APPENDIX -I

### ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

<b>5. ELECTROSTATIC PRECIPITATOR</b>		
<b>PG MA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg</b>
75 - 357	SPLITTER & GUIDE VANES	12000
75 - 365	HOPPER APPROACH PLATFORM	52000
75 - 366	WATER WASHING SYSTEM	1000
75 - 372	INTERLOCKS	1000
75 - 373	ELECTRICALLY OPERATED HOIST	3000
75 - 380	FOUNDATION MATERIALS FOR ESP	5000
75 - 381	SUPPORTING STRUCTURES FOR ESP	138000
89 - 610	GALLERIES AND RAILINGS OF ESP	34500
89 - 611	ESP ROOF HANDRAILS	3400
	TOTAL OF ESP	1901300

<b>6. ROTATING MACHINES</b>		
<b>PG MA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg</b>
52 000	Items per Contract	400
52 010	Rotor Assembly	317000
52 011	Rotor Post Assembly	15570
52 012	Pin Rack Assembly	3650
52 013	Rotor Seals (Corten)	4500
52 030	Rotor Housing	41000
52 041	Connecting Plate Hot End	36500
52 042	Connecting Cold End	54800
52 054	Axial Seal Assembly (Corten)	400
52 055	Bypass Seal Assembly (Corten)	800
52 100	Rotor Drive Assembly	3600
52 210	Access Doors	1100
52 211	Air Seal Piping	700
52 212	Observation Port & Light Assembly	85
52 217	Rotor Stoppage Alarm	60
52 220	General Details	9400
52 261	Guide Bearing Assembly	2950
52 262	Support Bearing Assembly	4300
52 271	Oil Piping - Guide Bearing	510
52 272	Oil Piping - Support Bearing	540
52 274	Lub Oil Circulation Unit	1250
52 301	Washing & Deluge System (Gas in)	480
52 302	Washing & Deluge System (Gas Out)	470
52 326	Cleaning Device (Gas Out)	350
52 329	Cleaning Device Drive Unit	1570
52 360	Fire Sensing Device	85
55 011	FD FAN FOUNDATION MATERIAL	1550
55 214	FD FAN	14000
55 017	FD C&I ITEMS	100
55 810	FD FAN COUPLING	800
55 910	FD FAN FOLS	4500
55 911	FD FAN SILENCER	25000
55 031	PA FAN FOUNDATION MATERIAL	1000
55 334	PA FAN	23500
55 037	PA C&I ITEMS	100

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

<b>6. ROTATING MACHINES</b>			
<b>PG</b>	<b>MA</b>	<b>PGMA DESCRIPTION</b>	<b>Wt. In Kg</b>
55	830	PA FAN COUPLING	900
55	930	PA FAN FOLS	4500
55	931	PA FAN SILENCER	300000
55	021	ID FAN FOUNDATION MATERIAL	2500
55	226	IF FAN	600000
55	027	ID C&I ITEMS	100
55	820	ID FAN COUPLING	1000
55	920	ID FAN FOLS	4500
55	090	TESTING MATERIALS	5000
56	172	SEAL AIR FAN	5300
56	077	SEAL AIR FAN C&I ITEMS	60
56	670	SEAL AIR FAN MOTOR	1000
56	870	SEAL AIR FAN COUPLING	100
56	191	COOLING AIR FANS WITH DUCTS	2000
56	161	PENT HOUSE VENTILLATION FANS	750
65	736	36" Gravimetric Feeder	31850.00
61		BOWL MILL XRP-803 - 5 Nos WITH ACCESSORIES	425000.00
		DRIVE MOTORS FOR ROTATING MACHINES	90000.00
		TOTAL OF ROTATING MACHINES	2053180.00

NOTES:

1. 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.
2. BHEL' s DECISION WITH REGARD TO CLASSIFICATION OF A PARTICULAR PRODUCT GROUP FOR APPLICABLE RATE CATEGORY SHALL BE FINAL & BINDING ON THE CONTRACTOR.
3. 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.
4. # - ELECTRICAL & C&I ITEMS OF HANDLING SYSTEM (PG99) IS EXCLUDED FROM THE SCOPE OF WORK.

## APPENDIX-II

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	250/300 T CRAWLER CRANE	01 No.	THIS WILL BE HIRED BY BHEL. REFER NOTE 1-6 BELOW FOR UTILIZATION.
02	INDUCTION HEATING M/C	AS PER REQMNT	FOR DETAILS REFER CLAUSE NO. 4.4.2.7
03	HUCK BOLTING MACHINE COMPLETE SET	AS PER REQMNT	FOR HUCK BOLTING OF SHOCK BARS AND SHOCK PADS.
04	AIR LEAK-IN TEST EQUIPMENTS WITH ALL AUXILIARIES	01 SET	FOR AIR LEAK TEST OF ESP AND DUCTING ETC AS PER SECTION-4.
06	FURNACE MAINTENANCE PLATFORM	01 SET	THIS MAY BE EITHER REGULAR DU OR BHEL'S OWN EQPT.

**NOTES:**

1. THIS CRANE (250/300 T CAP) WILL BE MADE AVAILABLE FROM THE END OF SECOND MONTH OF START OF BOILER ERECTION AND WILL BE AVAILABE FOR ERECTION OF MAIN BOILER SUPPORTING STRUCTURES INCLUDING CEILING GIRDERS, AND WELDED BEAMS ETC. THE CRANE WILL BE DEPLOYED FOR A SUITABLE PERIOD TILL COMPLETION OF ERECTION OF ABOVE MENTIONED ITEMS.
2. THE CRANE WILL ALSO BE MADE AVAIALBLE FOR ERECTION OF STRUCTURES AND EQUIPMENTS RESTING/ SUPPORTED ON THE CEILING GIRDERS SUCH AS ROOF STRUCTURES, SILENCERS ETC DURING THE DEPLOYMENT PERIOD OF THE CRANE. CONTRACTOR SHALL MAKE NECESSARY ARRANGEMENTS, WITHIN THE QUOTED RATES, FOR ERECTION OF SUCH STRUCTURES, EQUIPMENTS ETC BEYOND THE DEPLOYMENT PERIOD OF THE CRANE.
3. OPERATORS FOR HIRED CRANE WILL BE PROVIDED BY THE CRANE HIRING AGENCY.
4. CONTRACTOR SHALL PROVIDE THE FUEL FOR THE CRANE FOR CONTRACOR'S USE.
5. BHEL WILL MAKE 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 OF SPECIAL CONDITIONS OF CONTRACT.
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.

**APPENDIX-III**

**LIST OF T&P AND MMD TO BE DEPLOYED BY THE CONTRACTOR**

A: TOOL & PLANTS

<b>SN</b>	<b>DESCRIPTION OF EQUIPMENTS</b>	<b>CAPACITY (MINIMUM)</b>	<b>MINIMUM QUANTITY</b>
1	CRAWLER MOBILE CRANE FOR MATERIALS HANDLING & LOADING AT YARD - (CAPACITY OF CRANE INDICATED HERE IS FOR NORMAL AND CONTINUOUS REQUIREMENT. HOWEVER FOR CERTAIN SPECIFIC HEAVY LOADS BEYOND THESE NORMAL REQUIREMETN (e.g. MILL BASE > 50MT) CONTRACTOR SHALL MAKE NECESSARY ARRANGEMENT FOR HANDLING & LOADING OF MATERIALS AT STORAGE YARD.	18/25 MT	1 NO. - TO BE DEPLOYED FROM BEGINNING.
2	CRAWLER CRANE- WITH BOOM LENGTH OF 70M AND FLY JIB OF 18M WITH PROVISION FOR OFFSETS OF 15 <sup>0</sup> AND 30 <sup>0</sup> AND MAX CRAWLER WIDTH (EDGE TO EDGE) OF 7M	100 MT	01 No. -TO BE DEPLOYED FROM BEGINNING AT ERECTION SITE.
3	CRAWLER/MOBILE CRANE	30/35 MT	FOR PRE-ASSY AND ERECTION AT SITE. TO BE DEPLOYED FROM 3 <sup>RD</sup> MONTH
4	PICK AND CARRY MOBILE CRANE	8 – 10 T	1 No. AT ERECTION SITE FROM THE BEGINNING
5	TRAILER WITH HORSE	ADEQUATE CAP TO HANDLE HEAVYAND LONG COMPONENTS OF BOILER ETC	02
6	TRACTOR TROLLEY	15 T	02
7	<b>STRAND AND JACK SET-UP FOR LIFTING OF BOILER DRUM</b>	<b>SUITABLE</b>	<b>1 SET WITH</b>
8	<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: 150 M<sup>3</sup> 120 – 150M WC, WITH 90 KW, 3000 RPM, 150 AMPS MOTOR. HOWEVER, CONTRACTOR SHALL DEPLOY THE REQUIRED CAPACITY PUMP WITH ACCESSORIES AFTER OBTAINING WRITTEN APPROVAL OF BHEL.</b>	4 NOS.
9	AIR COMPRESSOR (ELECTRIC/DIESEL) – 7 Kg/cm <sup>2</sup>	140 CFM	02
10	TIG WELDING SET	-	AS REQUIRED

### APPENDIX-III

#### LIST OF T&P AND MMD TO BE DEPLOYED BY THE CONTRACTOR

##### A: TOOL & PLANTS

SN	DESCRIPTION OF EQUIPMENTS	CAPACITY (MINIMUM)	MINIMUM QUANTITY
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 EQUIVALENT/ 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 – HAND OPERATED	UP TO 50 mm Nb PIPES	AS PER SITE REQUIREMENT
22	BAKING OVEN AND HOLDING OVEN WITH THERMOSTAT AND TEMPERATURE GAUGE FOR BAKING COATED WELDING ELECTRODES	AS PER REQUIREMENT	02 EACH
23	PORTABLE OVEN FOR COATED WELDING ELECTRODES	AS PER SITE REQUIREMENT	20
<b>24</b>	<b>PASSANGER CUM GOODS ELEVATOR – 1MT CAPACITY</b>	<b>1MT</b>	<b>1 No. REFER CLAUSE 5.2.12</b>
25	HYDRAULIC TEST PUMP WITH DRIVE MOTOR, STARTER AND NECESSARY CABLES ETC 450/600 Kg/cm <sup>2</sup>	01 SET	

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-IV

### 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-V

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:

## APPENDIX-VI

### FORMAT FOR DEPLOYMENT PLAN FOR MAJOR TOOLS AND PLANTS

SL. NO.	DESCRIPTION & CAPACITY OF T&P	MONTHS										
		1	2	3	4	5	6	7	8	9	10	SO ON
01												
02												
03												
04												
05												
06												
07												
08												
09												
10												
SO ON												

SIGNATURE OF THE TENDERER

DATE:

**APPENDIX-VII**

**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-VIII

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

SL. NO.	FULL POSTAL ADDRESS OF CLIENT & NAME OF OFFICER IN CHARGE	DESCRIP - TION OF WORK	VALUE OF CONTRACT	DATE OF AWARD OF WORK	DATE OF COMMENCE MENT OF WORK	ACTUAL COMPLETION TIME (MONTHS)	DATE OF ACTUAL COMPLETION OF WORK	REMARKS
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