

TENDER SPECIFICATION

No. - BHE/PW/PUR/KNT-BLE/469

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 IT'S
AUXILIARIES, ROTATING MACHINES INCLUDING MILLS AND FANS, DUCTS, FUEL
PIPING ETC OF 500 MW UNIT#7

AT

KORBA SUPER THERMAL POWER STATION

OF

NATIONAL THERMAL POWER CORPORATION LIMITED

KORBA, C.G.

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, KINGS WAY - NAGPUR 440 001

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AT

KORBA SUPER THERMAL POWER STATION

OF

NATIONAL THERMAL POWER CORPORATION LIMITED

KORBA, C.G.

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
Corrigend ums.

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 440 001

PROCEDURE FOR SUBMISSION OF SEALED TENDERS

THE TENDERER MUST SUBMIT THEIR TENDERS AS REQUIRED IN TWO PARTS IN SEPARATE SEALED COVERS PROMINENTLY SUPERSCRIBED AS PART -I TECHNICAL BID AND PART -II PRICE BID AND ALSO INDICATING ON EACH OF THE COVERS THE TENDER SPECIFICATION NUMBER AND DUE DATE AND TIME AS MENTIONED IN THE TENDER NOTICE.

Part-I: Technical Bid (cover-I):

Excepting rate schedule, all other schedules, data sheets and details called for in the specification shall be enclosed in part-I "Technical Bid" only.

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 the current as well as all 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

KORBA SUPER THERMAL POWER PROJECT, STAGE-III (1X500MW), A PIT HEAD COAL BASED THERMAL POWER PROJECT, IS LOCATED IN KORBA DISTRICT OF CHHATTISGARH STATE. STAGE-I (3X200 MW) AND STAGE-II (3X500 MW) OF THE PROJECT ARE UNDER COMMERCIAL OPERATION. BASIC INPUTS I.E, COAL, WATER AND LAND HAVE ALREADY BEEN TIED UP. THE PROJECT IS PROPOSED TO BE IMPLEMENTED AS MERCHANT PLANT FOR THE BENEFITS OF STATES AND UTS OF WESTERN REGION.

1.01.00 LOCATION AND APPROACH

THE SITE IS LOCATED ON THE WESTERN BANK OF RIVER HASDEO NEAR KORBA TOWN IN KORBA DISTRICT OF CHHATTISGARH STATE. THE SITE IS CONTIGUOUS TO THE RIGHT BANK IRRIGATION CANAL ORIGINATING FRO HASDEO BARRAGE. BALCO'S ALUMINIUM PLANT AND TWO POWER STATIONS ARE ALREADY LOCATED ON BOTH THE BANKS OF HASDEO RIVER IN THE VICINITY.

KORBA TOWN IS A BROAD GAUGE RAILHEAD 37 KMS. AWAY FROM CHAMPA RAILWAY STATION ON CALCUTTA-NAGPUR MAIN LINE OF SOUTH-EASTERN CENTRAL RAILWAY AND IS APPROXIMATELY 510 KMS. FROM NAGPUR BY RAIL. THE SITE IS VERY CLOSE TO ALL WEATHER ROAD BETWEEN KOTGHORA & KORBA AND IS APPROXIMATELY 110 KMS FROM BILASPUR AND 10 KMS FROM KORBA TOWN. THE NEAREST AIRPORT IS RAIPUR LOCATED AT A DISTANCE OF APPROXIMATELY 250 KMS. FROM THE PROJECT SITE.

Check List			
(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 Last Date for Tender Submission)	Validity _____ days	
6	Mobilization Time (Please refer Section-11 of SCC)	Mobilization Time _____	
7	Whether any conditions stipulated?	Yes (vide Document reference:	No
		Bidder to note that tender with conditions unacceptable to BHEL shall be rejected.	
8	Bidder has visited the project site and acquainted with the site conditions	Yes	No
9	Details of concurrent jobs (Appendix-VII) 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 (Annexure 'A' of GCC) is furnished	Yes	No
14	Audited Profit & Loss Account for preceding three years authenticated by Bidder's Chartered Accountants is furnished	Yes	No

Check List (Vide Para 1.3 Of Section-I of General Conditions Of Contract)			
15	Latest Certificate by Bidder's Banker for Overdraft & BG Limits is Furnished (Certificate shall not be older than six months from the Last Date for offer submission)	Yes	No
16	Copy of IT Return of last three financial years along with copy of PAN Card are Furnished	Yes	No
17	Month -wise Manpower Deployment Plan (Appendix-V) is furnished	Yes	No
18	Analysis of Unit Rates (Appendix -IV) quoted is furnished	Yes	No
19	Month-wise deployment plan for major T&P (Appendix -VI) furnished	Yes	No
20	Whether all the pages of the Tender Specification documents are read, understood and signed	Yes	No
21	Power of Attorney 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	List of Jobs completed (Appendix-VIII) in last seven years is furnished	Yes	No
26	Whether copies of detailed Work Orders (with Scope and BOQ) and Completion Certificates 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 TENDERER

DECLARATION BY BIDDER'S AUTHORIZED SIGNATORY

I, _____, HEREBY CERTIFY THAT ALL THE INFORMATION AND DATA FURNISHED BY ME WITH REGARD TO THE TENDER SPECIFICATION NO. BHE/PW/PUR/KNT-BLE/469 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:

TENDERER'S NAME AND ADDRESS

CERTIFICATE OF NO-DEVIATION

TENDER SPECIFICATION NO. BHE/PW/PUR/KNT-BLE/469

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 BIDDER

To,
HEAD (PURCHASE)
BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR - WESTERN REGION
SHREEMOHINI COMPLEX
345, KINGSWAY
NAGPUR 440001

DEAR SIR,

I/WE HEREBY OFFER TO CARRY OUT THE WORK DETAILED IN TENDER SPECIFICATION NO. BHE/PW/PUR/KNT-BLE/469 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 REQUISITE 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) LOADING, TRANSPORTATION, UNLOADING OF MATERIALS BETWEEN STORES AND SITES OF WORK, PRE-ASSEMBLY, IF ANY, PRE-ERECTION CHECKS AS APPLICABLE
- 2) ERECTION, ALIGNMENT AND WELDING, BOLTING, FASTENING, GROUTING AS APPLICABLE OF:
 - a) BOILER SUPPORTING STRUCTURES
 - b) BOILER PRESSURE PARTS INCLUDING BOILER DRUM
 - c) BOILER TRIM & INTEGRAL PIPING AND MOUNTINGS
 - d) FUEL OIL PIPING
 - e) NON-PRESSURE PARTS
 - f) ROTATING MACHINES, INCLUDING MILLS, DRIVES, LUB OIL SYSTEM ETC
 - g) PULVERISED FUEL PIPING
 - h) OTHER EXTERNAL STRUCTURES INCLUDING ELEVATOR STRUCTURE.
 - i) HANDLING ARRANGEMENTS FOR ROTATING MACHINES
 - j) MAIN STEAM PIPING UPTO BSV AND OTHER SG PIPING
- 4) NON-DESTRUCTIVE EXAMINATION & POST WELD HEAT TREATMENT
- 5) PRE-COMMISSIONING CHECKS/TEST, TRIAL RUN/TESTING AND COMMISSIONING ASSISTANCE
- 6) TRIAL OPERATION AND PERFORMANCE GUARENTEE TEST.
- 7) HANDING OVER OF THE UNIT

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

4.1.1 GENERAL REQUIREMENTS – COMMON TO ALL WORK

4.1.1.1

THE INTENT OF SPECIFICATION IS TO PROVIDE SERVICES ACCORDING TO THE MOST MODERN AND PROVEN TECHNIQUES AND CODES. THE OMISSION OF SPECIFIC REFERENCE TO ANY METHOD, EQUIPMENT OR MATERIAL NECESSARY FOR PROPER AND EFFICIENT EXECUTION OF THIS WORK SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF PROVIDING SUCH FACILITIES TO COMPLETE THE WORK WITHOUT ANY EXTRA COMPENSATION.

4.1.1.2

THE TERMINAL POINTS DECIDED BY BHEL SHOULD BE FINAL AND BINDING ON THE CONTRACTOR FOR DECIDING THE SCOPE OF WORK AND EFFECTING PAYMENT FOR THE WORK DONE.

4.1.1.3

THE WORK SHALL BE EXECUTED UNDER THE USUAL CONDITIONS AFFECTING MAJOR POWER PLANT CONSTRUCTION AND IN CONJUNCTION WITH NUMEROUS OTHER OPERATIONS AT SITE. THE CONTRACTOR AND HIS PERSONNEL SHALL COOPERATE WITH PERSONNEL OF BHEL, BHEL'S CUSTOMER, CUSTOMER'S CONSULTANTS AND OTHER CONTRACTORS, COORDINATING HIS

BHARAT HEAVY ELECTRICALS LIMITED: PSWR:NAGPUR

TENDER SPECIFICATION No. BHE/PW/PUR/KNT-BLE/469

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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 THAT MAY NOT BE SPECIFIED NEVERTHELESS REQUIRED FOR THE COMPLETION OF WORK WITHIN QUOTED RATES.

4.1.1.10

ALL NECESSARY CERTIFICATES AND LICENSES REQUIRED FOR CARRYING OUT THIS WORK ARE TO BE ARRANGED BY THE CONTRACTOR EXPEDITIOUSLY.

4.1.1.11

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

4.1.1.12

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.

4.1.1.13

ALL CRANES, TRANSPORT EQUIPMENT, HANDLING EQUIPMENT, TOOLS, TACKLES, FIXTURES, EQUIPMENT, MANPOWER, SUPERVISORS/ENGINEERS, CONSUMABLES ETC, EXCEPT OTHERWISE SPECIFIED AS BHEL SCOPE AS 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 SHALL BE INCLUSIVE OF ALL SUCH CONTINGENCIES.

4.1.1.14

DURING THE COURSE OF ERECTION, TESTING AND COMMISSIONING CERTAIN REWORK / MODIFICATION / RECTIFICATION / REPAIR / FABRICATION ETC MAY BECOME NECESSARY ON ACCOUNT OF FEED BACK / REVISION OF DRAWING. THIS WILL ALSO INCLUDE MODIFICATIONS / RE-WORKS SUGGESTED BY BHEL / CUSTOMER / OTHER INSPECTION GROUP. CONTRACTOR SHALL CARRY OUT SUCH REWORK / MODIFICATION / RECTIFICATION / FABRICATION / REPAIR ETC PROMPTLY AND EXPEDITIOUSLY. DAILY LOG SHEETS SIGNED BY BHEL ENGINEER AND INDICATING THE DETAILS OF WORK CARRIED OUT, MAN-HOURS ETC SHALL BE MAINTAINED BY THE CONTRACTOR FOR SUCH REWORKS. CLAIM OF CONTRACTOR IF ANY, FOR SUCH WORKS WILL BE GOVERNED BY CLAUSES 13.1 TO 13.7.

4.1.1.15

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.

4.1.1.16

THE CONTRACTOR SHALL MAKE ALL FIXTURES, TEMPORARY SUPPORTS, STEEL STRUCTURES REQUIRED FOR JIGS & FIXTURES, ANCHORS FOR LOAD AND GUIDE PULLEYS REQUIRED FOR THE WORK. NECESSARY STEEL SHALL BE ARRANGED BY CONTRACTOR. ONLY THE STEEL FOR DRUM LIFTING TEMPORARY STRUCTURE (CAT HEAD) WILL BE PROVIDED ON FREE-RETURNABLE BASIS BY BHEL IN RANDOM SIZE MATERIALS AVAILABLE AT SITE.

4.1.1.17

THE CONTRACTOR SHALL TAKE DELIVERY OF THE COMPONENTS, EQUIPMENTS, CHEMICALS, AND LUBRICANTS ETC FROM THE BHEL STORES/ STORAGE AREA AFTER GETTING THE APPROVAL OF BHEL ENGINEER ON STANDARD INDENT FORMS OF BHEL. COMPLETE AND DETAILED ACCOUNT OF THE MATERIALS AND EQUIPMENTS AFTER USAGE SHALL BE SUBMITTED TO THE BHEL AND RECONCILED PERIODICALLY.

4.1.1.18

THE ROAD LENGTH TO STORAGE YARD FROM THE PROJECT SITE IS ABOUT 4-5 KM. THERE IS AN UNLOADING BAY FOR CONSIGNMENTS ARRIVING ON RAILS WHICH IS ABOUT 2 KM FROM STORAGE YARD. THESE ARE APPROXIMATE DISTANCES ANY VARIATION IN THESE DISTANCES SHALL NOT ENTITLE CONTRACTOR ANY ADDITIONAL COMPENSATION OR ANY CLAIM OF ANY KIND.

CONTRACTOR SHALL PLAN AND TRANSPORT EQUIPMENTS, COMPONENTS FROM STORAGE TO ERECTION SITE AND ERECT THEM IN SUCH A MANNER AND SEQUENCE THAT MATERIAL

ACCUMULATION AT SITE DOES NOT LEAD TO CONGESTION AT SITE OF WORK. MATERIALS SHALL BE STACKED NEATLY, PRESERVED AND STORED IN THE CONTRACTOR'S SHED AND AT WORK AREAS IN AN ORDERLY MANNER. IN CASE IT IS NECESSARY TO SHIFT AND RE-STACK THE MATERIALS KEPT AT WORK AREAS/ SITE TO ENABLE OTHER AGENCIES TO CARRY OUT THEIR WORK OR FOR ANY OTHER REASON, SAME SHALL BE DONE BY CONTRACTOR MOST EXPEDITIOUSLY. NO CLAIM FOR EXTRA PAYMENT FOR SUCH WORK WILL BE ENTERTAINED.

4.1.1.19

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

4.1.1.20

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

4.1.1.21

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

4.1.1.22

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. THIS EXERCISE MAY HAVE TO BE REPEATED TILL SATISFACTORY RESULTS ARE ACHIEVED.

4.1.1.23

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.

4.1.1.24

WELDING OF NECESSARY INSTRUMENTATION TAPPING POINTS, THERMOWELL, THERMOCOUPLE PAD, ROOT VALVE, CONDENSING VESSEL, FLOW METERING & MEASUREMENT DEVICES, AND CONTROL VALVES TO BE PROVIDED ON BOILER & ITS AUXILIARIES AND INTEGRAL PIPING AND SG SCOPE 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.

4.1.1.25

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. STORAGE, CALIBRATION, RE-ERECTION WILL BE DONE BY C & I ERECTION AGENCY.

4.1.1.26

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.

4.1.1.27

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

4.1.1.28

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

4.1.1.29

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

4.1.1.30

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

4.1.1.31

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

4.2 DETAILS OF SCOPE OF WORK FOR BOILER & AUXILIARIES

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

4.2.1 PRESSURE PARTS

- A) BOILER DRUM WILL BE BROUGHT INSIDE THE BOILER CAVITY BY THE MATERIAL HANDLING CONTRACTOR. HOWEVER, FURTHER WORK SUCH AS PROPER POSITIONING, ROTATION IF

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REQUIRED, AND ANY OTHER WORK NECESSITATED FOR MAKING THE BOILER DRUM READY FOR LIFTING IS TO BE DONE BY THE CONTRACTOR.

- B) 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 AREAS 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.
- C) 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. NECESSARY STEEL, CONCRETE BLOCKS SHALL BE ARRANGED BY THE CONTRACTOR. BED SHALL BE FABRICATED AS PER BHEL REQUIREMENT.
- D) 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).
- E) WELDING OF ALL ATTACHMENTS ON PRESSURE PARTS INCLUDING THOSE REQUIRED FOR INSULATION WORK IS IN THE SCOPE OF WORK.
- F) 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. PAINT IS IN CONTRACTOR'S SCOPE.
- G) 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.
- H) 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 PRESERVATIVE (GAS/CHEMICALS) WILL BE PROVIDED BY BHEL AS FREE ISSUE. FOR NITROGEN CAPPING REFER RELEVANT CLAUSE OF SECTION-5.
- I) THE DRUM INTERNALS, IF ALREADY INSTALLED, MAY HAVE TO BE REMOVED TO FACILITATE INSPECTION BY STATUTORY AUTHORITIES AND CHEMICAL CLEANING. NECESSARY MATCH MARKS SHALL HAVE TO PUNCHED ACROSS THE PARTING PLANES/ JOINTS TO ENSURE EASY RE-ASSEMBLY. THE DRUM INTERNALS ARE TO BE PRESERVED PROPERLY AND REFITTED AFTERWARDS AS PART OF WORK.

- J) REHEATER OUT LET HEADER NIPPLE JOINTS AND REHEATER COILS WILL HAVE T-91 MATERIAL. WELDING OF HP JOINTS SHALL BE CARRIED OUT BY 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.
- 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, MS LINE UPTO BSV AND SG SCOPE 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, AND 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 (EITHER 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, ARE ALSO WITHIN THE SCOPE OF WORK / SPECIFICATION.

4.2.2.6

MECHANICAL FREENESS OF VALVES SHALL BE ENSURED PRIOR TO ERECTION.

4.2.2.7

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

4.2.2.8

MAIN STEAM PIPING UPTO BOILER STOP VALV E INCLUDED IN THE SCOPE OF WORK IS OF THE MATERIAL **SA 335 P 91**. BIDDER SHALL FOLLOW BHEL APPROVED PROCEDURE FOR WELDING, PRE HEATING, ARGON PURGING, POST HEATING, PWHT & NDT OF **SA 335 P91** MATERIAL. DETAILED PROCEDURE WILL BE ISSUED TO THE CONTRACTOR DURING PROGRESS OF WORK.

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.

4.2.4.10 AIR LEAK TEST

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

CONTRACTOR SHALL ERECT ONE NUMBER PASSENGER CUM GOODS ELEVATOR OF ONE TON CAPACITY TO REACH UP TO THE BOILER DRUM LEVEL TO FACILITATE ERECTION, MOVEMENT OF PERSONS & GOODS ETC. THE ARRANGEMENT SHALL CONFORM TO APPLICABLE SAFETY NORMS. CONTRACTOR SHALL DISMANTLE AND HAND OVER THE ELEVATOR BACK AFTER COMPLETION OF WORK.

4.2.5.2

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

4.2.5.3

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

4.2.5.4

STIFFENING/STRENGTHENING OF MAIN SUPPORTING STRUCTURE, IF ANY, DUE TO DEVIATION IN VERTICALITY OF COLUMNS POST DRUM LIFTING, SHALL BE CARRIED OUT, INCLUDING FABRICATION, BY THE CONTRACTOR. 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.

4.2.5.5

EACH OF THE CEILING GIRDERS WILL BE SENT IN 3 PIECES AND WILL HAVE TO BE ASSEMBLED, WELDED AND NDE & PWHT DONE ON GROUND PRIOR TO THEIR ERECTION IN POSITION.

4.2.5.6

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 THAT 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.

4.2.5.7

IN SOME CASES, THE STRUCTURAL MATERIAL WILL BE SUPPLIED IN RANDOM LENGTHS THAT 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.

4.2.5.8

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

4.2.5.9

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.

4.2.5.10 **FLOOR GRILLS**

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

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

4.2.5.11

ADDITIONAL PLATFORMS OF PERMANENT NATURE FOR APPROACHING DIFFERENT EQUIPMENT AS PER THE SITE REQUIREMENT, THOUGH NOT INDICATED IN DRAWINGS, SHALL ALSO BE INSTALLED BY THE CONTRACTOR. 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.

4.2.5.12

ALL RELEVANT PROVISIONS AS ABOVE SHALL APPLY TO 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 AND NON METALLIC) ARE SUPPLIED IN LOOSE WALL PLATES/SEGMENTS AND THESE ARE TO BE ASSEMBLED AND WELDED AT SITE BEFORE ERECTION. INSTALLATION OF STEEL FRAME OF NMEJ AND CONNECTION WITH ADJACENT DUCT AND ERECTION OF SCAFFOLDING FOR FIXING THE NMEJ AND FABRIC PORTION IS IN CONTRACTOR'S SCOPE. ALL JOINTS CONNECTING DUCTS, EXPANSION PIECES AND DAMPERS SHALL BE SEAL WELDED. THESE WELDS HAVE TO BE TESTED LEAK PROOF 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, LUBE 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) SOME ROTATING MACHINES 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 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.

G) IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE TEMPORARY LADDERS ON COLUMNS FOR INITIAL WORKS, IF REQUIRED, TILL PERMANENT LADDER/ STAIRWAYS ARE COMPLETED. TEMPORARY WELDING ON ANY STRUCTURAL MEMBER SHALL BE DONE ONLY WITH THE APPROVAL OF BHEL. MATERIAL AND FABRICATION OF TEMPORARY LADDERS IS IN THE SCOPE OF CONTRACTOR

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

I) ALL WELDED JOINTS SHOULD BE PAINTED WITH ANTICORROSIVE PAINT IMMEDIATELY AFTER COMPLETION OF RADIOGRAPHY AND STRESS RELIEVING WORKS. NECESSARY PAINTS AND OTHER CONSUMABLES FOR THE ABOVE WORK ARE IN THE SCOPE OF THE CONTRACTOR.

J) 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. THIS EXERCISE MAY HAVE TO BE REPEATED TILL SATISFACTORY RESULTS ARE ACHIEVED.

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

J) ASSEMBLY AND FIXING AND ALL RELATED WORKS OF NON-METALLIC EXPANSION JOINTS OF FLUE GAS DUCTING AT BOF TERMINAL POINT IS IN THE SCOPE OF WORK.

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. CONTRACT 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.

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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(S) FOR SA 335 P-91 MATERIALS PIPING ONLY. THE SET WILL COMPRISE OF FOLLOWING:

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

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

4.4.2.8

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

4.4.2.9

DURING WELDING & POST WELD HEAT TREATMENT OF STEAM PIPING OF P-91 MATERIAL, THE INDUCTION HEATING PROCESS SHALL CONTINUE UN-INTERRUPTED. CONTRACTOR THEREFORE, SHALL ARRANGE BACK-UP DG SET TO TAKE CARE OF INTERRUPTIONS IN SUPPLY OF CONSTRUCTION POWER 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% RADIOGRAPH 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 P91 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 COMMISSIONING ASSISTANCE

4.5.1

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

4.5.2

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

4.5.3

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.

FOR THE PURPOSE OF PAYMENT VARIOUS EQUIPMENTS/ITEMS OF TEMPORARY SYSTEM FOR CHEMICAL CLEANING/ ALKALI BOIL OUT/ STEAM BLOWING WILL BE CATEGORISED AS UNDER:

- A) TANKS, PUMPS, SUPPORTS, EQUIPMENT ETC (OTHER THAN PIPES, PIPE FITTINGS & VALVES) – WILL BE TREATED AS & PAID @ NON-PRESSURE PARTS
- B) PIPELINE & VALVES, FITTINGS ETC – SHALL BE TREATED AS AND PAID @ PRESSURE PARTS

NO PAYMENT WILL BE MADE FOR TEMPORARY INSTALLATIONS MADE FOR HYDRAULIC TESTING OF VARIOUS SYSTEMS.

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 PUMPS, VALVES & OTHER EQUIPMENTS.

4.5.5

FABRICATION, FIT-UP, PRE-HEATING, WELDING, 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 COMMISSIONING IS INCLUDED IN THE SCOPE OF THIS CONTRACT. THE CONTRACTOR SHALL HAVE TO RETURN ALL THE EMPTY DRUMS TO THE CUSTOMER / BHEL STORES. SIMILARLY, FOR VARIOUS PRE-COMMISSIONING / COMMISSIONING ACTIVITIES / PROCESSES MENTIONED IN VARIOUS CLAUSES, TRANSPORT OF CHEMICALS FROM BHEL / CUSTOMER'S

STORES, CHARGING OF CHEMICALS INTO THE SYSTEM AND RETURNING OF REMAINING CHEMICALS AND THE EMPTY CONTAINERS OF THE CHEMICALS TO CUSTOMER / BHEL STORES IS THE RESPONSIBILITY OF THE CONTRACTOR.

4.5.9

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

4.5.10

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. IF ANY, READJUSTMENT AND REALIGNMENT ARE NECESSARY, THE SAME SHALL BE DONE AS PER BHEL ENGINEER'S INSTRUCTIONS. CLAIM, IF ANY, FOR THESE WORKS SHALL BE GOVERNED BY CLAUSES 13.1 TO 13.7 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

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 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 N₂ 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.

4.5.16

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.

4.5.17

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

4.5.18

CONTRACTOR SHALL INSTALL ALL NECESSARY TAPPING POINTS, INSTRUMENTS ETC REQUIRED FOR PG TEST AND PROVIDE ASSISTANCE FOR CONDUCT OF PERFORMANCE GUARANTEE TEST. **HOWEVER, IF FOR ANY REASON NOT ATTRIBUTABLE TO THE CONTRACTOR, THE PERFORMANCE GUARANTEE TEST IS NOT CARRIED OUT DURING THE CURRENCY OF CONTRACT AND CONTRACTOR IS NOT REQUIRED TO PROVIDE THE ASSISTANCE IN CONDUCT OF THE PG TEST THEN THE CONTRACT WILL BE CLOSED AFTER MUTUAL COMMERCIAL SETTLEMENT.**

4.5.19

THE CONTRACTOR SHALL CARRY OUT ANY OTHER TESTS AS DESIRED BY BHEL ENGINEER ON ERECTED EQUIPMENT COVERED UNDER THE SCOPE OF THIS CONTRACT DURING TESTING, PRE-COMMISSIONING AND COMMISSIONING, TO DEMONSTRATE THE COMPLETION OF ANY PART OR WHOLE OF WORK PERFORMED BY THE CONTRACTOR.

4.6 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 & PAINTS, FOR THE SAID ACTIVITY 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 INSTALLATION AND OPERATION OF TEMPORARY PASSANGER CUM GOODS ELEVATOR

A) BHEL IS PROVIDING, AS PART OF THEIR SCOPE OF T&P, ONE PASSANGER CUM GOODS ELEVATOR OF 1MT CAPACITY. CONTRACTOR SHALL ASSEMBLE AND PROVIDE ASSISTANCE IN COMMISSIONING THE SAME AS PART OF WORK WITHOUT ANY SEPARATE PAYMENT. BHEL WILL ARRANGE EXPERT/ SUPPLIER'S SUPERVISION FOR INSTALLATION AND COMMISSIONING OF THE SAME.

B) CONTRACTOR SHALL PROVIDE OPERATOR FOR THE PASSENGER CUM GOODS ELEVATOR. THE ROUTINE UPKEEP LIKE LUBRICATION, ELECTRICAL SYSTEM FITNESS ETC OF THE ELEVATOR IS IN CONTRACTOR'S SCOPE. THE LUBRICANTS FOR THE SAME WILL BE PROVIDED BY BHEL ON FREE ISSUE BASIS. CONTRACTOR SHALL ALSO PROVIDE ASSISTANCE WITH TOOLS & TACKLES FOR PERIODICAL/ANNUAL MAINTENANCE AND REPAIR OF THE ELEVATOR. ANY SPARES ETC FOR THE ABOVE WILL BE PROVIDED BY BHEL AS FREE ISSUE IF THE REASONS OF REPLACEMENT ARE NOT ATTRIBUTABLE TO THE CONTRACTOR, ELSE CONTRACTOR SHALL ARRANGE THE SAME AT HIS OWN COST. NO SEPARATE PAYMENT IS ENVISAGED FOR ABOVE SERVICES.

4.7 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, E PMS, MCC ETC.
- IV) ELECTRICAL & C&I ITEMS OF HANDLING SYSTEM (PG 99)
- V) ALL ELECTRICAL AND CONTROL & INSTRUMENTATION ITEMS EXCEPT THOSE SPECIFIED HEREIN.
- VI) CIVIL WORKS EXCEPT TO THE EXTENT SPECIFICALLY INDICATED ELSEWHERE IN THIS TENDER.
- VII) REFRACTORY & INSULATION.
- VIII) PNEUMATIC COPPER TUBING AND FITTINGS THEREOF.
- XI) ELECTROSTATIC PRECIPITATOR WORKS
- XII) FLUE GAS DUCTS BEYOND BOF AND RELATED EXTERNAL STRUCTURES, PLATFORMS, STAIRWAYS, HANDRAILS & POSTS ETC
- XIII) FINAL PAINTING.

SECTION-5

SPECIAL CONDITIONS OF CONTRACT

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

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

- a) ONLY OPEN SPACE FOR CONSTRUCTION OF LABOUR WILL BE PROVIDED BY THE CLIENT. DEVELOPMENT OF THE LAND AND COSTRUCTION OF LABOUR COLONY, WITH ARRANGEMENTS OF LIGHTING, DRINKING WATER, AND SANITATION ETC IS IN CONTRACTOR'S SCOPE.
- b) ELECTRICTY FOR LABUOR COLONY: CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENT FOR DRAWING AND FURTHER DISTRIBUTION CONFORMING TO THE STATUTORY & SAFETY REQUIREMENTS.
- c) FOR DRINKING WATER CONTRACTOR HAS TO MAKE HIS OWN ARRANGEMENT INCLUDING DIGGING OF BORE-WELL IF REQUIRED.
- d) THE CONTRACTOR HAS TO MAKE HIS OWN ARRANGEMENT FOR TRANSPORTATION OF HIS WORKMEN AND OTHER EMPLOYEES. BHEL/CLIENT SHALL NOT PROVIDE ANY FACILITY IN THIS REGARD.

5.2 TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES:

5.2.1

THE CONTRACTOR SHALL PROVIDE ALL EXCEPTING THOSE SPECIFICALLY INDICATED AS BHEL SCOPE REQUIRED TOOLS AND PLANTS, MONITORING AND MEASURING DEVICES (MMD) AND HANDLING & TRANSPORTATION EQUIPMENTS FOR THE SCOPE OF WORK COVERED UNDER THESE SPECIFICATIONS. CONTRACTOR HAS TO PROVIDE SUITABLE CRANES FOR MATERIAL HANDLING AT BHEL/CLIENT'S STORES/STORAGE YARD/ UNLOADING BAY FOR RAIL CONSIGNMENT. BHEL'S CRANE WILL NOT BE AVAILABLE FOR THIS PURPOSE. PLEASE REFER **APPENDIX-II** FOR THE LIST OF T&P BEING PROVIDED BY BHEL FREEE 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 **APPENDIX -III**. 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.

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.

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. USAGE OF WELDING TRANSFORMERS WILL BE SUBJECT TO PRIOR APPROVAL OF BHEL.

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

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

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.

5.3.3 COSUMABLES FOR BHEL SUPPLIED EQUIPMENTS (CRANES, T&P, ETC):

REFER SECTION-7 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.

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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.

5.5.3.

BHEL IS INSTALLING A COMPUTERIZED SITE MANAGEMENT SYSTEM AT SITE TO COVER AREAS OF MATERIAL MANAGEMENT, ERECTION & COMMISSIONING, QUALITY CONTROL, BILLING, MIRS, ETC. THIS SYSEM CAN BE ACCESSED THROUGH NORMAL TELEPHONE LINES AND THROUGH LAN INSTALLED AT SITE.

CONTRACTOR SHALL ENSURE THAT ALL OPERATIONS IN THEIR SCOPE WHICH HAVE INTERFACES WITH BHEL SYSTEM IS DONE ONLY THROUGH THIS COMPUTERIZED SYSTEM. CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR CONNECTIVITY, COMPUTING EQUIPMENT, PERSONNEL, SOFTWARE, ETC TO OPERATATE AND INTERACT WITH BHEL SYSTEM. NO MANUAL SYSTEM OTHER THEN WHAT IS NOT COVERED BY COMPUTREIZED SYSTEM WILL BE ACCEPTABLE TO BHEL.

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.

5.7 CONSTRUCTION POWER & WATER

5.7.1

CONSTRUCTION POWER (THREE PHASE, 415V / 440V, 3PHASE, 50Hz) WILL BE PROVIDED AT ONE POINT NEAR THE SITE APPROXIMATLY 500 METER FROM ERECTION SITE FREE OF CHARGE, HOWEVER ALL TAXES, DUTIES, LEVIES, CHARGES ETC SHALL ALSO BE BORNE BY THE CONTRACTOR. REQUIRED ENERGY METER, ALL CABLES, FUSES, DISTRIBUTION BOARDS, SWITCHES, SWITCHBOARDS, BUS BARS, EARTHING ARRANGEMENTS, PROTECTION DEVICES e.g. ELCB, IF ANY, AND ANY OTHER INSTALLATION AS SPECIFIED BY STATUTORY AUTHORITY, CLIENT IN THIS REGARD, FOR DRAWL OF CONSTRUCTION POWER SHALL BE ARRANGED BY THE CONTRACTOR. OBTAINING APPROVALS, PAYMENT OF NECESSARY FEES, DUTIES ETC TOWARDS THE CLEARANCE OF SUCH INSTALLATIONS, PRIOR TO THESE BEING PUT TO USE OR AS MAY BE SPECIFIED, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

5.7.2

IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE, MAINTAIN THE COMPLETE INSTALLATION ON THE LOAD SIDE OF THE SUPPLY WITH DUE REGARD TO THE SAFETY REQUIREMENTS AT SITE. ALL CABLING AND INSTALLATIONS SHALL COMPLY IN ALL RESPECTS WITH THE APPROPRIATE STATUTORY REQUIREMENTS. INSTALLATION AND MAINTENANCE OF THIS SHALL BE DONE BY LICENSED AND EXPERIENCED ELECTRICIAN.

5.7.3

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

5.7.4

CONTRACTOR SHALL BE WELL EQUIPPED WITH BACK-UP ARRANGEMENT TO TACKLE SITUATIONS ARISING DUE TO FAILURE OF CUSTOMER SUPPLIED POWER, SO AS TO ENSURE CONTINUITY AND COMPLETION OF CRITICAL PROCESSES AND ACTIVITIES 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 INSTALLATION SHALL BE MAINTAINED IN HYGINIC CONDITION AT ALL TIMES.

5.8.5 CERTAIN IMPORTANT MATTERS REGARDING IR AT SITE

A) CONTRACTOR SHALL OBTAIN FORM V FROM THE CLIENT IMMEDIATELY ON REACHING SITE.

B) CONTRACTOR SHALL OBTAIN NECESSARY LABOUR LICENSE WITHIN 30 DAYS FROM THE START OF WORK. THE NUMBER OF PERSONS COVERED BY THE LICENSE SHOULD BE INCREASED AS AND WHEN THE LABOUR STRENGTH IS INCREASED AT SITE.

C) THE COVERAGE OF WORKMEN COMPENSATION INSURANCE SHALL ALSO BE COMMENSURATE WITH THE ACTUAL STRENGTH OF WORKFORCE.

D) CONTRACTOR SHALL DEPOSIT APPLICABLE AMOUNT TOWARDS PROVIDENT FUND FOR ALL THE LABOUR EMPLOYED BY HIM WITH REQUISITE AUTHORITY AND FURNISH THE COPY OF CHALLAN TO BHEL EVERYMONTH AND SUBMIT ANNUAL RETURN FORMS 3A & 6A (AND/OR ANY OTHER APPLICABLE FORMS). AS FAR AS POSSIBLE, CONTRACTOR SHALL OBTAIN PF STATEMENT IN RESPECT OF EACH WORKER AND DISTRIBUTE TO THE INDIVIDUALS.

E) CONTRACTOR'S MONTHLY INVOICES WILL BE CLEARED SUBJECT TO SUBMISSION OF NECESSARY DOCUMENTS INCLUDING STATUTORY ONES SUCH AS PF CHALLANS, WAGE SHEETS ETC. THIS IS TO BE NOTED SPECIFICALLY AS ESSENTIAL FROM THE POINT OF VIEW THAT BHEL'S OWN INVOICES ON CLIENT WILL BE RELEASED ONLY ON SUBMISSION OF DOCUMENTS SUCH AS ABOVE STATED.

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 THEREBY SHALL BE RECOVERED FROM THE CONTRACTOR.

5.10 TAXES, DUTIES, LEVIES

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

5.10.1

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

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

5.10.2 Service Tax & Cess on Service Tax

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

- A) OVERALL PLANNING, MONITORING & CONTROL
- B) QUALITY CONTROL AND QUALITY ASSURANCE
- C) MATERIALS MANAGEMENT
- D) SAFETY, FIRE & SECURITY
- E) 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 LABOUR COLONY, 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

REFER SECTION-5 IN THIS REGARD.

7.3 EQUIPMENTS – TOOLS & PLANTS

BHEL WILL MAKE AVAILABLE T&P LISTED VIDE **APPENDIX-II** 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 **APPENDIX– II**) FREE OF CHARGE TO THE CONTRACTOR ON SHARING BASIS MAINLY FOR THE PURPOSES NOTED THEREIN VIDE NOTES.

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

7.3.1.2

CONTRACTOR SHALL LAY NECESSARY SLEEPER BEDS, BACKFILLING OF APPROACHES WHEREVER NECESSARY FOR SAFE MOVEMENT OF THE CRANES AS DIRECTED BY BHEL. **NECESSARY SLEEPERS HAVE TO BE PROVIDED BY THE CONTRACTOR.**

7.3.1.3

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

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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. THE CRANES PROVIDED BY BHEL 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 CRANES.

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

AS REGARDS THE HYDRAULIC TEST PUMPS, WATER FILL PUMPS AND CHEMICAL CLEANING EQUIPMENTS ETC WHICH 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

REFER CLAUSE 4.6.8 WITH REGARD TO BHEL PROVIDED 1MT CAPACITY PASSENGER CUM GOOD ELEVATOR

7.4.4

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 BHEL'S T&PS INCLUDING CRANES WILL BE PROVIDED BY BHEL FREE OF CHARGE. SIMILARLY FILTERS FOR CRANES WILL BE PROVIDED FREE OF CHARGE BY BHEL. ALL OTHER CONSUMABLES LIKE COTTON WASTE ETC SHALL BE IN THE CONTRACTOR'S SCOPE.

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 INITIAL FILL AND TOPPING UP FOR TRIAL RUN OF THE EQUIPMENT AND TRIAL OPERATION OF THE UNIT WILL BE SUPPLIED BY BHEL FREE OF CHARGES. CONTRACTOR SHALL COLLECT THESE LUBRICANTS FROM STORES, HANDLE AND CARRY OUT FILLING/POURING AS PER REQUIREMENT. EXCESS/ USED LUBRICANTS AND EMPTY CONTAINERS/BARRELS SHALL BE RETURNED FOLLOWING DUE PROCESS OF ACCOUNTING/RECONCILIATION.

SECTION-8

SPECIAL CONDITIONS OF CONTRACT

8.0 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 MMD. 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 PROVIDE 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 SHALL 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

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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

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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 ith the safety and environment regulations of the Project. The electricians to be deployed on the job should have wireman license.

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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 un safe/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/-

SN	Incidence of Violation	Fine (in Rs)
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 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 No.	YEAR	Amd. upto	DESCRIPTION
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 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 No.	YEAR	Amd. upto	DESCRIPTION
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)
IS 9457	1980		SAFETY COLOURS AND SIGNS
IS 9679	1980		CODE OF SAFETY FOR WORK ENVIRONMENTAL MONITORING
IS 9706	1997		CODE OF PRACTICE FOR THE CONSTRUCTION OF AERIAL RPEWAYS FOR THE TRANSPORTATION OF MATERIAL
IS 9759	1981		GUIDELINES FOR DEWATERING DURING CONSTRUCTION
IS 9815	1989		SERVO MOTOR OPERATED LINE VOLTAGE CORRECTOR (SERVO STABILISER)
IS 9944	1992		RECOMMENDATIONS ON SAFE WORKING LOAD FOR NATURAL AND MAN-MADE FIBRE ROPE SLINGS
IS 996	1979		SINGLE PHASE ELECTRIC MOTORS
ISO 3873	1977		SAFETY HELMET

SECTION-10
SPECIAL CONDITIONS OF CONTRACT

10.0 Drawings and Documents

10.0 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

THE CONTRACTOR HAS TO MOBILIZE HIS RESOURCES AND WORK FORCE IN SUCH A MANNER THAT THE ENTIRE WORK IS COMPLETED TO ACHIEVE THE FOLLOWING MILESTONE SCHEDULE:

SN	MAJOR MILESTONE	TENTATIVE COMPLETION SCHEDULE
01	ERECTION START (ZERO DATE FOR START OF CONTRACT PERIOD)	30 DAYS FROM FAX LETTER OF INTENT
02	BOILER DRUM LIFTING	5 th MONTH#
03	BOILER HYDRAULIC TEST (DRAINABLE)	17 TH MONTH#
04	BOILER LIGHT UP & ALKALI BOIL OUT	21 ST MONTH#
05	CHEMICAL CLEANING COMPLETION	23 TH MONTH#
06	STEAM BLOWING COMPLETION	27 TH MONTH#
07	SYNCHRONIZATION WITH COAL FIRING	28 TH MONTH#
08	COMPLETION OF ALL FACILITIES	32 ND MONTH#

THE ABOVE SCHEDULE IS FROM THE START OF ERECTION. IN ORDER TO MEET ABOVE SCHEDULE IN GENERAL, AND ANY OTHER INTERMEDIATE TARGETS SET, TO MEET CUSTOMER REQUIREMENTS, CONTRACTOR SHALL ARRANGE ALL NECESSARY RESOURCES IN CONSULTATION WITH BHEL. FURTHER, CONTRACTOR SHALL AUGMENT HIS RESOURCES TO MAKE UP FOR CUSTOMARY DELAY IN INTERMEDIATE MILESTONES AS USUALLY HAVE BEEN EXPERIENCED IN PROJECTS OF SIMILAR NATURE.

11.1.2 CONTRACT PERIOD

THE TOTAL CONTRACT PERIOD FOR COMPLETION OF ENTIRE WORK UNDER SCOPE SHALL BE **32 (THIRTY TWO)** MONTHS FROM THE START OF ERECTION OF BOILER.

PERMANENT ERECTION OF THE FIRST COLUMN SEGMENT OR MAJOR SUB-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.

IT IS TO BE SPECIFICALLY NOTED BY THE CONTRACTOR THAT BHEL'S CLIENT SHALL LEVY LIQUIDATED DAMAGES IN THE EVENT THE WORK IS NOT COMPLETED AS PER SCHEDULE AS FURNISHED HEREIN ABOVE. CONTRACTOR SHALL ENSURE COMPLETION OF HIS SCOPE OF WORK WITHIN THE TIME SCHEDULE INDICATED HERE. IN CASE OF DELAY IN COMPLETION IS ATTRIBUTABLE TO THE CONTRACTOR, BHEL WILL IMPOSE LD AT THE RATES SPECIFIED IN GCC.

11.1.3 GRACE PERIOD

GRACE PERIOD OF 6 (SIX) MONTHS BEYOND THE CONTRACT PERIOD IS PROVIDED FOR THIS CONTRACT **AT THE DISCRETION OF BHEL**. IT MAY BE NOTED THAT IN THE EVENT DELAY IN COMPLETION LEADS TO IMPOSITION OF LIQUIDATED DAMAGES BY BHEL'S CLIENT, SUCH EXTENSION WILL ALSO BE SUBJECT TO LEVY OF LD.

11.2 PROGRESS MONITORING, CONTRACT EXTENSION AND OVER RUN

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

11.2.4

A JOINT PROGRAMME SHALL BE DRAWN FOR THE WORK TO BE COMPLETED DURING THE EXTENDED CONTRACT PERIOD. REVIEW OF THE PROGRAM AND RECORD OF SHORTFALL AS DESCRIBE VIDE CLAUSE NO. 11.2.2 SHALL BE DONE DURING THE EXTENDED PERIOD. THE OVERRUN 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 HERE 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 (INCLUDING 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/- PER MONTH (RUPEES ONE LAKH ONLY). OVERRUN COMPENSATION WILL BE PAID FOR THE EXTENSION ATTRIBUTABLE TO BHEL ONLY. NO OVERRUN COMPENSATION WILL BE PAYABLE FOR THE EXTENSION ON ACCOUNT OF REASONS ATTRIBUTABLE TO CONTRACTOR AND/OR FORCE MAJEURE CONDITIONS. OVERRUN COMPENSATION FOR ELIGIBLE PERIOD SHALL BE IN PROPORTION TO THE PROGRESS ACHIEVED AGAINST THE PLAN FOR RESPECTIVE PERIOD.

11.3 PRICE VARIATION

11.3.1

THE 85% COMPONENT OF THE PRICE QUOTED SHALL BE PERMITTED TO BE ADJUSTED FOR VARIATION IN VARIOUS RELEVANT INDICES/PRICES DURING EXECUTION OF WORK AS PER BREAK-UP GIVEN HEREUNDER. THE REMAINING 15% SHALL BE TREATED AS FIXED COMPONENT OF PRICE.

SL NO.	CATEGORY	COMPONENT ('K')	BASE INDEX / PRICE	BASE DATE
A)	LABOUR OF ALL CATEGORIES	40%	CONSUMER PRICE INDEX FOR INDUSTRIAL WORKERS (GENERAL), APPLICABLE TO 'ALL INDIA' AS PUBLISHED BY LABOUR BUREAU, SHIMLA	CALENDAR MONTH OF THE OFFER SUBMISSION
B)	H.S. DIESEL OIL	5%	PRICE OF H.S. DIESEL OIL AT PUMP OF IOCL/BPCL/HPCL NEAREST TO THE PROJECT SITE.	...DO...
C)	WELDING ELECTRODE	40%	COMPANY'S LIST PRICE INCLUSIVE OF EXCISE BUT EXCLUSIVE OF SALES TAX & OTHER DUTIES/LEVIES/ TAXES FOR SUPRATHERM SPECIAL OF M/s D&H SECHERON LIMITED, – SIZE 3.15 mm x 450 mm LONG.	...DO...

11.3.2

PAYMENT/RECOVERY DUE TO VARIATION IN INDEX/PRICES SHALL BE DETERMINED ON THE BASIS OF THE FOLLOWING NOTIONAL FORMULA WITHOUT ANY INITIAL ABSORPTION, IN RESPECT OF THE IDENTIFIED COMPONENTS VIZ. LABOUR, H.S. DIESEL OIL AND WELDING ELECTRODE.

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

WHERE,

A = AMOUNT TO BE PAID/RECOVERED DUE TO VARIATION IN THE INDEX FOR LABOUR, AND PRICES FOR H.S. DIESEL OIL, WELDING ELECTRODE

K = PERCENTAGE COMPONENT OF LABOUR, H.S. DIESEL OIL & WELDING ELECTRODE AS INDICATED IN THE COLUMN 3 ABOVE.

R = VALUE OF WORK DONE FOR THE BILLING MONTH.

X_N = REVISED INDEX NUMBER FOR LABOUR, AND PRICE FOR DIESEL OIL AND WELDING ELECTRODE FOR THE CALENDAR MONTH OF BILLING PERIOD SUBSEQUENT TO THE BASE DATE AS INDICATED IN THE COLUMN NO. 5 OF THE ABOVE TABLE (I.E. FOR MONTH UNDER CONSIDERATION)

X_O = INDEX NO. FOR LABOUR, WELDING ELECTRODES AND PRICE FOR DIESEL OIL AS ON THE BASE DATE INDICATED IN THE COLUMN NO.5 OF THE ABOVE TABLE.

THE ABOVE FORMULA IS APPLICABLE FOR THE ENTIRE CONTRACT PERIOD, GRACE PERIOD, AND THE EXTENDED CONTRACT PERIOD, IF ANY. HOWEVER, FOR THE PERIOD EXTENDED ON ACCOUNT OF REASONS ATTRIBUTABLE TO THE CONTRACTOR AND/OR FORCE MAJEURE CONDITIONS THE PRICE VARIATION WILL BE APPLIED BASED ON THE RESPECTIVE INDICES/PRICES FROZEN AT LEVELS APPLICABLE FOR THE CALENDAR MONTH AT THE END OF GRACE PERIOD.

NO PRICE VARIATION SHALL BE APPLICABLE TO OVERRUN CHARGES, MANDAY RATE FOR EXTRA WORKS ETC.

PRICE VARIATION WILL ALSO NOT BE APPLICABLE FOR THE AGREED ITEM RATE AFTER FIRST 90% STAGE PAYMENT.

WITH THE ABOVE PROVISION, THE CLAUSE NO. 2.15 OF GENERAL CONDITIONS OF CONTRACT SECTION-2 IS NOT APPLICABLE.

11.3.3

THE CONTRACTOR SHALL FURNISH NECESSARY 'PRICE LIST' FOR H.S. DIESEL AND WELDING ELECTRODE AND 'MONTHLY BULLETINS' ISSUED BY LABOUR BUREAU, SHIMLA AND RBI BULLETINS FOR ALL COMMODITIES. IT IS CLARIFIED THAT THE PRICE OF H.S. DIESEL AS APPLICABLE FOR THE LAST DATE OF BILLING PERIOD SHALL BE CONSIDERED FOR PRICE VARIATION PURPOSE.

11.3.4

THE CONTRACTOR WILL BE REQUIRED TO RAISE THE BILLS FOR PRICE VARIATION PAYMENTS ON A MONTHLY BASIS ALONGWITH THE RUNNING BILLS IRRESPECTIVE OF THE FACT WHETHER ANY INCREASE/DECREASE IN THE CONSUMER PRICE INDEX FOR LABOUR, AND PRICE OF DIESEL OIL/WELDING ELECTRODE HAS TAKEN PLACE OR NOT. IN CASE IF THERE IS DELAY IN PUBLICATION OF BULLETINS (FINAL FIGURE), THE PROVISIONAL VALUES AS PUBLISHED CAN BE

CONSIDERED FOR PAYMENTS AND ARREARS SHALL BE PAID/RECOVERED ON GETTING THE FINAL VALUES.

11.4 CONTRACT VARIATIONS

11.4.1 VARIATION IN QUANTITIES

QUANTITIES OF VARIOUS ITEMS OF WORK COVERED UNDER RATE SCHEDULE OF THIS TENDER SPECIFICATION ARE LIKELY TO VARY. FOR ANY UPWARD OR DOWNWARD VARIATION IN THESE QUANTITIES, THE RATES ACCEPTED SHALL REMAIN FIRM WITHOUT ANY VARIATION. BHEL WILL MAKE PAYMENTS ON PRO-RATA BASIS FOR THE ACTUAL QUANTITIES EXECUTED.

11.4.2 VARIATION IN HP BUTT WELD JOINT QUANTITIES
NO ADDITIONAL PAYMENT OR RECOVERY IS ENVISAGED.

11.5 INTEREST BEARING RECOVERABLE ADVANCE

INTEREST BEARING (@ 12% PER ANNUM INTEREST ON MONTHLY REDUCING BALANCE BASIS) RECOVERABLE ADVANCE LIMITED TO 5% OF THE CONTRACT VALUE MAY BE PAID BY BHEL AT ITS DISCRETION DEPENDING ON THE MERIT OF THE CASE AGAINST RECEIPT & ACCEPTANCE OF BANK GUARANTEE FROM THE CONTRACTOR FOR THE AMOUNT SOUGHT. THIS BANK GUARANTEE (BG) SHALL BE VALID AT LEAST FOR ONE YEAR OR THE RECOVERY DURATION. IN CASE RECOVERY OF DUES DOES NOT GET COMPLETED WITHIN THE AFORESAID BG VALIDITY PERIOD, THE CONTRACTOR MUST RENEW THE VALIDITY OF BG OR SUBMIT FRESH BG FOR THE OUTSTANDING AMOUNT AND REMAINING RECOVERY PERIOD. BHEL IS ENTITLED TO MAKE RECOVERY OF THE ENTIRE OUTSTANDING AMOUNT IN CASE THE CONTRACTOR FAILS TO COMPLY WITH THE BG REQUIREMENT AS ABOVE.

RECOVERY OF DUES WILL BE MADE MINIMUM @ 10% OF THE ADMITTED GROSS RUNNING BILL AMOUNT FROM THE FIRST APPLICABLE RUNNING BILL ONWARDS TILL ENTIRE DUE (PRINCIPAL PLUS INTEREST) IS RECOVERED. IN THE EVENT SUFFICIENT TIME DURATION IS NOT LEFT FOR RECOVERY @10%, THE RATE OF RECOVERY SHALL BE SUITABLY ENHANCED SO THAT ENTIRE DUE IS RECOVERED WITHIN THE CONTRACT PERIOD (INCLUDING EXTENSIONS GRANTED OR FORECLOSURE IF ANY).

11.6 DEFINITION OF WORK COMPLETION

THE CONTRACTOR'S SCOPE OF WORK UNDER THESE SPECIFICATIONS WILL BE DEEMED TO HAVE BEEN COMPLETED IN ALL RESPECT, ONLY WHEN ALL THE ACTIVITIES ARE COMPLETED SATISFACTORILY AND SO CERTIFIED BY BHEL SITE IN CHARGE. THE DECISION OF BHEL IN THIS REGARD SHALL BE FINAL AND BINDING ON THE CONTRACTOR.

SECTION-12

SPECIAL CONDITIONS OF CONTRACT

12.0 TERMS OF PAYMENT

12.0.1

THE CONTRACTOR SHALL SUBMIT HIS MONTHLY 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 25TH OF PREVIOUS CALENDAR MONTH TO 24TH 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 (BEFORE OR AFTER COMPLETION OF ENTIRE WORK) ON RECEIPT AND ACCEPTANCE OF BANK GUARANTEE OF EQUAL AMOUNT IN PRESCRIBED FORMAT. 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. CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENT FOR MAKING PAYMENT OF IMPENDING LABOUR WAGES AND OTHER DUES IN THE MEANWHILE. **REFER TO CLAUSE NO. 5.8.5 (E).**

12.1 STAGES OF PROGRESSIVE PRO-RATA PAYMENTS

12.1.3 BOILER AND AUXILIARIES

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

12.1.3.1

SN	PART OF THE ACTIVITY COMPLET ED	PERCENTAGE OF ACCEPTED ITEM RATES			
		NON-PRESSURE PARTS	STRUC- TURES	PRESSURE PARTS	ROTATING M/c
A	TRANSPORT, & ERECTION / PLACEMENT	40	40	40	40
B	ALIGNMENT, BOLTING, GROUTING & WELDING	45	45	40	45

SN	PART OF THE ACTIVITY COMPLET ED	PERCENTAGE OF ACCEPTED ITEM RATES			
		NON-PRESSURE PARTS	STRUC- TURES	PRESSURE PARTS	ROTATING M/c
C	GAS TIGHTNESS TEST / KEROSENE LEAK TEST / OTHER LEAKAGE TEST ETC	5	---	---	---
D	NDE, HEAT TREATMENT ETC.	---	5	10	---
E	TRIAL RUN OF ROTATING 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
J	ON COMPLETION OF SVF & STEAM BLOWING	1	1	1	1
K	COAL FIRING	4	---	---	4
L	TRIAL OPERATION & FACILITY COMPLETION	1	1	1	1
	TOTAL	100%	100%	100%	100%

12.1.3.2 BOILER 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 MAIN STEAM PIPING UPTO BSV. HOWEVER, FOR COOLING WATER PIPING THIS WILL BE RELEASED ON COMPLETION OF INTERNAL AND EXTERNAL PAINTING.

12.1.3.3

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

12.2 GENERAL

12.2.1

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

12.2.2

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

12.2.3

FOR PAYMENT OF TEMPORARY PIPING AND EQUIPMENTS LIKE TANKS, PUMPS, STRUCTURES PROVIDED BY BHEL & NOT FIGURING IN SHIPPING LIST WILL BE BASED ON JOINTLY MEASURED QUANTITY AND CORRESPONDING STANDARD WEIGHTS. REFER CLAUSE 4.5.3 REGARDING CATEGORIZATION AND APPLICABLE RATES FOR VARIOUS ITEMS FOR RELEASE OF PAYMENT.

12.3 MEASUREMENT OF THE WORK COMPLETED

- A) WHERE PAYMENT IS TO BE MADE ON THE BASIS OF WEIGHT, THE WEIGHT PER UNIT GIVEN IN THE BHEL DOCUMENT ONLY SHALL BE TAKEN IN TO CONSIDERATION. IN CASE SUCH INFORMATION IS NOT AVAILABLE IN BHEL DOCUMENTS, THEN THE LATEST RELEVANT INDIAN STANDARDS IN THIS REGARD MAY BE APPLIED.
- B) SPARES, SURPLUS QUANTITY, ERECTION CONTINGENCY MATERIALS WILL NOT BE PAID FOR UNLESS THE SAME HAS BEEN CONSUMED IN PLACE OF REGULAR ITEM OF MEASURABLE WORK AS PER THE RATE SCHEDULE.
- C) WHERE THE PAYMENT IS MADE ON THE BASIS OF ITEM RATE, ACTUAL EXECUTED QUANTITY MEASURED JOINTLY SHALL ONLY BE PAID FOR.
- D) IT IS CLARIFIED THAT AS FAR AS WEIGHT CONSTITUTED BY WELDING CONSUMABLES AND OTHER CONSUMABLES SUPPLIED BY BHEL AS WELL AS BY THE CONTRACTOR, SHALL BE IGNORED FOR THE PURPOSE 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 ELEVATORS) ETC USED IN VARIOUS ACTIVITIES OF THIS WORK.

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 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 man-hours.

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.

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 COLLECTED (BANK GUARANTEE FOR MAXIMUM 50% OF THE TOTAL SD 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.

15.3 GENERAL

PROVISIONS OF **EMD** AND **SD** APPEARING IN GENERAL CONDITIONS OF CONTRACT STAND WITHDRAWN AND SHALL NOT BE APPLICABLE

APPENDIX-I			
ESTIMATED WEIGHT OF VARIOUS PRODUCT GROUPS FOR EACH UNIT			
PG	MA	DESCRIPTION	WT IN Kg
	1. NON PRESSURE PARTS:		
08	001	FURN.UR BCKSTY-PI	73200
08	003	FURN.UR INT.BSTY-PI	113400
08	006	FURN.LR INT.BSTY-PI	87500
08	007	FURN.LR .BSTY-PI	79200
08	111	REAR ARCH BUCKSTAYS	37100
08	380	FURN BOTTOM SUPPORTS	46200
08	382	BOTTOM FURN SPRT	46200
08	400	UNCL FURN GUIDE	20600
08	501	UPPER BCK PAS BKSTAY	74900
08	503	UPPER BCK PAS BKST	86500
08	901	UPPER FURN KEY BKST	4000
08	907	LOWER FURN KEY BKST	1600
08	910	EXPN MOVE MEAS COMPS	600
09	001	SEAL BOXES FOR FURNACE OPENING	10800
09	002	SEAL BOXES FOR INSTRUMENT INSERTS	2300
09	003	MATERIAL FOR INSTRUMENT INSERTS	400
18	002	FIRST ROOF SKIN CASING FIRST PASS	16200
18	003	SECND PASS ROOF SKIN CASING	3000
18	010	PRESSURE PARTS ATTACHMNTS IN FURN ROOF SKIN CA	2200
18	020	VIBRATION SNUBBERS	200
20	051	LRD IIE MAIN ASSY.	57027
20	054	WALL BOX ASSY	1150
20	201	WB IE MAIN ASSY.	14001
20	204	WALL BOX ASSY WB IE	1740
20	511	DAHEAD MAIN ASSY.	223
20	794	WALL BOX ASSY FTP IE	63
20	962	FTP IE MAIN ASSY.	2035
24	320	SAFETY VALVES ESC.PIPE & DRAIN-CC RH BOILR	43170
24	385	SAFETY VALVES /ERV SILENCERS(BHEL)	63400
28	220	DOORS	11700
28	700	BPS FASTENERS	930
30	103	SEAL PLATE ASSEMBLY	3500
30	105	FUR BOTTOM ENCL FRAM	8800
30	211	FUR REAR ARCH ENCL	5100
30	212	FUR EXT D BOT ENCL	3600
30	215	MAIN BOILER ENCL	12600
30	219	VERT ROOF ENCL	63500
30	220	DECK SPRT & SEAL	65500
30	235	ENCLOSURE SUPPORT STEEL	27000
31	010	COMP WELDED TO PR	8000
31	102	FUR BOT SKIN CSG	900
31	104	FUR REAR ARCH SKIN	6000
31	105	SEC PASS SKIN CSG	400
31	993	ERECTION MATERIALS	900
32	010	FICOM ON PR PARTS	10000
41	350	OIL GUN ASSEMBLY AIR COOLED	1450

APPENDIX-I			
ESTIMATED WEIGHT OF VARIOUS PRODUCT GROUPS FOR EACH UNIT			
PG	MA	DESCRIPTION	WT IN Kg
41	390	OIL GUN VICE ASSEMBLY & RACK	1450
41	500	HIGH ENERGY ARC IGNITOR	750
41	988	COMMISSIONING SPARES	10
41	997	OILBURNER MANDATORY SPARES	100
42	001	PNEUMATIC FITTINGS	30
42	002	STEAM BLOWING MATERIAL	2500
42	005	INSTRUMENT FITTING	425
42	010	LFO PUMP SET	5300
42	020	HFO PUMP SET	6525
42	030	HFO HEATER SET	14000
42	046	DRAIN OILPUMP MOTOR ASSEMBLY	350
42	065	DRAIN OIL TANK	5500
43	004	ASSY.SCANNER & GUN AIR SYSTEM	2450
43	005	ASSY MILL AIR SYSTEM	18250
43	104	M/C SCNR & GUN AIR SYSTEM	19200
43	105	M/C MILL AIR SYSTEM	36000
43	200	SUB DEL AIR SYSTEM	9500
45	321	WIND BOX SUPPORT-32" WIDTH	10800
45	325	T.T. BURNERS ASSEMBLY1&3	70500
45	326	T.T. BURNERS ASSEMBLY2&4	73000
45	997	COAL BURNER MANDATRY SPARES	1600
47	261	FUEL PIPE SUPPORTS	49300
47	263	PIPE COUPLING ,ORIFICE& MISC. ITEMS	21300
47	266	FUEL PIPES ST PIPES FOR MILL A&B	104500
47	267	FUEL PIPES ST PIPES FOR MILL C&D	134200
47	268	FUEL PIPES ST PIPES FOR MILL E&F	126000
47	269	FUEL PIPES ST PIPES FOR MILL G&H	46300
47	XXX	CERLIN BENDS FROM EPD	250000
48	012	SQ.DUCT-FDFAN TO A.H	100000
48	015	SUPPORT SET CBET F.D FAN AND AH	24000
48	019	AIR DUCT SUP. FDN MATL	4600
48	022	SQ.DUCT-FDFAN INTRCON	13700
48	112	SQ.DUCT-PAFAN -PRI-AH	61800
48	115	SUPPORT-PAFAN -PRI-AH	25400
48	132	SQ.DUCT-PAFAN COLDBUS	33000
48	142	SQ.DUCT- COLDAIRBUS	42800
48	145	SUPPORT -COLDAIR BUS	5000
48	152	SQ.DUCT-PAFAN -INTER	46900
48	200	INS. TAPPINGS ON DUCTS	4400
48	202	SQ DUCT AH-WIND BOX	237700
48	205	SUPPORT AH-WIND BOX	21500
48	207	FLOWMTR SEC.AIRFLOW	23600
48	212	SQDUCT WIND BOX CONN.	35400
48	222	SQDUCT AH-HOT AIRBUS	115200
48	225	SUPPORT AH-HOT AIRBUS	11900
48	232	SQDUCT HOT AIRBUS	131300
48	235	SUPPORT HOT AIRBUS	2300
48	382	SQ DUCT ECO-AH	98800
48	385	SUPPORT ECO-AH	39600

APPENDIX-I			
ESTIMATED WEIGHT OF VARIOUS PRODUCT GROUPS FOR EACH UNIT			
PG	MA	DESCRIPTION	WT IN Kg
48	386	DUCT BELOW DIVERTOR	112700
48	388	SQ DUCT ECO-PRI.AH	136300
48	432	SQ DUCT AH-BLROUT FL	85100
48	435	SUPPORT AH-BLROUT FL	19700
48	438	SQ DUCT PRI.AH -BOF	33100
48	439	SQ DUCT SEC.AH -BOF	44000
48	494	NON METALIC EXPAN JOINT	100000
48	662	SQ DUCT HOTBUS-MILL	75000
48	665	SUPPORTS FOR HOT PA	13600
48	667	VENTURY.PRI,AIR FLOW	21400
48	700	BULKED BPS COMPONENT	4000
48	993	ERECTION MATERIALS	10000
50	510	Steam coil APH	9000
50	610	SCAPH horizontal type	11800
57	010	Gate fan outlet	21800
57	013	Dampers bet FD fan	22300
57	033	Dampers AH by pass	24200
57	110	Guillotine gate PA	20200
57	113	Flue gas line to mill	14200
57	133	Damper PA fan to coll	5000
57	143	Damper Cold Air bus	4100
57	160	Cold airgate, air bus	18300
57	203	Damp APH to wind box	21000
57	223	Damp APH primary SID	17300
57	380	Valve for flue gas	71000
57	403	Damper primary gas	11000
57	410	Economiser by pass GA	22000
57	423	Damper cascade Evop	25300
57	433	Damper APH boiler DU	27200
57	497	Knife gate valve	100
57	577	Elect actuator for G	1600
57	660	Gate hot air bus to	30900
57	663	Damper hot air bus	11700
57	988	Ducts commissioning	600
67	204	NEEDLE GATE	5100
67	272	36"RAW COAL GATE BUNKER OUTLET(MOTOR)	9600
67	276	36"RAW COAL GATE FEEDER INLET	9900
67	283	FEEDER OUTLET ISOLATION GATE	12400
67	801	DOWN SPOUT	20000
67	802	BUNKER EMPTYING CHUTE	29000
67	803	FEED PIPE TO MILL	24000
		NPP TOTAL	4363029
2. PIPING			
24	345	MAIN STEAM PIPING SH OUT TO BLER STOP VALVEII	34740
24	346	H ANGERS+SUPPORTS OFMAIN STEAM PPNG FOR HED	8100
24	350	BOILER FILLING PIPING	2420

APPENDIX-I			
ESTIMATED WEIGHT OF VARIOUS PRODUCT GROUPS FOR EACH UNIT			
PG	MA	DESCRIPTION	WT IN Kg
24	351	HANGERS+SUPPORTS FOR BLR FILLING PIPING	450
24	991	IMPORTED ELECTRODES MS+BLER FILLING LINE	460
80 & 81	XXX	SG SCOPE PIPING, VALVES AND H&S (SERVICE WATER, FIRE WATER, INSTRUMENT AIR, ETC ARE EXCLUDED), CBD & IBD EXPANDERS (WITHOUT INSULATILON) ETC	300000
		PIPING TOTAL	346170
3. PRESSURE PARTS:			
04	126	UPPER DRUM WITHOUT INTL ID 61-71	228600
04	136	UPPER DRUM INTERNALS ONLY FOR ID 61-71	10000
04	146	UPPER DRUM SUSPENSION ID 61 -71	15600
04	196	UPPER DRUM TRANS STRR ID 61-71	4500
04	988	DRUM COMMISSIONING SPARES	100
05	137	INLET FRONT LOWER WATER WALL HEADER	41000
05	139	LOWER INLET HEADER INTERNALS	100
05	147	INLET REAR LOWER WATER WALL HEADER	41000
05	158	INLET SIDE WATER WALL HEADER(LEFT)	35600
05	159	INLET SIDE WATER WALL HEADER(RIGHT)	35600
05	227	WATER WALL REAR HANGER OUTLT HEADER	4800
05	229	WATER WALL REAR SCREEN TUBE OUTLET HEADER	6600
05	231	OUTLET FRONT UPPER WATER WALL HEADER	6300
05	251	OUTLET SIDE UPPER WATER WALL HEADER	13500
06	400	UNCLASSIFIED BURNER PANEL	22700
06	631	FRONT UPPER WATER WALL PANEL	59300
06	633	FRONT UPPER INTER WATER WALL PANEL	56900
06	634	FRONT INTERMEDIATE WATER WALL PANEL	27300
06	637	WATER WALL LOWR FRONT PANEL	27900
06	641	REAR UPPER WATER WALL PANEL	30400
06	643	REAR UPPER INTER WATER WALL PANEL	57600
06	644	REAR INTERMEDIATE WATER WALL PANEL	27000
06	647	REAR LOWER WATER WALL PANEL	45900
06	651	SIDE UPPER WATER WALL PANEL	76400
06	653	SIDE INTERMEDIATE WATER WALL PANEL	84600
06	655	SIDE LOWER WATER WALL PANEL	61400
06	670	EXTENDED SIDE WATER WALL PANEL	16200
07	102	DOWENCOMER PIPING CONTROLLED CIRCULATION	77100
07	104	DISCHARGE LINE	24100
07	106	SUCTION MANIFOLD	14000
07	107	SUCTION SPOOLS	6700
07	215	RELIEF TUBES FROM SIDE WALL OUTLET HEADER	40900
07	216	RELIEF TUBES FROM REAR HANGER HEADER	4800
07	217	SCREEN RELIEF TUBES	28200
07	218	RELIEF TUBES FROOM FRONT OUTLET HEADER	8800
07	223	FURNACE SCREEN TUBES	26900
07	225	FURNACE REAR HANGER TUBES	17100
07	226	FURNACE REAR ARCH TUBES	8300
07	231	LOWER CORNER TRANSITION TUBE	4700
07	232	UPPER CORNER TRANSITION TUBE	600

APPENDIX-I			
ESTIMATED WEIGHT OF VARIOUS PRODUCT GROUPS FOR EACH UNIT			
PG	MA	DESCRIPTION	WT IN Kg
07	402	WATER WALL FRONT HEADER SUSPENSION	16400
07	403	WATER WALL SIDE HEADER SUSPENSION	17200
07	404	WATER WALL HANGER HEADER SUSPENSION	26800
07	405	WATER WALL SCREEN HEADER SUSPENSION	1800
07	420	DOWENCOMER GUIDES	7600
07	431	RISER TUBE SUPPORT	2600
07	500	MISC.PRESSURE PART CMONENTS	300
07	601	PRESSURE PART SEALS	2900
10	135	SH HRIZONTAL SPACED INLET HEADER	7200
10	178	SH VERTICAL PLATEN INLET HEADER	17600
10	182	SH BACKPASS REAR WALL L INLET HEADER	6200
10	183	SH BACKPASS SIDE WALL INLET HEADER	12200
10	185	SH FRONT WALL INLET HEADER	11900
10	191	SH RADIANT ROOF INLET HEADER	6100
10	195	SH DIVISIONAL PANELLET/PANEL INLET HEADER	11900
10	218	SH BACKPASS SIDE WALL REAR OUTLET HEADER	3500
10	235	SH HORIZONTAL SPACED OUTLET HEADER	21600
10	278	SH VERTICAL PLATEN OUTLET HEADER	32500
10	283	SH BACK PASS SIDED WALL FRONT OUTLET HEADER	9300
10	291	SH RADIANT ROOF OUTLET HEADER	10500
10	295	SH DIVISIONAL PANELLETTE / PANEL OUTLET HEADER	11900
10	315	SH INTERMEDIATE HANGER / SUPPORT HEADER	12400
10	687	SH RADIANT WALL JUNCTION HEADER	6600
11	036	LTSH UPPER COIL ASSEMBLY (LEFT)	69700
11	038	LTSH LOWER COIL ASSEMBLY (LEFT)	108600
11	077	LTSH VERTICAL SPACED COIL ASSEMBLY (LEFT)	48200
11	078	SH VERTICAL PLATEN COIL ASSEMBLY (LEFT)	72300
11	095	SHIVISIONAL PANALLETE ASSEMBLY (LEFT)	50600
11	336	SH HORIZONTAL COIL ASSEMBLY (UPPER RIGHT)	69700
11	338	SH HORIZONTAL COIL ASSEMBLY (LOWER RIGHT)	102400
11	377	SH VERTICAL SPACED REAR COIL WITH HEADER	48200
11	378	SH VERTICAL PLATEN COIL ASSEMBLY (RIGHT)	66800
11	395	SH DIVISIONAL PANELLETTE ASSEMBLY (RIGHT)	50600
11	606	SH FRONT WALL PANELS UPPER	8600
11	608	SH FRONT WALL PANELS LOWER	16900
11	716	SH REAR WALL PANELS UPPER (LEFT)	7000
11	717	SH REAR WALL PANELS INTER (LEFT)	6300
11	718	SH REAR WALL PANELS LOWER (LEFT)	7300
11	767	SH SIDE WALL PANELS UPPER FRONT(L&R)	12900
11	768	SH SIDE WALL PANELS INTER FRONT(L&R)	9600
11	769	SH SIDE WALL PANELS LOWER FRONT(L&R)	14900
11	787	SH REAR ROOFPANELS(LEFT)	8700
11	791	SH RADIANT ROOF TUBES(LEFT)	19200
11	916	SH REAR WALL PANEL UPPER (RIGHT)	6700
11	917	SH REAR WALL PANEL INTER (RIGHT)	5700
11	918	SH REAR WALL PANEL LOWER (RIGHT)	9700
11	967	SH SIDE WALL PANELS UPPER REAR(L&R)	12900
11	968	SH SIDE WALL PANELS INTER REAR(L&R)	9600
11	969	SH SIDE WALL PANELS LOWER REAR(L&R)	14900

APPENDIX-I			
ESTIMATED WEIGHT OF VARIOUS PRODUCT GROUPS FOR EACH UNIT			
PG	MA	DESCRIPTION	WT IN Kg
11	987	SH REAR ROOFPANELS(RIGHT)	10000
11	991	SH RADIANT ROOF TUBES(RIGHT)	18500
12	178	SH VERTICAL PLATEN INLET PIPE	13200
12	395	SH DIVISIONAL PANELLE TE INLET TUBES	7300
12	495	SH DIVISIONAL PANELLETE OUTLET TUBES	7200
12	515	SH BACKPASS HANGER TUBES	56400
12	619	SH HRIZONTAL BOTTOM SUPPORT TUBES	11200
12	803	SH STEAM COOLED SPACER TUBES	2400
12	805	SH HANGER TUBES	13500
12	850	SH SATURATED LINKS	7900
12	852	SH DESH LINKS	38100
12	900	SH DESH	4700
12	903	SH MISC. CMPONENTS	101000
12	906	SH SUPPORTS FOR LINES & LINKS	3400
12	914	SUSPENSION OF SHS RADIANT ROOF HEADER	4000
12	917	SUSPENSION OF RADIANT ROOF	11200
12	924	SUSPENSION OF BACKPASS TOP HEADER	19100
12	927	SUSPENSION OF REAR ROOF	2000
12	928	SUSPENSION OFSH HANGER TUBES FRONT& REAR WALL	56700
12	944	SUSPENSION OFSH PLATE & SH DIVN.PANTE HEADER	2000
12	948	SUSPENSION OFSH FL SH SPD. CL.ASSY <SH TER.TE	36800
12	954	SUSPENSION OFSH PLATEN HDR & FINAL SPACED HEADER	9600
12	968	SUSPENSION OFSH PLATEN COIL ASSEMBLY	29400
15	177	RH VERTICAL PLATEN INLET HEADER	16400
15	279	RH VERTICAL SPACED OUTLET HEADER	38800
16	077	RH VERTICAL SPACED REAR COIL ASSEMBLY(LEFT)	74400
16	079	RH VERTICAL PLATEN FRONT COIL ASSEMBLY(LEFT)	87000
16	377	RH VERTICAL SPACED REAR COIL ASSEMBLY(RIGHT)	74400
16	379	RH VERTICAL PLATEN FRONT COIL ASSEMBLY(RIGHT)	87000
17	776	RH VERTICAL SPACED CENTER CROSS OVER TUBE	10500
17	807	STEAM COOLED SPACER TUBES FOR RH COIL	900
17	900	RH DESUPERHEATER	2500
17	904	RH HEADER SUPPORTS	7900
17	919	RH FRONT COIL SUSPENSION	28800
17	929	RH REAR SUSPENSION	54100
19	701	ECONOMISER INLET HEADER	16000
19	702	ECONOMISER OUTLET HEADER	10400
19	814	PLAIN TUBE E CONOMISER UPPER COIL ASSEMBLY (LEFT)	77800
19	824	PLAIN TUBE ECONOMISER LOWER COIL ASSEMBLY (LEFT)	125800
19	850	ECONOMISER FEED PIPE	3200
19	851	ECONOMISER OUTLET LINKS TO DRUM	39200
19	884	PLAIN TUBE ECONOMISR COIL INTERNAL ASSY(LEFT)	206400
19	903	ECONOMISER MISC.COMPONENTS	200
19	905	ECONOMISER SUPPORTS & SUSPENS BELOW ROOF	400
19	906	ECONOMISER LINES & LINKS SUPPORTS	2900
19	907	ECONOMISER FEED PIPE SUPPORTS	1000

APPENDIX-I			
ESTIMATED WEIGHT OF VARIOUS PRODUCT GROUPS FOR EACH UNIT			
PG	MA	DESCRIPTION	WT IN Kg
19	914	PLAIN TUBE ECONOMISER UPPER ASSEMBLY (RIGHT)	77500
19	924	PLAIN TUBE ECONOMISER LOWER ASSEMBLY (RIGHT)	120300
19	984	PLAIN TUBE ECONOMISER INTER ASSEMBLY (RIGHT)	206400
21	600	SOOT BLOWER PIPING & FITTINGS	14000
21	601	SOOT BLOWER PIPING SUPPORTS	9420
21	700	BULKED BPS COMPONENTS FOR SB PIPING	860
21	800	SB VALVES (BHEL)	2000
21	825	SB VALVES (SUB-DELIVERY)	1600
21	850	SOOT BLOWER SAFETY VALVE(BHEL)	55
24	300	BOILER TRIM PIPING & FITTING	76620
24	301	BOILER TRIM PIPING & SUPPORTS	14510
24	315	SPRAY WATER SYSTEM-CC RH BOILER	5900
24	340	SAMPLE COOLER & SUPPORTS	830
24	355	CIRCULATING PUMP CMPONENTS(SD)	29320
24	360	VALVES(BHEL)-CC RH BOILER	64450
24	365	VALVES & FITTINGS(SD)-CC RH BOILER	6170
24	374	COLLER & STRAINER ASSMBLY FOR BCWP	2000
24	375	HEADERS FOR TRIM PIPING	2620
24	380	ERV & SAFETY VALVES(BHEL)	8200
24	700	BULKED BPS COMPONENTS FOR TRIM PIPES	640
24	993	CONSUMABLE & ERECTION MATERIALS	25
24	994	NAME PLATES	310
42	070	BURNER STATION SKID ASSEMBLY	7100
42	120	PIPING PUMP HOUSE FUEL OIL	3700
42	128	PIPING PUMP HOUSESTEAM-IBR	400
42	150	PIPING OPERATING FLOOR HFO&TRACER	8850
42	152	PIPING OPERATING FLOOR LFO	1550
42	154	PIPING OPERATING FLOOR DRAIN OIL	2150
42	157	PIPING OPERATING FLOOR ATM.AIR	1650
42	158	PIPING OPERATING FLOOR -STEAM IBR	4150
42	200	SUB DEL FUEL OILSYSTEM	2700
42	300	BHELVALVE FUEL OIL SYSTEM	1100
42	358	BHELVALVE FOS-IBR	1000
42	700	BPS FASTENERS	1250
		PRESSURE PARTS TOTAL	4525030
		4. ROTATING MACHINES:	
52	000	Special tools/contra	400
52	001	Tools/cont (sec AH)	700
52	010	Larg AH-Rotor Assy	395200
52	011	Larg AH-Rotor Post	15600
52	012	Larg AH Rotor pin rack	3800
52	013	Larg AH Rotor seals	4600
52	030	Larg AH rotor housing	35800
52	041	Hot end conn. Plate	31400
52	042	Cold end conn. Plate	51200
52	054	Larg AH axial seal	400
52	055	Larg AH by pass seal	900
52	100	Large AH Rotor drive	5600

APPENDIX-I			
ESTIMATED WEIGHT OF VARIOUS PRODUCT GROUPS FOR EACH UNIT			
PG	MA	DESCRIPTION	WT IN Kg
52	210	Larg AH access door	25000
52	211	Larg AH air seal pipe	700
52	212	Larg AH obser ports	700
52	217	Larg AH stop alarms	100
52	261	Larg AH guide bearing	2900
52	262	Larg AH support bearing	4300
52	271	Oil piping guide bearing	500
52	272	Oil piping support bearing	500
52	274	Lub oil circuln Unit	1200
52	301	Wash manifold gas inl	800
52	302	Wash manifold gas out	500
52	326	Cleaning eqpt gas out	100
52	329	Cleaning equipment drive unit	300
52	360	Fire sensing system	1600
52	401	Wash manifold GI(sec)	2600
52	402	Wash manifld GD(sec)	1600
52	410	Rotor Assy(Sec)	619800
52	411	Rotor Post (sec)	32600
52	412	Rotor pin rack(sec)	4700
52	413	Rotor seals(sec)	6800
52	426	Cleaning equipment GD(sec)	400
52	429	Clean equipt drive Sec	800
52	430	Rotor Housing(SEC)	42100
52	441	Hot end conn. Plates	51800
52	442	Cold end conn. Plates	87300
52	454	Axial seal (sec)	500
52	455	By pass seal(sec)	1100
52	460	Fire sensing sys -Sec	100
52	500	Rotor drive(sec)	8600
52	510	Access door(sec)	700
52	511	Air seal piping (sec)	800
52	512	Observation port	100
52	517	Rotor stop alarm-sec	100
52	520	AH General Details-Sec	11200
52	561	Guide bearings(sec)	4400
52	562	Support bearing(Sec)	11000
52	571	Oil PPG guideBrg (S)	500
52	572	Oil PPG Suprt Brgs(S)	500
52	574	Lub oil cir Unit(s)	1200
52	600	Large AH E, C&I components	100
52	988	Larg AH commng spares	500
53	220	RTYP AH genl details	9100
55	011	FD fan foundation MA	1800
55	017	FD fan C&I items	4600
55	031	P A fan foundation MA	1400
55	037	PA fan C&I items	100
55	216	IREAC FD fan 2500-300	38000
55	335	2REAC PA fan 2000-250	29400
55	810	Axial FD fan coupling	1000

APPENDIX-I			
ESTIMATED WEIGHT OF VARIOUS PRODUCT GROUPS FOR EACH UNIT			
PG	MA	DESCRIPTION	WT IN Kg
55	830	Axl. PA fan coupling	900
55	910	Axl FD fan accessory	6400
55	911	Axial FD fan silencer	70500
55	916	Additional FD rotor	25000
55	930	Axl. PA fan accessory	4400
55	931	PA fan silencer	65800
55	936	Additional pA rotor	4600
56	000	Tools & fixture cont	800
56	021	ID fan foundation MA	4200
56	027	ID fan C&I items	100
56	161	BAC 1 suc SAfan	800
56	173	Bac 2 suc IGNTR fan	600
56	228	Bac 2 suc ID fan	191200
56	670	IGNTR fan motor	6300
56	820	Radial ID fan coupling	200
56	870	Seal air fan coupling	1600
56	920	R AD ID fan accessory	5000
56	926	Additional ID rotor	100
56	988	Radial fan commng Spa	200
61	XXX	BOWL MILLS XRP 1003 - 10 Nos	1425000
65	736	36"GRAVIMETRIC FEEDER 7'CD	65000
		DRIVE MOTORS FOR ROT M/Cs	225000
		ROTATING MACHINES TOTAL	3665800
5. STRUCTURE:			
24	325	SILENCER SUPPORT SAFETY VALVES	22300
24	335	SILENCER SUPPORT STARTING VENT-CC RH BOILER	3320
35	010	BLR FOUNDN MATERIALS	20100
35	111	MAIN COLUMN LT 1PASS	332100
35	112	MAIN COLUMN LT 2PASS	349200
35	121	MAIN COLUMN RT 1PASS	332100
35	122	MAIN COLUMN RT 2PASS	338800
35	130	MAIN COLUMN MIDDLE	326800
35	140	AUX.COLUMNS LEFT SIDE	293000
35	150	AUX.COLUMNS RT. SIDE	293000
35	190	GIRDER PINS CONNECNS	14700
35	211	CEIL GRID-1ST PASS	226200
35	212	CEIL GRID-2ND PASS	220000
35	213	CR WLD BEAM-1ST PASS	165700
35	214	CR WLD BEAM-2ND PASS	71500
35	221	ROLL BEAM CEIL 1PASS	44400
35	222	ROLL BEAM CEIL 2PASS	27000
35	231	CEIL H BRACING 1PASS	11900
35	232	CEIL H BRACING 2PASS	25000
35	311	BYPASS STACK COLUMN	27300
35	312	HORIZ BRAC IIPASS IM	18600
35	321	HORIZ BRAC IPASS IIM	23700
35	322	HORIZ BRAC IIPASS IIM	35600
35	331	HORIZ BRAC IPASS III	15600

APPENDIX-I			
ESTIMATED WEIGHT OF VARIOUS PRODUCT GROUPS FOR EACH UNIT			
PG	MA	DESCRIPTION	WT IN Kg
35	332	HORIZ BRAC IIPASS III	13400
35	341	HORIZ BRAC IPASS IVM	19900
35	342	HORIZ BRAC IIPASS IV	19600
35	351	HORIZ BRAC IPASS V M	19600
35	352	HORIZ BRAC IIPASS V	14100
35	361	HORIZ BRAC IPASS VI	21500
35	362	HORIZ BRAC IIPASS VI	18000
35	381	LAND & CONN PLAT LOW	48700
35	382	LAND & CONN PLAT MID	38600
35	383	LAND & CONN PLAT UPP	31000
35	390	MISC STRUCTURES	67300
35	441	HRIL BEAMS-LOWER	127600
35	442	HRIL BEAMS-MIDDLE	79700
35	443	HRIL BEAMS-UPPER	56700
35	451	HOR BEAM-LOW 2ND PASS	99500
35	452	HOR BEAM-MID 2ND PASS	58300
35	453	HOR BEAM-UPP 2ND PASS	40200
35	511	FRONT BRACING-LOWER	48000
35	512	FRONT BRACING-MIDDLE	38100
35	513	FRONT BRACING-UPPER	26700
35	521	SIDE BRACING-LOWER	110500
35	522	SIDE BRACING-MIDDLE	81800
35	523	SIDE BRACING-UPPER	55800
35	531	REAR BRACING-LOWER	126900
35	532	REAR BRACING-MIDDLE	75600
35	533	REAR BRACING-UPPER	72600
35	700	BULK BPS COM PG35,36	25800
35	811	FLOOR GRILLS & GUARDPL	267400
35	821	STEEL RAC KS FOR SITE	10800
35	822	STAIR & LADDER MIDDLE	8800
35	823	STAIR & LADDER UPPER	5800
35	851	H ANDRAILS & POSTS	23900
36	110	COLUMNS-GALLERIS	286600
36	130	TUBLAR AH FRAMES	89100
36	150	COLUMNS BRACINGS	633700
36	311	M.FLOOR 11LEV 1PASS	49700
36	312	M.FLOOR 11LEV 2PASS	17000
36	313	NON_MBL 3LVL BET 1&2	81600
36	314	FLOOR IN II PASS	50000
36	315	FLOOR IN I PASS	44400
36	316	FLOOR IN I PASS	74000
36	321	M FLOOR 12LEV 1PASS	31200
36	322	M FLOOR 12LEV 2PASS	190600
36	323	NON_MBL 3LVL BET 2&3	23000
36	324	FLR AT EL25.55M	34200
36	325	FLOOR IN I PASS	59700
36	326	FLOOR IN IIPASS	100200
36	327	FLOOR IN I PASS	42100
36	331	M FLOOR 13LEV 1PASS	23000

APPENDIX-I			
ESTIMATED WEIGHT OF VARIOUS PRODUCT GROUPS FOR EACH UNIT			
PG	MA	DESCRIPTION	WT IN Kg
36	332	M FLOOR 13LEV 2PASS	3300
36	333	NON_MBL 3LVL BET 3&4	149300
36	334	FLOOR IN I PASS	33100
36	335	FLOOR IN IIPASS	40100
36	341	M FLOOR 14LEV 1PASS	85500
36	342	M FLOOR 14LEV 2PASS	10600
36	343	NON_MBL 3LVL BET 4&5	19500
36	344	FLOOR IN IIPASS	26600
36	345	FLOOR IN I PASS	22200
36	346	FLOOR IN IIPASS	38500
36	347	FLOOR IN I PASS	21600
36	348	FLOOR IN IIPASS	17900
36	351	MAIN FLOOR 15LEV UR	21300
36	352	MAIN FLOOR 15LEV LR	4900
36	353	NON_MBL 3LVL BET 5&6	25700
36	354	FLOOR@EL68.05M	36500
36	355	FLOOR IN I PASS	36400
36	361	M FLOOR 16LEV 1PASS	26200
36	362	M FLOOR 16LEV 2PASS	25000
36	363	NON_MBL 3LVL BET 6&7	29300
36	391	MISC PLAT-PART I	127300
36	392	MISC PLAT-PART II	200800
36	393	MISC PLAT-PARTIII	102400
36	394	MISC PLAT DUCT SUPPT	19100
36	395	MISC PLAT & PIPE SUPPT	76200
36	610	WATER PROTN-BUIRN FLR	88200
36	611	BURNER ROOF SHEETING	20500
36	613	R AIN WATER GUTTER	30000
36	620	WATER PROTN-DRUM FLR	76100
36	621	DRUM ENCL. SHEETING	24500
36	740	POSTS & HGRS	76700
36	811	FLR GRILLS & GUD PL LR	79700
36	812	FLR GRILLS & GRD PL MID	89000
36	813	FLR GRILLS & GRD PL UP	228600
36	814	FLR GRILLS & GRD PL MIS	86500
36	820	STAIRS & LADDERS	35700
36	851	H ANDRAILS & POSTS LOWER	15600
36	852	H ANDRAILS & POSTS MIDL	15600
36	853	H ANDRAILS & POSTS UPPER	61300
38	210	CONN PLFM BLR & ELVR	39800
38	299	MILL HANDLG MONORAIL	106600
38	310	CONN PLFM BLR & MILL	53000
38	381	ECO HANDLING STRUCT.	70900
38	410	MILL MAIN PLATFORMS	144600
38	510	COLUMN BRACINGS	88900
38	610	ELEVATOR CLADDING	64600
38	611	ELEVATOR CLADDING	41400
38	710	ELEVATOR CLAD STRUCT	58600
38	810	FLOOR GRILLS & GUARD PL	75500

APPENDIX-I			
ESTIMATED WEIGHT OF VARIOUS PRODUCT GROUPS FOR EACH UNIT			
PG	MA	DESCRIPTION	WT IN Kg
38	820	STAIRS & LADDERS	4500
38	850	HAND RAIL & POSTS	21700
39	301	STRUC & PLATFORM-FANS	5400
39	302	STRUC MOTOR HOOD	7600
39	304	FDFAN HANDLING STRU	7600
39	305	PA FAN HANDLING STRU	13500
39	306	ID FAN HANDLING STRU	88900
39	700	BULK BPS COM PG38,39	100
39	810	FLOOR GRILLS & GUARD PL	8000
39	820	STAIRWAYS & LADDERS	2000
39	850	HAND RAIL & POSTS	2000
99	099	MISCELLANEOUS CHAIN PULLEY BLOCK	100
99	100	FAN HANDLING ARRANGEMENT	19000
99	300	CIRCULATING WATER PUMP HANDLING ARRGT.	9000
99	400	APH ELE.&SCAPH HANDLING ARRGT	8000
99	502	LTSH & ECONOMISR HANDLING ARRGT	6500
99	514	FURNACE MAINTENANCE PLATFORM	3700
99	600	F.O. SYSTEM HANDLING EQUIPMENT	1200
		STRUCTURE TOTAL	9921720

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 IS 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 (PG 99) IS EXCLUDED FROM THE SCOPE OF WORK.

APPENDIX -II (Page 1 of 2)**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	325 TON OR EQUIVALENT CRAWLER CRANE WITH HEAVY LIFT ATTACHMENT	01 No	From 2 ND Month of Start of erection. Refer NOTES below.
02	150 TON OR EQUIVALENT CLASS CRAWLER CRANE	01 No.	From 4 th Month of start of erection. Refer NOTES below.
03	75 T OR EQUIVALENT CRAWLER CRANE- for material loading at yard	01 No.	At BHEL storage yard only for loading of materials issued to the contractor. Refer NOTES below.
04	75 T OR EQUIVALENT CRAWLER CRANE- for pre - assembly, erection etc at site	01	This crane is likely to be deployed by 9 th – 10 th month from start of erection. Refer NOTES below.
05	HYDRAULIC TEST/ PRESSURIZING PUMP SET of rating 600 & 450 Kg per c m ²	01 No EACH	WITH NECESSARY ELECTRICAL STARTER. FOR PRESURE TESTING OF BOILER AND HIGH PRESSURE PIPELINES. Contractor to arrange necessary electrical cable for connection to the supply point.
06	ACID CIRCULATION PUMP SET: 200 TPH WITH CONTROL PANEL	05 Nos	FOR CHEMICAL CLEANING. Necessary Electrical cables will be provided by BHEL. Contractor shall duly lay the same.
07	ACID INJECTION PUMP	03 Nos	FOR CHEMICAL CLEANING. Necessary Electrical cables will be provided by BHEL. Contractor shall duly lay the same.
08	INDUCTION HEATING M/c	As per requirement	FOR WELDING OF P-91 PIPING. Refer clause no. 4.4.2.7
09	PASSENGER CUM GOODS ELEVATOR – 1 TON CAP	01 No	REF clause 4.6.8 (A) & (B) FOR INSTALLATION, OPERATOR & ROUTINE MAINT.
10	FURNACE MAINTENANCE PLATFORM	01 SET	THIS MAY BE EITHER REGULAR DU OR BHEL'S OWN EQPT.

THESE TOOLS & PLANTS WILL BE PROVIDED IN A PHASED MANNER TO SUIT ACTUAL REQUIREMENT OF THE PROJECT.

APPENDIX -II (Page 2 of 2)

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

1. OPERATOR FOR THE 350 T CRANE WILL BE PROVIDED BY BHEL.
 2. CONTRACTOR SHALL ARRANGE OPERATOR FOR THE 150 T CLASS CRANE.
 3. CONTRACTOR SHALL PROVIDE OPERATOR FOR 75 T CRANE PROVIDED FOR ERECTION AND PRE-ASSEMBLY AT SITE – SL.NO. 4 ABOVE.
 4. 75 T CRANE EARMARKED FOR MATERIAL LOADING AT STORAGE YARD IS ISSUED TO THE MATERIAL HANDLING AGENCY ON SHARING BASIS. OPERATOR FOR THE SAME WILL BE PROVIDED BY MATERIAL HANDLING AGENCY. CONTRACTOR SHALL SHARE THE CHARGES FOR THE OPERATOR FOR HIS USE.
 5. NO CRANE WILL BE PROVIDED BY BHEL FOR LOADING OF MATERIALS, IF ANY, AT UNLOADING BAY OF INCOMING MATERIALS BY RAIL. CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENT FOR PICKING UP AND TRANSPORTING THE MATERIALS FROM UNLOADING BAY.
 5. CONTRACTOR SHALL PROVIDE THE FUEL FOR ABOVE CRANES PROVIDED FOR CONTRACTOR'S USE BOTH AT STORAGE YARD AS WELL AS AT SITE.
 6. BHEL WILL MAKE AVAILABLE THE CRAWLER CRANES AT SITE 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.
 7. ALSO REFER SECTION-7.
- BHEL CRANES HAVE TO BE SHARED WITH OTHER AGENCIES / CONTRACTORS OF BHEL. THE ALLOCATION OF CRANES SHALL BE THE DISCRETION OF BHEL ENGINEER, WHICH SHALL BE BINDING ON THE CONTRACTOR.

APPENDIX -III

LIST OF MAJOR TOOLS & PLANTS AND MMD TO BE DEPLOYED BY THE CONTRACTOR

A: TOOL & PLANTS

SN	DESCRIPTION OF EQUIPMENTS & CAPACITY	MINIMUM QUANTITY	REMARKS
01	CRAWLER CRANE – 75 MT	01	THIS CRANE SHOULD BE DEPLOYED FROM THE BEGINNING TO ENABLE START OF BOILER ERECTION
02	HYDRA CRANE 8-10 MT	02	1No. FOR MATERIAL FEEDING AT STORAGE YARD - FROM THE BEGINNING 1No. AT SITE FOR MATL MOVEMENT -FROM THE BEGINNING
03	TRAILER WITH HORSE – Suitable capacity to handle all boiler material movement to site from storage yard	As per requirement	To be added progressively
04	TRACTOR TROLLEY- Suitable capacity to handle all boiler material movement to site from storage yard	As per requirement	To be added progressively
05	TRUCK	As per requirement	To be added progressively
06	AIR COMPRESSOR (ELECTRIC/DIESEL) – 7 Kg/cm ² - 140 CFM	02	To be added progressively
07	TIG WELDING SET	As per requirement	To be added progressively
08	3 Ph DISTRIBUTION BOARD WITH COMPLETE SET UP FOR DRAWL OF CONSTRUCTION POWER - 600 Amp, 415 Volt	AS PER REQMT	
09	PRE HEATING / STRESS RELIEVING SET (HEATING CONTROL PANEL, CABLES, HEATING ELEMENTS, ANNEALING CABLES ETC.)	AS PER REQUIREMENT	REFER CLAUSE 4.4.2.7
10	RADIOGRAPHY ARRANGEMENT INCLUDING THE SOURCE	IR 192 & COBALT 60	TO MEET THE SITE REQUIREMENT
11	THEODOLITE OF REQUIRED ACCURACY	01 Set	
12	SELF DRILLING CUM TAPPING MACHINE FOR SCREWS OF FLOOR GRILL & BOILER ROOF SHEETING AND SIDE CLADDING	As per requirement	To be added progressively
13	ARRANGEMENT FOR UT OF HIGHER THICKNESS JOINTS WITH RECORDING FACILITY- TYPE USN 50 OR EQUIVALENT/ UPGRADED TYPE	01 SET	
14	ELECTRO-HYDRAULIC PIPE BENDING MACHINE	2" Nb X 12 mm THICK PIPES	AS PER SITE REQUIREMENT

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APPENDIX -III			
LIST OF MAJOR TOOLS & PLANTS AND MMD TO BE DEPLOYED BY THE CONTRACTOR			
A: <u>TOOL & PLANTS</u>			
SN	DESCRIPTION OF EQUIPMENTS & CAPACITY	MINIMUM QUANTITY	REMARKS
15	WELDING GENERATOR (ELECTRIC & DIESEL)	300 AMPS	AS REQUIRED
16	RADIOGRAPHY FILM VIEWER OF REQUIRED INTENSITY	2 Nos	
17	ELECTRIC CABLE FOR DRAWAL & DISTRIBUTION OF CONSTRUCTION POWER	AS PER SITE REQUIREMENT	AS PER SITE REQUIREMENT
18	PIPE BENDING MACHINE – HAND OPERATED	UP TO Nb 65mm Tubes	AS PER SITE REQUIEREMENT 02 EACH
19	BAKING OVEN AND HOLDING OVEN WITH THERMOSTAT AND TEMPERATURE GAUGE FOR BAKING COATED WELDING ELECTRODES	AS PER REQUIREMENT	
20	PORTABLE OVEN FOR COATED WELDING ELECTRODES	AS PER SITE REQUIREMENT	20
21	STAND BY DIESEL POWER GENERATING SET OF SUITABLE CAPACITY FOR INDUCTION HEATING PROCESS AS PER CLAUSE NO. 4.4.2.9 OF SPECIAL CONDITIONS OF CONTRACT	AS PER SITE REQUIREMENT	AS PER SITE REQUIREMENT

THE LIST ABOVE IS ONLY AN INDICATIVE ONE. ANY OTHER T&P REQUIRED OVER AND ABOVE THOSE MENTIONED ABOVE SHALL BE DEPLOYED BY THE CONTRACTOR WITHOUT ANY ADDITIONAL FINANCIAL IMPLICATION TO BHEL.

B: MEASURING AND MONITORING DEVICES (MMD):
AS PER REQUIREMENT TO BE FINALIZED AT SITE.

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		
	TOTAL	100%	

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											
	MONTH WISE TOTAL											

* Please use additional sheets for remaining contract period

DATE:

BHARAT HEAVY ELECTRICALS LIMITED:PSWR:NAGPUR
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SIGNATURE OF TENDERER

APPENDIX–VI

FORMAT FOR DEPLOYMENT PLAN FOR MAJOR TOOLS AND PLANTS BY CONTRACTOR

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												
11												
12												
13												
14												
15												
16												
17*												

* Please use additional sheets for remaining contract period and subsequent serial numbers

DATE:

SIGNATURE OF THE TENDERER

**BHARAT HEAVY ELECTRICALS LIMITED:PSWR:NAGPUR
TENDER SPECIFICATION No. BHE/PW/PUR/KNT-BLE/469**

APPENDIX-VII

CONCURRENT COMMITMENTS

S N	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

BHARAT HEAVY ELECTRICALS LIMITED:PSWR:NAGPUR
TENDER SPECIFICATION No. BHE/PW/PUR/KNT-BLE/469

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

**BHARAT HEAVY ELECTRICALS LIMITED:PSWR:NAGPUR
TENDER SPEC IFICATION No. BHE/PW/PUR/KNT-BLE/469**

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