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

No. - BHE/PW/PUR/UKT-BLR Vertical Pkg/625

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 ITS AUXILIARIES, AIR PREHEATERS, DUCTS AND DAMPERS, FUEL PIPING, BOILER INTEGRAL PIPING, ELECTROSTATIC PRECIPITATOR, FANS, POWER CYCLE PIPING, COAL MILLS AND COAL FEEDERS, CHEMICAL DOZING SYSTEM, INSULATION, FINAL PAINTING ETC OF 1x500 MW UKAI THERMAL POWER PROJECT UNIT No-6.

AT

GUJARAT STATE ELECTRICITY CORPORATION LIMITED

DIST- TAPI

GUJRAT

PART I

TECHNICAL BID SPECIFICATION
AND
NOTICE INVITING TENDER

BOOK NO.:

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

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$: Included in Tender Specifications Part-I. Hosted in BHEL web page (www.bhel.com) as file titled **"NIT+GCC-625".**

@: Issued as separate hard copy booklet 'Tender Specifications Part-II (Price Bid-625)'. Hosted in BHEL web page (www.bhel.com) as file titled **"PRICE BID-625"**

Note:

Rest of the tender documents are included in Tender Specifications Part-I. Hosted in BHEL web page (www.bhel.com) as file titled "**TECH BID-625"**

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

TENDER SPECIFICATION DOCUMENT ISSUE DETAILS

TENDER SPECIFICATION NO:- BHE/PW/PUR/UKT-BLR Vertical Pkg/625

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 ITS AUXILIARIES, AIR PREHEATERS, DUCTS AND DAMPERS, FUEL PIPING, BOILER INTEGRAL PIPING, ELECTROSTATIC PRECIPITATOR, FANS, POWER CYCLE PIPING, COAL MILLS AND COAL FEEDERS, CHEMICAL DOZING SYSTEM, INSULATION, FINAL PAINTING ETC OF 1X500 MW UNIT-6

AT

UKAI THERMAL POWER STATION EXPANSION PROJECT (1X500MW), UKAI , DIST-TAPI (GUJRAT)

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 Corrigendum.

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

M/s. ……

…….

PLEASE NOTE:
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

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

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

PROCEDURE FOR SUBMISSION OF SEALED TENDERS

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

PART-I (TECHNICAL BID) COVER-I

EXCEPTING RATE SCHEDULE, ALL OTHER SCHEDULES, DATA SHEETS AND DETAILS CALLED FOR IN THE SPECIFICATION SHALL BE ENCLOSED IN PART-I "TECHNICAL BID" ONLY.

PART-II (PRICE BID) COVER-II

ALL INDICATIONS OF PRICE SHALL BE GIVEN IN THIS PART-II "PRICE BID". **EMD SHALL NOT BE INCLUDED IN THIS COVER.**

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

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

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

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

PROJECT INFORMATION

BHEL's Client M/s Gujarat State Electricity Corporation Limited (GSECL) has their existing 5 units pulverized Coal based Power Plant at Ukai Thermal Power Plant, Distt-Tapi, Gujarat. The said client has undertaken the process of expanding the capacity of the power plant by setting up one more power generation unit of 490 MW rating.
The Ukai TPS is about 90km from Surat. The site is approachable by road. The nearest railway station is Ukai- Songarh.

LOCATION & APPROACH

1) Existing Project : Total Five units of 120, 200 & 210 MW
2) Project : Thermal Power Station Unit#6 (490MW), Ukai.
3) Project Location : UKAI, DIST: TAPI, GUJRAT STATE
3) Transport facilities:

A) Nearest Railway: SONGARH on the broad gauge, connected from Surat junction on Howrah main line
Power station is having broad gauge private railway siding served through Rly.station at distance of about 10 Kms.

B) Road: The site is also connected by all weather road from SURAT -DHULIA through state highway SH-6 at a distance of 10 Kms from Songarh.

C) CLIMATE CONDITIONS:

Maximum temp	: 45 Deg C
Minimum Temp	: 5 Deg C
Max daily average temp	: 35 Deg C
Max yearly average temp	: 30 Deg C
Maximum humidity	: 85%
Minimum humidity	:15%
Annual average rainfall	:1500 mm (During June-Sept)
Wind Velocity: Max	: 20 Km/Hr

D) Seismic Zone: As per IS 1839/70 : Zone-III

CHECK LIST

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

1	NAME OF THE TENDERER WITH ADDRESS		
2	NATURE OF THE FIRM	LIMITED / PARTNERSHIP / PROPRIETARY	
3	EMD DETAILS (Rs. 2.0 LACS BY DD ONLY OR ONE TIME EMD)		
4	VALIDITY OF OFFER (REQUIRED 6 MONTHS FROM DUE DATE)		
5	MOBILIZATION TIME (NOT EXCEEDING 15 DAYS FROM FAX LOI)		
6	WHETHER NO DEVIATION CERTIFICATE FURNISHED	YES	NO
7	TENDERER HAS VISITED THE PROJECT SITE AND ACQUAINTED WITH THE SITE CONDITIONS	YES	NO
8	DETAILS OF CONCURRENT JOBS ARE FURNISHED (AS PER RELEVANT APPENDIX)	YES	NO
9	HEAD QUARTER'S ORGANISATION IS FURNISHED	YES	NO
10	PROPOSED SITE ORGANISATION IS FURNISHED	YES	NO
11	FINANCIAL STATUS OF THE COMPANY (RELEVANT ANNEXURE OF GCC) IS FURNISHED	YES	NO
12	PROFIT & LOSS ACCOUNT FOR PRECEDING THREE YEARS IS FURNISHED	YES	NO
13	LATEST SOLVENCY CERTIFICATE FROM THE BANKER IS FURNISHED	YES	NO
14	LATEST INCOME TAX CLEARANCE CERTIFICATE OR COPY OF PAN CARD ACCOMPANIED BY 'IT RETURN' COPY IS FURNISHED	YES	NO
15	MANPOWER DEPLOYMENT PLAN (AS PER RELEVANT APPENDIX) IS FURNISHED	YES	NO
16	MONTHWISE DEPLOYMENT PLAN FOR MAJOR T&P (AS PER RELEVANT APPENDIX) IS FURNISHED	YES	NO
17	ANALYSIS OF UNIT RATES QUOTED (AS PER RELEVANT APPENDIX) IS FURNISHED	YES	NO
18	POWER OF ATTORNEY ENCLOSED IN FAVOUR OF PERSON MAKING OFFER.	YES	NO

19	DETAILS OF SIMILAR WORK DONE IN LAST SEVEN YEARS (AS PER RELEVANT APPENDIX) AND SUPPORTING DOUCMENTS FURNISHED.	YES	NO
20	PROGRAMME FOR THE SUBJECT WORK FURNISHED	YES	NO
21	BIDDER HAS FMILIARIZED HIMSELF WITH ALL RELEVANT LOCAL LAWS & CONDITIONS.	YES	NO
22	WHETHER ALL THE PAGES OF THE TENDER DOCUMENTS ARE READ, UNDERSTOOD AND SIGNED	YES	NO
23	WHETHER THE FOLLOWING DETAILS PERTAINING TO YOUR BANK ACCOUNT DULY ENDORSED BY THE BANK HAVE BEEN FURNISHED {TO ENABLE BHEL RELEASE PAYMENTS THROUGH ELECTRONIC FUND TRANSFER (EFT/RTGS) AS SPECIFIED IN SECTION 12 } 1. Name of the Company 2. Name of Bank 3. Name of Bank Branch 4. City/Place 5. Account Number 6. Account type 7. IFSC code of the Bank Branch 8. MICR Code of the Bank Branch	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/UKT-BLR Vertical Pkg/625** 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/UKT-BLR Vertical Pkg/625

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

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

SIGNATURE OF THE TENDERER

DATE:

SECTION-3
OFFER OF THE CONTRACTOR

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

DEAR SIR,

I/WE HEREBY OFFER TO CARRY OUT THE WORK DETAILED IN TENDER SPECIFICATION NO. **BHE/PW/PUR/UKT-BLR Vertical Pkg/625** ISSUED BY BHARAT HEAVY ELECTRICALS LIMITED, POWER SECTOR-WESTERN REGION, NAGPUR , IN ACCORDANCE WITH THE TERMS AND CONDITIONS THEREOF.

I/WE HAVE CAREFULLY PERUSED THE FOLLOWING LISTED DOCUMENTS CONNECTED WITH THE ABOVE WORK AND AGREE TO ABIDE BY THE SAME.

1. INSTRUCTIONS TO TENDERERS
2. GENERAL CONDITIONS OF CONTRACT
3. SPECIAL CONDITIONS OF CONTRACT
4. OTHER SECTIONS, APPENDICES, SCHEDULES AND DRAWINGS.

I/WE HAVE DEPOSITED / FORWARDED HEREWITH THE EARNEST MONEY DEPOSIT FOR A SUM OF RS. 2,00,000/- (RUPEES TWO LAKH ONLY) 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, UKAI** . 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, UKAI .

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

PLACE: SIGNATURE OF TENDERER:
DATE : 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) 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 ITS AUXILIARIES, AIR PREHEATERS, DUCTS AND DAMPERS, FUEL PIPING, BOILER INTEGRAL PIPING, ELECTROSTATIC PRECIPITATOR, FANS, POWER CYCLE PIPING, COAL MILLS AND COAL FEEDERS, CHEMICAL DOZING SYSTEM, INSULATION, FINAL PAINTING ETC OF1X500 MW

2) ERECTION, ALIGNMENT AND WELDING, BOLTING, FASTENING, GROUTING AS APPLICABLE OF :

   a) BOILER SUPPORTING STRUCTURES
   b) BOILER PRESSURE PARTS
   c) BOILER TRIM & INTEGRAL PIPING AND MOUNTINGS
   d) FUEL OIL PIPING
   e) NON-PRESSURE PARTS
   f) ROTATING MACHINES (e.g. AIR HEATERS, COAL MILLS, COAL FEEDERS, FANS, BLOWERS etc. WITH THEIR DRIVES & LUBE OIL SYSTEM ETC.)
   g) PULVERISED FUEL PIPING
   h) EXTERNAL STRUCTURES (e.g. DUCT SUPPORTING, PIPE RACK STRUCTURES etc.) INCLUDING ELEVATOR STRUCTURE.
   i) HANDLING ARRANGEMENTS FOR ROTATING MACHINES
   j) POWER CYCLE PIPING (MAIN STEAM, HRH, CRH ETC) AND VALVES INCLUDING HP/LP BYPASS
   k) ELECTROSTATIC PRECIPITATOR AND STAIRWAYS & GALLARIES
   l) CHEMICAL DOZING SYSTEM
   m) FABRICATION OF RACK STRUCTURES AND EMBEDMENTS

3) PRE-ASSEMBLY, IF ANY, PRE-ERECTION CHECKS AS APPLICABLE

4) TRANSPORTATION / DRAGGING OF BOILER DRUM FROM UNLOADING BAY TO INSIDE BOILER STRUCTURES AND POSITIONING ON GROUND, ERECTION USING STRAND JACK METHOD INCLUDING FINAL ALIGNMENT.

5) NON-DESTRUCTIVE EXAMINATION & POST WELD HEAT TREATMENT

6) INSULATION OF ALL EXPOSED METAL PARTS OF THE EQUIPMENTS INCLUDING PIPING, STRUCTURES ETC

7) PRE-COMMISSIONING CHECKS/TESTS, TRIAL RUNS/TESTING AND COMMISSIONING

8) FINAL PAINTING OF ERECTED ITEMS

9) TRIAL OPERATION AND ASSOCIATED TESTS

10) COMPLETION OF FACILITY/SYSTEMS

11) HANDING OVER OF THE UNIT

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

4.1.1 GENERAL REQUIREMENTS – COMMON TO ALL WORK

4.1.1.1

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

4.1.1.2

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

4.1.1.3

THE WORK SHALL BE EXECUTED UNDER THE USUAL CONDITIONS AFFECTING MAJOR POWER PLANT CONSTRUCTION AND IN CONJUNCTION WITH NUMEROUS OTHER OPERATIONS AT SITE. THE CONTRACTOR AND HIS PERSONNEL SHALL COOPERATE WITH PERSONNEL OF BHEL, BHEL'S CUSTOMER, CUSTOMER'S CONSULTANTS AND OTHER CONTRACTORS, COORDINATING HIS WORK WITH OTHERS AND PROCEED IN A MANNER THAT SHALL NOT DELAY OR HINDER THE PROGRESS OF WORK OF THE PROJECT AS A WHOLE.

4.1.1.4

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

4.1.1.5

CONTRACTOR SHALL ERECT AND COMMISSION ALL THE EQUIPMENTS AND AUXILIARIES AS PER THE SEQUENCE & METHODOLOGY PRESCRIBED BY BHEL DEPENDING UPON THE TECHNICAL REQUIREMENTS. AVAILABILITY OF MATERIALS AND FRONTS WILL DECIDE THIS. BHEL ENGINEER'S DECISION REGARDING CORRECTNESS OF THE WORK AND METHOD OF WORKING SHALL BE FINAL AND BINDING ON THE CONTRACTOR. NO CLAIMS FOR EXTRA PAYMENT FROM THE CONTRACTOR WILL BE ENTERTAINED ON THE GROUND OF DEVIATION FROM THE METHODS / SEQUENCE ADOPTED IN ERECTION OF SIMILAR SETS ELSEWHERE.

4.1.1.6

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

4.1.1.7

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

4.1.1.8

THE WORK SHALL CONFORM TO DIMENSIONS AND TOLERANCES SPECIFIED IN THE VARIOUS DRAWINGS / DOCUMENTS THAT WILL BE PROVIDED DURING VARIOUS STAGES OF ERECTION. IF ANY PORTION OF WORK IS FOUND TO BE DEFECTIVE IN WORKMANSHIP, NOT CONFORMING TO DRAWINGS OR OTHER STIPULATIONS DUE TO CONTRACTOR'S FAULT, THE CONTRACTOR SHALL DISMANTLE AND RE-DO THE WORK DULY REPLACING THE DEFECTIVE MATERIALS AT HIS COST, FAILING WHICH THE WORK WILL BE GOT DONE BY BHEL AND RECOVERIES WILL BE EFFECTED FROM THE CONTRACTOR'S BILLS TOWARDS EXPENDITURE INCURRED INCLUDING COST OF MATERIALS AND DEPARTMENTAL OVERHEADS OF BHEL.

4.1.1.9

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

4.1.1.10

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 OF FREE ISSUE, REQUIRED FOR THIS SCOPE OF WORK SHALL BE PROVIDED BY THE CONTRACTOR. ALL EXPENDITURE INCLUDING TAXES AND INCIDENTALS IN THIS CONNECTION WILL HAVE TO BE BORNE BY CONTRACTOR UNLESS OTHERWISE SPECIFIED IN THE RELEVANT CLAUSES. THE CONTRACTOR'S QUOTED RATES SHOULD 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 ETC. THIS WILL ALSO INCLUDE MODIFICATIONS / RE-WORKS SUGGESTED BY BHEL / CUSTOMER / OTHER INSPECTION GROUP. CONTRACTOR SHALL CARRY OUT SUCH REWORK / MODIFICATION / RECTIFICATION / FABRICATION / REPAIR ETC PROMPTLY AND EXPEDITIOUSLY. DAILY LOG SHEETS SIGNED BY BHEL ENGINEER AND INDICATING THE DETAILS OF WORK CARRIED OUT, MAN-HOURS ETC SHALL BE MAINTAINED BY THE CONTRACTOR FOR SUCH REWORKS. CLAIM OF CONTRACTOR IF ANY, FOR SUCH WORKS WILL BE GOVERNED BY RELEVANT CLAUSES OF SECTION-13.

4.1.1.15

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. CONTRACTOR SHALL ARRANGE NECESSARY STEEL FOR SUCH USAGE. ONLY THE STEEL FOR DRUM LIFTING TEMPORARY STRUCTURE (CAT HEAD) WILL BE PPROVIDED 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

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 AS INCIDENTAL TO WORK.

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 RELEVANT APPENDICES. THESE DETAILS ARE APPROXIMATE AND MEANT ONLY TO GIVE A GENERAL IDEA TO THE TENDERER ABOUT THE MAGNITUDE OF THE WORK INVOLVED. ACTUAL QUANTUM AND TYPE OF EQUIPMENTS WILL BE BASED ON THE RELEVANT ERECTION DOCUMENTS WHICH WILL BE FURNISHED TO THE CONTRACTOR IN DUE COURSE OF ERECTION AND THE WEIGHT AND QUANTITY AS PER THE RELEVANT ENGINEERING DOCUMENTS WILL ONLY BE ADMISSIBLE FOR THE BILLING PURPOSE.

4.1.1.21

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

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

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

4.1.1.25

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. C & I ERECTION AGENCY WILL DO STORAGE/RE-ERECTION CALIBRATION ETC.

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/CLIENT. CONTRACTOR, JOINTLY WITH BHEL, SHALL PREPARE ALL NECESSARY RECORDS OF MEASUREMENTS/READINGS/ PROTOCOLS ETC.

4.1.1.31

ALL WORKS SUCH AS CLEANING, LEVELLING, ALIGNING, TRIAL ASSEMBLY, DISMANTLING OF CERTAIN EQUIPMENTS / COMPONENTS FOR CHECKING AND CLEANING, SURFACE PREPARATION, FABRICATION OF SHEETS, TUBES AND PIPES AS PER THE GENERAL ENGINEERING PRACTICE AND AS PER BHEL ENGINEERS INSTRUCTIONS AT SITE, CUTTING, WELD DESPOSING, GRINDING, STRAIGHTENING, CHAMFERING, FILING, CHIPPING, DRILLING, REAMING, SCRAPING, LAPPING, FITTING UP ETC AS MAY BE APPLICABLE IN SUCH ERECTION WORKS AND WHICH ARE TREATED INCIDENTAL TO THE ERECTION WORK AND NECESSARY TO COMPLETE THE WORK SATISFACTORILY SHALL BE CARRIED OUT BY THE CONTRACTOR AS PART OF THE WORK.

4.1.1.32

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

4.1.1.33

CONTRACTOR SHALL REGULATE FLOW OF MATERIAL TO AND FROM SITE IN SUCH A MANEER AND SEQUENCE THAT MATERIAL ACCUMULATION AT SITE DOES NOT LEAD TO CONGESTION AT SITE. IN CASE IT IS NECESSARY TO SHIFT AND RESTACK THE MATERIALS KEPT AT WORK AREAS / SITE TO ENABLE OTHER AGENCIES TO CARRY OUT THEIR WORK OR FURTHER ANY OTHER REASON, IT SHALL BE DONE BY THE CONTRACTOR MOST EXPEDITIOUSLY. NO CLAIM FOR EXTRA PAYMENT FOR SUCH WORK WILL BE ENTERTAINED.

4.1.1.34

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

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

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

4.2.1 PRESSURE PARTS

A) INSTALLATION OF TEMPORARY STRUCTURE FOR DRUM LIFTING IS IN THE SCOPE OF THE CONTRACTOR'S WORK. THE REQUIRED STEEL FOR THE PURPOSE WILL BE PROVIDED IN RANDOM SIZES BY BHEL FREE OF CHARGE. THESE SHALL BE FABRICATED TO SUIT THE REQUIREMENT, ERECTED AND WELDED AS PART OF WORK. NDT HAS TO BE CARRIED OUT AS PER INSTRUCTIONS. THESE STRUCTURES HAVE TO BE DISMANTLED AT APPROPRIATE STAGE AND RETURNED TO BHEL AS PER THE INSTRUCTIONS OF BHEL ENGINEER. ALSO, THE RELEVANT AREA OF PERMANENT STRUCTURES HAVE TO BE FINISHED AS INSTRUCTED/ AS PER RELEVANT CODES OF PRACTICE. PAYMENT FOR ABOVE WILL BE MADE AT THE RATE ACCEPTED FOR STRUCTURES; NO SEPARATE PAYMENT WILL BE MADE FOR FABRICATION, DISMANTLING AND FINISHING WORK AND RETURN OF MATERIALS.

B) PRESSURE PARTS COMPONENTS LIKE HEADERS, PANELS, COILS, LOOSE TUBES ETC HAVE TO BE FLUSHED/BLOWN WITH COMPRESSED AIR, CHECKED FOR DIMENSIONAL ACCURACY AND CONFIGURATION AND MINOR RECTIFICATIONS, IF NECESSARY WILL HAVE TO BE DONE BEFORE ERECTION. THIS WILL INVOLVE MAKING APPROPRIATE BED OF STEEL STRUCTURES OVER THE CONCRETE BLOCKS/ STEEL PEDESTALS. NECESSARY STEEL, CONCRETE BLOCKS SHALL BE ARRANGED BY THE CONTRACTOR. BED SHALL BE FABRICATED AS PER BHEL REQUIREMENT.

C) NORMALLY THE HIGH PRESSURE VALVES WILL HAVE PREPARED EDGES FOR WELDING. BUT, IF IT BECOMES NECESSARY, THE CONTRACTOR SHALL PREPARE NEW EDGES OR RECONDITION THE EDGES BY GRINDING OR CHAMFERING TO MATCH THE CORRESPONDING TUBES AND PIPES. NO GAS CUTTING WILL BE PERMITTED. ALL FITTINGS LIKE "T" PIECES, WELD NECK FLANGES, REDUCERS, ETC SHALL BE SUITABLY MATCHED WITH PIPES FOR WELDING (THIS IS APPLICABLE TO PIPING WORK ALSO).

D) WELDING OF ALL ATTACHMENTS ON PRESSURE PARTS INCLUDING THOSE REQUIRED FOR INSULATION WORK IS IN THE SCOPE OF WORK.

E) SURFACES INSIDE SEAL BOX AND OTHER AREAS THAT ARE TO BE APPLIED WITH CASTABLE REFARCTORY LINING SHALL BE PAINTED WITH BLACK BITUMEN PAINT BEFORE BOXING UP AND APPLICATION OF REFRACTORY. SEAL BOXES NEED TO BE PARTIALLY CUT OPEN IN ORDER TO POUR REFRACTORY. CONTRACTOR SHALL CARRY OUT NECESSARY CUTTING AND SEAL WELDING OF SUCH CUTOUTS. CONTRACTOR SHALL PROVIDE THE BLACK BITUMEN PAINT OF REQUIRED SPECIFICATION FOR SUCH APPLICATIONS.

F) FURNACE AREA AND HEAT RECOVERY AREA OF FLUE GAS PASSAGE HAS TO BE MADE LEAK PROOF BY SEAL WELDING. AIR LEAK TEST BY PRESSURIZATION HAS TO BE CONDUCTED TO PROVE EFFECTIVENESS OF THE SEAL WELD AND SOAP BUBBLE OR ANY OTHER SIMILAR TEST WILL HAVE TO BE CARRIED OUT FOR THE ENTIRE SEAL WELDS TO ASCERTAIN THE EFFECTIVE SEALING IS ACHIEVED. THE TESTS MAY HAVE TO BE REPEATED TILL SATISFACTORY RESULT IS ACHIEVED.

G) IF REQUIRED, THE PRESSURE PARTS, AFTER INITIAL ERECTION AND TESTS, WILL HAVE TO BE PRESERVED BY EITHER DRY OR WET PRESERVATION PROCEDURE. CONTRACTOR SHALL ERECT THE PIPING & VALVES AND PROVIDE NECESSARY ASSISTANCE FOR THE SAME. REQUIRED PIPING, VALVES AND PRESERVATIVE (GAS/CHEMICALS) WILL BE PROVIDED BY BHEL AS FREE ISSUE.

H) THE DRUM INTERNALS, IF ALREADY INSTALLED, MAY HAVE TO BE REMOVED TO FACILITATE INSPECTION BY STATUTORY AUTHORITIES AND CHEMICAL CLEANING. THE DRUM INTERNALS ARE TO BE PRESERVED PROPERLY AND RE-FITTED AT APPROPRIATE STAGE AS PART OF WORK.

I) SUPERHEATER AND/OR REHEATER SYSTEM WILL HAVE HP BUTT WELD JOINTS OF T-91 MATERIAL. WELDING OF THESE HP JOINTS SHALL INVOLVE PRE-HEATING AND POST HEATING BY RESISTANCE HEATING, ARGON PURGING OF JOINTS DURING WELDING PROCESS AND FULL TIG WELD. CONTRACTOR SHOULD FOLLOW REQUIRED PROCEDURE FOR T91 WELDING NDT, ETC.

J) BOILER DRUM : BOILER DRUM MAY NEED TO BE LED FROM THE POINT OF UNLOADING TO THE CAVITY OF BOILER. THE SAME IS IN THE CONTRACTOR'S SCOPE AND SHALL MAKE ALL ARRANGEMENTS, INCLUDING FABRICATION OF SADDLE IF REQUIRED. STRUCTURAL MATERIALS REQUIRED FOR THE SAME WILL BE PROVIDED BY BHEL ON FREE-RETURNABLE BASIS.

BOILER DRUM IS TO BE LIFTED USING STRAND JACK METHOD. CONTRACTOR TO ENGAGE SERVICES OF EXPERT AGENCY TO LIFT THE BOILER DRUM BY THIS METHOD. CONTRACTOR SHALL DEPLOY THE EXPERT AGENCY AND OTHER RESOURCES WELL IN TIME TO SUIT THE MILESTONE REQUIRMENT.

K) CORRECTIONS IN THE PROFILES OF SCALLOPED PLATES/BARS, SKIN CASING, SEAL PLATES ETC. FOR PROPER MATCHING WITH MATING PARTS, WHEREVER REQUIRED, SHALL BE DONE AS INCIDENTAL TO THE WORK.

4.2.2 TRIM & INTEGRAL PIPING OF BOILER AND CRITICAL PIPING

4.2.2.1

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

4.2.2.2

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

4.2.2.3

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

4.2.2.4

CONNECTION (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, IS ALSO WITHIN THE SCOPE OF WORK/ SPECIFICATION.

4.2.2.6

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

4.2.2.7

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

4.2.2.8

MAIN STEAM PIPING UPTO TURBINE STOP VALVE RELEASED IN PG 80 IS INCLUDED IN THE SCOPE OF WORK. THE MATERIAL WILL BE SA-335 P-91. BIDDER SHALL FOLLOW BHEL APPROVED PROCEDURE FOR WELDING, PRE HEATING, PWHT & NDT OF SA-335 P-91 MATERIAL. DETAILED PROCEDURE WILL BE ISSUED TO THE CONTRACTOR.

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

1. INSTALLATION & REMOVAL OF ISOLATING DEVICES/ NRVs AND REMOVAL & RE-FIXING OF INTERNALS REQUIRED FOR HYDRAULIC TESTING, PRE-COMMISSIONING AND COMMISSIONING ACTIVITIES. REQUIRED GASKETS WILL BE SUPPLIED BY BHEL FREE OF COST.

2. MATCHING OF FLANGES FOR ACHIEVING PARALLELISM AND ALIGNMENT RESORTING TO HEAT CORRECTION OR OTHER SUITABLE METHODS AS PER INSTRUCTIONS OF BHEL ENGINEERS.

3. TO LOCATE THE CAUSE OF VIBRATIONS IN PUMPS OR OTHER AUXILIARIES AND TO CARRY OUT NECESSARY CORRECTIONS IN PIPING AND ITS SUPPORTS. THIS MAY INVOLVE CUTTING, FRESH EDGE PREPARATION, WELDING, RADIOGRAPHY, STRESS RELIEVING, ETC., OF SUCTION, DISCHARGE, RE-CIRCULATING AND OTHER CONNECTED PIPING AND ITS SUPPORTS AT A NUMBER OF PLACE.

4. FABRICATION AND ERECTION OF RACKS AND STEEL SUPPORTS FOR ALL THE PIPING INCLUDING CRITICAL PIPING. STEEL FOR THIS PURPOSE WILL BE SUPPLIED BY BHEL.

5. ERECTION, WELDING, NDE AND STRESS RELIEVING OF CERTAIN EQUIPMENTS, E.G. FLOW NOZZLES, CONTROL VALVES ETC, AFTER COMPLETION OF CERTAIN ACTIVITIES E.G. CHEMICAL CLEANING, STEAM BLOWING ETC IS PART OF WORK. THIS MAY INVOLVE REMOVAL OF PORTIONS FROM THE ALREADY ERECTED PIPELINES IN ORDER TO INTRODUCE THESE EQUIPMENTS AND RESULTANT EDGE PREPARATION ETC SHALL BE INCIDENTAL TO WORK. NO SEPARATE/ ADDITIONAL PAYMENT IS ENVISAGED FOR CUTTING, WELDING AND EDGE PREPARATION IN THIS REGARD. THE REMOVED PIECES OF PIPES SHALL BE RETURNED TO BHEL STORES WITH PROPER CLEANING, DRESSING AND IDENTIFICATION MARKING.

6. WELDING OF ROOT VALVES WITH SMALL LENGTH OF PIPING TO THE PRESSURE, FLOW AND LEVEL TAPPING POINTS ON PIPING OR FLOW NOZZLES / ORIFICES / METERING ELEMENTS FIXED ON PIPING.

7. OPENING OF VALVE ACTUATORS, DISMANTLING OF ACTUATORS FROM THE VALVES, REFITTING AND RENDERING ASSISTANCE CONNECTED WITH THE ELECTRICAL AND MECHANICAL PROBLEMS.

8. FIXING AND WELDING INCLUDING DUE NDE & PWHT ETC OF CARRIER PLATES ON TO THE PIPES.

4.2.2.10

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

4.2.2.11

THE LOCATION OF DRAIN HEADERS, VALVES, STATIONS, STEAM TRAPS OF PIPING AS INDICATED IN THE BHEL DRAWINGS ARE SUGGESTIVE ONLY. THE FINAL LOCATION AND ROUTINGS SHALL BE DECIDED TO SUIT THE SITE CONDITIONS. WHILE ROUTING SUCH LINES AND FIXING THE STATIONS, IT HAS TO BE ERECTED SO AS TO PROVIDE EASY

ACCESSIBILITY AND FREE PATH FOR THE PURPOSE OF EASY OPERATION AND MAINTENANCE. THESE LOCATIONS SHALL BE ACCEPTABLE TO THE CLIENT. SOMETIMES, THE LOCATIONS OF STATIONS AND ROUTING OF LINES MAY HAVE TO BE CHANGED AS PER THE SITE CONDITIONS. ALL SUCH WORKS SHALL BE CARRIED OUT EXPEDITIOUSLY AS PER THE INSTRUCTIONS OF BHEL ENGINEER. THE DECISION OF BHEL ENGINEER IS FINAL AND BINDING ON THE CONTRACTOR.

4.2.2.12

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

4.2.2.13

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

4.2.2.14

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

4.2.2.15

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

4.2.2.16

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

4.2.2.17

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

4.2.2.18

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

4.2.2.19

NORMALLY, HANGERS SETTING IN COLD CONDITION ARE DONE BY SIMULATION ADDING ADDITIONAL TEMPORARY WEIGHT, WHICH WILL BE ROUGHLY EQUAL TO THE WEIGHT OF THE INSULATION. ATTACHMENT OF TEMPORARY WEIGHTS AND FLOATING OF THE JOINTS IN THE SIMULATION TEST TO BE TREATED AS PART OF JOB. HANGER SETTINGS HAVE TO BE REPEATED FOR ACHIEVING FREE-FLOATING JOINTS. HANGER ADJUSTMENTS

TO BE REPEATED FOR STEAM BLOWING BY RESETTING HOT AND COLD VALUES IF REQUIRED. THIS MAY HAVE TO BE REPEATED SEVERAL TIMES AFTER STEAM BLOWING AND SYNCHRONIZATION. THE WEIGHTS WILL BE SUPPLIED BY BHEL. CONTRACTOR HAS TO TRANSPORT FROM BHEL STORES AND RETURN THE SAME AFTER COMPLETION OF WORK. NO EXTRA CLAIM ON THIS ACCOUNT WILL BE ENTERTAINED.

4.2.3 ROTATING MACHINERY

A) SPECIFICATIONS COVERED UNDER THE FOLLOWING PARA AND ALSO OTHER RELEVANT SPECIFICATIONS CONTAINED IN OTHER PARAS ELSEWHERE IN THIS TENDER DOCUMENT WILL BE APPLICABLE FOR ROTATING MACHINES LIKE FD / ID / PA FANS, AIR PRE HEATERS, 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.

K) THERE ARE 08 NOS OF BOWL MILLS. 4 NUMBERS ARE LOCATED ON LEFT AND 4 NUMBERS RIGHT SIDE OF THE BOILER .

4.2.4 ERECTION OF ELECTROSTATIC PRECIPITATOR

4.2.4.1

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

4.2.4.2

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

4.2.4.3

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

4.2.4.4

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

4.2.4.5

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

4.2.4.6

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

4.2.4.7

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

4.2.4.8

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

4.2.4.9

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

4.2.4.10 **AIR LEAK TEST**

AFTER ERECTION OF ESP AND BEFORE CLEARING FOR INSULATION, AIR LEAK TEST HAS TO BE CARRIED OUT. NECESSARY EQUIPMENT LIKE, AIR BLOWER, VENTURY, DUCTING, AND INSTRUMENTATION ETC. WILL BE PROVIDED BY BHEL FREE OF CHARGES. HANDLING AT STORES, TRANSPORT, ERECTION, COMMISSINONING AND CARRYING OUT THE LEAKAGE TEST, ATTENDING TO THE LEAKAGES TILL SATISFACTORY SEALING / LEAK PROOFNESS SHALL BE IN SCOPE OF THE WORK. CONTRACTOR SHALL DISMANTLE THE TEST EQUIPMENTS AND RETURN TO BHEL STORES IN GOOD CONDITION AFTER DUE

RECONCILIATION, CLEANING AND SERVICING. NO SEPARATE/ ADDITIONAL PAYMENT IS ENVISAGED FOR THE ABOVE.

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

4.2.5.1

CONTRACTOR SHALL PROVIDE AND ERECT ONE NUMBER PASSENGER CUM GOODS ELEVATOR OF 1 MT CAPACITY TO REACH UPTO THE BOILER DRUM LEVEL TO FACILITATE ERECTION, MOVEMENT OF PERSON AND GOODS ETC. THE ARRANGEMENT SHALL CONFIRM TO APPLICABLE SAFETY NORMS. CONTRACTOR SHALL DISMANTLE AND TAKE 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, IF ANY. NECESSARY STEEL FOR THIS WILL BE PROVIDED IN RANDOM SIZES BY BHEL AS FREE ISSUE. PAYMENT FOR SUCH STIFFENING/ STRENGTHENING SHALL BE MADE FOR WEIGHT CERTIFIED BY BHEL ENGINEER AT THE ITEM RATE APPLICABLE TO STRUCTURES, PROVIDED THE DEVIATION HAS OCCURED FOR THE REASONS NOT ATTRIBUTABLE TO THE CONTRACTOR.

4.2.5.5

EACH OF THE CEILING GIRDERS WILL BE SENT IN 2 TO 3 PIECES AND WILL HAVE TO BE ASSEMBLED, WELDED AND NDE & PWHT (SR) 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, WHICH SHALL BE FABRICATED BY THE CONTRACTOR TO SUIT THE REQUIREMENT.

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

4.2.5.7

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

THE REMOVAL AND RE-ERECTION OF SUCH MEMBERS AS AGREED BY THE BHEL ENGINEER, WILL HAVE TO BE DONE BY THE CONTRACTOR AS INCIDENTAL TO WORK.

4.2.5.8

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

4.2.5.9

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

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

4.2.5.11

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

4.2.5.12

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

4.2.6 OTHER PRODUCTS AND SYSTEMS AND COMMON REQUIREMENTS

A) THE DUCTING COVERED UNDER THIS SCOPE OF WORK IS FLUE GAS DUCTING UP TO BOILER OUTLET FLANGE, BOILER OUTLET FLANGE TO ESP, ESP TO ID FANS TO CHIMNEY, HOT AND COLD SECONDARY AIR DUCTING FROM FD FANS OUTLET TO WIND BOX, HOT AND COLD PRIMARY AIR DUCTING FROM PA FANS TO MILLS INCLUDING INTERCONNECTIONS, FLOWMETERS, DAMPERS/GATES AND THEIR DRIVES, SUPPORTS AND SUSPENSIONS ETC FOR THESE SYSTEMS.

B) DUCTS / EXPANSION BELLOWS (METALLIC & NON-METALLIC) ARE NORMALLY SUPPLIED IN LOOSE COMPONENTS / SEGMENTS AND THESE ARE TO BE ASSEMBLED AND WELDED/

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

C) 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.

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

E) LIGHT WEIGHT CONCRETE SLABS ARE TO BE ERECTED ON BOILER ROOF STRUCTURE . FOR WATER PROOFING OF THE ROOF 50 MM THICK CONCRETE SCREED WITH REINFORCEMENT OF 6MM / 8MM ROD FOLLOWED BY 10 LAYERS OF WATER PROOFING TO BE PROVIDED. IT IS OPTIONAL. IF SHEETS ARE USED IN PLACE OF LIGHT WEIGHT CONCRETE SLABS THEN SHEETS SHALL BE PAID AS PER THE TONNAGE RATE QUOTED FOR BOILER.

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

G) ACTUATOSR / DRIVES OF DAMPERS, GATES ETC MAY HAVE TO BE SERVICED, LUBRICATED BEFORE ERECTION, DURING PRECOMMISSIONING AND COMMISSIONING, INCLUDING CARRYING OUT ADJUSTMENTS REQUIRED AS INCIDENTAL OF THE WORK.

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

I) SPRING SUSPENSION / CONSTANT LOAD HANGERS MAY HAVE TO BE PREASSEMBLED FOR REQUIRED LOAD AND ERECTION CARRIED OUT AS PER INSTRUCTION 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 STAGE OF ERECTION AND 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.

J) 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.

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

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

4.3.1

BUILDING FOUNDATIONS AND OTHER NECESSARY CIVIL WORKS FOR SUPPORTING STRUCTURES, EQUIPMENTS ETC WILL BE PROVIDED BY BHEL / CUSTOMER. THE CHECKING OF DIMENSIONAL ACCURACY, AXES, ELEVATION, LEVELS ETC, WITH REFERENCE TO BENCH MARKS OF FOUNDATIONS AND ANCHOR BOLT PITS HAVE TO BE CHECKED AND LOGGED BY THE CONTRACTOR. THE PERMANENT BENCHMARK / REFERENCE MARKS WILL HAVE TO BE TRANSFERRED TO NEW LOCATIONS WITH SUFFICIENT CARE TO MAINTAIN THE ACCURACY AND PROTECTED / PRESERVED WITH ADEQUATE CARE (TO ENABLE RECHECKING AT LATER DATES) AS PER BHEL INSTRUCTION.

MINOR ADJUSTMENT OF FOUNDATION LEVEL, DRESSING AND CHIPPING OF FOUNDATION SURFACES AND BLUE-MATCHING (WHEREVER REQUIRED) FOR OF ALL EQUIPMENTS AS PER BHEL ENGINEERS INSTRUCTIONS, SHOULD BE DONE BY THE CONTRACTOR AS PART OF THE WORK. CONTRACTOR/BHEL SHALL PREPARE PROTOCOLS BEFORE TAKING OVER THE FOUNDATIONS. DRESSING AND CHIPPING OF FOUNDATIONS UPTO 35MM 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.

NEUTRALISATION PIT FOR EDTA CLEANING IS TO BE MADE BY THE CONTRACTOR. AFTER COMPLETION OF JOB PIT HAS TO BE DISMANTLED AND AREA IS TO BE LEVELLED BEFORE HANDING OVER OF AREA TO OWNER.

EFFLUENT TO BE DISPOSED OFF SAFELY FROM NEUTRALISING PIT TO A SAFE AREAS AS PER INSTRUCTION OF BHEL ENGINEER.

4.3.3

CONTRACTOR SHALL CARRY OUT SCRAPPING AND BLUE MATCHING OF EMBEDDED PLATES/ PACKERS OF ROTATING EQUIPMENTS. CHIPPING AND THE LEVELING OF CONCRETE SURFACES, FINE DRESSING UP TO THE EXTENT REQUIRED TO OBTAIN CONTACT BETWEEN PACKER AND CONCRETE, IS ALSO COVERED IN THE SCOPE OF THIS WORK. SCRAPPING, CHIPPING AND MATCHING SHALL BE DONE SO AS TO ACHIEVE PRESCRIBED PERCENTAGE OF CONTACT BETWEEN THE TWO SURFACES.

4.3.4

BHEL WILL PROVIDE FREE OF COST ONLY THE SHIMS AND PACKER PLATES (EITHER MACHINED OR PLAIN) WHICH GO AS PERMANENT PART OF THE EQUIPMENT. CERTAIN PACKER PLATES AND SHIMS OVER AND ABOVE THE QUANTITY RECEIVED AS A PART OF SUPPLIES FROM MANUFACTURING UNITS OF BHEL, WILL HAVE TO BE CUT OUT FROM STEEL PLATES / STEEL SHEETS AT SITE TO MEET SITE REQUIREMENT. CONTRACTOR SHALL CUT AND PREPARE PACKERS AND SHIMS BY GAS CUTTING / CHISELING / GRINDING AND DE-BURR THE SAME. HOWEVER, MACHINING OF THE PACKERS WHEREVER NECESSARY,SHALL BE ARRANGED BY CONTARACTOR.

4.3.5

COMPLETE GROUTING OF STRUCTURES EQUIPMENTS, INCLUDING ANCHOR/ FOUNDATION BOLTS, BENEATH BASE, BASE HOLLOWS ETC, AS MAY BE APPLICABLE, IS INCLUDED IN THE

SCOPE OF CONTRACTOR. ARRANGING ALL LABOUR, BUILDING MATERIALS INCLUDING CEMENT, ORDINARY PORTLAND AS WELL AS QUICK SETTING – FREE FLOW - NON-SHRINK GROUT MIX (e.g. CONBEXTRA GP1/GP2), FORM WORK, SHUTTERING, AND ANY OTHER REQUIREMENTS IS IN THE CONTRACTOR'S SCOPE. CONTRACTOR SHALL OBTAIN APPROVAL OF BHEL FOR CEMENT (ORDINARY PORTLAND AS-WELL-AS QUICK SETTING – FREE FLOW-NON-SHRINK GROUT MIX) PRIOR TO USE. CLEANING OF FOUNDATION SURFACES, POCKET HOLES AND 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 ARE WITHIN THE SCOPE OF THIS SPECIFICATION/ WORK.

4.3.6

AFTER THE GROUTING HAS FINALLY SET AND CURED, ALIGNMENT OF EQUIPMENTS INVOLVED SHALL BE CHECKED AGAIN TO VERIFY FOR ANY DISTURBANCE OR ANY OTHER REASON. IF REQUIRED, DE-COUPLING OF EQUIPMENTS HAS TO BE DONE FOR CONDUCTING THE VERIFICATION. IN CASE ANY DISTURBANCE IS NOTICED THE CAUSE, IF ANY, SHALL BE REMOVED AND RE-ALIGNMENT DONE AS PART OF WORK.

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 OF INSPECTION. WHERE REQUIRED, JOINTS SHALL BE OFFERED FOR VISUAL INSPECTION AFTER ROOT RUN. SUBSEQUENT WELDING SHOULD BE MADE ONLY AFTER THE APPROVAL OF ROOT RUN.

4.4.1.12 SOCKET WELDING :

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

4.4.1.13

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

4.4.1.14

WELDING ELECTRODES, PRIOR TO THEIR USE, CALL FOR BAKING FOR SPECIFIED PERIOD AND WILL HAVE TO BE HELD AT SPECIFIED TEMPERATURE FOR SPECIFIED PERIOD. ALSO, DURING EXECUTION, THE WELDING ELECTRODES HAVE TO BE CARRIED IN PORTABLE OVENS.

4.4.2 HEAT TREATMENT:

4.4.2.1

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

4.4.2.2

CONTRACTOR SHOULD PROVIDE TEMPERATURE INDICATOR / TEMPERATURE RECORDER FOR MEASURING TEMPERATURE DURING PRE-HEATING FOR WELDING OR FOR

CONTROLLING TEMPERATURE OF METAL FOR HOT CORRECTION ETC. THE TEMPERATURE RECORDERS SHOULD BE PREFERABLY OF SOLID STATE TYPE.

4.4.2.3

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

4.4.2.4

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

4.4.2.5

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

4.4.2.6

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

4.4.2.7

PREHEATING, INTER-PASS HEATING, POST WELD HEATING AND STRESS RELIEVING AFTER WELDING ARE PART OF ERECTION WORK AND SHALL BE PERFORMED BY THE CONTRACTOR IN ACCORDANCE WITH BHEL ENGINEER'S INSTRUCTIONS. WHERE THE ELECTRIC RESISTANCE HEATING METHOD IS ADOPTED CONTRACTOR SHALL MAKE ALL ARRANGEMENT INCLUDING HEATING EQUIPMENT WITH AUTOMATIC RECORDING DEVICES, ALL HEATING ELEMENTS, THERMOCOUPLES AND ATTACHMENT UNITS, GRAPH SHEETS, THERMAL CHALKS, & INSULATING MATERIALS LIKE MINERAL WOOL, ASBESTOS CLOTH, CERAMIC BEADS, ASBESTOS ROPES ETC, REQUIRED FOR ALL HEATING AND STRESS RELIEVING WORKS.

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

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

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

4.4.2.8

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

4.4.2.9

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

4.4.2.10

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

4.4.3 NON DESTRUCTIVE EXAMINATION :

4.4.3.1

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

4.4.3.2

RADIOGRAPHY INSPECTION OF WELDS SHALL BE PERFORMED IN ACCORDANCE WITH REQUIREMENTS AND RECOMMENDATION OF BHEL ENGINEER. THE MINIMUM QUANTUM OF RADIOGRAPHIC INSPECTION SHALL BE AS PER PROVISION OF IBR/BHEL'S ERECTION DOCUMENTS. THEY MAY, HOWEVER BE INCREASED DEPENDING UPON THE PERFORMANCE OF THE INDIVIDUAL WELDER AT THE DISCRETION OF BHEL ENGINEER/BOILER INSPECTING AUTHORITY. BIDDER SHALL ALSO ARREAGE 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.

4.4.3.3

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.

4.4.3.4

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.

4.4.3.5

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.

4.4.3.6

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.

4.4.3.7

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

4.4.3.8

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.

4.4.3.9

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.

4.4.3.10

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.

4.4.3.11

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

4.4.3.12

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.

4.4.3.13

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 LINING AND INSULATION

APPLICATION OF INSULATION, FINISHING, CLADDING AND OUTER CASING ETC OF THE FOLLOWING:

1. MAIN BOILER
2. BOILER AUXILIARIES INCLUDING, BUT NOT LIMITED TO, ESP, DUCTS, FUEL OIL EQUIPMENTS, FANS ETC
3. BOILER INTEGRAL PIPING AND TANKS & VESSELS
4. POWER CYCLE PIPING AND CRITICAL PIPING INCLUDING VESSELS AND TANKS & OTHER EQUIPMENTS
5. LP PIPING AND OTHER EQUIPMENTS
6. OTHER EQUIPMENTS INCLUDING BOIs, THOUGH NOT LISTED ABOVE BUT REQUIRED FOR COMPLETION

4.5.1

THE WORK SHALL CONFORM TO DIMENSION AND TOLERANCES SPECIFIED IN THE VARIOUS DRAWING. AND DOCUMENTS THAT WILL BE PROVIDED DURING THE

EXECUTION. IF ANY PORTION OF THE WORK IS FOUND TO BE DEFECTIVE IN WORKMANSHIP OR NOT CONFORMING TO DRAWINGS OR OTHER SPECIFICATIONS, THE CONTRACTOR SHALL DISMANTLE AND RE-DO THE WORK DULY REPLACING THE DEFECTIVE MATERIALS AT HIS COST. FAILING WHICH THE WORK WILL BE GOT DONE BY ENGAGING OTHER AGENCIES OR DEPARTMENTALLY AND RECOVERIES WILL BE DEDECTED FROM CONTRACTOR'S BILLS TOWARDS EXPENDITURE INCURRED INCLUDING 30% DEPARTMENTAL CHARGES.

4.5.2

THE TERMINAL POINTS AS DECIDED BY BHEL SHALL BE FINAL AND BINDING ON THE CONTRACTOR.

4.5.3

ALL INSULATION AND REFRACTORY MATERIALS INCLUDING IRON COMPONENTS AND OUTER SHEET CASING MATERIALS, CLADDING SHEETS ETC REQUIRED WILL BE SUPPLIED BY BHEL AND THE SAME HAVE TO BE ERECTED/ APPLIED AS PER THE DRAWINGS AND SPECIFICATIONS OF BHEL BY THE CONTRACTOR.

4.5.4

THE CONTRACTOR SHALL PROVIDE THE REQUIRED QUANTITY OF WIRE, NAILS, AND PLANKS FOR FORMWORK AND OTHER MATERIALS FOR SHUTTERING AND CURING WORKS.

4.5.5

CONTRACTOR SHALL OBSERVE ALL PRECAUTION FOR LAYING, CURING ETC OF POURABLE INSULATION. THE CONTRACTOR AT HIS OWN COST SHALL REDO ANY DEFECTIVE WORKS FOUND.

4.5.6

WOOL INSULATION IS RECEIVED AT SITE AS LOOSE BONDED MATTRESSES IN STANDARD SIZES. THESE ARE TO BE DRESSED/CUT TO SUITE THE EQUIPMENTS. MULTIPLE LAYERS OF WOOL HAVE TO BE APPLIED AS DIRECTED AND AS PER DRAWINGS AND SPECIFICATIONS FOR ALL EQUIPMENTS/ SYSTEMS COVERED UNDER THE SCOPE OF WORK.

4.5.6

CUTTING & DRESSING OF INSULATION BRICKS TO SUIT THE SITE AREA OF APPLICATION IS INCIDENTAL TO WORK.

4..5.7

REMOVABLE TYPE OF INSULATION HAS TO BE PROVIDED FOR VALVES FITTINGS, EXPANSION JOINTS ETC AS PER DRAWING OR AS DIRECTED BUY BHEL ENGINEER.

4.5.8

THE CLADDING AND OUTER CASING ARE ALUMINIUM SHEETS. ALL RELEVANT SPECIFICATIONS AND PROCEDURES WITH REGARDS TO BEADING, SEALING ETC FOR ALUNIMIUM SHEETS HAVE TO BE ADHERED TO.

4..5.9

CLADDING/OUTER CASING SHALL BE FIXED EXPEDITIOUSLY, SO AS TO AVOID DAMAGE TO THE INSULATION FROM THE WEATHER.

4.5.10

THE OVERLAPPING SURFACE OF OUTER CASING/CLADDING SHEET SHALL BE COATED WITH SEALING COMPOUND, WHICH WILL BE SUPPLIED BY BHEL FREE OF COST.

4.5.11

TO TAKE CARE OF BIMETAL CORROSION DUE TO VARIETY OF METALS IN CONTACT OF EACH OTHER VIZ RETAINER TO SUPPORT, SUPPORT TO OUTER CASING/CLADDING, CLADDING-TO-CLADDING ETC, SUITABLE PAINTS SPECIFIED BY BHEL, TO BE APPLIED

AND/OR NEOPRENE RUBBER PACKING/STRIPS OR ANY OTHER INSERT MAY HAVE TO BE FIXED AS REQUIRED.

4.5.12

THE CONTRACTOR SHALL LEAVE CERTAIN GAPS AND OPENINGS WHILE DOING THE WORK AS PER THE INSTRUCTIONS OF BHEL ENGINEER TO FACILITATE INSPECTION BY BOILER INSPECTOR OR DURING COMMISSIONING TO FIX GAUGES, FITTINGS, INSTRUMENTS ETC. THESE GAPS WILL HAVE TO BE FINISHED AS PER DRAWINGS AT LATER DATE BY THE CONTRACTOR AT HIS COST.

CONTRACTOR SHALL CUT OPEN WORKS IN NEEDED AS PER BHEL ENGINEER'S INSTRUCTIONS DURING COMMISSIONING FOR INSPECTION, CHECKING AND MAKE GOOD THE WORKS AFTER INSPECTION IS OVER WITHOUT ANY EXTRA PAYMENT.

4.5.13

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

4.5.14

WASTAGE ALLOWANCE FOR THE MATERIAL ISSUED ARE ENVISAGED AS FOLLOWS:

A	POURABLE & CASTABLE INSULATION	-	2%
B	INSULATION BRICKS AND MOTOR	-	2%
C	WOOL MATTRESSES	-	2%
D	CLADDING SHEETS	-	2%

THE WASTAGE ALLOWANCE WILL BE APPLICABLE ON THE NET ISSUED QUANTITY i.e. TOTAL QUANTITY ISSUED REDUCED BY THE QUANTITY RETURNED TO STORES AS UNUSED/FRESH ITEM. CONTRACTOR SHALL RECONCILE THE MATERIAL ISSUES PERIODICALLY AS PRESCRIBED BY BHEL SITE. PAYMENT FOR THE DONE WILL BE REGULATED AS PER PROVISION OF SECTION –12.

4.5.15

THE FOLLOWING WORKS ARE ALSO INCLUDED IN THE SCOPE OF THIS CONTRACT.

CUTTING OF CLADDING SHEETS AS PER THE PROFILE OF THE EQUIPMENT AND PAINTING ON INNER SURFACE TWO COATS OF BITUMINOUS PAINT. PAINT WILL BE SUPPLIED BY BHEL.

CUTTING OF THE WOOL MATTRESSES TO THE REQUIRED SHAPE AND APPLICATION OF FINISHING CEMENT OF REQUIRED THICKNESS WHEREVER REQUIRED.

4.5.16

INSULATION WORK OF TEMPORARY PIPING FOR ALKALI BOIL OUT, STEAM BLOWING AND CHEMICAL CLEANING HAS TO BE CARRIED OUT AT SITE. THE SAME HAVE TO BE REMOVED AND RETURNED TO THE BHEL STORES AFTER THE COMPLETION OF ACTIVITY. RATES QUOTED FOR APPLICATION OF WOOL FOR BOILER AND AUXILIARIES WILL BE APPLICABLE FOR THIS WORK ALSO. NO SEPARATE PAYMENT WILL BE MADE FOR REMOVAL OF TEMPORARY INSULATION AND RETURN OF THE SAME TO BHEL STORES/YARD.

4.5.17

IN CERTAIN INSTANCES, CO-ORDINATED/PHASED APPLICATION OF CASTABLE REFRACTORY/ INSULATION ON PRESSURE PARTS ETC MAY BE NECESSITATED IN CONSIDERATION OF SEQUENCE OF ACTIVITIES OF OTHER ERECTION AGENCIES. CONTRACTOR SHALL DO SUCH PHASED WORK AS MAY BE DIRECTED BY BHEL.

4.5.18

PRIOR TO APPLICATION OF REFRACTORY BITUMINOUS PAINTING ON THE PRESSURE PARTS AND OTHER AREA IS UNDER CONTRACTOR SCOPE. ONLY THE BITUMINOUS PAINT WILL BE SUPPLIED BY BHEL FREE OF COST. NO SEPARATE PAYMENT WILL BE MADE FOR APPLICATION OF PAINT.

4.6 PAINTING

4.6.1

ALL EXPOSED METAL PARTS OF THE EQUIPMENT INCLUDING PIPING, STRUCTURES, RAILLINGS ETC. WHEREVER APPLICABLE, AFTER INSTALLATION UNLESS OTHERWISE SURFACE PROTECTED, SHALL BE FIRST PAINTED WITH AT LEAST ONE COAT OF SUITABLE PRIMER WHICH MATCHES THE SHOP PRIMER PAINT USED, AFTER THOROUGHLY CLEANING ALL SUCH PARTS OF ALL DIRT, RUST, SCALES, GREASES, OILS AND OTHER FOREIGN MATERIALS BY WIRE BRUSHING, SCRAPING OR SAND BLASTING, AND THE SAME BEING INSPECTED AND APPROVED BY BHEL ENGINEER FOR PAINTING. AFTERWARDS, THE ABOVE PARTS SHALL BE FINISHED WITH TWO COATS OF ALLOYED RESIN MACHINERY ENAMEL PAINTS.

4.6.2 TOUCH-UP PAINTING ON DAMAGED AREAS -

a) FOR COATINGS DAMAGED UP TO METAL SURFACE

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

PRIMER COAT OF TOUCH-UP PRIMER TO BE APPLIED BY BRUSH IMMEDIATELY AFTER THE SURFACE PREPARATION.

OVER THIS PRIMER COAT, FINISH COAT AND FINAL FINISH COAT SHALL BE APPLIED AS COVERED ABOVE BY BRUSH WITHIN MAXIMUM SEVEN (7) DAYS OF APPLICATION OF TOUCH UP PRIMER.

PAINTING SCHEME IS ENCLOSED FOR INFORMATION AT **ANNEXURE-1**. HOWEVER, FOR EXECUTION ONLY THE LATEST DOCUMENT SHALL BE APPLICABLE AND NO CLAIM WHATSOEVER SHALL BE ENTERTAINED IN CASE OF ANY VARIANCE BETWEEN SUCH DOCUMENTS. SIMILARLY, DOCUMENTS AS PROVIDED PROGRESSIVELY DURING THE EXECUTION OF WORK FOR ALL OTHER PRODUCTS/ EQUIPMENTS ETC SHALL BE APPLICABLE.

4.6.3

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

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

4.6.4

THE SCOPE OF WORK INCLUDES PAINTING OF COLOUR BANDS, LETTERING, MARKING AND SIGNS FOR DIRECTION OF FLOW/ROTATION, NAMES ETC OF APPROVED COLOURS AS

PER THE STANDARD COLOUR CODES AND SPECIFICATIONS SPECIFIED IN TENDER SPECIFICATION OR AS ADVISED BY BHEL/CUSTOMER ENGINEER AT SITE FOR THE EQUIPMENTS/ COMPONENTS COVERED IN THESE SPECIFICATIONS.

4.6.5

ALL EXPOSED METAL PARTS OF THE EQUIPMENT INCLUDING PIPING, STRUCTURES, HAND RAILING, GRATING ETC SHALL BE THOROUGHLY CLEANED OFF DUST, RUST, SCALES AND OTHER FOREIGN MATERIALS BY MANUAL OR MECHANISED WIRE BRUSHING, SCRAPPING, SAND BLASTING ETC AND THE SAME BEING INSPECTED AND APPROVED BY BHEL/CUSTOMER ENGINEER BEFORE APPLICATION OF PRIMER. AFTERWARDS, THE ABOVE PARTS SHALL BE FINISH PAINTED WITH SPECIFIED NUMBER OF COATS AS PER SPECIFICATION.

4.6.6

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

4.6.7

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

4.6.8

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

4.6.9

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

4.6.10

THIS WORK REQUIRES WORKING AT HIGHER ALTITUDES FROM GROUND LEVEL TO AS HIGH AS 90 M AND MORE. THE WORK SPREAD IS ALSO SUBSTANTIAL INVOLVING SUBSTANTIAL RUN OF STRUCTURES AND PIPING. CONTRACTOR SHALL TAKE SUFFICIENT PRECAUTIONS TO AVOID ANY ACCIDENT AND HAZARD IN ALL RESPECTS. THE ROPES, LADDERS, SCAFFOLDING MATERIALS, CLAMPS ETC AND CLIMBER USED SHOULD BE OF STANDARD QUALITY FOR SAFE AND SMOOTH EXECUTION OF WORK.

4.6.11

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

4.6.12

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

4.6.13

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

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

4.6.14

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

4.6.15

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

4.7 TESTING, PRE-COMMISSIONING, AND COMMISSIONING

4.7.1

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

4.7.2

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

4.7.3

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

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

4.7.4

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

IN ACCOUNTING OF MATERIALS FOLLOWING WASTAGE ALLOWANCES ARE PROVIDED:

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

NO WASTAGE ALLOWANCE FOR VALVES & OTHER EQUIPTMENTS.

4.7.5

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

4.7.6

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

4.7.7

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

4.7.8

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

4.7.9

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

4.7.10

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

4.7.11

i) CONTRACTOR SHALL CUT / OPEN / DISMANTLE WORK, IF NEEDED, AS PER BHEL ENGINEER'S INSTRUCTIONS DURING COMMISSIONING FOR INSPECTION, CHECKING AND MAKE GOOD THE WORKS AFTER INSPECTION IS OVER.

ii) SIMILARLY, DURING THE COURSE OF ERECTION, IF CERTAIN PORTION OF EQUIPMENTS ERECTED BY THE CONTRACTOR HAS TO BE UNDONE FOR ENABLING OTHER CONTRACTORS / AGENCIES OF BHEL / CUSTOMER TO CARRY OUT THEIR WORK, CONTRACTOR SHALL CARRY OUT SUCH JOBS EXPEDITIOUSLY AND PROMPTLY AND MAKE GOOD THE JOB AFTER COMPLETION OF WORK BY OTHER CONTRACTORS / AGENCIES OF BHEL / CUSTOMER AS PER BHEL ENGINEER'S / AGENCIES OF BHEL / CUSTOMERS INSTRUCTIONS. CLAIMS, IF ANY, IN THIS REGARD SHALL BE GOVERNED AS PER CLAUSES IN SECTION-13 HEREIN.

4.7.12

DURING THIS PERIOD, THOUGH BHEL/ CLIENT'S STAFF WILL ALSO BE ASSOCIATED IN THE WORK, THE CONTRACTOR'S RESPONSIBILITY WILL BE TO ARRANGE FOR COMPLETE REQUIREMENT OF MEN AND REQUIRED TOOLS AND PLANTS, CONSUMABLES, SCAFFOLDING AND APPROACHES ETC TILL SUCH TIME THE COMMISSIONED UNIT UNDERGOES TRIAL OPERATIONS.

4.7.13

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

4.7.14

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

4.7.15

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

4.7.16

AT VARIOUS STAGES OF COMPLETION BOILER HAS TO BE PRESERVED AGAINST CORROSION EITHER BY WET PRESERVATION OR BY DRY PRESERVATION AS PER THE REQUIREMENT OF BHEL ENGINEER. CONTRACTOR SHALL CARRY OUT ALL THE INCIDENTAL JOBS LIKE FILLING UP OF WATER, DOZING OF CHEMICALS AND PRESSURIZING THE SYSTEM TO THE REQUIRED PRESSURE, CHANGE OF GAS REFILLS ETC. THE BOILERS HAVE A PERMANENT N_2 BLANKETING ARRANGEMENT.

DURING THIS PERIOD, THOUGH BHEL/ CLIENT'S STAFF WILL ALSO BE ASSOCIATED IN THE WORK, THE CONTRACTOR'S RESPONSIBILITY WILL BE TO ARRANGE FOR COMPLETE REQUIREMENT OF MEN AND REQUIRED TOOLS AND PLANTS, CONSUMABLES, SCAFFOLDING AND APPROACHES ETC., TILL SUCH TIME THE COMMISSIONED UNIT IS TAKEN OVER.

4.7.17

COMMISSIONING ACTIVITIES WILL CONTINUE TILL THE COMPLETION OF TRIAL RUN, TRIAL OPERATION. DURING THIS PERIOD CONTRACTOR SHALL MAKE AVAILABLE THE

SERVICES OF SEPARATE DEDICATED LABOR FORCE COMPRISING OF SUITABLE SKILLED AND SEMI/UN-SKILLED HANDS ALONG WITH NECESSARY TOOLS AND PLANTS, CONSUMABLES ETC.

4.7.18

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

4.7.19

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

IN CASE PG TEST IS GETTING DELAYED BEYOND THE CONTRACT PERIOD (NORMAL PLUS GRACE PLUS EXTENSION IF ANY) DUE TO REASONS NOT ATTRIBUTABLE TO THE CONTRACTOR, PG TEST ISSUE WILL BE MUTUALLY DISCUSSED AND DECIDED. HOWEVER INTALLATION OF NECESSARY TAPPING POINTS, IMPULSE PIPES, APPROACHES ETC ARE TO BE COMPLETED BY THE CONTRACTOR.

4.7.20

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

4.8 GENERAL RESPONSIBILITY OF THE CONTRACTOR

4.8.1

THE CONTRACTOR SHALL HAVE TOTAL RESPONSIBILITY FOR ALL EQUIPMENT AND MATERIALS IN HIS CUSTODY AT CONTRACTOR'S STORES, LOOSE, SEMI-ASSEMBLED, ASSEMBLED OR ERECTED BY HIM AT SITE. HE SHALL EFFECTIVELY PROTECT THE FINISHED WORKS FROM ACTION OF WEATHER AND FROM DAMAGES OR 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.

4.8.2 PRESERVATION & PROTECTION OF COMPONENTS

AT ALL STAGES OF WORK, EQUIPMENTS/MATERIALS IN THE CUSTODY OF CONTRACTOR, INCLUDING THOSE ERECTED, WILL HAVE TO BE PRESERVED AS PER THE INSTRUCTIONS OF BHEL. NECESSARY PRESERVATION AGENTS INCLUDING THE PRIMER & PAINT, FOR THE ABOVE WORK SHALL BE PROVIDED BY THE CONTRACTOR.

4.8.3

THE CONTRACTOR SHALL MAKE SUITABLE SECURITY ARRANGEMENTS INCLUDING EMPLOYMENT OF SECURITY PERSONNEL AND ENSURE PROTECTION OF ALL MATERIALS/ EQUIPMENT IN THEIR CUSTODY AND INSTALLED EQUIPMENTS FROM THEFT/FIRE/PILFERAGE AND ANY OTHER DAMAGES AND LOSSES.

4.8.4

CONTRACTOR SHALL COLLECT ALL SCRAP MATERIALS PERIODICALLY FROM VARIOUS AREA OF WORK SITE, DEPOSIT THE SAME AT ONE PLACE EARMARKED AT SITE OR SHIFT THE SAME TO A PLACE EARMARKED IN BHEL/ CLIENT'S STORES. IN CASE OF FAILURE OF CONTRACTOR IN COMPLIANCE OF THIS REQUIREMENT, BHEL WILL MAKE SUITABLE ARRANGEMENT AT CONTRACTOR'S RISK AND COST.

4.8.5

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

4.8.6

THE CONTRACTOR SHALL NOT WASTE ANY MATERIALS ISSUED TO HIM. IN CASE IT IS OBSERVED AT ANY STAGE THAT THE WASTAGE/EXCESS 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.

4.8.7

FOR ANY CLASS OF WORK FOR WHICH NO SPECIFICATIONS HAVE BEEN LAID DOWN IN THESE SPECIFICATIONS, WORK SHALL BE EXECUTED AS PER THE INSTRUCTIONS OF BHEL.

4.9 COMPUTER BASED SYSTEM

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

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

4.10 EXCLUSIONS

THE FOLLOWING WORKS ARE SPECIFIC EXCLUSIONS FROM THE SCOPE OF WORK UNDER ERECTION, TESTING & COMMISSIOINING OF TENDER SPECIFICATION-

I) SOME SUB-DELIVERY ITEMS AND ELECTRICAL COMPONENTS SUCH AS PUSH-BUTTONS, JUNCTION BOXES ETC.
II) E&C WORK OF CABLE TRAYS, CABLES AND EARTHING ETC
III) CONTROL PANELS, EPMS, MCC ETC.
IV) ELECTRICAL & C&I ITEMS OF HANDLING SYSTEM (PG 99)
V) ALL ELECTRICAL AND CONTROL & INSTRUMENTATION ITEMS EXCEPT THOSE SPECIFIED ELSEWHERE IN THESE SPECIFICATIONS.
VI) CIVIL WORKS EXCEPT TO THE EXTENT SPECIFICALLY INDICATED ELSEWHERE IN THIS TENDER.
VII) SUPPLY OF PRIMER AND PAINTS FOR FINAL PAINTING
VIII) PNEUMATIC COPPER TUBING AND FITTINGS THEREOF.
IX) TESTING AND COMMISSIONING OF HEATING ELEMENTS, THERMOSTATS, HV RECTIFIER TRANSFORMERS.
X) ELECTRICAL AND C&I ITEMS OF VARIABLE FREQUENCY DRIVES AS PROVIDED ELSEWHERE IN THESE SPECIFICATIONS.

SECTION-5

SPECIAL CONDITIONS OF CONTRACT

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

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

BHEL/CLIENT IS NOT PROVIDING ANY SPACE FOR LABOUR COLONY. CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENTS FOR ACCOMODATION WITH NECESSARY FACILITIES ETC FOR HIS WORKMEN AND THE STAFF OUT SIDE THE PROJECT PREMISES. ALSO, THE CONTRACTOR HAS TO MAKE HIS OWN ARRANGEMENT FOR TRANSPORTATION OF HIS WORKMEN AND OTHER EMPLOYEES. BHEL/CLIENT SHALL NOT PROVIDE ANY FACILITY IN THIS REGARD.

5.2.1 TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES:

5.2.1

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

5.2.2

ALL TOOLS AND TACKLES TO BE DEPLOYED BY THE CONTRACTOR FOR THE WORK SHALL HAVE THE PRIOR APPROVAL OF BHEL ENGINEER WITH REGARD TO BRAND, QUALITY AND SPECIFICATION. INDICATIVE LIST OF MAJOR T&P TO BE ARRANGED BY THE CONTRACTOR HAS BEEN FURNISHED IN RELEVANT APPENDIX. CONTRACTOR SHALL ALSO MOBILIZE ALL OTHER T&P NECESSARY FOR TIMELY AND SATISFACTORY COMPLETION OF THE WORK IN SCOPE.

5.2.3

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

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. USE OF WELDING TRANSFORMERS WILL BE SUBJECT TO SPECIFIC APPROVAL OF BHEL ENGINEER.

5.2.9

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

5.2.10

BHEL 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.

5.2.11 STRAND AND JACK ARRANGEMENT FOR BOILER DRUM ERECTION

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

SOME OF THE RENOWNED AGENCIES WHO CAN PROVIDE STRAND AND JACK LIFTING ARRANGEENT ARE –

1 M/S FAGIOLI PSE INDIA PVT LTD (203, KRISHNA BHAVAN, GOVANDI STATION ROAD, DEONAR, MUMBAI 400 088, TELPHONE NO 022 – 25564388, FAX NO 022 – 25562565)
2 M/S FREIGHT WINGS (P) LTD, (309, REX CHAMBERS, WALCHAND HIRACHAND MARG, BALLARD ESTATE, MUMBAI 400 001, TELPHONE NO 022 – 22631714, 22632261, 22639988)
3 M/S DORMAN LONG TECHNOLOGY LTD, (233 BHARAT INDUSTRIAL ESTATE, LAL BAHADUR SHASTRI MARG, BHANDUP (WEST), MUMBAI 400 078, TELEPHOHE NO 022 – 25961960, Mo 09820192807)
4 M/S BASU AND BASU ENGINEERS PVT LIMITED, KOLKATA, TELEPHONE NO 033 – 24642967, 24664069, FAX 033 – 24664621)

5 M/S LIFT AND SHIFT INDIA PRIVATE LIMITED (96 CHEMBUR, MANKHURD LINK ROAD, MUMBAI 400 043, TELEPHONE 022 – 25484180, 25560101, FAX 022 – 25563573, E-MAIL – projects@liftandshift.co.in)

CONTRACTOR MAY ENGAGE ANY OF THE ABOVE NAMED AGENCIES OR ANY OTHER COMPETENT AGENCY KNOWN TO CONTRACTOR FOR THIS LIFTING ACTIVITY.

PRIOR APPROVAL OF BHEL IS TO BE TAKEN BEFORE ASSIGNING THE WORK TO THE AGENCY.

5.2.12 PASSENGER CUM GOODS ELEVATOR

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

THE PROBABLE SUPPLIERS FOR THE ELEVATOR ARE:

1. M/S AVON CRANES PVT LTD, GURGAON

2. M/S MEKASTER ENGINEERING & EQUIPMENT PVT LTD, HALOL

5.2.13

LAYING OF SLEEPERS AND RAILS AND ROUTINE MAINTENANCE OF THE DIP TROLLEY SYSTEM INCLUDING ASSEMBLY AND DISMANTLING ARE IN CONTRACTOR'S SCOPE.

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 FOR PRESERVATION

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

5.3.4 COSUMABLES FOR BHEL SUPLLIED EQUIPMENTS (CRANES, T & P ETC)

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

5.3 WELDING ELECTRODES, FILLER WIRES FOR TIG WELDING AND GASES

5.4.1

ALL THE REQUIRED WELDING ELECTRODES, EXCEPT THOSE INDICATED AS BHEL SCOPE ELSEWHERE IN THESE SPECIFICATIONS, AS APPROVED BY BHEL SHALL BE ARRANGED BY

CONTRACTOR AT HIS COST. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN PRIOR APPROVAL OF BHEL, BEFORE PROCUREMENT, REGARDING MANUFACTURER, TYPE OF ELECTRODES ETC. ON RECEIPT OF THE ELECTRODES AT SITE, IT SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY BHEL REGARDING TYPE OF ELECTRODES, BATCH NUMBER, DATE OF EXPIRY ETC. BATCH TEST CERTIFICATES SHALL BE MADE AVAILABLE FOR VERIFICATION & RECORD BEFORE THE ACTUAL USE OF THE WELDING CONSUMABLES.

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

5.4.2

FILLER WIRES, FOR TIG WELDING OF PRESSURE PARTS & PIPING, TO THE EXTENT SUPPLIED BY THE MANUFACTURING UNITS OF BHEL ALONGWITH THE COMPONENTS / EQUIPMENTS ONLY SHALL BE PROVIDED BY BHEL AS FREE ISSUE. CONTRACTOR SHALL AT HIS COST MEET REQUIREMENTS OF TIG FILLER WIRES, IF ANY, BEYOND THESE FREE ISSUE 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, ACETYLENE ETC THAT ARE REQUIRED FOR ERECTION RELATED ACTIVITIES SHALL BE ARRANGED BY THE CONTRACTOR AT HIS COST. FOR T-91 MATERIAL SITE WELD JOINTS ARGON AS PER GRADE-3 OF IS5760: 1998 WITH OXYGEN AND WATER VAPOUR RESTRICTED TO MAX 6 PPM EACH AND WITH ARGON PURITY LEVEL OF MINIMUM 99.99% SHALL BE ARRANGED AND USED BY THE CONTRACTOR. THE SUPPLY SHOULD ACCOMPANY TEST CERTIFICATE FOR THE BATCH INDICATING INDIVIDUAL ELEMENT 'PPM' LEVEL AND OVERALL PURITY LEVEL.

5.4.4

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

5.5 FIELD OFFICE

5.5.1

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

5.5.2

ON COMPLETION OF WORK, ALL THE TEMPORARY BUILDINGS, STRUCTURES, PIPELINES, CABLES, ETC SHALL BE DISMANTLED AND LEVELED AND DEBRIS SHALL BE REMOVED AS PER INSTRUCTION OF BHEL BY THE CONTRACTOR AT HIS COST. IN THE EVENT OF HIS FAILURE TO DO SO, THE SAME WILL BE ARRANGED TO BE REMOVED AND EXPENDITURE THEREOF WILL BE RECOVERED FROM THE CONTRACTOR. THE DECISION OF BHEL ENGINEER IN THIS REGARD SHALL BE FINAL. HOWEVER, THE SCOPE OF DISMANTLING AND LEVELING THE AREA IS LIMITED ONLY TO THE CONTRACTOR'S SITE OFFICE, YARD AND OTHER SPACES OCCUPIED BY THE CONTRACTOR.

5.5.3.

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 THAT HAS INTERFACE 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 FOR MATERIAL HANDLING, UNLOADING, VERIFICATION, STACKING, ERECTION, PRE-ASSEMBLY ACTIVITIES ETC. ALL TEMPORARY WIRING MUST COMPLY WITH REGULATIONS AND WILL BE SUBJECTED TO ENGINEER'S INSPECTION BEFORE CONNECTING TO SUPPLY POINT. CONTRACTOR SHALL USE HIS OWN MATERIALS LIKE CABLES, FUSES, SWITCH-BOARDS ETC. BHEL/CLIENT WILL NOT PROVIDE ANYTHING IN THIS REGARD.

5.7 CONSTRUCTION POWER & WATER

5.7.1 **CONSTRUCTION POWER**

CONSTRUCTION POWER (THREE PHASE, 415V / 440V) WILL BE PROVIDED FREE OF CHRAGE AT ONE POINT NEAR THE SITE APPROXIMATLY 500 METERS FROM ERECTION SITE. **HOWEVER TAXES, DUTIES, LEVIES ETC WILL HAVE TO PAID EXTRA IF CHARGED BY THE CUSTOMER SEPARATELY.** 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. . IT MAY BE NOTED DISTANCE OF 500 M IS ONLY AN ESTIMATED DISTANCE. IT MAY VARY TO ANY EXTENT DEPENDING UPON SITE CONDITIONS.

5.7.2

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

WHILE REASONABLE EFFORTS WILL BE MADE TO ENSURE CONTINUOUS ELECTRIC POWER SUPPLY, INTERRUPTIONS CANNOT BE RULED OUT AND NO CLAIM FROM THE CONTRACTOR SHALL BE ENTERTAINED ON THIS ACCOUNT SUCH AS IDLE LABOUR, EXTENSION OF TIME ETC. THE CONTRACTOR SHALL ADJUST HIS WORKING SHIFT ACCORDINGLY AND DEPLOY ADDITIONAL MANPOWER, IF NECESSARY, SO AS TO ACHIEVE THE TARGET.

5.7.3 CONSTRUCTION WATER

THE CUSTOMER WILL PROVIDE WATER FOR CONSTRUCTION PURPOSE AT A SINGLE POINT. **SUPPLY OF CONSTRUCTION WATER SHALL BE FREE OF CHARGE. TAXES,**

DUTIES, LEVIES ETC WILL HAVE TO PAID EXTRA IF CHARGED BY CUSTOMER SEPERATELY. ALL ARRANGEMENTS FOR FURTHER DISTRIBUTION BEYOND THIS POINT HAVE TO BE MADE BY THE CONTRACTOR.

5.7.4

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

5.7.5

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

5.8 RESPONSIBILITIES WITH REGARD TO LABOUR EMPLOYMENT ETC.

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

5.8.1

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

5.8.2

BHEL / CUSTOMER MAY INSIST FOR WITNESSING THE REGULAR PAYMENT TO THE LABOUR. THEY MAY ALSO LIKE TO VERIFY THE RELEVANT RECORDS FOR COMPLIANCE WITH STATUTORY REQUIREMENTS. CONTRACTOR SHALL ENABLE SUCH FACILITIES TO BHEL / CUSTOMER.

5.8.3

IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ARRANGE GATE PASS FOR ALL HIS EMPLOYEES, T&P ETC FOR ENTERING THE PROJECT PREMISES. NECESSARY COORDINATION WITH CUSTOMER OFFICIALS IS THE RESPONSIBILITY OF THE CONTRACTOR. CONTRACTOR TO FOLLOW ALL THE PROCEDURES LAID DOWN BY THE CUSTOMER FOR MAKING GATE PASSES. WHERE PERMITTED, BY CUSTOMER / BHEL, TO WORK BEYOND NORMAL WORKING HOURS, THE CONTRACTOR SHALL ARRANGE NECESSARY WORK PERMITS FOR WORKING BEYOND NORMAL WORKING HOURS.

5.8.4.

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

5.9

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

5.10 TAXES, DUTIES, LEVIES

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

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.

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.

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.

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.

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.

BHEL AT SITE WILL SUGGEST FORMATS FOR THESE REPORTS.

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-VI. ALSO THE ACTUAL DEPLOYMENT WILL BE SO AS TO SATISFY THE ERECTION AND COMMISSIONING TARGETS SET BY BHEL.

6.2

IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENGAGE HIS WORKMEN IN SHIFTS AND OR ON OVERTIME BASIS FOR ACHIEVING THE TARGETS SET BY BHEL. THIS TARGET MAY BE SET TO SUIT BHEL'S COMMITMENTS TO ITS CUSTOMER OR TO ADVANCE DATE OF COMPLETION OF EVENTS OR DUE TO OTHER REASONS. THE DECISION OF BHEL IN REGARD TO SETTING THE ERECTION AND COMMISSIONING TARGETS WILL BE FINAL AND BINDING ON THE CONTRACTOR.

6.3

CONTRACTOR SHALL DEPLOY ONLY QUALIFIED AND EXPERIENCED ENGINEERS/ SUPERVISORS. THEY SHALL HAVE PROFESSIONAL APPROACH IN EXECUTING THE WORK.

6.4

THE CONTRACTOR'S SUPERVISORY STAFF SHALL EXECUTE THE WORK IN THE MOST PROFESSIONAL MANNER IN THE STIPULATED TIME. ACCURACY OF WORK AND AESTHETIC FINISH ARE ESSENTIAL PART OF THIS CONTRACT. THEY SHALL BE RESPONSIBLE TO ENSURE THAT THE ASSEMBLY AND WORKMANSHIP CONFORM TO DIMENSIONS AND TOLERANCES GIVEN IN THE DRAWINGS/INSTRUCTIONS GIVEN BY BHEL ENGINEER FROM TIME TO TIME.

6.5

THE SUPERVISORY STAFF EMPLOYED BY THE CONTRACTOR SHALL ENSURE PROPER OUTTURN OF WORK AND DISCIPLINE ON THE PART OF THE LABOUR PUT ON THE JOB BY THE CONTRACTOR. ALSO IN GENERAL THEY SHOULD SEE THAT THE WORKS ARE CARRIED OUT IN A SAFE AND PROPER MANNER AND IN COORDINATION WITH OTHER LABOUR AND STAFF EMPLOYED DIRECTLY BY BHEL OR OTHER CONTRACTORS OF BHEL OR BHEL'S CLIENT.

6.7

IF AT ANY TIME, IT IS FOUND THAT THE CONTRACTOR IS NOT IN A POSITION TO DEPLOY THE REQUIRED ENGINEERS/SUPERVISORS/WORKMEN DUE TO ANY REASON, BHEL SHALL HAVE THE OPTION TO MAKE ALTERNATE ARRANGEMENTS AT THE CONTRACTOR'S RISK AND COST.

6.8 SITE ORGANISATION

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

a) MATERIAL MANAGEMENT
b) OVERALL PLANNING, MONITORING & CONTROL
c) QUALITY CONTROL AND QUALITY ASSURANCE

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 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 QUALIFICATION TEST AT SITE

BHEL WILL PROVIDE THE RAW MATERIAL FREE OF CHARGES FOR PREPARATION OF TEST PIECES FOR CONDUCTING THE SITE QUALIFICATION TEST OF WELDERS. CONTRACTOR SHALL PREPARE THE REQUIRED TEST PIECES FROM SUCH RAW MATERIALS.

CONTRACTOR SHALL ARRANGE ALL THE MATERIALS AND PREPARE TEST COUPONS FOR SITE QUALIFICATION TEST OF ALL OTHER WELDERS.

7.2 FILLER WIRE FOR TIG WELDING AND WELDING ELECTRODES FOR WELDING OF T-91/P-91 MATERIAL TUBES/PIPES

REFER SECTION-5 IN THIS REGARD.

7.3 EQUIPMENTS – TOOLS & PLANTS

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

7.3.1 CRANES TO BE PROVIDED BY BHEL

7.3.1.1

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

7.3.1.2

CONTRACTOR SHALL ARRANGE AND LAY NECESSARY SLEEPER BEDS, BACKFILLING OF APPROACHES WHEREVER NECESSARY FOR SAFE MOVEMENT OF THE CRANES AT HIS OWN COST AS DIRECTED BY BHEL.

7.3.1.3

ANY BOOM REDUCTION, EXTENSION FOR THEIR USE AND RESTORATION TO PREVIOUS STATE OR AS DIRECTED BY BHEL AFTER THE USE SHALL BE THE CONTRACTOR'S RESPONSIBILITY. CONTRACTPOR SHALL ARRANGE AT HIS COST SUITABLE CAPACITY OF ASSIST CRANE FOR BOOM EXTENSION & REDUCTION AND SUITABLE TRAILERS FOR

SHIFTING /HANDLING OF THE BOOM INSERTS OF BHEL'S OWNED AS WELL FOR HIRED CRANES.

7.3.1.4

IT IS PROPOSED TO DEPLOY HIRED CRANE OF CAPACITY 250 MT- 1 NO., 150/180 MT- 1 NO , 100 MT-1 NO AND 75 MT -2 NOS .

THE HIRING AGENCY SHALL PROVIDE OPERATING CREW AND CARRY OUT PREVENTIVE /BREAK DOWN MAINTEANCE INCLUDING PROVIDING LUBRICANTS AND SPARES FOR RUNNING OF THE CRANE.

7.3.1.5

HEAVY LIFT HIGH REACH CRAWLER CRANE (BHEL OWNED CRANE -- REFER SL.NO.1 OF APPENDIX –III) SHALL BE DEPLOYED AT APPROPRIATE STAGE FOR LIMITED PERIOD.

CONTRACTOR SHALL ARRANGE SKILLEED / EXPERIENCED OPERATOR IN CONSUTATION OF BHEL ENGINEER .CONTRACTOR CARRY OUT 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. HOWEVER LUBRICANTS LIKE ENGINE OIL, CARDIUM COMPOUND, HYDRAULIC OIL, GEAR OIL, AND GREASE FOR BHEL'S 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, CLEANING FLUIDS ETC SHALL BE IN THE CONTRACTOR'S SCOPE

7.3.1.6

THE CRANES PROVIDED BY BHEL (INCLUDING HIRED CRANE) 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.

7.3.1.7

CONTRACTOR SHALL PROVIDE THE FUEL (DIESEL) FOR ALL THE CRANES(HIRED AND BHEL OWNED CRANES),.

7.3.1.8

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

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.

7.4.3

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

7.4.4

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.

7.4.5

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

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

7.5.1

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

7.6 PRIMER AND PAINTS FOR FINAL PAINTING

ALL PRIMER AND PAINTS REQUIRED FOR FINAL PAINTING SHALL BE SUPPLIED BY BHEL FREE OF CHARGES.

THE CONTRACTOR , HOWEVER, SHALL PROVIDE ACCOUNT OF ALL THE ITEMS ISSUED TO HIM AND RETURN ALL PRIMER, PAINTS ETC REMAINING EXTRA OVER THE NORMAL REQUIREMENT WITH PROPER IDENTIFICATION TAGS IN A PACKED CONDITION TO BHEL STORES. IN CASE OF ANY MISUSE OR EXCESS USE OVER THE NORMAL REQUIREMENT, BHEL RESERVES THE RIGHT TO RECOVER THE COST OF SUCH MISUSE/ EXCESS USE. DECISION OF BHEL ENGINEER IN THIS REGARD WILL BE FINAL AND BINDING ON THE CONTRACTOR.

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 MMDS. CONTRACTOR SHALL RENDER ALL ASSISTANCE IN CONDUCT OF SUCH COUNTER CHECK / FINAL MEASUREMENTS.

8.10

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

8.11

TOTAL QUALITY IS THE WATCHWORD OF THE WORK AND CONTRACTOR SHALL STRIVE TO ACHIEVE THE QUALITY STANDARDS, PROCEDURES LAID DOWN BY BHEL. HE SHALL FOLLOW ALL THE INSTRUCTIONS AS PER BHEL DRAWINGS AND QUALITY STANDARDS. CONTRACTOR SHOULD ENGAGE WELL-QUALIFIED AND EXPERIENCED ENGINEER FOR QUALITY ASSURANCE AND NDT SERVICES.

8.12 STAGE INSPECTION BY FES / QA ENGINEERS

8.12.1

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

8.13 STATUTORY INSPECTION OF WORK

8.13.1

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

8.13.2

THE WORK RELATED STATUTORY INSPECTIONS, THOUGH NOT LIMITED TO, ARE AS UNDER:

1) INSPECTORATE OF STEAM BOILERS AND SMOKE NUISANCE
2) FACTORY INSPECTOR, LABOUR COMMISSIONER, ELECTRICAL INSPECTOR PF COMMISSIONER AND OTHER AUTHORITIY CONNECTED TO THIS PROJECT WORK

THE SCOPE INCLUDES GETTING THE APPROVALS FROM THE STATUTORY AUTHORITIES, WHICH INCLUDES ARRANGING FOR INSPECTION VISITS OF STATUTORY AUTHORITY PERIODICALLY AS PER 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

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

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

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

9.1 The Contractor Shall

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

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

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

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

i) Name of Contractor
ii) Name of Contractor Site-in-charge & Telephone number
iii) Job Description in short
iv) Date of start of job
v) Date of expected completion
vi) Name of BHEL Site-in-charge.

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

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

9.2 **SPECIAL CONDITIONS**

9.2.1 **Safety**

9.2.1.1 **Safety Plan**

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

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

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

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

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

9.2.1.5 All electrical equipment, connections and wiring for construction power, its distribution and use shall conform to the requirements of Indian Electricity Act and Rules. Only electricians licensed by the appropriate statutory authority shall be employed by the contractor to carryout all types of electrical works. All electrical appliances including portable electric tools used by the contractor shall have safe plugging system to source of power and be appropriately earthed.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

9.2.1.25 If the contractor fails to improve the standards of safety in its operation to the satisfaction of BHEL after being given a reasonable opportunity to do so, and/or if the contractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instructions regarding safety issued by the 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.

9.2.1.26 **Emergency Response**

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

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

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

9.2.1.27 At least 5% Contractors supervisors and workmen shall undergo training in administering 'First Aid'. The trained persons should represent for all categories of work and for all areas of work. Adequate number of trained persons should be available for each shift. These first aiders 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 focussed

- Issue of approved Personnel Protective Equipment
- Verification that the PPEs 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 good house keeping and if there is an imminent risk of pollution

9.2.4 ENVIRONMENT MANAGEMENT

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

9.2.4.2 WASTE MANAGEMENT

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

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

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

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

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

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

9.3 SUPERVISION

9.3.1

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

9.3.2

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

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

9.3.3

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

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

9.4.0 **TRAINING & AWARENESS**

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

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

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

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

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

9.5.0 **REPORTING**

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

9.5.2 Any injury sustained by any of the contractor's employees within the Project premises must be reported to BHEL supervisor and FIRST AID should be immediately administered. The Contractor shall be responsible for keeping and maintaining proper records of Accidents to his personnel.

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

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

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

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

9.6 **AUDIT REVIEW AND INSPECTION**

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

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

- Compliance with procedures and systems
- Availability, condition and use of PPEs
- 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.

SN	Equipment	Scope of inspection	Inspection by	Schedule
1	Hand tools	To identify unsafe / defective tool	User	Daily
2	Power tools	To identify unsafe / defective tool	User	Daily
3	Fire Extinguishers	To check pressure and any defect	User / Safety Coordinator	Daily Every month
4	Lifting equipment/tacles	To check for defects and efficacy of brakes	User Third party	Daily Every Year
5	PPE	To check for defects	User	Daily

9.7 **NON COMPLIANCE**:-

9.7.1

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

SN	Violation of Safety Norms	Fine (in Rs)
01	Not Wearing Safety Helmet	50/-
02.	Not wearing Safety Belt	100/-
03.	Grinding Without Goggles	50/-
04.	Not using 24 V Supply For Internal Work	500/-
05.	Electrical Plugs Not used for hand Machine	100/-
06.	Not Slinging property	200/-
07.	Using Damaged Sling	200/-
08.	Lifting Cylinders Without Cage	500/-
09.	Not Using Proper Welding Cable With Lot of Joints And Not Insulated Property.	200/-
10.	Not Removing Small Scrap From Platforms	200/-
11.	Gas Cutting Without Taking Proper Precaution or Not Using Sheet Below Gas Cutting	200/-
12.	Not Maintaining Electric Winches Which are Operated Dangerously	500/-
13.	Improper Earthing Of Electrical T&P	500/-
14.	Accident Resulting in Partial Loss in Earning Capacity	25,000/- per victim
15.	Fatal Accident/Accidents Resulting in total loss in Earning Capacity	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:

Article I. 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:

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

IS No.	YEAR	Amd upto	DESCRIPTION
IS 10204	1982		PORTABLE FIRE EXTINGUISHERS MECHANICAL FOAM TYPE
IS 10245	1994		SPECIFICATION FOR BREATHING APPARATUS
IS 10291	1982		SAFETY CODE FOR DRESS DRIVERS IN CIVIL ENGINEERING WORKS
IS 10658	1983		HIGHER CAPACITY DRY POWDER FIRE EXTINGUISHERS (TROLLEY MOUNTED)
IS 10662	1992		COLOUR TELEVISION
IS 10667	1983		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR PROTECTION OF FOOT AND LEG
IS 11037	1984		ELECTRONIC FAN REGULATORS

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

IS No.	YEAR	Amd upto	DESCRIPTION
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

IS No.	YEAR	Amd upto	DESCRIPTION
			OPENINGS, RAILINGS AND TOE BOARDS
IS 5121	1969		SAFETY CODE FOR PILING AND OTHER DEEP FOUNDATIONS
IS 5182	1969	1982	METHODS FOR MEASUREMENT OF AIR POLLUTION
IS 5184	1969		CODE OF SAFETY FOR HYDROFLUORIC ACID
IS 5216	1982	2000	RECOMMENDATIONS ON SAFETY PROCEDURES AND PRACTICE IN ELECTRICAL WORK PART I AND II
IS 555	1979		TABLE FANS
IS 5557	1995		INDUSTRIAL AND SAFETY LINED RUBBER BOOTS (SECOND REVISION)
IS 5916	1970		SAFETY CODE FOR CONSTRUCTION INVOLVING USE OF HOR BITUMINOUS MATERIALS
IS 5983	1980		SPECIFICATION FOR EYE PROTECTORS - FIRST REVISION
IS 6234	1986		PORTABLE FIRE EXTINGUISHERS WATER TYPE (STORED PRESSURE)
IS 692	1994		CRITERIA FOR SAFETY AND DESIGN OF STRUCTURES SUBJECTED TO UNDERGROUND BLASTS
IS 6994	1973		SPECIFICATION FOR SAFETY GLOVES
IS 7155	1986		CODE OF RECOMMENDED PRACTICE FOR CONVEYOR SAFETY (PART 1 TO 8)
IS 7205	1974		SAFETY CODE FOR ERECTION OF STRUCTURAL STEEL WORK
IS 7293	1974		SAFETY CODE FOR WORKING WITH CONSTRUCTION MACHINERY
IS 7323	1994		GUIDELINES FOR OPERATIONS OF RESERVOIRS
IS 7812	1975		CODE OF SAFETY FOR MERCURY
IS 7969	1975		SAFETY CODE FOR HANDLING AND STORAGE OF BUILDING MATERIALS
IS 8089	1976		CODE OF SAFE PRACTICE FOR LAYOUT OF OUTSIDE FACILITIES IN AN INDUSTRIAL PLANT
IS 8091	1976		CODE OF PRACTICE FOR INDUSTRIAL PLANT LAYOUT
IS 8095	1976		ACCIDENTS PREVENTION TAGS
IS 818	1968	1997	CODE OF PRACTICE FOR SAFETY AND HEALTH REQUIREMENTS IN ELECTRIC AND GAS WELDING, AND CUTTING OPERATIONS
IS 8448	1989		AUTOMATIC LINE VOLTAGE CORRECTOR (STABILISER)
IS 8519	1977		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR BODY PROTECTION
IS 8520	1977		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR EYE, FACE AND EAR PROTECTION
IS 875	1987		STRUCTURAL SAFETY OF BUILDING: LOADING STANDARD PART 1 TO 5
IS 8807	1978		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR PROTECTION OF ARMS AND HANDS
IS 8978	1985		INSTANTANEOUS WATER HEATERS
IS 8989	1978		SAFETY CODE FOR ERECTION OF CONCRETE FRAMED STRUCTURES

IS No.	YEAR	Amd upto	DESCRIPTION
IS 940	1989		PORTABLE FIRE EXTINGUISHERS WATER TYPE (GAS CARTRIDGE)
IS 9457	1980		SAFETY COLOURS AND SIGNS
IS 9679	1980		CODE OF SAFETY FOR WORK ENVIRONMENTAL MONITORING
IS 9706	1997		CODE OF PRACTICE FOR THE CONSTRUCTION OF AERIAL RPEWAYS FOR THE TRANSPORTATION OF MATERIAL
IS 9759	1981		GUIDELINES FOR DEWATERING DURING CONSTRUCTION
IS 9815	1989		SERVO MOTOR OPERATED LINE VOLTAGE CORRECTOR (SERVO STABILISER)
IS 9944	1992		RECOMMENDATIONS ON SAFE WORKING LOAD FOR NATURAL AND MAN-MADE FIBRE ROPE SLINGS
IS 996	1979		SINGLE PHASE ELECTRIC MOTORS
ISO 3873	1977		SAFETY HELMET

SECTION-10

SPECIAL CONDITIONS OF CONTRACT

10.0 DRAWINGS AND DOCUMENTS

10.1

THE DETAILED DRAWINGS, SPECIFICATIONS AVAILABLE WITH BHEL ENGINEERS WILL ALSO FORM PART OF THIS TENDER SPECIFICATION. REVISION OF DRAWINGS/DOCUMENTS MAY TAKE PLACE DUE TO VARIOUS CONSIDERATIONS AS IS NORMAL IN SUCH LARGE PROJECT. WORK WILL HAVE TO BE CARRIED OUT AS PER REVISED DRAWINGS/ DOCUMENTS. THESE DOCUMENTS WILL BE MADE AVAILABLE TO THE CONTRACTOR DURING EXECUTION OF WORK AT SITE.

10.2

ONE SET OF NECESSARY DRAWINGS/DOCUMENTS TO CARRY OUT THE ERECTION WORK WILL BE FURNISHED TO THE CONTRACTOR BY BHEL ON LOAN THAT SHALL BE RETURNED TO BHEL AFTER COMPLETION OF THE WORK. CONTRACTOR'S PERSONNEL SHALL TAKE CARE OF THESE DOCUMENTS GIVEN TO THEM.

10.3

THE DATA FURNISHED IN VARIOUS SECTIONS AND APPENDICES AND THE DRAWINGS ENCLOSED WITH THIS TENDER SPECIFICATION DESCRIBE THE EQUIPMENT TO BE INSTALLED, TESTED AND COMMISSIONED UNDER THIS SPECIFICATION, BRIEFLY. HOWEVER, THE CHANGES IN THE DESIGN AND IN THE QUANTITY MAY BE EXPECTED TO OCCUR AS IS USUAL IN ANY SUCH LARGE SCALE OF WORKS.

10.4

IF ANY ERROR OR AMBIGUITY IS DISCOVERED IN THE SPECIFICATION/INFORMATION CONTAINED IN THE DOCUMENTS/DRAWINGS AND TENDER, THE CONTRACTOR SHALL FORTHWITH BRING THE SAME TO THE NOTICE OF BHEL BEFORE SUBMISSION OF OFFER.

10.5

IN CASE AN AMBIGUITY IS DETECTED AFTER AWARD OF WORK, THE SAME MUST BE BROUGHT TO THE NOTICE OF BHEL BEFORE COMMENCEMENT OF THE WORK/ACTIVITY. BHEL'S INTERPRETATION IN SUCH CASES WILL BE FINAL AND BINDING ON THE CONTRACTOR.

10.6

IN CASE OF ANY CONFLICT BETWEEN GENERAL INSTRUCTIONS TO TENDERERS, 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.

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 CASE.

SECTION-11

SPECIAL CONDITIONS OF CONTRACT

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

11.1 MOBILIZATION, TIME SCHEDULE, CONTRACT PERIOD AND GRACE PERIOD

11.1.1 INITIAL MOBILIZATION FOR MATERIAL HANDLING AND MM SERVICES

CONTRACTOR SHALL MOBILIZE NECESSARY RESOURCES WITHIN SHORTEST POSSIBLE TIME OF ISSUE OF FAX LETTER OF INTENT TO COMMENCE THE ERECTION WORK. SUCH RESOURCES SHALL BE PROGRESSIVELY AUGMENTED TO MATCH THE SCHEDULE OF MILESTONES AND COMMISSIONING.

11.1.2 MOBILIZATION FOR ERECTION, TESTING, ASSISTANCE FOR COMMISSIONING ETC.

THE ACTIVITIES FOR ERECTION, TESTING ETC. SHALL BE STARTED AS PER DIRECTIONS OF CONSTRUCTION MANAGER OF BHEL. CONTRACTOR SHALL MOBILISE FURTHER RESOURCES (IN ADDITION TO THOSE REQUIRED FOR ACTIVITIES UNDER CLAUSE No. 11.1.1) AS PER REQUIREMENT TO COMMENCE THE WORK OF ERECTION, TESTING ETC. OF BOILER AND AUXILIARIES AND PROGRESSIVELY AUGMENT THE RESOURCES TO MATCH SCHEDULE OF THE PROJECT.

11.1.3 COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE

ERECTION/PLACEMENT ON IT'S DESIGNATED FOUNDATION/LOCATION, OF THE FIRST MAJOR PERMANENT EQUIPMENT/COMPONENT/COLUMN COVERED IN THE SCOPE OF THESE SPECIFICATIONS SHALL BE RECOGNIZED AS "START OF CONTRACT PERIOD". SMALLER ITEMS LIKE PACKER PLATES, SHIMS, ANCHORS, INSERTS ETC. WILL NOT BE CONSIDERED AS START OF CONTRACT PERIOD.

THE CONTRACTOR HAS TO SUBSEQUENTLY AUGMENT HIS RESOURCES IN SUCH A MANNER THAT FOLLOWING MAJOR MILESTONES OF ERECTION & COMMISSION ARE ACHIEVED ON SPECIFIED SCHEDULES:

SN	MAJOR MILESTONE	COMPLETION
1	BOILER DRUM LIFTING	15-JuL-09
2	BOILER HYDRAULIC TEST (DRAINABLE)	10-Mar-10
3	BOILER LIGHT UP & ALKALI BOIL OUT	3-Oct-10
4	STEAM BLOWING COMPLETION & SAFETY VALVE FLOATING	07-Dec-10
7	SYNCHRONIZATION	29-Dec-10
8	COAL FIRING & FULL LOAD	05-Jan-11
9	**TRIAL OPERATION COMPLETION & HANDING OVER**	**05-Feb-11**

IN ORDER TO MEET ABOVE SCHEDULE IN GENERAL, AND ANY OTHER INTERMEDIATE TARGETS SET, TO MEET CUSTOMER/ PROJECT SCHEDULE REQUIREMENTS, CONTRACTOR SHALL

ARRANGE & AUGMENT ALL NECESSARY RESOURCES FROM TIME TO TIME AND ALSO ON THE INSTRUCTIONS OF BHEL.

11.1.2 **CONTRACT PERIOD**

THE CONTRACT PERIOD FOR COMPLETION OF ENTIRE WORK UNDER SCOPE SHALL BE 24 **(Twenty Four) MONTHS** FROM THE "START OF CONTRACT PERIOD" AS SPECIFIED EARLIER.

THE PERIOD FROM THE COMMENCEMENT OF PREPARATORY WORK FOR ERECTION TILL THE ACTUAL "START OF CONTRACT PERIOD" SHALL NOT BE RECKONED FOR THE ABOVE PURPOSE.

11.1.3 **GRACE PERIOD**

GRACE PERIOD OF 6 (SIX) MONTHS BEYOND THE CONTRACT PERIOD OF 24 (TWENTY FOUR) MONTHS MAY BE PROVIDED FOR THIS CONTRACT AT THE DISCRETION OF BHEL.

11.1.4 CONSEQUENCE OF DELAY

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

11.2 PROGRESS MONITORING, CONTRACT EXTENSION AND OVERRUN

11.2.1 PROGRESS MONITORING

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

11.2.2 ASCERTAINING AND ESTABLISHING THE REASONS FOR SHORTFALL

THE ONUS PROBANDI THAT THE CAUSES LEADING TO EXTENSION OF THE CONTRACT PERIOD IS NOT DUE TO ANY REASONS ATTRIBUTABLE TO THE CONTRACTOR IS ON HIM (THE CONTRACTOR). REVIEW OF THE PERFORMANCE AS STATED VIDE CL. 11.2.1 ABOVE WILL BE MADE CONSIDERING THE AVAILABILITY OF COMPONENTS TO BE 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 OVER RUN CHARGES WILL BE PAID IN PROPORTION TO THE ACHIEVEMENT OF THE RESPECTIVE MONTH VIS-À-VIS THE PLAN FOR THE MONTH (FOR ASSESSING THE PERFORMANCE, THE AGREED PLAN SHALL BE REDUCED BY SHORTFALL ATTRIBUTABLE TO THE BHEL). BHEL MAY DISALLOW CONTRACTOR'S CLAIM FOR OVER RUN CHARGES IF THE MONTHLY PROGRAMME AS MENTIONED IN THESE SPECIFICATIONS ARE NOT MADE BY HIM.

11.2.5

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

11.2.6 OVERRUN COMPENSATION

IF THE CONTRACT IS EXTENDED BEYOND THE CONTRACT AND GRACE PERIOD FOR ANY REASON OTHER THAN THOSE ATTRIBUTABLE TO THE CONTRACTOR OR FORCE MAJEURE CONDITIONS, THE CONTRACTOR WILL BE COMPENSATED BY PAYMENT OF OVERRUN CHARGES AT THE RATE OF RS.1,00,000/- (RUPEES ONE LAKH ONLY) PER MONTH. OVERRUN COMPENSATION WILL BE PAID FOR THE EXTENSION ATTRIBUTABLE TO BHEL ONLY. **NO OVERRUN COMPENSATION SHALL BE PAYABLE FOR THE EXTENSION OF CONTRACT ON ACCOUNT OF REASONS OF DELAY OF ERECTION & COMMNG. WORKS ATTRIBUTABLE TO CONTRACTOR AND/OR FORCE MAJEURE CONDITIONS**. OVERRUN COMPENSATION FOR ELIGIBLE PERIOD SHALL BE IN PROPORTION TO THE PROGRESS ACHIEVED AGAINST THE PLAN FOR RESPECTIVE PERIOD.

11.3 PRICE VARIATION

IN ORDER TO TAKE CARE OF VARIATION IN COST OF EXECUTION OF WORK ON EITHER SIDE, DUE TO VARIATION IN THE INDEX OF LABOUR, DIESEL AND ELECTRODE, PRICE VARIATION FORMULA AS DESCRIBED HEREIN SHALL BE APPLICABLE

11.3.1

85% COMPONENT OF CONTRACT VALUE SHALL BE PERMITTED TO BE ADJUSTED FOR VARIATION IN VARIOUS RELEVANT INDICES DURING EXECUTION OF WORK. THE REMAINING 15% SHALL BE TREATED AS FIXED COMPONENT.

11.3.2

THE BASIS FOR CALCULATION OF PRICE VARIATION IN EACH CATEGORY, THEIR COMPONENT, BASE INDEX, BASE DATE OF ACCOUNTING SHALL BE AS UNDER:

.SL NO.	CATEGORY	COMPONENT ('K')	BASE INDEX	BASE DATE
A)	LABOUR (ALL CATEGORIES)	40%	CONSUMER PRICE INDEX FOR INDUSTRIAL WORKERS (GENERAL), APPLICABLE TO 'ALL INDIA' AS PUBLISHED BY LABOUR BUREAU, SHIMLA	Base date shall be calendar month of last date of submission of Tender (including extended date of submission if any)
B)	H.S. DIESEL OIL	5%	WHOLE SALE PRICE INDEX (FOR COMMODITY :HIGH SPEED DIESEL)	...DO...

			PUBLISHED BY MINISTRY OF COMMERCE AND INDUSTRY (www.eaindustry.nic.in)	
C)	WELDING ELECTRODE	40%	WHOLE SALE PRICE INDEX (FOR COMMODITY:ELECTRODES) PUBLISHED BY MINISTRY OF COMMERCE AND INDUSTRY (www.eaindustry.nic.in)	...DO...

11.3.3

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

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

Where

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

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

R = Value of work done for the billing month

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

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

11.3.4

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

11.3.5

THE PRICE VARIATION IS NOT APPLICABLE TO OVER RUN CHARGES, MANDAY RATES FOR EXTRA WORKS ETC.

SIMILARLY PRICE VARIATION SHALL NOT BE APPLICABLE FOR THE RESPECTIVE % ASSIGNED TO MILESTONE ACTIVITIES VIZ OIL FLUSHING, BARRING GEAR, COMMISSIONING OF CONDENSATE SYSTEM, COMMISSIONING OF FEED WATER SYSTEM AND SYNCHRONISATION

11.3.6

THE CONTRACTOR SHALL FURNISH NECESSARY MONTHLY BULLETINS FOR WHOLE SALE PRICE INDEX (FOR COMMODITY :ELECTRODES AND HS DIESEL) PUBLISHED BY MINISTRY OF COMMERCE AND INDUSTRY (WWW.EAINDUSTRY.NIC.IN) AND CONSUMER PRICE INDEX FOR INDUSTRIAL WORKERS (GENERAL), APPLICABLE TO 'ALL INDIA' AS PUBLISHED BY LABOUR BUREAU, SHIMLA.

11.3.7

THE CONTRACTOR WILL BE REQUIRED TO RAISE THE BILLS FOR PRICE VARIATION PAYMENTS ON A MONTHLY BASIS ALONG WITH THE RUNNING BILLS IRRESPECTIVE OF THE FACT WHETHER

ANY INCREASE/DECREASE IN THE CONSUMER PRICE INDEX FOR LABOUR, HS DIESEL AND ELECTRODE HAS TAKEN PLACE OR NOT. IN CASE THERE IS DELAY IN PUBLICATION OF BULLETINS (FINAL FIGURE), THE PROVISIONAL VALUES AS PUBLISHED CAN BE CONSIDERED FOR PAYMENTS AND ARREARS SHALL BE PAID/RECOVERED ON GETTING THE FINAL VALUES.

11.3.8

THE TOTAL QUANTUM OF PRICE VARIATION SHALL NOT EXCEED FIFTEEN PERCENTAGE (15%) OF EXECUTED CONTRACT VALUE. EXECUTED CONTRACT VALUE FOR THIS 15% CAP SHALL NOT INCLUDE OVERRUN CHARGES, EXTRA WORKS.

11.3.9

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

11.4 CONTRACT VARIATIONS

11.4.1 VARIATION IN WEIGHT/QUANTITIES

WEIGHT OF VARIOUS EQUIPMENTS, QUANTITIES OF VARIOUS ITEMS OF WORK COVERED UNDER THESE SPECIFICATIONS AND INDICATED IN RELEVANT APPENDICES FOR ERECTION & COMMISSIOING AND MATERIAL HANDLING/MATERIAL MANAGEMENT SERVICES ARE LIKELY TO VARY. FOR ANY UPWARD OR DOWNWARD VARIATION IN THE QUANTITIES, THE RATES ACCEPTED SHALL BE APPLICABLE WITHOUT ANY VARIATION. PAYMENT WILL BE MADE BY BHEL FOR THE ACTUAL EXECUTED QUANTITY OF RESPECTIVE ITEM AS CERTIFIED BY BHEL ENGINEERS.

11.4.2 VARIATION IN SITE WELD JOINT QUANTITIES

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

11.5 INTREST BEARING ADVANCE

INTEREST BEARING (RATE OF INTEREST SHALL BE PRIME LEADING RATE OF SBI PLUS 2% PER ANNUM, ON MONTHLY REDUCING BALANCE BASIS) RECOVERABLE ADVANCE LIMITED TO 5% OF THE CONTRACT VALUE MAY BE PAID BY BHEL AT ITS DISCRETION DEPENDING ON THE MERIT OF THE CASE AGAINST RECEIPT & ACCEPTANCE OF BANK GUARANTEE FROM THE CONTRACTOR FOR THE AMOUNT SOUGHT. THIS BANK GUARANTEE (BG) SHALL BE VALID AT LEAST FOR ONE YEAR OR THE RECOVERY DURATION. IN CASE RECOVERY OF DUES DOES NOT GET COMPLETED WITHIN THE AFORESAID BG VALIDITY PERIOD, THE CONTRACTOR MUST RENEW THE VALIDITY OF BG OR SUBMIT FRESH BG FOR THE OUTSTANDING AMOUNT AND REMAINING RECOVERY PERIOD. BHEL IS ENTITLED TO MAKE RECOVERY OF THE ENTIRE OUTSTANDING AMOUNT IN CASE THE CONTRACTOR FAILS TO COMPLY WITH THE BG REQUIREMENT AS ABOVE.

RECOVERY OF DUES WILL BE MADE MINIMUM @ 10% OF THE ADMITTED GROSS RUNNING BILL AMOUNT FROM THE FIRST APPLICABLE RUNNING BILL ONWARDS TILL ENTIRE DUE (PRINCIPAL PLUS INTEREST) IS RECOVERED. IN THE EVENT SUFFICIENT TIME DURATION IS NOT LEFT FOR RECOVERY @10%, THE RATE OF RECOVERY SHALL BE SUITABLY ENHANCED SO THAT ENTIRE DUE IS RECOVERED BY THE TIME CONTRACTOR REACHES 90% BILLING OF TOTAL VALUE OF WORK EXECUTED &

WITHIN THE CONTRACT PERIOD (INCLUDING EXTENSIONS GRANTED OR FORECLOSURE IF ANY).

11.7 DEFINITION OF WORK COMPLETION

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

SECTION-12

SPECIAL CONDITIONS OF CONTRACT

12.0 TERMS OF PAYMENT

12.0.1
The contractor shall submit his monthly RA account bills with all the details required by BHEL on specified date every month covering progress of work in all respects and areas for the previous calendar month.

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

12.0.3
Release of payment in each running bill will be restricted to 95% of the value of work admitted, as per the percentage break-up for the stage of work completion stipulated vide clauses hereinafter.
The 5% thus remaining shall be on account of workmanship guarantee of work executed. The same will be released after completion of the guarantee period of **12 months** from the date of completion of entire work as certified by BHEL.

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

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

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

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

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

12.1 STAGES OF PROGRESSIVE PRO-RATA PAYMENTS

12.1.1 E & C OF BOILER AND AUXILIARIES , PIPING, FABRICATED STRUCTURES ETC (REFER SECTION-"C" OF RATE SCHEDULE.

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

12.1.1.1

SL. NO.	PART OF THE ACTIVITY COMPLETED	PERCENTAGE OF ACCEPTED ITEM RATES					
		NON-PR PARTS	STRUC-TURES	PR. PARTS	ROTATING M/c	E S P	INSULA-TION
A	TRANSPORT, & ERECTION / PLACEMENT	40	40	40	40	40	40
B	ALIGNMENT, BOLTING, GROUTING & WELDING	45	45	40	45	45	45
C	GAS TIGHTNESS TEST / KEROSENE LEAK TEST / LPI TEST ETC	5	---	---	---	5	5
D	NDE AND HEAT TREATMENT	---	3	9	---	--	--
E	TRIAL RUN OF ROT. M/C	---	---	---	5	--	--
F	ON COMPLETION OF DRUM LIFTING	---	4	---	---	--	--
G	ON COMPLETION OF HYDRAULIC TEST OF BOILER (DRAINABLE)	---	2	3	---	--	--
H	ON COMPLETION OF HYDRAULIC TEST OF BOILER (NON-DRAINABLE)	---	---	2	---	--	--
I	ON COMPLETION OF BOILER LIGHT UP AND ABO	2	2	2	2	2	2
J	ON COMPLETION OF FINAL PAINTING	2	2	2	2	2	2
K	ON COMPLETION OF SVF & STEAM BLOWING	1	1	1	1	--	--
L	COAL FIRING	4	---	---	4	5	5
M	TRIAL OPERATION	1	1	1	1	1	1
	TOTAL	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

12.1.1.2 SOOT BLOWING STEAM PIPING, BOILER TRIM AND INTEGRAL PIPING, FUEL OIL PIPING AND CRITICAL 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 & POST WELD HEAT TREATMENT, IF ANY.

(E) 5% OF THE CONTRACT RATE ON PRORATA BASIS AFTER COMPLETION OF HYDRAULIC TEST

(F) 3% OF THE CONTRACT RATE ON PRORATA BASIS AFTER FLOATING OF LINE ON PERMANENT SUPPORTS AND REMOVAL OF TEMPORARY SUPPORT

(G) 2% OF THE CONTRACT RATE ON PRORATA BASIS AFTER FINAL ADJUSTMENT OF SUPPORTS FOR COLD AND HOT VALUES FOR BOILER TRIM, INTEGRAL PIPING AND CRITICAL PIPING.

12.1.1.3 RADIOGRAPHY TEST (Item No. C.8 of Rate Schedule)

100% OF THE CONTRACT RATE ON PRORATA BASIS ON ACCEPTANCE OF THE SAME. IN THE CASE OF SUBSTUTION OF 'RT' WITH ULTRASONIC TEST, THE RATES WILL BE LIMITED TO THAT OF RADIGRAPHY.

12.2 MODE OF PAYMENT AND MEASUREMENT OF WORK COMPLETED

CLAUSE 2.6 OF THE GENERAL CONDITIONS OF CONTRACT SHALL BE APPLICABLE.
THE SCOPE OF WORK UNDER THIS CONTRACT SHALL BE TREATED AS COMPLETED ONLY WHEN SO CERTIFIED BY SITE ENGINEER OF BHEL.

12.3 GENERAL

12.3.1

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.

12.3.2

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.

12.3.3

FOR PAYMENT OF TEMPORARY SYSTEM FOR CHEMICAL CLEANING AND STEAM BLOWING OF BOILER AND PIPING THE MEASUREMENT FOR THE PIPING, FITTING, VALVES ETC AND EQUIPMENTS LIKE TANKS, STRUCTURES PROVIDED BY BHEL & NOT FIGURING IN SHIPPING LIST WILL BE BASED ON JOINTLY MEASURED QUANTITY AND CORRESPONDING STANDARD WEIGHTS. PAYMENT WILL BE MADE AT THE RATE APPLICABLE FOR **NON-PRESSURE PARTS**

FOR ITEMS. NO PAYMENT WILL BE MADE FOR THE EQUIPMENTS BROUGHT BY THE CONTRACTOR SUCH AS PUMPS ETC AND FOUNDATIONS MADE BY THE CONTRACTOR FOR TEMPORARY SYSTEMS.

12.4 MEASUREMENT OF THE WORK COMPLETED

A) WHERE PAYMENT IS TO BE MADE ON THE BASIS OF WEIGHT, THE WEIGHT PER UNIT GIVEN IN THE BHEL DOCUMENT ONLY SHALL BE TAKEN IN TO CONSIDERATION. IN CASE SUCH AN INFORMATION IS NOT AVAILABLE IN BHEL DOCUMENTS, THEN THE LATEST RELEVANT INDIAN STANDARDS IN THIS REGARD MAY BE APPLIED.

B) SPARES, SURPLUS QUANTITY, ERECTION CONTINGENCY MATERIALS WILL NOT BE PAID FOR UNLESS THE SAME HAS BEEN CONSUMED IN PLACE OF REGULAR ITEM OF MEASURABLE WORK AS PER THE RATE SCHEDULE.

C) WHERE THE PAYMENT IS MADE ON THE BASIS OF ITEM RATE, ACTUAL EXECUTED QUANTITY MEASURED JOINTLY SHALL ONLY BE PAID FOR.

D) IT IS CLARIFIED THAT AS FAR AS WEIGHT CONSTITUTED BY WELDING CONSUMABLES AND OTHER CONSUMABLES SUPPLIED BY BHEL AS WELL AS BY THE CONTRACTOR, SHALL NOT BE CONSIDERED FOR PAYMENT.

E) BHEL ENGINEER'S DECISION REGARDING STAGE OF PAYMENT CORRESPONDING TO PROGRESS OF WORK, CALCULATION OF WEIGHT ETC WILL BE FINAL AND BINDING ON THE CONTRACTOR.

F) NO SEPARATE PAYMENT SHALL BE MADE FOR GROUTING OF EQUIPMENTS, STRUCTURES ETC SPECIFIED ELSEWHERE IN THESE SPECIFICATIONS.

G) NO SEPARATE PAYMENT WILL BE MADE FOR THE WEIGHT/VOLUME OF LUBRICANT, OILS, CHEMICALS, GASES, WATER, PRESERVATIVES ETC.

H) NO PAYMENT WILL BE MADE FOR THE SPECIAL TOOLS (e.g. FURNACE PLATFOMS – SKY CLIMBERS, PASSENGER ELEVATOR) ETC USED IN VARIOUS ACTIVITIES OF THIS WORK.

I) NO PAYMENT WILL BE MADE FOR WEIGHT OF RUBBER LINING.

SECTION-13
SPECIAL CONDITIONS OF CONTRACT

13.0 EXTRA CHARGES FOR RECTIFICATION AND MODIFICATION

13.1

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

13.2

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

13.3

HOWEVER, BHEL MAY CONSIDER FOR PAYMENT AS EXTRA, FOR SUCH OF THOSE WORKS DETAILED IN CLAUSE 13.1 WHICH REQUIRE MORE THAN **100 MAN-HOURS** AND SUCH PAYMENT WILL BE REGULATED BY THE TERMS, CONDITIONS AND STIPULATIONS CONTAINED IN THE CLAUSES 13.4 TO13.8 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) UNDER BOILER & AUX. ERECTION & COMMISSIONING WORKS WILL BE **RS. 320/- (RUPEES THREE HUNDRED AND TWENTY ONLY).**

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

SECTION-14
SPECIAL CONDITIONS OF CONTRACT

14.0 Insurance

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

14.1.1
BHEL/client has an MCE insurance cover, inter-alia, for all the permanent project equipments/components supplied by BHEL under scope of this work by way of a transit and storage cum erection policy covering liability against damages/ losses etc.

14.2 Reporting Damages and Carrying out Repairs

14.2.1
Checking all components/equipments at siding/site and reporting to transporter and /or insurance authorities of any damages/losses will be done by BHEL.

14.2.2
Contractor shall render all help to BHEL in inspection including handling, re-stacking etc, assessing and preparing estimates for repairs of components damaged during transit, storage and erection, commissioning and preparing estimates for fabrication of materials lost/damaged during transit, storage and erection. Contractor shall help BHEL to furnish all the data required by railways, insurance company or their surveyors.

14.2.3
Contractor shall report to BHEL in writing any damages to equipments/ components on receipt, storing, and during drawl of the materials from stores, in transit to site and unloading at place of work and during erection and commissioning. The above report shall be as prescribed by BHEL site management. Any consequential loss arising out of non-compliance of this stipulation will be borne by contractor.

14.2.4
Contractor shall carry out fabrication of any material lost/damaged as per instructions from BHEL engineer.

14.2.5
BHEL, however, retains the right to award or not to award to the contractor any of the rectification/rework/repairs of damages and also fabrication of components.

14.2.6
All the repairs/rectification/rework of damages and fabrication of materials lost, if any, shall be carried out by a separately identifiable gang for certification of man-hours. Daily log sheets should be maintained for each work separately and should be signed by contractor's representative and BHEL engineer. Signing of log sheets does not necessarily mean the acceptance of these as extra works.

14.2.7
All rectification, repairs, rework and fabrication of components lost, which are minor and incidental to erection work (consuming not more than 100 man-hours on each occasion) shall be treated as part of work without any extra cost.

14.2.8
Insurance cover under this policy will generally be as per clauses 2.10.1 to 2.10.4 of General Conditions of Contract unless and otherwise specified differently in the Special Conditions.

14.2.9
In case the loss/damage is not attributable to the contractor, Payments of all extra works on account of repair / rectification / reworks of damages and fabrication of materials lost will be as per provisions of Section-13 of SCC.

14.2.10
In case the repairs/rectification/rework and fabrication of materials lost, the work has been done by more than one agency including the contractor, the payment towards extra charges will be on pro-rata basis and the decision of BHEL in this regard is final and binding on the contractor.

14.2.11
In case of theft / damage / loss of materials due to **repeated/continued instances of negligence/failure** attributable to the contractor, the expenses incurred on account of repair/ replacement of such components including BHEL's overhead expenses as applicable (presently @ 30%) in excess of the amount realized from the underwriters, if any, shall be recovered from the contractor. Recovery will be limited to Normal Deductible Franchise (DF)/Excess as per applicable Insurance (TAC) tariff guidelines for every incidence of loss/damage.

14.2.12
In case any insurance claim does not become tenable due to **willful** negligence/ damage/loss attributable to the contractor, the total cost of repair/replacement including BHEL overhead expenses shall be recovered from the contractor.

14.3 Insurance by the Contractor and Indemnification of BHEL

14.3.1

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

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

14.3.2
Contractor shall obtain suitable statutory as well as non-statutory insurance policies for all the properties belonging to him and also for his personnel deployed at project for execution of the contract work.

SECTION-15

SPECIAL CONDITION OF CONTRACT

15.0 EARNEST MONEY DEPOSIT , SECURITY DEPOSIT & BANK GUARANTEE

15.1 Earnest Money Deposit:

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

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

i) After opening the tender, the bidder revokes his tender within the validity period or increases his earlier quoted rates.

ii) The bidder does not commence the work within the period as per LOI/Contract. In case the LOI / contract is silent in this regard then within 15 days after award of contract.

15.1.2 EMD shall not carry any interest.

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

15.2 Security Deposit

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

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 should be furnished before start of the work by the contractor.

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

i. Cash (as permissible under the Income Tax Act)

ii. Pay Order, Demand Draft in favour of BHEL.

iii. Local cheques of scheduled banks, subject to realization.

iv. Securities available from Post Offices such as National Savings Certificates, Kisan Vikas Patras etc. (Certificates should be held in the name of Contractor furnishing the security and duly pledged in favour of BHEL and discharged on the back).

v. Bank Guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format should have the approval of BHEL.

vi. Fixed Deposit Receipt issued by Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The FDR should be in the name of the contractor, A/C BHEL, duly discharged on the back.

vii. Security deposit can also be recovered at the rate of 10% from the running bills. However in such cases at least 50% of the Security Deposit should be remitted (either by cash/DD or **BG for maximum 50%** of total SD) before start of the work and the balance 50% may be recovered from the running bills.

viii. EMD of the successful bidder shall be converted and adjusted against the cash Security Deposit excepting for such bidder who has remitted One Time EMD.

ix. The Security Deposit shall not carry any interest.

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

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

15.3 BANK GUARANTEE

i. It is the responsibility of the bidder to get the Bank Guarantees revalidated/extended for the required period as per the advice of BHEL Site Engineer / Construction Manager. BHEL shall not be held liable for issue of any reminders regarding expiry of the Bank Guarantees.

ii. In case extension/further extensions of any Bank Guarantees are not required, the bidders shall ensure that the same is explicitly conveyed through the Construction Manager to BHEL PSWR/HQ, Nagpur

iii. In case the Bank Guarantees are not extended before the expiry date, BHEL reserves the right to invoke the same by informing the concerned Bank in writing, without any advance notice/communication to the concerned bidder.

iv. **Bidders to note that any corrections to Bank Guarantees shall be done by the issuing Bank, only through an amendment in an appropriate non judicial stamp paper.**

v. Bidders to ensure that the Bank Guarantees submitted are exactly as per format given in the Tender documents.

vi. The Original Bank Guarantee shall be sent directly by the Bank to BHEL under Registered Post (Acknowledgement Due). However, in exceptional cases, where guarantee is directly received by Vendor, the Vendor shall instruct the Bank to send an unstamped duplicate copy of the guarantee directly to BHEL under Registered Post (Acknowledgement Due).

ANNEXURE - 1

PAINTING SCHEME

S N	AREA / DESCRIPTION	COLOUR	IS SPECIFICATION
1	A) HANGER SUPPORTS, B) FURNACE BUCKSTAYS C) PF COAL PIPING, COUPLING, ORIFICES AND SUPPORTS D) GATES ON DUCTS AND RAW COAL PIPES E) PLATFORMS F) STAIR SIDE CHANNEL G) BOILER STRUCTURE, H) FAN HANDLING STRUCTURE, I) FLOOR BEAMS. J) ESP STRUCTURE AND GALLERIES K) OIL GUN MAINTENANCE VICE L) SUPPORTS FOR WIND BOX, DUCTS, FANS M) ESP PENT HOUSE, OUTER ROOF N) LINKAGES FOR DAMPERS P) MANHOLE DOORS IN ESP AND DUCTS	SMOKE GREY	SYNTHETIC ENAMEL AS PER IS:2932
2	A) FLOOR GRILLS, B) HANGERS, HANGER RODS C) DRUM SUSPENSION RODS, D) STAIR CASE STEP TREADS.	BLACK	SYNTHETIC ENAMEL AS PER IS:2932
3	A) LIGHT OIL PIPING B) DIRTY OIL TANK C) LUB OIL FOR AIR HEATERS D) LUB OIL FOR FANS	GOLDEN BROWN	SYNTHETIC ENAMEL AS PER IS:2932
4	A) COOLING WATER PIPING B) AUX COOLING WATER PIPING C) BOILER FILL PIPING D) AIR HEATER WASH MANIFOLD E) AIR HEATER CLEANING EQUIPMENT F) LP PIPING DRAINS G) BOILER WASH WATER H) CONDENSATE PIPING	SEA GREEN	SYNTHETIC ENAMEL AS PER IS:2932
5	A) HAND RAILS AND POSTS B) CHUTE PIPE C) LADDER D) ELECTRICAL AND MECHANICAL HOISTS E) HOISTS FOR AIR HEATER F) FAN HANDLING EQUIPMENTS G) MONORAIL BEAMS	GOLDEN YELLOW	SYNTHETIC ENAMEL AS PER IS:2932
6	TOE GUARD PLATE	POST OFFICE RED	SYNTHETIC ENAMEL AS PER IS:2932

S N	AREA / DESCRIPTION	COLOUR	IS SPECIFICATION
7	A) SILENCERS FOR SAFETY VALVES AND START UP VENT, B) ACCESS DOORS AND OBSERVATION PORT FOR AIR HEATERS, C) INSPECTION DOORS ON FURNACE AND ESP, D) FURNACE BOTTOM SEAL PLATES ASSEMBLY, E) INSTRUMENT TAPPING POINTS ON FURNACE AND DUCTS	HEAT RESISTENT ALUMINIUM	IS13183 Gr-I
8	STEAM PIPING (BAND - EACH 5MTR)	POST OFFICE RED	SYNTHETIC ENAMEL AS PER IS:2932
9	EQUIPMENT(MILL, HT & LT MOTORS, SB/WB, FANS, VALVES, ACTUATORS ETC) AND PANELS.	EXISTING MFG UNIT COLOUR	SYNTHETIC ENAMEL AS PER IS:2932
10	PANELS (TOUCH UP PAINTING)	EXISTING MFG UNIT COLOUR	SYNTHETIC ENAMEL AS PER IS:2933
11	A) ATOMISING AIR PIPING, B) SCANNER AIR PIPING, C) IGNITOR AIR PIPING D) GUN COOLING AIR PIPING, E) MILL SEAL AIR PIPING F) AIR HEATER AIR MOTOR PIPING G) CONDENSER AIR EVACUATION PIPING H) INSTRUMENT AIR PIPING I) SERVICE AIR PIPING	SKY BLUE	SYNTHETIC ENAMEL AS PER IS:2932
12	AIR HEATER FIRE FIGHTING	FIRE RED	SYNTHETIC ENAMEL AS PER IS:2932
13	LEGEND IN BLOCK LETTER OVER GOLDEN YELLOW BACKGROUND	BLACK	SYNTHETIC ENAMEL AS PER IS:2932

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

LIST OF APPLICABLE PGMA'S

S N	PG	MA	PGMA DESCRIPTION	Wt (MT)	STAGE	PKG	PG WT	REMARKS
	FROM TRICHY (CUST NO 0642)							
A			**STRUCTURES**					
1	24	325	Silencer Support-Saf	22.30	LU	STR		
2	24	335	SIncr&Suprt-Starting	3.30	DL	STR		
			PG Weight				25.60	
3	30	103	Seal Plate Assy	3.50	LU	STR		
4	30	105	Furnace Bottom Enclo	8.80	LU	STR		
5	30	211	Furnace Rear Arch En	5.10	LU	STR		
6	30	212	Furnace Extd Side Bo	3.60	LU	STR		
7	30	215	Main Boiler	12.60	LU	STR		
8	30	219	Vertical Roof Enclos	64.50	LU	STR		
9	30	233	First Pass Deck Sprt	65.40	LU	STR		
10	30	235	Enclosure Support St	26.50	LU	STR		
			PG Weight				190.00	
11	35	010	Foundation Materials	17.01	DL	STR		
12	35	111	Main Columns Left 1s	387.33	DL	STR		
13	35	112	Main Columns Lert 2n	175.71	DL	STR		
14	35	121	Maincolumns Right 1s	387.33	DL	STR		
15	35	122	Main Columns Right 2	175.71	DL	STR		
16	35	130	Main Columns Middle	265.12	DL	STR		
17	35	140	Auxiliary Columns-Le	204.76	DL	STR		
18	35	150	Auxiliary Columns-Ri	204.76	DL	STR		
19	35	190	Girder Pin Connectio	15.70	DL	STR		
20	35	211	Ceiling Structuremai	220.70	DL	STR		
21	35	212	Ceiling Structuremai	138.00	DL	STR		
22	35	213	Ceil Struct -Cross W	135.70	DL	STR		
23	35	214	Ceil Struct -Cross W	74.00	DL	STR		
24	35	221	Ceiling Structure Ro	39.10	DL	STR		
25	35	222	Ceiling Structure Ro	29.50	DL	STR		
26	35	231	Ceiling Structure Ho	24.50	DL	STR		
27	35	232	Ceiling Structure Ho	14.30	DL	STR		
28	35	311	Horizontal Bracing I	18.50	DL	STR		
29	35	312	Horiz Bracing Ii Pas	12.30	DL	STR		
30	35	321	Horiz Bracing I Pass	24.50	DL	STR		
31	35	322	Horiz Bracing Ii Pas	9.00	DL	STR		
32	35	331	Horiz Bracing I Pass	20.40	DL	STR		
33	35	332	Horiz Bracing Ii Pas	22.50	DL	STR		
34	35	341	Horiz Bracing I Pass	17.80	DL	STR		
35	35	342	Horiz Bracing Ii Pas	39.00	DL	STR		
36	35	351	Horiz Bracing I Pass	32.80	DL	STR		
37	35	352	Horiz Bracing Ii Pas	18.00	DL	STR		
38	35	361	Horiz Bracing I Pass	28.50	DL	STR		

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

S N	PG	MA	PGMA DESCRIPTION	Wt (MT)	STAGE	PKG	PG WT	REMARKS
39	35	362	Horiz Bracing Ii Pas	17.80	DL	STR		
40	35	381	Land Platform Lower	57.70	DL	STR		
41	35	382	Land Platform Middle	31.40	DL	STR		
42	35	383	Land Platform Upper	41.90	DL	STR		
43	35	390	Platform At Drum Flo	59.70	DL	STR		
44	35	441	Horizontal Beams-Low	70.00	DL	STR		
45	35	442	Horizontal Beams Mid	50.00	DL	STR		
46	35	443	Horizontal Beams-Upp	67.00	DL	STR		
47	35	451	Horizontal Beams - L	60.30	DL	STR		
48	35	452	Horizontal Beams - M	55.00	DL	STR		
49	35	453	Horizontal Beams - U	41.00	DL	STR		
50	35	511	Front Bracing-Lower	29.60	DL	STR		
51	35	512	Front Bracing Middle	21.50	DL	STR		
52	35	513	Front Bracing-Upper	14.70	DL	STR		
53	35	521	Side Bracing-Lower	95.90	DL	STR		
54	35	522	Side Bracing Middle	52.60	DL	STR		
55	35	523	Side Bracing-Upper	44.50	DL	STR		
56	35	531	Rear Bracing-Lower	62.70	DL	STR		
57	35	532	Rear Bracing- Middle	35.30	DL	STR		
58	35	533	Rear Bracing-Upper	53.90	DL	STR		
59	35	700	Hsfg Fasteners For P	21.10	DL	STR		
60	35	811	Floor Grills And Gua	194.76	DL	STR		
61	35	821	Stairs ? Lower	10.00	DL	STR		
62	35	822	Stairs - Middle	7.40	DL	STR		
63	35	823	Stairs ? Upper	6.80	DL	STR		
64	35	851	Hand Rails And Posts	14.78	DL	STR		
			PG Weight				3,969.88	
65	36	110	Columns Near Air Pre	105.98	HT	STR		
66	36	130	Middle Columns In Bo	61.69	HT	STR		
67	36	150	Beamsandbracings Nea	130.00	HT	STR		
68	36	311	Main Floor I Mbl 1st	37.00	HT	STR		
69	36	312	Main Floor I Mbl 2nd	40.50	HT	STR		
70	36	313	Non-Mbl Floor Betwee	36.00	HT	STR		
71	36	314	Non-Mbl Floor Betwee	19.20	HT	STR		
72	36	315	Non-Mbl Floor Betwee	25.10	HT	STR		
73	36	316	Non-Mbl Floor Betwee	35.00	HT	STR		
74	36	321	Main Floor Ii Mbl Is	80.00	HT	STR		
75	36	322	Main Floor Ii Mbl 2n	30.40	HT	STR		
76	36	323	Non-Mbl Floor Betwee	39.00	HT	STR		
77	36	324	Non-Mbl Floor Betwee	33.80	HT	STR		
78	36	325	Non-Mbl Floor Betwee	63.20	HT	STR		
79	36	326	Non-Mbl Floor Betwee	41.60	HT	STR		
80	36	327	Non-Mbl Floor Betwee	83.00	HT	STR		
81	36	331	Main Floor Iii Mbl 1	27.50	HT	STR		
82	36	332	Main Floor Iii Mbl 2	90.00	HT	STR		

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

S N	PG	MA	PGMA DESCRIPTION	Wt (MT)	STAGE	PKG	PG WT	REMARKS
83	36	333	Non-Mbl Floor Betwee	38.50	HT	STR		
84	36	334	Non-Mbl Floor Betwee	30.00	HT	STR		
85	36	335	Non-Mbl Floor Betwee	48.00	HT	STR		
86	36	341	Main Floor Iv Mbl 1s	46.50	HT	STR		
87	36	342	Main Floor Iv Mbl 2n	14.00	HT	STR		
88	36	343	Non-Mbl Floor Betwee	19.00	HT	STR		
89	36	344	Non-Mbl Floor Betwee	22.50	HT	STR		
90	36	345	Non-Mbl Floor Betwee	66.00	HT	STR		
91	36	346	Non-Mbl Floor Betwee	15.50	HT	STR		
92	36	347	Non-Mbl Floor Betwee	19.00	HT	STR		
93	36	348	Non-Mbl Floor Betwee	79.00	HT	STR		
94	36	351	Main Floor V Mbl Ist	18.00	HT	STR		
95	36	352	Main Floor V Mbl Ii	7.00	HT	STR		
96	36	353	Non-Mbl Floor Betwee	47.00	HT	STR		
97	36	354	Non-Mbl Floor Betwee	22.00	HT	STR		
98	36	355	Non-Mbl Floor Betwee	31.00	HT	STR		
99	36	361	Main Floor Vi Mbl 1s	28.00	HT	STR		
100	36	362	Main Floor Vi Mbl 2n	19.00	HT	STR		
101	36	363	Non_Mbl Floor Above	20.50	HT	STR		
102	36	391	Miscellaneous Platfo	73.00	HT	STR		
103	36	392	Miscellaneous Platfo	76.50	HT	STR		
104	36	393	Miscellaneous Platfo	65.00	HT	STR		
105	36	394	Miscellaneous Platfo	20.00	HT	STR		
106	36	395	Miscellaneous Platfo	9.00	HT	STR		
107	36	610	Boiler Roof Structur	95.40	HT	STR		
108	36	611	Boiler Roof Sheeting	22.00	HT	STR		
109	36	613	Rain Water Pipes And	24.00	LU	STR		
110	36	620	Boiler Side Cladding	70.00	LU	STR		
111	36	621	Boiler Side Cladding	18.00	LU	STR		
112	36	740	Posts And Hangers	67.00	HT	STR		
113	36	811	Floorgrillsandguardp	79.70	HT	STR		
114	36	812	Floorgrillsandguardp	150.00	HT	STR		
115	36	813	Floorgrillsandguardp	150.00	HT	STR		
116	36	814	Floorgrillsandguardp	86.00	HT	STR		
117	36	820	Stairs And Ladders	30.50	HT	STR		
118	36	851	Handrails And Posts	15.70	HT	STR		
119	36	852	Handrails And Posts	15.70	HT	STR		
120	36	853	Handrails And Posts	50.00	HT	STR		
121	36	993	Consumablesanderecit	16.50	HT	STR		
			PG Weight				2,703.47	
122	38	210	Inter Conn Platforms	43.00	SY	STR		
123	38	299	Mill Handling Monora	102.80	LU	STR		
124	38	310	Conn Platforms To Mi	20.00	SY	STR		
125	38	381	Eco Handling Structu	29.00	SY	STR		
126	38	410	Mill Maintanance Pla	148.50	SY	STR		

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

S N	PG	MA	PGMA DESCRIPTION	Wt (MT)	STAGE	PKG	PG WT	REMARKS
127	38	510	Lift Beams And Braci	89.00	LU	STR		
128	38	610	Elevator Cladding St	64.50	LU	STR		
129	38	611	Elevator Cladding Sh	33.00	LU	STR		
130	38	710	Lift Machine Room De	59.60	LU	STR		
131	38	810	Floorgrills And Guar	87.00	LU	STR		
132	38	820	Stairs And Ladders	4.00	SY	STR		
133	38	850	Hand Rails And Hand	7.60	LU	STR		
			PG Weight				688.00	
134	39	012	Foundation Materials	20.00	DL	STR		
135	39	101	Columns Frames Befor	100.00	LU	STR		
136	39	102	Columns Frames Befor	240.00	LU	STR		
137	39	141	Cols Frames Near Id	129.00	LU	STR		
138	39	142	Cols Frames Near Id	260.00	LU	STR		
139	39	150	Col Frames Betn I.D.	50.00	LU	STR		
140	39	300	Platforms - External	160.00	LU	STR		
141	39	301	Struc And Platform F	6.50	LU	STR		
142	39	302	Struc For Motor Hood	6.50	LU	STR		
143	39	304	Fan Handling Structu	15.00	LU	STR		
144	39	305	Fan Handling Structu	11.00	LU	STR		
145	39	306	Fan Handling Structu	50.00	LU	STR		
146	39	700	Hsfg Fasteners For P	1.10	LU	STR		
147	39	810	Floor Grill	50.00	LU	STR		
148	39	820	Stairs	21.50	LU	STR		
149	39	850	Hand Rail And Hand R	28.90	LU	STR		
150			Site fabricated structure	200.00		STR		
			PG Weight				1,349.50	
			SUB TOTAL - A (STRUCTURE)	**8,926.45**				
B			**PRESSURE PARTS**					
1	4	126	Upper Drum Without I	214.20	DL	PP		
2	4	136	Upper Drum Internals	10.00	DL	PP		
3	4	146	Upper Drum Sspn Id 6	15.40	DL	PP		
4	4	196	Upper Drum Trans Str	4.40	DL	PP		
			PG Weight				244.00	
5	5	137	Inlet Front Lower Ww	45.20	HT	PP		
6	5	139	Lower Inlet Header I	0.10	HT	PP		
7	5	147	Inlet Rear Lower Ww	43.00	HT	PP		
8	5	158	Inlet Side Waterwall	38.20	HT	PP		
9	5	159	Inlet Side Water Wal	38.20	HT	PP		
10	5	227	Waterwall Rear Hange	5.00	HT	PP		
11	5	229	Waterwall Rear Scree	7.00	HT	PP		
12	5	231	Outlet Front Upper W	6.80	HT	PP		
13	5	251	Outlet Side Upper Ww	13.50	HT	PP		
			PG Weight				197.00	
14	6	400	Unclassified Burner	22.10	HT	PP		

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

S N	PG	MA	PGMA DESCRIPTION	Wt (MT)	STAGE	PKG	PG WT	REMARKS
15	6	631	Front Upper Ww Pnl	58.30	HT	PP		
16	6	633	Front Upper Inter Ww	54.80	HT	PP		
17	6	634	Front Intermediate W	25.60	HT	PP		
18	6	637	Waterwall Lower Fron	29.90	HT	PP		
19	6	641	Rear Upper Ww Pnl	29.10	HT	PP		
20	6	643	Rear Upper Inter Ww	55.30	HT	PP		
21	6	644	Rear Intermediate Ww	25.20	HT	PP		
22	6	647	Rear Lower Ww Pnl	48.90	HT	PP		
23	6	651	Side Upper Ww Pnl	75.50	HT	PP		
24	6	653	Side Intermediate Ww	84.10	HT	PP		
25	6	655	Side Lower Ww Pnl	64.90	HT	PP		
26	6	670	Extended Side Ww Pnl	18.30	HT	PP		
			PG Weight				592.00	
27	7	102	Downcomer Piping-Con	77.30	HT	PP		
28	7	104	Discharge Line	24.70	HT	PP		
29	7	106	Suction Manifold	14.20	HT	PP		
30	7	107	Suction Spools	7.00	HT	PP		
31	7	215	Relief Tubes From Si	41.50	HT	PP		
32	7	216	Relief Tubes From Re	4.90	HT	PP		
33	7	217	Screen Relife Tubes	28.20	HT	PP		
34	7	218	Relief Tubes From Fr	8.90	HT	PP		
35	7	223	Furnace Screen Tubes	27.10	HT	PP		
36	7	225	Furnace Rear Hanger	17.20	HT	PP		
37	7	226	Furnace Rear Arch Tu	8.40	HT	PP		
38	7	231	Lower Corner Transit	4.90	HT	PP		
39	7	232	Upper Corner Transit	0.80	HT	PP		
40	7	402	Ww Front Header Susp	10.90	HT	PP		
41	7	403	Ww Side Header Suspe	17.40	HT	PP		
42	7	404	Ww Hanger Header Sus	18.20	HT	PP		
43	7	405	Ww Screen Header Sus	2.00	HT	PP		
44	7	420	Downcomer Guides	6.30	HT	PP		
45	7	431	Riser Tube Support	2.90	HT	PP		
46	7	500	Misc Components - Pr	0.50	HT	PP		
47	7	601	Pressure Seals	3.00	HT	PP		
48	7	992	Imported Electrodes	0.20	HT	PP		
49	7	993	Consumables & Erecti	1.50	HT	PP		
			PG Weight				328.00	
50	10	135	Horizontal Spaced Sh	4.70	HT	PP		
51	10	178	Vertical Platen Sh 1	30.00	HT	PP		
52	10	182	Sh Rear Wall Inlet H	4.50	HT	PP		
53	10	183	Sh Frontwall Inlet	9.00	HT	PP		
54	10	185	Sh Rear Roof Inlet H	8.50	HT	PP		
55	10	191	Sh Radiant Wall Roof	4.50	HT	PP		
56	10	195	Sh Division Panel In	20.00	HT	PP		
57	10	218	Rear Lower Sh Outlet	2.20	HT	PP		

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

S N	PG	MA	PGMA DESCRIPTION	Wt (MT)	STAGE	PKG	PG WT	REMARKS
58	10	235	Horizntl Spaced Sh O	17.50	HT	PP		
59	10	278	Vertical Platen Sh O	34.00	HT	PP		
60	10	283	Sh Frontwall Outlet	7.00	HT	PP		
61	10	291	Sh Radiant Wall Roof	7.30	HT	PP		
62	10	295	Sh Division Panel Ou	20.00	HT	PP		
63	10	315	Sh Rear Intermedhate	9.30	HT	PP		
64	10	687	Sh Radiant Wall Junc	4.50	HT	PP		
			PG Weight				183.00	
65	11	036	Sh Rear Hori Spaced	64.20	HT	PP		
66	11	038	Sh Reor Hori Spaced	95.50	HT	PP		
67	11	077	Sh Reor Vertical Spa	42.40	HT	PP		
68	11	078	Sh Vertic1l Platen C	70.00	HT	PP		
69	11	095	Sh Division Panel Co	86.00	HT	PP		
70	11	336	Sh Hor Spaced Upper	111.00	HT	PP		
71	11	338	Sh Hor Spaced Lower	94.40	HT	PP		
72	11	377	Sh Vertical Spaced R	44.40	HT	PP		
73	11	378	Sh Vertical Platen C	48.00	HT	PP		
74	11	395	Sh Division Panel Co	33.00	HT	PP		
75	11	606	Sh Front Upper Panel	8.30	HT	PP		
76	11	608	Sh Front Lower Panel	15.50	HT	PP		
77	11	716	Sh Rear Upper Pnl +	7.30	HT	PP		
78	11	717	Sh Rear Inter Pnl +	6.10	HT	PP		
79	11	718	Sh Rear Lower Pnl +	6.40	HT	PP		
80	11	767	Sh Stm Cool Side Wal	54.00	HT	PP		
81	11	768	Sh Stm Cool Side Wal	9.30	HT	PP		
82	11	769	Sh Stm Cool Side Wal	14.00	HT	PP		
83	11	787	Sh Rear Roof Panel +	3.20	HT	PP		
84	11	791	Sh Radiant Wall Roof	19.20	HT	PP		
85	11	916	Sh Stm Cool Rear Wal	6.40	HT	PP		
86	11	917	Sh Stm Cool Reor Wal	5.50	HT	PP		
87	11	918	Sh Stm Cool Rear Wal	8.50	HT	PP		
88	11	967	Sh Stm Cool Side Wal	12.70	HT	PP		
89	11	968	Sh Stm Cool Side Wal	9.40	HT	PP		
90	11	969	Sh Stm Cool Side Wal	14.10	HT	PP		
91	11	987	Sh Stm Cool Rear Roo	9.50	HT	PP		
92	11	991	Sh Radiant Roof Pane	18.60	HT	PP		
			PG Weight				916.90	
93	12	178	Sh Vertical Platen I	63.20	HT	PP		
94	12	395	Sh Division Panel In	10.80	HT	PP		
95	12	495	Sh Div9sion Panel Ou	10.10	HT	PP		
96	12	515	Sh Rear Hanger Tube	48.00	HT	PP		
97	12	619	Sh Horizontal Suppor	9.50	HT	PP		
98	12	803	Sh Steam Cooled Spac	3.50	HT	PP		
99	12	805	Super Heater Hanger	11.40	HT	PP		
100	12	850	Sh Conn Pipes-Satura	6.70	HT	PP		

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

S N	PG	MA	PGMA DESCRIPTION	Wt (MT)	STAGE	PKG	PG WT	REMARKS
101	12	852	Sh Desh Links	45.80	HT	PP		
102	12	900	Sh Desh	7.00	HT	PP		
103	12	903	5h Miscl Components	61.50	HT	PP		
104	12	906	Sh Suprts For Lines	14.70	HT	PP		
105	12	914	Suspension Of Sh Rad	8.00	HT	PP		
106	12	917	Suspension Of Radian	24.00	HT	PP		
107	12	924	Suspension Of Sh Bac	9.10	HT	PP		
108	12	927	Suspension Of Rear R	0.90	HT	PP		
109	12	928	Suspension Of Sh Rea	26.80	HT	PP		
110	12	944	Suspension Of Sh Pla	0.80	HT	PP		
111	12	948	Suspension Of Vertic	17.50	HT	PP		
112	12	954	Suspension Of Vertic	19.50	HT	PP		
113	12	968	Suspension Of Platen	26.40	HT	PP		
114	12	991	Indegenous Electrode	0.10	HT	PP		
115	12	992	Imported Electrodes	0.10	HT	PP		
116	12	993	Consumables & Erecti	0.50	HT	PP		
			PG Weight				425.90	
117	15	177	Rh Vertical Spaced R	18.00	HT	PP		
118	15	279	Rh Vertical Platen F	40.00	HT	PP		
			PG Weight				58.00	
119	16	077	Rh Ver Spaced Rear C	120.00	HT	PP		
120	16	079	Rh Ver Platen Front	83.00	HT	PP		
121	16	377	Rh Vertical Spaced R	8.00	HT	PP		
122	16	379	Rh Ver Platen Front	60.00	HT	PP		
			PG Weight				271.00	
124	17	776	Rh Ver Spaced Centre	13.00	HT	PP		
125	17	807	Rh Steam Cooled Spac	1.00	HT	PP		
126	17	904	Rh Hdr Suprts & Susp	7.00	HT	PP		
127	17	919	Rh Front Suspension	30.50	HT	PP		
128	17	929	Rh Rear Suspension	51.00	HT	PP		
129	17	991	Indegenous Electrode	0.20	HT	PP		
130	17	992	Rh Site Electrodes I	0.10	HT	PP		
			PG Weight				102.80	
131	19	701	Inlet Eco Headers	15.00	HT	PP		
132	19	702	Outlet Eco Headers	99.00	HT	PP		
133	19	814	Economisercoil Assy	77.90	HT	PP		
134	19	824	Economiser Coil Assy	152.00	HT	PP		
135	19	850	Eco Feed Pipe	4.00	HT	PP		
136	19	851	Eco Links To Drum	7.00	HT	PP		
137	19	884	Eco.Coil Assy Interm	200.00	HT	PP		
138	19	903	Eco. Miscellaneous C	1.00	HT	PP		
139	19	905	Eco Suprts & Suspens	0.60	HT	PP		
140	19	906	Eco Suprts For Lines	3.20	HT	PP		
141	19	907	Eco Supports/Feed Pi	2.00	HT	PP		
142	19	914	Econ-Miser Coil Assy	77.60	HT	PP		

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

S N	PG	MA	PGMA DESCRIPTION	Wt (MT)	STAGE	PKG	PG WT	REMARKS
143	19	924	Economiser Coil Assy	138.00	HT	PP		
144	19	984	Economiser Coil Midd	200.00	HT	PP		
145	19	991	Indegenous Electrode	0.10	HT	PP		
146	19	992	Imported Electrodes	0.10	HT	PP		
			PG Weight				977.50	
147	21	600	Soot Blower Piping A	14.00	SY	PP		
148	21	601	Sootblower Piping Su	9.40	SY	PP		
149	21	700	Bulked Bps Component	0.90	SY	PP		
150	21	800	Sb Valves (Bhel)	2.00	SY	PP		
151	21	825	Sb Valves (Sub Deliv	1.60	SY	PP		
152	21	992	Imported Electrodes	0.10	SY	PP		
			PG Weight				28.00	
153	24	300	Boiler Trim Piping A	76.70	HT	PP		
154	24	301	Boiler Trim Piping S	14.50	HT	PP		
155	24	315	Spray Water System	5.90	LU	PP		
156	24	316	Rh DeSh	4.20	LU	PP		
157	24	340	Sample Cooler And Su	0.80	LU	PP		
158	24	345	Main Steam Piping Fr	34.50	HT	PP		
159	24	346	Hangers And Supports	8.30	HT	PP		
160	24	350	Boiler Filling Pipin	2.40	HT	PP		
161	24	351	Hangers And Supports	0.50	HT	PP		
162	24	355	Circulating Pump Com	29.20	HT	PP		
163	24	360	Valves (Bhel) Cc R	63.80	HT	PP		
164	24	365	Valves & Fittings (S	6.20	LU	PP		
165	24	365	Valves & Fittings (S	1.00	LU	PP		
166	24	374	Cooler & Strainer As	2.00	LU	PP		
167	24	375	Headers For Trim Pip	2.60	HT	PP		
168	24	380	Erv And Safety Valve	8.20	HT	PP		
169	24	700	Bulked Bps Component	1.10	HT	PP		
170	24	950	Special Tools	0.20	SY	PP		
171	24	991	Imported Electrode F	1.30	HT	PP		
172	24	992	Imported Electrodes	0.10	LU	PP		
173	24	993	Consumables & Erecti	0.10	HT	PP		
174	24	994	Name Plates	0.30	SY	PP		
			PG Weight				263.90	
175	42	002	Steam Blow Materials	1.50	LU	PP		
176	42	128	Piping,Pump House St	1.00	LU	PP		
177	42	158	Piping,Opr'G Floor S	3.55	LU	PP		
178	42	300	Bhel Valve F.O. Syst	1.15	LU	PP		
179	42	358	Bhel Valve,Opr'G Flo	1.05	LU	PP		
			PG Weight				8.25	
180	81	003	Cont Blow Down Expan	4.40	LU	PP		
181	81	009	Inter Blow Down Expa	6.90	LU	PP		
			PG Weight				11.30	
182	97	088	Elctronic Level Indi	1.26	LU	PP		

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

S N	PG	MA	PGMA DESCRIPTION	Wt (MT)	STAGE	PKG	PG WT	REMARKS
183	97	297	Mtm Clamps And Pads	0.06	HT	PP		
			PG Weight				1.32	
			SUB TOTAL - B (PR PARTS)	**4,608.87**				
C			**NON PRESSURE PARTS**					
1	8	001	Furnace Upper Buckst	71.90	HT	NPP		
2	8	003	Furnace Upp.Inter Bu	115.00	HT	NPP		
3	8	006	Furnace Inter.Buckst	88.80	HT	NPP		
4	8	007	Furnace Lower Buckst	79.50	HT	NPP		
5	8	111	Furnace Rear Arch Bu	37.30	HT	NPP		
6	8	380	Furnace Bottom Suppo	46.50	HT	NPP		
7	8	382	Furnace Bottom Suppo	46.50	HT	NPP		
8	8	400	Furnace Guide	6.50	HT	NPP		
9	8	501	Furnace Backpassbuck	75.50	HT	NPP		
10	8	503	Furnace Back Pass Bu	87.00	HT	NPP		
11	8	901	Furnace Key Buckstay	4.50	HT	NPP		
12	8	907	Furnace Key Buckstay	2.00	HT	NPP		
13	8	910	Ex.Movement Measurem	1.00	LU	NPP		
			PG Weight				662.00	
14	9	001	Seal Boxes For Furna	10.70	HT	NPP		
15	9	002	Seal Boxes For Instr	2.70	HT	NPP		
16	9	003	Material For Instrum	0.60	LU	NPP		
			PG Weight				14.00	
17	18	002	First Pass Roof Skin	16.80	HT	NPP		
18	18	003	Second Pass Roof Sk9	3.50	HT	NPP		
19	18	010	Pr Pts Attachmnts In	1.40	HT	NPP		
20	18	020	Vibration Snubbers	0.30	HT	NPP		
			PG Weight				22.00	
21	20	051	Long Retractable Soo	57.03	SY	NPP		
22	20	054	Wall Box Non Pressur	1.15	SY	NPP		
23	20	201	Wall Deslagger Rw5e	14.00	SY	NPP		
24	20	204	Wall Box Non Pressur	1.74	SY	NPP		
25	20	511	Da Head Valve Assy	0.22	SY	NPP		
26	20	794	Wall Box Non 7ressur	0.06	SY	NPP		
27	20	962	Temp Probe Duplex Wi	2.04	LU	NPP		
28	20	988	Sdot Blower Commissi	0.01	SY	NPP		
29	20	998	Special Tools For So	0.01	SY	NPP		
			PG Weight				76.25	
30	24	320	Safety Valve Esc Pip	42.90	LU	NPP		
31	24	385	Safety Valve/Erv Sil	63.80	DL	NPP		
			PG Weight				106.70	
32	28	220	Doors	12.10	LU	NPP		
33	28	700	Bps Fasteners	0.90	LU	NPP		
			PG Weight				13.00	

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

S N	PG	MA	PGMA DESCRIPTION	Wt (MT)	STAGE	PKG	PG WT	REMARKS
34	31	010	Skin Casing Comps We	7.70	HT	NPP		
35	31	102	Fornace Bottom Skin	1.00	LU	NPP		
36	31	104	Furnace Rear Arch Sk	5.80	LU	NPP		
37	31	105	Second Pass Skin Cas	0.50	LU	NPP		
38	31	993	Erection Materials	1.00	LU	NPP		
			PG Weight				16.00	
39	41	350	Air Cooled Oil Gun A	1.45	LU	NPP		
40	41	390	Oil Gun Vice Assy An	1.45	LU	NPP		
41	41	500	High Energy Arc Igni	0.65	LU	NPP		
42	41	988	Oil&Gas Burner Commi	0.01	LU	NPP		
			PG Weight				3.56	
43	42	001	Pneumatic Fittings	0.25	LU	NPP		
44	42	005	Instrument Fittings	0.50	LU	NPP		
45	42	010	Lfo Pump Set	4.00	LU	NPP		
46	42	020	Hfo Pump Set	6.50	LU	NPP		
47	42	030	Hfo Heater Set	15.00	LU	NPP		
48	42	046	Drain Oil Pump-Motor	0.30	LU	NPP		
49	42	065	Drain Oil Tank	5.50	LU	NPP		
50	42	070	Burner Station Skid	5.00	LU	NPP		
51	42	120	Piping, Pump House-F	5.00	LU	NPP		
52	42	150	Piping, Operating Fl	6.25	LU	NPP		
53	42	152	Piping,Opr'G Floor L	3.00	LU	NPP		
54	42	154	Piping,Opr'G Floor D	2.35	LU	NPP		
55	42	157	Piping,Opr'G Floor A	1.55	LU	NPP		
56	42	200	Subdelivery Fuel Oil	3.00	LU	NPP		
57	42	700	Bps Fasteners	1.45	LU	NPP		
58	42	988	Oil&Gas System Commi	0.02	LU	NPP		
59	42	992	Imported Electrodes	0.02	LU	NPP		
			PG Weight				59.69	
60	43	004	Assy Comp Scanner &	2.45	LU	NPP		
61	43	005	Assy Comp Mill Seal	15.00	LU	NPP		
62	43	104	M/C Comp Scanner & G	19.05	LU	NPP		
63	43	105	M/C Comp Mill Seal A	30.00	SY	NPP		
64	43	200	Subdel,Ignitor&Scann	7.00	LU	NPP		
			PG Weight				73.50	
65	45	321	Wind Box Support 32	10.75	HT	NPP		
66	45	325	Windbox For One And	65.00	HT	NPP		
67	45	326	Windbox For Two And	65.00	HT	NPP		
			PG Weight				140.75	
68	47	261	Fuel Pipe Supports	35.00	SY	NPP		
69	47	263	Fuel Pipe Coupling C	35.00	LU	NPP		
70	47	266	Fuel Pipe St Pipes F	100.00	SY	NPP		
71	47	267	Fuel Pipe St Pipes F	100.00	SY	NPP		
72	47	268	Fuel Pipe St Pipes F	100.00	SY	NPP		
73	47	269	Fuel Pipe St Pipes F	50.00	SY	NPP		

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

S N	PG	MA	PGMA DESCRIPTION	Wt (MT)	STAGE	PKG	PG WT	REMARKS
			PG Weight				420.00	
74	48	012	Rect Duct Bet F.D F	91.00	LU	NPP		
75	48	014	Expn Piecesbet F.D F	5.50	LU	NPP		
76	48	015	Supportsetcbet F.D F	10.00	LU	NPP		
77	48	019	Foundation Materials	4.20	DL	NPP		
78	48	022	Rect Duct Sec.Air I	12.50	LU	NPP		
79	48	032	Rect Duct A.H Bypas	42.50	LU	NPP		
80	48	112	Rect Ducts Pri Fan T	56.40	SB	NPP		
81	48	114	Expn Piecespri Fan T	5.00	SB	NPP		
82	48	115	Supportsetcpri Fan T	24.00	SB	NPP		
83	48	132	Rect Duct Pri Air F	30.20	SB	NPP		
84	48	142	Rect Duct Coldairbu	39.00	SB	NPP		
85	48	144	Expn Piecescoldairbu	4.00	SB	NPP		
86	48	145	Supportsetccoldairbu	6.00	SB	NPP		
87	48	152	Rect Duct Pri Air F	42.80	SB	NPP		
88	48	200	Instrument Tappings	4.00	LU	NPP		
89	48	202	Rect Ductsairheater	216.20	LU	NPP		
90	48	204	Expn Piecesairheater	10.00	LU	NPP		
91	48	205	Supportsetcairheater	19.80	LU	NPP		
92	48	207	Flowmeters For Secon	27.00	LU	NPP		
93	48	212	Wind Box Connecting	50.00	LU	NPP		
94	48	214	Expn Pieceswindbox C	5.00	LU	NPP		
95	48	222	Rect Duct-Airheater	105.00	LU	NPP		
96	48	224	Expn Piecesairheater	12.00	LU	NPP		
97	48	225	Supports For Hot P.A	11.00	LU	NPP		
98	48	232	Rect Ducts Hot Air B	131.00	SB	NPP		
99	48	235	Support Hot Air Bus	2.20	SB	NPP		
100	48	382	Rect Duct Economise	95.00	HT	NPP		
101	48	384	Expn Pieceseconomise	24.00	LU	NPP		
102	48	385	Supportsetceconomise	36.40	LU	NPP		
103	48	386	Duct Below Divertor	102.80	LU	NPP		
104	48	388	Sq Duct,Economiser-P	124.40	LU	NPP		
105	48	432	Rect Duct Airheater	77.60	LU	NPP		
106	48	434	Expn Piecesairheater	13.00	LU	NPP		
107	48	435	Supportsetcairheater	18.20	LU	NPP		
108	48	438	Sq Duct,Pri Ah-Blr O	30.20	LU	NPP		
109	48	439	Sq Duct,Sec Ah-Blr O	40.10	LU	NPP		
110	48	462	Rect Duct Boiler Ou	283.30	LU	NPP		
111	48	464	Expn Piecesboiler Ou	20.00	LU	NPP		
112	48	465	Bof To Ep Ducting Su	4.70	LU	NPP		
113	48	468	Sq Duct,Blr Outlet F	136.80	LU	NPP		
114	48	482	Rect Ducts-Elec Prpt	95.00	LU	NPP		
115	48	484	Expn Pieceselec Prpt	20.00	LU	NPP		
116	48	485	Supportsetcelec Prpt	32.80	LU	NPP		
117	48	486	Ep Spool Duct	136.90	LU	NPP		

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

S N	PG	MA	PGMA DESCRIPTION	Wt (MT)	STAGE	PKG	PG WT	REMARKS
118	48	489	Sq Duct,Ep Interconn	64.90	LU	NPP		
119	48	492	Rect Duct Ind Draft	326.00	LU	NPP		
120	48	494	Expn Piecesind Draft	6.00	LU	NPP		
121	48	495	I.D.System Duct Supp	67.20	LU	NPP		
122	48	662	Rect Duct Hot Air B	80.00	SB	NPP		
123	48	664	Expn Pieceshot Air B	10.00	SB	NPP		
124	48	665	Supports For Hot Pa	15.60	SB	NPP		
125	48	667	Venturi-Primary Air	19.60	SB	NPP		
126	48	700	Bulked Bps Component	5.60	LU	NPP		
127	48	993	Erection Materials	20.00	LU	NPP		
			PG Weight				2,872.40	
128	67	204	Raw Coal Gates Needl	4.00	SY	NPP		
129	67	272	Coal Valve-36 Inch M	8.00	SY	NPP		
130	67	276	Raw Coal Gate Chain	8.00	SY	NPP		
131	67	283	Feeder Outlet Isolat	10.00	SY	NPP		
132	67	801	Down Spout	18.70	SY	NPP		
133	67	802	Bunker Emptying Chut	28.50	SY	NPP		
134	67	803	Feed Pipe To Mill	17.00	SY	NPP		
			PG Weight				94.20	
135	81	018	Mixing Tanks For Che	0.60	LU	NPP		
136	81	019	Metering Tanks For C	0.60	LU	NPP		
137	81	036	Cw Store Tank - 16-2	6.90	LU	NPP		
138	81	110	Cooling Water Pump	0.40	LU	NPP		
139	81	120	Hp Dozing Pump	0.80	LU	NPP		
			PG Weight				9.30	
140	97	593	Elevator & Accessori	20.00	SY	NPP		
141	97	599	Pneumatic Actuator I	4.00	LU	NPP		
			PG Weight				24.00	
142	99	099	Misc Chain Pully Blo	0.10	SY	NPP		
143	99	100	Fan Handling Equipme	17.60	SY	NPP		
144	99	300	Cir.Pump,Feed Pump,H	9.00	SY	NPP		
145	99	400	Airheater,Steamcoil	7.75	SY	NPP		
146	99	512	Furnace Cradle 2 Wal	3.00	SY	NPP		
147	99	600	Fo System Handling E	1.20	SY	NPP		
			PG Weight				38.65	
148			CERALINE BENDS FOR COAL PIPE	150.00	SYN	NPP		
149			LIGHT WEIGHT CONCRETE SLABS	200.00	BLU	NPP		
			PG Weight				350.00	
			SUB TOTAL - C (NON PR PTS)	**4,995.99**				
D			**SG PIPING**					
1	80	342	Aux Steam To Scaph	5.00	LU	SGP		
2	80	343	Aux Steam To Sootblo	2.10	LU	SGP		
3	80	344	Aux.Steam To F.O.Pum	11.00	LU	SGP		

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

S N	PG	MA	PGMA DESCRIPTION	Wt (MT)	STAGE	PKG	PG WT	REMARKS
4	80	351	Aux Steam To Unliste	16.00	SY	SGP		
5	80	352	Aux Steam To Unliste	2.00	SY	SGP		
6	80	355	Steam Tracing Line O	3.00	LU	SGP		
7	80	364	Cbd Tank Vent To Sys	2.80	SY	SGP		
8	80	365	Cbd Tank Vent/Sv Exh	0.90	LU	SGP		
9	80	366	Ibd Tank Vent To Atm	12.00	LU	SGP		
10	80	368	Scaph Drain Tank Ven	2.30	LU	SGP		
11	80	395	Aux Steam To Fo Atom	1.20	LU	SGP		
12	80	418	Ecection Materials F	0.30	LU	SGP		
13	80	450	Cbd And Emergency Dr	2.00	LU	SGP		
14	80	451	Boiler Integral Pipi	14.00	LU	SGP		
15	80	453	Lp Piping Drains-Sg	4.90	LU	SGP		
16	80	454	Scaph Drains	2.40	LU	SGP		
17	80	455	Drain From Ulisted E	3.50	SY	SGP		
18	80	460	Sg Aux Cooling Water	46.00	LU	SGP		
19	80	471	Boiler Wash Water To	12.00	SY	SGP		
20	80	477	Service Water	2.00	LU	SGP		
21	80	480	Fire Water-Other Are	6.20	LU	SGP		
22	80	600	Hp Dozing	1.20	LU	SGP		
23	80	612	Service Air For Unit	13.00	LU	SGP		
24	80	616	Inst Air For Unit	11.00	LU	SGP		
25	80	650	Heavy Fuel Oil Main	45.00	LU	SGP		
26	80	812	Hangers & Supports -	23.00	LU	SGP		
27	80	820	Aux.Structure-Drains	33.00	LU	SGP		
28	80	901	Sd Valves&Specialiti	9.00	LU	SGP		
29	80	905	Bhel Valves-Boiler L	22.00	LU	SGP		
30	80	992	Imported Electrodes	0.20	HT	SGP		
			PG Weight				309.00	
31	97	282	Flowmeters	0.45	LU	SGP		
			PG Weight				0.45	
			SUB TOTAL - D (SG PIPING)	**309.45**				
E			**ROTATING MACHINES**					
1	65	736	36 Inch Gravimetric	60.00	SYN	RTM		
2			Motors	200.00	BLU	RTM		
			PG Weight				260.00	
			SUB TOTAL - E (ROT. M/C)	**260.00**				
			TOTAL WEIGHT	**19,100.76**				
F			**LINING AND INSULATION**					
1	32	010	Fixing Comp For Blr	9.00	HT	INS		
2	32	110	Fixing Comp For Blr	4.00	LU	INS		
3	32	120	Fixing Comp For Sb P	1.20	SY	INS		
4	32	310	Fixing Comp For Air	45.00	LU	INS		

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

S N	PG	MA	PGMA DESCRIPTION	Wt (MT)	STAGE	PKG	PG WT	REMARKS
5	32	410	Fixing Comp For Ah A	20.00	LU	INS		
6	32	510	Fixing Comp For Id D	90.00	LU	INS		
7	32	520	Fixing Comp For Fans	170.80	LU	INS		
8	32	710	Fixing Comp For Oil	20.00	SB	INS		
			PG Weight				360.00	
9	33	021	Blr Pr Parts Mineral	277.00	LU	INS		
10	33	121	Blr Mountings Minera	10.90	LU	INS		
11	33	126	Sb Pipes Mineral Woo	3.40	SY	INS		
12	33	201	Main Blr Formed Refr	1.00	LU	INS		
13	33	212	Main Blr Castable Re	153.00	LU	INS		
14	33	230	Main Blr Pourable In	306.00	LU	INS		
15	33	321	Air Ducts Mineral Wo	240.00	LU	INS		
16	33	421	Air Heater And Gas D	140.00	LU	INS		
17	33	521	Id Ducts Mineral Woo	118.00	LU	INS		
18	33	526	Fans And Ep Mineral	238.00	LU	INS		
19	33	721	Oil System Mineral W	5.80	SB	INS		
20	33	970	Misc Eqpts Expanded	0.70	LU	INS		
21	33	971	Misc Eqpts Woven Wir	1.00	LU	INS		
22	33	975	Misc Eqpts Sealing C	0.20	LU	INS		
			PG Weight				1,495.00	
23	37	010	Blr Outer Casing Com	35.00	LU	INS		
24	37	810	Blr Outer Casing	45.00	LU	INS		
							80.00	
25	81	318	Fix Comp For Insuln	6.60	LU	INS		
26	81	325	Mineral Wool Mattres	50.00	SB	INS		
27	81	341	Sealing Compound-Ext	0.60	SB	INS		
28	81	350	Aluminium Sheet-Exte	25.00	SB	INS		
							82.20	
			SUB TOTAL - F (INSULATION)	**2,017.20**				

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

LIST OF APPLICABLE PGMA'S

SN	PGMA	PGMA DESCRIPTION	WT(MT)	STAGE	PKG	PG WT	REMARKS
	FROM BAP RANIPET						
G		**ROTATING MACHINES**					
1	50510	STEAM COIL A P H	11.45	BLU	RTM		
						11.45	
2	52010	LARG AH-ROTOR ASSY	837.10	BLU	RTM		
3	52011	LARG AH-ROTOR POST	38.14	BLU	RTM		
4	52012	LARG AH-ROTORPINRACK	5.54	BLU	RTM		
5	52013	LARG AH-ROTORSEALS	9.95	BLU	RTM		
6	52030	LARG AH-ROTORHOUSING	55.00	BLU	RTM		
7	52041	HOT END CONN PLATE	80.00	BLU	RTM		
8	52042	COLD END CONN PLATE	128.00	BLU	RTM		
9	52054	LARG AH-AXIAL SEAL	0.51	BLU	RTM		
10	52055	LARG AH-BY PASS SEAL	1.29	BLU	RTM		
11	52100	LARGE AH ROTOR DRIVE	8.60	BLU	RTM		
12	52210	LARG AH-ACCESS DOOR	1.09	BLU	RTM		
13	52211	LARG AH-AIRSEAL PIPE	0.87	BLU	RTM		
14	52212	LARG AH-OBSER. PORTS	0.07	BLU	RTM		
15	52217	LARG AH-STOP.ALARMS	0.03	BLU	RTM		
16	52220	LARG AH-GENS DETAILS	11.50	BLU	RTM		
17	52261	LARG AH-GUIDE BEARNG	8.10	BLU	RTM		
18	52262	LARG AH-SUPRT BEARNG	12.00	BLU	RTM		
19	52271	OIL PIPING GUIDE BRG	0.52	BLU	RTM		
20	52272	OIL PIPING SUPRT BRG	0.53	BLU	RTM		
21	52274	LUB OIL CIRCULN UNIT	1.23	BLU	RTM		
22	52301	WASH MANIFLD GAS INL	1.81	BLU	RTM		
23	52302	WASH MANIFLD GAS OUT	1.65	BLU	RTM		
24	52326	CLEANG EQPT GAS OUT	0.47	BLU	RTM		
25	52329	CLE EQPT DRIVE UNIT	0.83	BLU	RTM		
26	52360	FIRE SENSING SYSTEM	0.06	BLU	RTM		
		PG WEIGHT				1,204.89	
27	55216	1REAC FDFAN 2500-300	38.30	BLU	RTM		
28	55335	2REAC PAFAN 2000-250	29.50	SYN	RTM		
29	55810	AXIAL FDFAN COUPLING	1.00	BLU	RTM		
30	55830	AXL PAFAN COUPLING	1.00	SYN	RTM		
31	55910	AXL FDFAN ACCESSORY	7.10	BLU	RTM		
32	55911	AXIAL FDFAN SILENCER	71.00	BLU	RTM		
33	55930	AXL PAFAN ACCESSORY	4.50	SYN	RTM		
34	55931	PA FAN SILENCER	65.00	SYN	RTM		
						217.40	
35	56077	SEAL AIR FAN C&I ITEMS	0.10	SYN	RTM		
36	56161	BAC 1 SUC SA FAN	1.60	SYN	RTM		
37	56173	BAC 1 SUC IGNTR FAN	8.00	BLU	RTM		
38	56228	BAC 2 SUC ID FAN	190.00	BLU	RTM		

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

SN	PGMA	PGMA DESCRIPTION	WT(MT)	STAGE	PKG	PG WT	REMARKS
39	56670	IGNITR FAN MOTOR	1.60	BLU	RTM		
40	56820	RADL IDFAN COUPLING	0.20	BLU	RTM		
41	56870	SEAL AIR FAN COUPLING(R	0.05	SYN	RTM		
42	56920	RAD IDFAN ACCESSORY	5.00	BLU	RTM		
43	56921	ID FAN SILENCER	7.00	BLU	RTM		
44	56971		10.00	BLU	RTM		
		PG WEIGHT				223.55	
		SUB TOTAL - G (ROT MACHINES)	**1,657.29**				
H		**NON PRESSURE PARTS**					
1	57010	GATE FAN OUTLET	22.00	BLU	NPP		
2	57013	DAMPERS BET FD FAN & AP	9.00	BLU	NPP		
3	57033	DAMPERS AH BY PASS SEC	17.40	BLU	NPP		
4	57110	GUILLOTENE GATE PA FAN	18.40	SYN	NPP		
5	57113	DAMPERS BETWEEN PAFAN A	6.20	SYN	NPP		
6	57143	DAMPER COLD AIR BUS(TEM	2.90	SYN	NPP		
7	57160	COLD AIRGATE, AIRBUS TO	11.30	SYN	NPP		
8	57203	DAMP APH TO WINDBOX DUC	13.70	BLU	NPP		
9	57209	LINKAGES FOR DAMPERS	2.00	BLU	NPP		
10	57223	DAMP APH PRIMARY SIDE T	8.00	BLU	NPP		
11	57270	GUILLOTENE GATE DUCT TO	29.10	BLU	NPP		
12	57383	DAMPER ECONOMISER TO AP	32.00	BLU	NPP		
13	57433	DAMPER APH BOILER OUTLE	25.20	BLU	NPP		
14	57460	GUILLOTENE GATE EP INLE	36.70	BLU	NPP		
15	57466	PLATFORMS AND LADDERS	6.00	BLU	NPP		
16	57480	GUILLOTENE GATE EP OUTL	78.40	BLU	NPP		
17	57490	GUILLOTENE GATE ID FAN	53.70	BLU	NPP		
18	57491	BLOWER WITH MOTOR	0.60	BLU	NPP		
19	57577	ELECT ACTUATOR FOR GATE	19.70	BLU	NPP		
20	57663	DAMPER HOT AIR BUS TO M	8.70	SYN	NPP		
		PG WEIGHT				401.00	
		SUB TOTAL - H (NON PR PARTS)	**401.00**				
J		**E S P**					
1	79601	ROLL/SLIDE SUPPORTS	30.00	BLU	ESP		
2	79605	ESP-SUB-DELIVERY COMPON	1.00	BLU	ESP		
3	79606	INSULATOR HOUSING AS	54.84	BLU	ESP		
4	79608	GAS DIST. ASSY	85.00	BLU	ESP		
5	79609	GD-RAPPING MECHANISM	12.78	BLU	ESP		
6	79610	GD_DRIVE ARRANGEMENT	0.86	BLU	ESP		
7	79611	GAS SCREEN-EP	40.80	BLU	ESP		
8	79613	EMIT SYST SUSPENSION	19.59	BLU	ESP		
9	79614	SUPPORT INSULATORS	8.64	BLU	ESP		
10	79615	EMITTING ELECTRODES	38.87	BLU	ESP		
11	79616	EMIT ELECT RAPP MECH	46.00	BLU	ESP		
12	79617	DRIVE ARGT. FOR EMIT. S	38.00	BLU	ESP		

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

SN	PGMA	PGMA DESCRIPTION	WT(MT)	STAGE	PKG	PG WT	REMARKS
13	79619	COL ELEC SUSPENSION	160.00	BLU	ESP		
14	79620	COLLECTING ELECTRODE	875.98	BLU	ESP		
15	79620	COLLECTING ELECTRODE	885.54	BLU	ESP		
16	79621	EMIT SYS FRAME-TOP	129.31	BLU	ESP		
17	79622	EMIT SYS FRAME BOTOM	208.13	BLU	ESP		
18	79623	INSPECTION DOORS	21.61	BLU	ESP		
19	79624	SHOCK BARS	138.43	BLU	ESP		
20	79625	COLL ELECT RAPP MECH	115.00	BLU	ESP		
21	79626	COLL ELEC RAPP DRIVE	7.72	BLU	ESP		
22	79628	ESP ROOF PANELS	187.04	BLU	ESP		
23	79631	GEARED MOTORS FOR RAPPI	25.80	BLU	ESP		
24	79632	EMIT SYS FRAME-MIDLE	293.78	BLU	ESP		
25	79641	ELECTRICAL MISCELLANEOU	0.50	BLU	ESP		
26	79642	OUTER ROOF-EP	255.00	BLU	ESP		
27	79643	HOPPER RIDGES	83.50	BLU	ESP		
28	79644	HOPPER UPPER PART	315.90	BLU	ESP		
29	79645	HOP MLD&LOWER PART	540.00	BLU	ESP		
30	79646	INSULATOR SUPP PANEL	94.50	BLU	ESP		
31	79647	ROOF PANEL ASSY	127.00	BLU	ESP		
32	79648	CASING STRUCTURE	449.43	BLU	ESP		
33	79649	CASING SHELL/PANEL	650.73	BLU	ESP		
34	79650	INLET-OUTLET FUNNEL	180.74	BLU	ESP		
35	79655	PENT HOUSE FOR E P	262.00	BLU	ESP		
36	79657	SPLITTER&GUIDE VANES	26.89	BLU	ESP		
37	79659	CONTROL ROOM-INSERTS	58.20	BLU	ESP		
38	79661	EP PERF TEST EQUIPT	1.00	BLU	ESP		
39	79663	ASH LEVEL INDICATOR	1.50	BLU	ESP		
40	79665	APP PLATFORM-HOPPER	180.00	BLU	ESP		
41	79666	WATER WASHING SYSTEM	4.65	BLU	ESP		
42	79672	INTERLOCKS-EP	2.00	BLU	ESP		
43	79673	ELECTRICALLY OPERTD HOI	6.00	BLU	ESP		
44	79681	SUPPORTING STRUCTURES FO	457.47	BLU	ESP		
45	79690	HEATING ELEMENTS	1.01	BLU	ESP		
46	79691	PANEL TYPE HOPPER HEATE	37.00	BLU	ESP		
		PG WEIGHT				7,159.75	
47	89610	EP GALLERIES&STAIRS	126.01	BLU	ESP		
48	89611	ESP ROOF HANDRAILS	9.84	BLU	ESP		
		PG WEIGHT				135.85	
49		HIGH VOLTAGE RECTIFIERS	120.00				FROM JHANSI
		PG WEIGHT				120.00	
		SUB TOTAL - J (E S P)	**7,415.60**				
		TOTAL WEIGHT	**9,473.89**				

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

LIST OF APPLICABLE PGMA'S

SN	PGMA	DESCRIPTION	WT (MT)	IBR	STAGE	PKG	REMARKS
K		**POWER CYCLE PIPING**					
1	80-301	MS FROM BOILER STOP VALVE TO ESV	114.00	I	SB	PP	
2	80-303	MS HEADER TO AUX PRDS	15.00	I	SB	PP	
3	80-304	MS HEADER TO HPBP VALVE	24.00	I	SB	PP	
4	80-307	HP & LP BYPASS WARM UP	1.70	I	SN	PP	
5	80-310	HRH FROM REHEATER TO INTERCEPTOR VALVE	300.00	I	SB	PP	
6	80-311	HRH FROM INTERCEPTOR VALVE TO TURBINE	20.00	I	SB	PP	
7	80-312	LPBP VALVE UPSTREAM & DOWNSTREAM	109.00	I	SB	PP	
8	80-320	CRH FROM TURBINE TO REHEATER	129.00	I	SB	PP	
9	80-321	HPBP VALVE TO CRH PIPING	12.00	I	SB	PP	
10	80-322	CRH PIPING TO DEAERATING HEATER	11.00	I	SN	PP	
11	80-323	STEAM TO BFP DRIVE TURBINE	3.70	I	SB	PP	
12	80-324	CRH HEADER TO AUX.PRDS	1.30	I	SB	PP	
13	80-329	EXTRACTION STEAM TO BFP DRIVE TURBINE	12.00	I	SN	PP	
14	80-331	EXTRACTION STEAM TO LP HEATER-2	5.90	I	SN	PP	
15	80-332	EXTRACTION STEAM TO LP HEATER-3	3.30	I	SN	PP	
16	80-335	EXTRACTION STEAM TO DEAERATING HEATER	13.00	I	SN	PP	
17	80-336	EXTRACTION STEAM TO HP HEATER NO.1	7.00	I	SN	PP	
18	80-337	EXTRACTION STEAM TO HP HEATER-2	6.30	I	SN	PP	
19	80-339	AUX STEAM TO BFD TURBINE	1.20	I	SN	PP	
20	80-340	AUX STEAM HEADER	5.60	I	LU	PP	
21	80-341	AUX STEAM HEADER INTERCONN BETN UNITS	41.00	I	LU	PP	
22	80-345	AUX STEAM TO DEAERATING HEATER	6.80	I	LU	PP	
23	80-349	AUX STEAM TO GLAND SEALS - TG SCOPE	1.70	I	SN	PP	
24	80-421	BOILER FEED PUMP RECIRCULATION	28.00	I	LU	PP	
25	80-423	BOILER FEED PUMP TO HPH INCLUDING BYPASS	88.00	I	LU	PP	
26	80-424	BFD BETWEEN HTRS & GROUP PROTECTION VLV	47.00	I	LU	PP	
27	80-425	BFD FROM FINAL HPH TO SG TP	119.00	I	LU	PP	
28	80-430	SPRAY WATER TO HPBP	5.20	I	LU	PP	
29	80-432	SPRAY WATER TO BOILER DESH UPTO SG TP	19.00	I	LU	PP	
30	80-433	SPRAY WATER FROM BFP INTERSTAGE	4.20	I	LU	PP	
31	80-452	HP PIPING DRAINS - SG SCOPE	24.00	I	LU	PP	
32	80-453	LP PIPING DRAINS - SG SCOPE	8.40	I	LU	PP	
							1,187.30
33	80-362	EXHAUST STEAM FROM PRIME MOVERS	20.00	N	LU	LPP	
34	80-371	DRAIN FLASH TANK VENT TO CONDENSER	2.00	N	SN	LPP	
35	80-373	AUX STEAM HEADER SV EXHAUST	6.40	N	LU	LPP	
36	80-375	UNLISTED SV EXHAUST - TG SCOPE	1.80	N	SN	LPP	
37	80-379	HPH SV EXHAUST TO FLASH TANK	4.00	N	SN	LPP	
38	80-381	HP HEATER VENTS - TG SCOPE	3.20	N	SN	LPP	

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

SN	PGMA	DESCRIPTION	WT (MT)	IBR	STAGE	PKG	REMARKS
39	80-382	LP HEATER VENTS	1.40	N	SN	LPP	
40	80-385	VENT FROM UNLISTED PPG/EQPT TO COND	22.00	N	SN	LPP	
41	80-388	CONDENSER AIR EVACUATION PIPING	3.00	N	SN	LPP	
42	80-390	GS COOLER EXHAUST TO FAN	6.60	N	SN	LPP	
43	80-400	CONDENSATE SUCTION	6.90	N	LU	LPP	
44	80-401	CD FROM PUMP TO LPH 1/ DC INLET TEE & RECIR	27.00	N	LU	LPP	
45	80-402	CD FROM LPH 1/ DC INLET TEE TO TG TP	17.00	N	LU	LPP	
46	80-403	CD FROM TG TP TO DEAERATING HEATER	14.00	N	LU	LPP	
47	80-407	CONDENSATE FOR SEALING OF VACUUM	3.00	N	LU	LPP	
48	80-408	CONDENSATE DUMP FROM HEADER	3.80	N	LU	LPP	
49	80-419	DEAERATOR SAFETY VALVE EXHAUST TO ATM	4.00	N	LU	LPP	
50	80-420	BOILER FEED PUMP SUCTION	21.00	N	LU	LPP	
51	80-435	UNLISTED SPRAY WATER -TG SCOPE	0.75	N	SN	LPP	
52	80-436	SPRAY WTAER TO LPBP DESH	3.80	N	SN	LPP	
53	80-439	TURBINE FLASH TANK DRAIN TO CONDENSER	0.80	N	SN	LPP	
54	80442	GLAND STEAM COOLER DRAINS	0.45	N	SN	LPP	
55	80-446	DEAERATING HEATER OVER FLOW AND DRAIN	4.70	N	LU	LPP	
56	80-447	HP HEATER DRAINS	17.00	N	SN	LPP	
57	80-448	DRAIN FROM UNLISTED EQPT/VESSEL -TG SCOPE	3.70	N	SN	LPP	
58	80-449	TG CYCLE PIPING DRAINS & VENTS	3.00	N	SN	LPP	
59	80-463	TG AUX COOLING WATER	390.00	N	LU	LPP	
60	80-868	MAIN CIRCULATION WATER PIPING	62.00	N	LU	LPP	
61	80-493	HP FLASH TANK VENT TO CONDENSER	3.20	N	SN	LPP	
62	80-494	LP FLASH TANK VENT TO CONDENSER	2.60	N	SN	LPP	
63	80-495	LP FLASH TANK DRAIN TO COND	2.30	N	SN	LPP	
64	80-601	LOW PRESSURE DOSING PIPING	0.90	N	LU	LPP	
65	80-612	SERVICE AIR FOR INDIVIDUAL UNITS	19.00	N	LU	LPP	
66	80-616	INSTRUMENT AIR FOR INDIVIDUAL UNIT	17.00	N	LU	LPP	
67	80-673	LUBE OIL PIPING SYSTEM	3.50	N	TR	LPP	
68	80-901	SUB DELIVERY VALVES FOR LIGHT UP	0.90	N	LU	LPP	
69	80-457	MANIFOLDS FOR HP FLASH BOX & CONDENSER	2.00	N	SN	LPP	
70	80-459	HP FLASH TANK DRAIN TO CONDENSER	1.70	N	SN	LPP	
							706.40
71	80-811	H&S FOR BOILER FEED DISCHARGE PPG LU	20.00	N	LU	STR	
72	80-812	H&S FOR AUXILIARY STEAM PIPING FOR LU	28.00	N	LU	STR	
73	80-830	H&S FOR CRITICAL PIPING - STEAM LINES	130.00	N	SB	STR	
74	80-840	AUX STR FOR MAIN STEAM PIPING FOR SB	311.00	N	SB	STR	
75	80-871	H&S OF MISCELLANEOUS PIPING FOR SYN	35.00	N	SN	STR	
76	80-933	H & S FOR LP PIPING	30.00	N	LU	STR	
							554.00
		SUB TOTAL - K (PIPING)	**2,447.70**				

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

SUMMARY

Weight in MT

SN	Package	Trichy	PC	BAP	Hyderabad	Jhansi	Total	Remarks
1	Structures	8,949.949	554.000				9,503.949	
2	Pressure Parts	4,608.871					4,608.871	
3	Non Pressure Parts	4,995.994		401.000			5,396.994	
4	Rotating machines	260.000		1,657.290	1,200.000		3,117.290	
5	ESP			7,415.595		120.000	7,415.595	
6	Lining and Insulation	2,017.200					2,017.200	
7	Piping - IBR	221.500	1,187.300				1,408.800	
8	Piping - Non-IBR	64.450	706.400				770.850	
	TOTAL	**21,117.964**	**2,447.700**	**9,473.885**	**1,200.000**		**34,239.549**	

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. THE WEIGHTS GIVEN AGAINST PGMA'S LISTED ABOVE ARE TENTATIVE. IT MAY CHANGE AFTER DETAILED ENGINEERING IS DONE. RATE QUOTED BY THE CONTRACTOR SHALL NOT CHANGE DUE TO VARIATION IN WEIGHT.

3. BHEL' s DECISION WITH REGARD TO CLASSIFICATION OF A PARTICULAR PRODUCT GROUP FOR APPLICABLE RATE CATEGORY SHALL BE FINAL & BINDING ON THE CONTRACTOR.

4. 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.

5. # - ELECTRICAL & C&I ITEMS OF HANDLING SYSTEM (PG99) IS EXCLUDED FROM THE SCOPE OF WORK.

APPENDIX – II
LIST OF IBR SITE WELD JOINTS

HIGH PRESSURE WELD JOINTS FOR PRERSSURE PARTS SYSTEM

S N	SIZE : OD (mm) x Thickness (mm)	MATERIAL	NO. OF JOINTS	REMARKS
(A)	**FOR BOILER PRESSURE PARTS**			
	Economiser PG 19			
1	457.2 x 50	SA 106 Gr. C	1	
2	508 x 75	SA 106 Gr.c	2	
3	406.4 x 60	SA 106 Gr.c	1	
4	406.4 x 45	SA 106 Gr.c	2	
5	368 x 40	SA 106 Gr.c	13	
6	323.9x 35	SA 106 Gr.c	9	
7	38.1 x 5.3	SA 210 Gr.A 1	2,832	
	Water Wall, Riser Tubes, Downcomer - PG 05, 06, 07			
8	368 x 36	SA 105 / 515 Gr. 70	36	
9	457.2 x 45	SA 106 Gr. c	6	
10	323.9 x 36	SA 106 Gr. c	18	
11	914 x 95	SA 106 Gr. c	4	
12	273 x 50	SA 106 Gr. c	2	
13	273 x 40	SA 106 Gr. c	3	
14	508 x 50	SA 106 Gr. c	1	
15	127 x 20	SA 106 Gr. B	1	
16	159 x 18	SA 106 Gr. c	329	
17	51 x 5.6 & 6.0	SA 106 Gr. c	5,290	
18	63.5 x 7.1 & 7.3	SA 106 Gr. c	607	
19	63.5 x 7.1	SA 106 Gr. c	184	
20	63.5 x 12	SA 106 Gr. c	88	
21	63.5 x 7.1	SA 106 Gr. c	498	
22	51 x 6.0	SA 106 Gr. c	275	
23	51 x 8.8	SA 106 Gr. c	1,062	
24	63.5 x 7.1	SA 106 Gr. c	248	
	Super Heaters PG 11, 12			
25	159 x 18	SA 106 Gr. c	63	
26	273 x 45	SA 106 Gr. c	1	
27	406.4 x 56	SA 106 Gr. c	1	
28	406.4 x 37.4	SA 106 Gr. c	2	
29	406.4 x 60	SA 106 Gr. c	2	
30	406.4 x 56	SA 106 Gr. c	1	
31	323.9 x 45	SA 106 Gr. c	3	
32	508 x 60	SA 335 P12	24	
33	219.1 x 36	SA 106 Gr. c	4	
34	63.5 x 6.3	SA 213 T11	152	
35	57 x 6.0	SA 213 T11	305	
36	51 x 5.0	SA 210 Gr.c	1,292	
37	76.1 x 12.5	SA 210 Gr.c	6	
38	63.5 x 6.3	SA 210 Gr.c	358	
39	38.1 x 5.0	SA 210 Gr.c	1,104	
40	44.5 x 7.1	SA 210 Gr.c	1,104	

APPENDIX – II
LIST OF IBR SITE WELD JOINTS

S N	SIZE : OD (mm) x Thickness (mm)	MATERIAL	NO. OF JOINTS	REMARKS
41	44.5 x 5	SA 210 Gr.c	274	
42	51 x 11	SA 210 Gr.c	1,450	
43	47.63 x 6.0	SA 213 T 11	1,860	
44	47.63 x 6.6	SA 213 T 11	2,232	
45	44.5 x 5.0	SA 213 T 11	768	
46	44.5 x 7.1	SA 213 T 22	192	
47	44.5 x 5.0	SA 213 T 22	768	
48	63.5 x 7.1	SA 213 T 22	25	
49	51 x 6.3	SA 213 T 22	50	
50	51 x 11.0	SA 213 T 22	725	
51	63.5 x 12	SA 213 T 22	25	
52	63.5 x 8	SA 213 TP 347 H	12	
53	63.5 x 8	SA 213 T 11	6	
54	51 x 6.6	SA 213 T 11	9	
55	63.5 x 8	SA 213 T 22	12	
56	51 x 6.6	SA 213 TP 347 H	60	
57	63.5 x 8.8	SA 213 T 22	12	
58	51 X9	SA 213 T 22	75	
	Reheaters : PG 16, 17			
59	63.5 x 6.3	SA 213 T 11	74	
60	44.5 x 8.0	SA 213 T 11	592	
61	44.5 x 6.3	SA 213 T 11	222	
62	54 x 4.0	SA 213 T 22	296	
63	54 x 4.5	SA 213 T 22	1,184	
64	54 x 4.0	SA 213 T 22	296	
65	54 x 4.5	SA 213 T 91	148	
66	44.5 X 4.0	SA 213 T 22	740	
67	51 x 5.0	SA 210 Gr.c	4	
68	51 x 6.6	SA 213 T 11	15	
(B)	**SOOT BLOWING PIPING**			
	PG 21			
1	21.3X4.75	SA234 P22 + SA213 T22	2	
2	33.4X6.35	SA234 P22 + SA213 T22	6	
3	108X16	SA335 P22 + SA217 WC	14	
4	21.3X1.77	SA106 Gr B	11	
5	60.3X3.91	SA106 Gr B	500	
6	33.9X3.4	SA106 Gr B	70	
7	88.9X5.49	SA106 Gr B	12	
8	108X8	SA106 Gr B	50	
9	108X8	SA106 Gr B+ ART7 WC9	1	
10	21.3X2.77	SA234 WPB + SA 106 Gr B	6	
11	23.4x3.4	SA234 WPB	100	
(C)	**BOILER TRIM PIPING**			
	PG 24			
1	159X41.3	SA105	2	

APPENDIX – II
LIST OF IBR SITE WELD JOINTS

S N	SIZE : OD (mm) x Thickness (mm)	MATERIAL	NO. OF JOINTS	REMARKS
2	172 X47.9	-DO-	6	
3	222.3 X35	SA 105 + + SA217 WC9	4	
4	209.6 X28.6	SA182 F22 + SA217 WC9	4	
5	139.7X34.85	SA182 F22 + SA217 WC9	5	
6	139.7X39.7	SA217 WC9 + SA182 F22	5	
7	223 X26.55	SA217 WC9 + SA182 F22	4	
8	21.3X4.75	SA106 GrB/ SA106 GrB +SA105	426	
9	33.4X6.35/3.35	SA106 GrB/ SA106 GrB +SA105	500	
10	48.3X7.14/7.14 /3.68	SA106 GrB/ SA106 GrB +SA105	350	
11	31.8X5.0	SA213TP304H	14	
12	60.3X8.74	SA106 GrB/ SA106 GrB +SA105	111	
13	73.0X7.01	SA106 GrB/ SA106 GrB +SA105	38	
14	73.0X9.52	SA106 GrB/ SA106 GrB +SA105	400	
15	88.9 X11.12/5.49	SA106 GrB/ SA106 GrB +SA105	220	
16	168.3X21.94	SA106 GrB/ SA106 GrB +SA105	30	
17	371.5 x 39.75	SA106 GrB/SA 216 WCB	6	
18	108X16	SA106 GrB/ SA106 GrB +SA105	40	
19	127X20	SA106 GrB/ SA106 GrB +SA105	62	
20	219.1X36	SA106 GrB/ SA106 GrB +SA105	8	
21	88.8X20/14.2	SA335 P22	75	
22	33.4X3.38/6.35/6.09/ 7.14	SA335 P22	275	
23	108X16	SA335 P22	25	
24	78.1X12.5	SA335 P22	2	
25	33.4X9.09/6.35/3.38	SA335 P22 + SA182P22	70	
26	21.3 X4.78/2.77	SA335 P22	300	
27	48.3X3.68	SA335 P22 + SA182P22	36	
28	48.3X7.14	SA335 P22 + SA182P22	135	
29	47.63X10	SA213 T22 + SA182P22	10	
30	SAMPLING LINES14X2.9	SA213TP304H	135	
(D)	**MAIN STEAM PIPING UPTO BOILER STOR VALVE AND BOILER INTEGRAL PIPING**			
PG 80 (BOILER-SG SCOPE PORTION).[Following PGMA 80-300,80-341,80-340,80-452(Partly),80-453(Partly),80-342,80-343,80-344,80-351,80-355,80-364,80-365,80-395,80-451,80-450,80-455,80-366 are included in this.				
01	510X100	SA 335 P22	2	
02	406X42	SA 335 P91	24	
03	88.9X21	SA 335 P91	20	
04	219.1 X 36	SA106 GrB/ SA106 GrB +SA105	2	
05	355.6 X 9.27	SA 106 Gr B	5	
06	273 X 9.27	SA 106 Gr B	6	
07	168.3 X 7.11	SA 106 Gr B	2	
08	114.3 X 6.02	SA 106 Gr B	4	

APPENDIX – II
LIST OF IBR SITE WELD JOINTS

S N	SIZE : OD (mm) x Thickness (mm)	MATERIAL	NO. OF JOINTS	REMARKS
09	114.3 X 6.02	SA 106 Gr B	4	
10	21.3 X 3.73	SA 106 Gr B	6	
12	273 X 9.27	SA 106 Gr B	93	
13	273 X 9.27	SA 106 Gr B	16	
14	114.3 X 6.02	SA 106 Gr B	10	
15	73 X 7.16	SA 335 P22	20	
16	60.3 X 12.5	SA 335 P22	110	
17	60.3 X 5.54	SA 335 P22	200	
18	33.4 X 4.55	SA 335 P22	100	
19	33.4 X 9.09	SA 335 P22	50	
20	73 X 5.16	SA 335 P22	4	
21	60.3 X 5.54'	SA 335 P22	50	
22	48.3 X10.15	SA 335 P22	500	
23	33.4 X 4.55	SA 106 Gr B	50	
24	33.4 X 9.09	SA 106 Gr B	40	
25	48.3 X 10.15	SA 335 P22	50	
26	73 X 5.16	SA 106 Gr B	10	
27	33.4 X 4.55	SA 106 Gr B	70	
28	60.3 X 5.54	SA 106 Gr B	50	
29	73 X .16	SA 106 Gr B	10	
30	60.3 X 5.54	SA 106 Gr B	150	
31	48.3 X 5.08	SA 106 Gr B	80	
32	33.4 X 4.55	SA 106 Gr B	1200	
33	21.3 X 3.73	SA 106 Gr B	100	
34	323.9 X 9.27	SA 106 Gr B	50	
35	273 X 9.27	SA 106 Gr B	5	
36	219.1 X 9.27	SA 106 Gr B	6	
37	168.3 X 7.11	SA 106 Gr B	220	
38	114.3 X 6.02	SA 106 Gr B	16	
39	88.9 X 5.49	SA 106 Gr B	40	
40	73 X 5.16	SA 106 Gr B	40	
41	114.3 X 6.02	SA 106 Gr B	16	
42	273 X 9.27	SA 106 Gr B	45	
43	219.1 X 9.27	SA 106 Gr B	50	
44	114.3 X 6.02	SA 106 Gr B	15	
45	60.3 X 5.54	SA 106 Gr B	25	
46	219.1 X 9.27	SA 106 Gr B	100	
47	21.3 X 3.73	SA 106 Gr B	7	
48	33.4 X 4.55	SA 106 Gr B	7	
49	168.3 X 7.11	SA 106 Gr B	9	
50	21.3 X 3.73	SA 106 Gr B	1046	
51	323.9 X 9.53	SA 106 Gr B	17	
56	114.3 X 6.02	SA 106 Gr B	23	
57	168.3 X 21.95	SA 106 Gr B	20	
58	114.3 X 17.12	SA 106 Gr B	42	
59	73 X 14.02	SA 106 Gr B	3	
60	60.3 X 5.54	SA 106 Gr B	200	

APPENDIX – II
LIST OF IBR SITE WELD JOINTS

S N	SIZE : OD (mm) x Thickness (mm)	MATERIAL	NO. OF JOINTS	REMARKS
61	48.3 X 5.08	SA 106 Gr B	50	
70	168.3X21.94	SA106 GrB/ SA106 GrB + SA105	20	
71	60.3X8.74/3.91	SA106 GrB/ SA106 GrB + SA105	100	
72	88.9 X11.12/5.49	SA106 GrB/ SA106 GrB + SA105	90	
73	88.8X20/14.2	SA335 P22	30	
74	108X16	SA335 P22	12	
75	33.4X3.38/6.35/6.09/ 7.14	SA335 P22	110	
76	48.3X3.68	SA335 P22 + SA182P22	12	
77	48.3X7.14	SA335 P22 + SA182P22	75	
78	SAMPLING LINES14X2.9	SA213TP304H	50	
	127X20	SA106 GrB/ SA106 GrB +SA105	18	

NOTE:
THE NUMBER OF JOINTS INDICATED HEREINABOVE ARE ONLY TENTATIVE AND LIKELY TO VARY IN ACTUAL. CONTRACTOR SHALL CARRY OUT ALL NECESSARY SITE WELD JOINTS REQUIRED FOR COMPLETION OF ENTIRE SCOPE OF WORK UNDER THESE SPECIFICATIONS. NO ADDITONAL PAYMENTS SHALL BE MADE FOR ANY VARIATIONS IN THE ACTUAL QUANTITY OF JOINTS CARRIED OUT.

APPENDIX – III
LIST OF T & P TO BE MADE AVAILABLE BY BHEL FREE OF CHARGES

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
1	HEAVY LIFT-HIGH REACH CRAWLER CRANE (BHEL OWNED CRANE)	01 No	**CONTRACTOR SHALL ARRANGE SKILLED & EXPERIENCED OPERATOR FOR THIS CRANE.** THIS CRANE WILL BE AVAILABLE FOR VERY LIMITED PERIOD AT APPROPRIATE STAGE FOR ERECTION OF CEILING GIRDER STRUCTURES
2	250 MT CRANE (HIRED CRANE)	01 No	FOR OTHER BOILER ERECTION ON SHARING BASIS WITH OTHER AGENCIES
3	150/180 MT CRANE (HIRED CRANE)	01 No	FOR OTHER BOILER ERECTION ON SHARING BASIS WITH OTHER AGENCIES
4	100 MT CRANE (HIRED CRANE)	01 No	FOR BOILER AND ESP ERECTION & ON SHARING BASIS TO OTHER AGENCIES
5	75 MT CRAWLER CRANE(HIRED CRANE)	2 Nos	ON SHARING BASIS WITH OTHER AGENCIES FROM 4^{TH} MONTH FROM START OF BOILER ERECTION ONWARDS
6	INDUCTION HEATING M/C	As required	FOR WELDING OF P-91 PIPING
7	HUCK BOLTING MACHINE COMPLETE SET	01 SET	FOR HUCK BOLTING OF SHOCK BARS AND SHOCK PADS.
8	AIR LEAK TEST EQUIPMENTS WITH ALL AUXILIARIES	01 SET	FOR AIR LEAK TEST OF ESP AND DUCTING.

NOTE:

1 THE HLHR CRANE IS TO BE USED FOR ERECTION OF BOILER STRUCTURES, CEILING STRUCTURES AND EQUIPMNET/COMPONENTS ABOVE BOILER CEILING STRUCTURE OR COMPONENTS/EQUIPMENT OUT OF REACH OF OTHER CRANES OR NON-AVAILABILITY OF OTHER BHEL CRANES OR FOR ACTIVITIES THAT ESSENTIALLY REQUIRE SERVICES OF THIS CRANE AS DECIDED BY BHEL. THIS CRANE WILL ACCORDINGLY BE DEPLOYED AT APPROPRIATE TIME AS DECIDED BY BHEL FOR SUITABLE DURATION AND INTENDED PURPOSE.

2 FURTHER, ABOVE USE OF CRANES MAY BE ALLOWED FOR ANY OTHER ERECTION RELATED ACTIVITY AT THE DISCRETION & APPROVAL OF BHEL SITE INCHARGE.

3 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. CRANES WILL BE DEPLOYED AT APPROPRIATE TIME AS DECIDED BY BHEL FOR SUITABLE DURATION AND INTENDED PURPOSE.

APPENDIX – IV
INDICATIVE LIST OF MAJOR T & P TO BE DEPLOYED BY THE CONTRACTOR

A: TOOL & PLANTS TO BE DEPLOYED BY THE CONTRACTOR

SN	DESCRIPTION OF EQUIPMENTS	CAPACITY (MINIMUM)	MINIMUM QUANTITY	REMARKS
				FROM ONE MONTH BEFORE BES TO COMPLETION OF ERECTION
1	MOBILE PICK AND CARRY WITH TELESCOPIC BOOM	14 MT	2 Nos	
2	MOBILE PICK AND CARRY WITH TELESCOPIC BOOM	8 MT	2 Nos	
3	TRAILER WITH HORSE	30 T	2 Nos	
4	TRACTOR TROLLEY	20 T	2 Nos	
5	TRUCK	9 T	1 No	
6	PASSENGER CUM GOODS ELEVATOR TO REACH UP TO BOILER DRUM LEVEL	1 T	1 No	
7	STRAND AND JACK ARRANGEMENT FOR BOILER DRUM ERECTION	AS PER REQUIREMENT	AS REQUIRED	
8	AIR COMPRESSOR (ELECTRIC/DIESEL) – 7 Kg/cm^2	140 CFM	2 Nos	
9	TIG WELDING SET	-	AS REQUIRED	
10	PLASMA CUTTING M/c	10 mm	AS REQUIRED	
11	3 Ph DISTRIBUTION BOARD WITH COMPLETE SET UP FOR DRAWL OF CONSTRUCTION POWER	600 Amp, 415 Volt	AS PER REQMT	
12	PRE HEATING / STRESS RELIEVING SET (HEATING CONTROL PANEL, CABLES, HEATING ELEMENTS ETC.)	AS PER REQUIREMENT	2 SETS	
13	RADIOGRAPHY ARRANGEMENT INCLUDING THE SOURCE	IR 192 & COBALT 60	2 SET EACH	
14	THEODOLITE OF REQUIRED ACCURACY	-	1 No	
15	SELF DRILLING CUM TAPPING MACHINE FOR SCREWS OF FLOOR GRILL & BOILER ROOF SHEETS	-	2 Nos	
16	ARRANGEMENT FOR UT OF HIGHER THICKNESS JOINTS WITH RECORDING FACILITY.	TYPE USN 50 OR EQUAVALANT/ UPGRADED TYPE	01 SET	
17	ELECTRO-HYDRAULIC PIPE BENDING MACHINE	2" Nb X 12 mm THICK PIPES	AS PER SITE REQUIREMENT	
18	WELDING GENERATOR (ELECTRIC & DIESEL)	300 AMPS	AS REQUIRED	

APPENDIX – IV
INDICATIVE LIST OF MAJOR T & P TO BE DEPLOYED BY THE CONTRACTOR

SN	DESCRIPTION OF EQUIPMENTS	CAPACITY (MINIMUM)	MINIMUM QUANTITY	REMARKS
19	RADIOGRAPHY FILM VIEWER	HI INTENSITY	2 Nos	
20	ELECTRIC CABLE FOR DRAWAL & DISTRIBUTION OF CONSTRUCTION POWER	AS PER SITE REQUIREMENT	AS PER SITE REQUIREMENT	
21	PIPE BENDING MACHINE – HAND OPERATED	UP TO 50 mm Nb PIPES	AS PER SITE REQUIEREMENT	
22	BAKING OVEN AND HOLDING OVEN WITH THERMOSTAT AND TEMPERATURE GAUGE FOR BAKING COATED WELDING ELECTRODES	AS PER REQUIREMENT	02 EACH	
23	PORTABLE OVEN FOR COATED WELDING ELECTRODES	AS PER SITE REQUIREMENT	20 Nos	
24	HAND WINCH	>= 1 MT	2 Nos	
25	SCAFFOLDING MATERIALS	ADEQUATE	REFER SECTION -5 OF S C C	
26	ELECTRODE DRYING BACKING OVEN		1 No	
27	PORTABLE BACKING OVEN		4 Nos	
28	ALU. SHEET CLAD PROFILE MAKING MACHINE		REQUIRED NOS	
29	HAND TOOLS, CUTTING TOOLS GRINDING MACHINES ETC		REQUIRED NOS	
30	NIBBLING MACHINE		REQUIRED NOS	
31	SHEARING MACHINE		REQUIRED NOS	
32	WATER PUMP (ADEQUATE CAPACITY TO LIFT UPTO BOILER TOP)		1 No	
33	VARIPUS TYPE OF LIFTING DEVICES LIKE PULLEY BLOCKS, CHAIN PULLEY BLOCKS , ETC		REQUIRED NOS	
34	FIRE EXTINGUISHERS		REQUIRED NOS	
35	FIRE RETARDANT TARPAULING		REQUIRED NOS	
36	CHEMICAL CIRCULATION PUMPS TO HANDLE ACID SOLUTION, OPR TEMP 80 DEG CEL, WITH DRIVE MOTORS, STARTER PANEL, CABLE, SWITCH FUSE UNIT etc. SUGGESTED RATING: 150 M3, 120 – 150M WC, WITH 90 KW, 3000 RPM, 150 AMPS MOTOR. HOWEVER, CONTRACTOR SHALL DEPLOY THE REQUIRED CAPACITY PUMP WITH ACCESSORIES AFTER OBTAINING WRITTEN APPROVAL OF BHEL.		4 Nos	
37	MEASURING INSTRUMENTS (ELCOMETERS ETC) FOR PAINTING		AS REQUIRED	
38	CIRCULATING PUMP CAPACITY 200 TPH WITH CONTROL PANELS FOR CHEMICAL CLEANING OF BOILER (EDTA)		05 NOS.	
39	ACID UNLOADING PUMP WITH CONTROL PANELS CAPACITY 20 TPH		02 NOS	

40	LT POWER CABLES FROM PUMP STARTER PANEL TO PUMPS MOTORS AND POWER SUPPLYSOURCE TO STARTER PANEL	AS REQUIRED		
41	HYDRAULIC TEST /PRESSURISING PUMPS 600 &450 Kg cm2		1 No.each	WITH NECESSARY ELECTRICAL STARTER .FOR PRESSURE TESTING OF BOILER AND HIGH PRESSURE PIPELINES

B: MEASURING AND MONITORING DEVISES (MMD):

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

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

APPENDIX-V

ANALYSIS OF UNIT RATE QUOTED

SL.NO.	DESCRIPTION	% OF QUOTED RATE	REMARKS
01	SITE FACILITIES VIZ., ELECTRICITY, WATER OTHER INFRASTRUCTURE.		
02	SALARY AND WAGES + RETRENCHMENT BENEFITS		
03	CONSUMABLES		
04	T&P DEPRECIATION & MAINTENANCE		
05	ESTABLISHMENT & ADMINISTRATIVE EXPENSES		
06	OVERHEADS		
07	PROFIT		

SIGNATURE OF THE TENDERER

DATE:

APPENDIX-VI

FORMAT FOR MONTH-WISE MANPOWER DEPLOYMENT PLAN

(CATEGORY-WISE NUMBERS TO BE INDICATED FOR EACH MONTH)

SL. NO.	(i) CATEGORY	(ii) MONTHS										
		1	2	3	4	5	6	7	8	9	10	SO ON
01	RESIDENT ENGINEER											
02	ERECTION ENGINEERS											
03	ERECTION SUPERVISORS											
04	QUALITY ASSURANCE ENGINEER											
05	SAFETY ENGINEER											
06	MATERIALS MANAGEMENT SUPERVISORS											
07	HIGH PRESSURE WELDERS											
08	STRUCTURAL & OTHER WELDERS											
09	FITTERS											
10	CRANE OPERATOR											
11	TRUCK/TRAILER DRIVERS											
12	STORE KEEPERS											
13	ELECTRICIANS											
14	SEMISKILLED/ UNSKILLED WORKERS											
SO ON												
	MONTH WISE TOTAL											

SIGNATURE OF TENDERER

DATE:

APPENDIX–VII

FORMAT FOR DEPLOYMENT PLAN FOR MAJOR TOOLS AND PLANTS

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

SIGNATURE OF THE TENDERER

DATE:

APPENDIX-VIII

CONCURRENT COMMITMENTS

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

DATE

SIGNATURE OF THE TENDERER

APPENDIX–IX

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 COMMENCEMENT 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