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

No. - BHE/PW/PUR/RIT-STG/739

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 TURBINE AND GENERATOR SET AND ITS AUXILIARIES, HP/LP HEATER AND DEAERATOR, INSULATION AND FINAL PAINTING ETC OF 2X500 MW UNIT 5 & 6.

AT

NATIONAL THERMAL POWER CORPORATION LIMTED

RIHAND SUPER THERMAL POWER PROJECT,
STAGE- III (2X500MW),
RIHAND NAGAR, DIST.SONEBHADRA (UTTARPRADESH)

PART I

(TECHNICAL BID SPECIFICATION, QR,NOTICE INVITING TENDER & GCC)

BOOK NO. :

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

C O N T E N T S

SL. NO.	DESCRIPTION	SECTION/ APPENDIX NO.	NO OF PAGES
27.	LIST OF PACKAGES,ODC DETAILS,WEIGHTS ETC.	APPENDIX-I	12
28.	WEIGHT DETAILS	APPENDIX-II	1
29.	LIST OF T&PS TO BE MADE AVAILABLE BY BHEL	APPENDIX-III	1
30.	MAJOR T&Ps & MMDS TO BE DEPLOYED BY THE CONTRACTOR	APPENDIX-IV	2
31.	ANALYSIS OF UNIT RATES QUOTED	APPENDIX-V	1
32.	MONTHWISE MANPOWER DEPLOYMENT PLAN BY THE CONTRACTOR	APPENDIX-VI	1
33.	MONTHWISE T&P DEPLOYMENT PLAN BY CONTRACTOR	APPENDIX-VII	1
34.	DETAILS OF CONCURRENT COMMITMENT	APPENDIX-VIII	1
35.	RATE SCHEDULE (PRICE BID : PART-II)		@

BHARAT HEAVY ELECTRICALS LIMITED

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

TENDER SPECIFICATION ISSUE DETAILS.
TENDER SPECIFICATION NO:- BHE/PW/PUR/RIT- STG/739

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 TURBINE AND GENERATOR SET AND ITS AUXILIARIES, HP/LP HEATER AND DEAERATOR, INSULATION AND FINAL PAINTING ETC OF 2X500 MW UNIT 5 & 6. AT**NATIONAL THERMAL POWER CORPORATION LIMTED,RIHAND SUPER THERMAL POWER PROJECT, STAGE- III (2X500MW), AND NAGAR, DIST.SONEBHADRA (UTTARPRADESH)**

EARNEST MONEY DEPOSIT(EMD) : *EMD of this tender is* ***RS.2,00,000/- (Rupees Two lakh only)*** *. EMD shall be deposited by bidder along with their offer as a part of technical bid as per Cl no : 1.9 (Page 11of 43) of General Terms & conditions of Contract (GCC) of this tender.*

THESE TENDER DOCUMENTS CONTAINING **PART-I** TECHNICAL BID AND **PART- II** PRICE BID, ARE ISSUED TO:

M/s. ……

……

(THESE TENDER DOCUMENTS ARE NOT TRANSFERABLE)

FOR BHARAT HEAVY ELECTRICALS LIMITED

SR. MANAGER (PURCHASE)
PLACE: NAGPUR
DATE:

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
POWER SECTOR - WESTERN REGION
345, KINGS WAY - NAGPUR 440 001

PROCEDURE FOR SUBMISSION OF SEALED TENDERS

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

Part-I (Technical Bid) cover-I:

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

EARNEST MONEY DEPOSIT (EMD)

EMD shall be included in the Technical Bid. **EMD shall be paid by bidders only in the form of account payee Demand Draft payable at Nagpur in favour of Bharat Heavy Electricals Limited.** No other mode of payment of EMD shall be acceptable.
Bidder may opt to deposit "One Time EMD" of Rs. 2.0 lacs with this office (BHEL:PSWR:Nagpur) which will enable them to participate in all the future tender enquiries in respect of Erection and Commissioning services issued from this office. Interested bidders may clearly send their consent for converting the present EMD into an "One Time EMD" in their offer.
Bidders who have already submitted such "One Time EMD" will be exempted from submission of any EMD for this tender. However bidder shall furnish details of the "One Time EMD" in his offer including the Check List furnished herein.

Part-II (Price Bid) cover-II:

All indications of price shall be given in this part-II "Price Bid". **EMD shall not be included in this cover.**

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

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

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

1) CONTRACTOR SHOULD HAVE ADEQUATE RESOURCES INCLUDING MAJOR T&P AT HIS DISPOSAL FOR THIS JOB.

2) CONTRACTOR SHOULD HAVE SOUND FINANCIAL STABILITY.

3) TENDERER SHOULD MEET QUALITY REQUIREMENT REGARDING WORKMANSHIP, DEPLOYMENT OF PERSONNEL, ERECTION TOOLS AND NECESSARY INSPECTION, MEASUREMENT & TESTING INSTRUMENTS.

4) BIDDER SHALL MEET ALL THE QUALIFYING REQUIREMENTS AS MENTIONED IN THE NOTICE INVITING TENDER.

5) ALL INFORMATION AS CALLED FOR IN VARIOUS APPENDICES AND CLAUSES OF TENDER SPECIFICATION, SHOULD BE FURNISHED. PLEASE REFER THE CHECKLIST. THE DETAILS SO FURNISHED BY TENDERER SHOULD BE COMPLETE IN ALL RESPECTS AND AS PER FORMATS SPECIFIED IN TENDER SPECIFICATION.

6) OFFERS RECEIVED WITH ANY DEVIATION OR WITHOUT RELEVANT INFORMATION AS DESCRIBED ABOVE ARE LIABLE TO BE REJECTED. PRICE BIDS RECEIVED IN THE FORM OTHER THAN SPECIFIED IN PART-II (PRICE BID) ARE LIABLE TO BE REJECTED.

7) TENDERER SHALL NOTE THAT THEIR OFFER WILL BE CONSIDERED SUBJECT TO THE APPROVAL OF BHEL'S CUSTOMER.

8) 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.**

9) Bidder must sign & stamp all pages of this tender specification as an acceptance of tender conditions and must enclose this tender specification with their offer.

10) Offer of bidder received after due date shall NOT be considered under any circumstances.

PROJECT INFORMATION

1.0 INTROUCTION

RIHAND SUPER THERMAL POWER PROJECT IS OWNED BY NATIONAL THERMAL POWER CORPORATION LIMITED
(NTPC LTD). THE POWER PROJECT PRESENTLY HAS FOUR SETS OF 500 MW EACH COAL BASED THERMAL POWER GENERATING SETS. THE CAPACITY OF THE THERMAL POWER PLANT IS PRESENTLY 2000 MW. THIS WILL BE AUGMENTED BY INSTALLATION OF TWO 500 MW SET IN THE EXISTING PREMISES. WORK UNDER THE PRESENT TENDER SPECIFICATION IS A PART OF THIS AUGMENTATION.

THE PLANT IS LOCATED ON THE SOUTHERN BANK OF RIHAND RESERVOIR NEAR VILLAGE BIJPUR IN DISTRICT SONEBHADHRA OF UTTER PRADESH HAVING LATITUDE AND LONGITUDE $24^{O}01'49''$ N AND $82^{O}47'25''$ E RESPECTIVELY. THE SITE IS SITUATED SOUTH EAST OF SINGRAULI STPP ACROSS THE RESERVOIR AT A DISTANCE OF ABOUT 12 KMS.

THE SITE IS APPROACHABLE FROM RENUKUT -SINGRAULI ROAD VIA AN APPROACH ROAD ALREADY CONSTRUCTED IN STAGE-I OF THIS PROJECT. NEAREST RAILWAY STATION IS AT SINGRAULI LOCATED AT A DISTANCE OF ABOUT 65 KMS RENUKUT AND MIRZAPUR RAILWAY STATIONS ARE AT A DISTANCE OF APPROXIMATELY 75 KMS AND 210 KMS RESPECTIVELY. THE NEAREST AIRPORT AT VARANASI IS AT A DISTANCE OF ABOUT 200 KMS FROM THE PROJECT SITE.

2.0 CLIMATIC CONDITIONS

A) MAXIMUM TEMPERATURE	:	44.1 DEG CELCIUS
B) MINIMUM TEMPERATURE	:	1.1 DEG CELCIUS
C) MAXIMUM RELATIVE HUMIDITY	:	88%
D) MINIMUM RELATIVE HUMIDITY	:	21%
E) AVERAGE ANNUAL RAINFALL	:	1440 MM
F) HEIGHT ABOVE MSL	:	611 M

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

Check List (Vide Para 1.3 Of Section-I of General Conditions Of Contract)			
15	**Latest Certificate by Bidder's Banker for Overdraft & BG Limits** is Furnished (Certificate shall not be older than six months from the Last Date for offer submission)	Yes	No
16	Latest copy of **IT Return** along with copy of **PAN Card** are Furnished	Yes	No
17	Month-wise **Manpower Deployment Plan** (**Appendix – IV**) is furnished	Yes	No
18	**Analysis of Unit Rates** quoted (**Appendix-III**) is furnished	Yes	No
19	**Month-wise deployment plan for major T&P** (**Appendix-V**) is furnished	Yes	No
20	Whether all the pages of the Tender Specification documents are read, understood and signed	Yes	No
21	**Power of Attorney** enclosed in favor of person making offer	Yes	No
22	Bidder has familiarized himself with all Relevant Local Laws & Local Conditions	Yes	No
23	Safety Requirement of this work in a Running plant Premises has been understood.	Yes	No
24	Erection and Commissioning programme furnished	Yes	No
25	**List of Jobs completed** in last seven years is furnished (**Appendix-VII**)	Yes	No
26	Whether **copies of detailed Work Orders (with BOQ)** and **Completion Certificates** in support of above furnished	Yes	No
27	Whether contractor has left any job unfinished? If so, give reasons.	Yes	No
28	Whether any client has terminated the contractor's work before completion? If so, furnish reasons for the same	Yes	No
29	**BIDDER MUST FURNISH HERE THE FOLLOWING DETAIL FOR RELEASING EMD AND OTHER PAYMENTS DULY ENDORSED BY BANK (IE SIGN & STAMP BY BANK).** 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 or tick **'yes'** or **'no'**, as applicable

BIDDERS MUST SUBMIT ALL NECESSARY DOCUMENTS AS BEING ASKED IN ABOVE CHECK LIST.

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/RIT-STG/739** 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/RIT-STG/739

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

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

DEAR SIR,

I/WE HEREBY OFFER TO CARRY OUT THE WORK DETAILED IN TENDER SPECIFICATION **No. BHE/PW/PUR/RIT-STG/739** ISSUED BY BHARAT HEAVY ELECTRICALS LIMITED, POWER SECTOR-WESTERN REGION, NAGPUR, IN ACCORDANCE WITH THE TERMS AND CONDITIONS THEREOF.

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

1. INSTRUCTIONS TO 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 LAKHS ONLY)** AS STIPULATED VIDE CLAUSE NO, 1.4 OF GENERAL CONDITIONS OF CONTRACT, DETAILS OF WHICH IS FUNISHED IN THE CHECK LIST, & WHICH SHALL BE REFUNDED SHOULD OUR OFFER NOT BE ACCEPTED. SHOULD OUR OFFER BE ACCEPTED, I/WE FURTHER AGREE TO DEPOSIT SUCH ADDITIONAL SUM WHICH ALONGWITH THE SUM OF **RS. 2,00,000/- (RUPEES TWO LAKHS ONLY)** MENTIONED ABOVE, SHALL MAKE UP SECURITY DEPOSIT FOR THE WORK AS PROVIDED FOR IN THE TENDER SPECIFICATION WITHIN THE STIPULATED TIME AS MAY BE INDICATED BY BHEL, POWER SECTOR-WESTERN REGION, NAGPUR.

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

PLACE: SIGNATURE OF TENDERER:
DATE : ADDRESS:

WITNESSES WITH THEIR ADDRESS

SIGNATURE	NAME	ADDRESS
1.		
2.		

SECTION-4

SPECIAL CONDITIONS OF CONTRACT

4.0 SCOPE OF WORK

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

COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE ; ERECTION ,TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF –

STEAM TURBINE GENERATOR SETS COMPLETE WITH –

1 LUBE OIL AND CONTROL OIL SYSTEM,
2 UNIT OIL PURIFICATION SYSTEM,
3 CENTRAL LUBE OIL PURIFICATION SYSTEM (COMMON FOR TWO UNITS),
4 TURBINE GLAND SEALING SYSTEM,
5 TURBINE INTEGRAL AND OTHER MISCELLANEOUS PIPING,

6 GENERATOR SEAL OIL SYSTEM,
7 GENERATOR STATOR WATER COOLING SYSTEM,
8 GENERATOR ROTOR COOLING SYSTEM,
9 WATER COOLED CONDENSER,
10 CONDENSER ON LOAD TUBE CLEANING SYSTEM,

11 3X50% CONDENSATE EXTRACTION PUMPS,
12 FEED HEATING PLANT WITH LP AND HP HEATERS
13 DEAERATING FEED WATER HEATER WITH STORAGE TANK,
14 2X50% TURBINE DRIVEN BOILER FEED PUMPS AND
15 1X50% MOTOR DRIVEN BOILER FEED PUMP WITH VARIABLE SPEED FLUID COUPLING

16 HP & LP STEAM BYPASS SYSTEM,
17 COOLING WATER SYSTEM, (PART UPTO TERMINAL POINT)
18 EQUIPMENT COOLING WATER SYSTEM,
19 PERFORMANCE TESTING OF EQUIPMENT
20 FIRST FILL AND ONE YEAR TOPPING REQUIREMENT OF CONSUMABLES / CHEMICALS

21 ERECTION MATERIALS AND CONSUMABLES,
22 HOT/ELECTRIC HOISTS FOR ERECTION, OPERATION AND MAINTENANCE.
23 OPERATING PLATFORM AROUND THE DEAERATOR, GSC, FLASH TANKS, LUBE OIL / CONTROL OIL TANKS, HP/LP BY PASS VALVES, ESVS / IVS, LOCAL PLATFORMS FOR VARIOUS INACCESSIBLE VALVES AND EQUIPMENT ETC.
24 INSULATION OF EQUIPMENT AND PIPING
25 PAINTS AND PAINTING OF ALL EQUIPMENTS AND STRUCTURES

OF RIHAND SUPER THERMAL POWER PROJECT, STAGE-III (2X500MW), RIHAND NAGAR, DIST.SONEBHADRA (UTTARPRADESH)

4.0.1

THE WORK COVERED UNDER THIS SPECIFICATION IS OF HIGHLY SOPHISTICATED NATURE, REQUIRING THE BEST QUALITY OF WORKMANSHIP FOR FABRICATION, ENGINEERING AND CONSTRUCTION MANAGEMENT. THE BIDDER SHOULD ENSURE TIMELY COMPLETION OF WORK.

THE BIDDER MUST HAVE ADEQUATE QUANTITY OF TOOLS, CONSTRUCTION AIDS, EQUIPMENTS ETC, IN HIS POSSESSION. HE MUST ALSO HAVE ON HIS ROLLS ADEQUATE, TRAINED, QUALIFIED AND EXPERIENCED SUPERVISORY STAFF AND SKILLED PERSONNEL.

4.0.2
THE WORK SHALL BE EXECUTED UNDER THE USUAL CONDITIONS AFFECTING MAJOR POWER PLANT CONSTRUCTION AND IN CONJUNCTION WITH NUMEROUS OTHER OPERATIONS AT SITE. THE BIDDER AND HIS PERSONNEL SHALL CO-OPERATE WITH THE PERSONNEL OF OTHER AGENCIES, CO-ORDINATE HIS WORK WITH OTHERS AND PROCEED IN A MANNER THAT SHALL NOT DELAY OR HINDER THE PROGRESS OF WORK AS A WHOLE.

4.0.3
ALL THE WORK SHALL BE CARRIED OUT AS PER THE INSTRUCTIONS OF BHEL ENGINEER. BHEL ENGINEERS DECISION REGARDING THE CORRECTNESS OF THE WORK AND METHOD OF WORKING SHALL BE FINAL AND BINDING ON THE BIDDER.

4.0.4
THE BIDDER SHALL AT HIS COST PERFORM ANY SERVICES, TESTS ETC, ALTHOUGH NOT SPECIFIED BUT NEVERTHELESS REQUIRED FOR THE COMPLETION OF WORK.

4.0.5
CONTRACTOR SHALL ERECT ALL THE EQUIPMENTS AS PER SEQUENCE PRESCRIBED BY BHEL AT SITE. THE SEQUENCE OF ERECTION, METHODOLOGY WILL BE DECIDED BY THE BHEL ENGINEERS DEPENDING UPON THE AVAILABILITY OF MATERIAL, WORK FRONTS ETC. NO CLAIMS FOR EXTRA PAYMENT FROM THE CONTRACTOR WILL BE ENTERTAINED ON THE GROUNDS OF DEVIATION FROM THE METHODS AND SEQUENCE OF ERECTION ADOPTED IN ERECTION OF SIMILAR TG SETS OR FOR ANY REASONS WHATSOEVER.

4.0.6
ALL THE NECESSARY CERTIFICATES AND LICENSES REQUIRED TO CARRYOUT THIS WORK ARE TO BE ARRANGED BY THE CONTRACTOR EXPEDITIOUSLY AT HIS COST.

4.0.7
THE WORK TO BE CARRIED OUT UNDER THE SCOPE OF THESE SPECIFICATIONS COVERS THE COMPLETE WORK OF LOADING AT STORES/STORAGE YARD, HANDLING, TRANSPORTING, UNLOADING AT ERECTION SITE, PRE-ASSEMBLY, ERECTION, ALIGNMENT, HOT ALIGNMENT, BOLTING, FASTENING, WELDING, RADIOGRAPHY, LEVELLING, COLD PULLING, ADJUSTING, NON-DESTRUCTIVE TESTING, POST WELD HEAT TREATMENT, HYDRAULIC TEST, CHEMICAL CLEANING, PASSIVATION, STEAM BLOWING, OIL FLUSHING, WATER FLUSHING, AIR FLUSHING, PRE-COMMISSIONING TESTS, TRIAL RUNNING OF AUXILIARIES COVERED UNDER THESE SPECIFICATIONS, COMMISSIONING AND ALL OTHER ACTIVITIES TILL HANDING OVER OF THE UNIT. THE WORK SHALL CONFORM TO DIMENSIONS AND TOLERANCES SPECIFIED IN THE VARIOUS DRAWINGS, DOCUMENTS ETC. THAT WILL BE PROVIDED DURING THE COURSE OF INSTALLATION. 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 BHEL AT THE COST AND RISK OF THE CONTRACTOR.

4.0.8
THE TERMINAL POINTS AS DECIDED BY BHEL SHALL BE FINAL AND BINDING ON THE CONTRACTOR.

4.0.9
THE INDICATIVE SCHEDULE OF WEIGHT OF MAJOR EQUIPMENTS GIVEN IN RELEVANT APPENDICES ARE MEANT FOR PROVIDING A GENERAL IDEA TO THE CONTRACTOR ABOUT THE MAGNITUDE OF THE WORK INVOLVED.

4.0.10
DURING THE COURSE OF EXECUTION OF THIS WORK, CERTAIN REWORK/ MODIFICATION/ RECTIFICATION/ REPAIRS/ FABRICATION ETC. WILL BE NECESSARY ON ACCOUNT OF FEED BACK FROM VARIOUS THERMAL POWER STATIONS ON UNITS ALREADY COMMISSIONED AND/OR UNITS UNDER ERECTION AND COMMISSIONING AND ALSO ON ACCOUNT OF DESIGN DISCREPANCIES AND MANUFACTURING DEFECTS AND SITE OPERATION/MAINTENANCE REQUIREMENTS. CONTRACTOR SHALL CARRYOUT SUCH REWORK/MODIFICATION/ RECTIFICATION /FABRICATION/REPAIRS ETC., PROMPTLY AND EXPEDITIOUSLY. DAILY LOG SHEETS INDICATING THE DETAILS OF WORK CARRIED OUT, MAN HOURS, CONSUMABLES USED ETC, SHALL BE MAINTAINED BY THE CONTRACTOR AND GOT SIGNED BY BHEL ENGINEER EVERY DAY. CLAIMS OF CONTRACTOR, IF ANY, FOR SUCH WORKS WILL BE DEALT AS PER CLAUSES OF SECTION-13, SPECIAL CONDITIONS OF CONTRACT.

4.0.11
ALL TOOLS AND TACKLES, FIXTURES, EQUIPMENTS, MATERIALS, MANPOWER, SUPERVISORS/ ENGINEERS, CONSUMABLES ETC. REQUIRED FOR THIS SCOPE OF WORK SHALL BE PROVIDED BY THE CONTRACTOR. ALL EXPENDITURE INCLUDING TAXES AND INCIDENTALS IN THIS CONNECTION WILL HAVE TO BE BORNE BY HIM UNLESS OTHERWISE SPECIFIED IN THE RELEVANT CLAUSE.

4.0.12
THE CONTRACTOR SHALL MAKE ADEQUATE SECURITY ARRANGEMENTS INCLUDING EMPLOYMENT OF SECURITY PERSONNEL AND ENSURE PROTECTION FROM THEFT, FIRE, PILFERAGE, DAMAGE AND LOSS OF MATERIALS/EQUIPMENTS ISSUED TO HIM FOR THE WORK. SPECIAL CARE WILL HAVE TO BE TAKEN TO GUARD AGAINST PILFERAGE / THEFT OF COPPER TUBING, BRASS FITTINGS, BRASS VALVES AND OTHER COSTLY MATERIALS.

4.0.13
ALL EQUIPMENTS SHALL BE HANDLED VERY CAREFULLY TO PREVENT ANY DAMAGE OR LOSS. NO BARE WIRE ROPES, SLINGS ETC, SHALL BE USED FOR HANDLING OF THE EQUIPMENTS WITHOUT THE SPECIFIC PERMISSION OF THE ENGINEER.

4.0.14
CONTRACTOR SHALL ENSURE PROPER HOUSEKEEPING AND REMOVE ALL SCRAP MATERIALS PERIODICALLY FROM VARIOUS WORK AREA COVERED IN THE SCOPE AND DEPOSIT THE SAME AT THE PLACE EARMARKED FOR THIS PURPOSE. IN CASE OF CONTRACTOR'S FAILURE TO DO THE SAME, BHEL RESERVES THE RIGHT TO REMOVE SCRAP AT CONTRACTOR'S COST AND RISK.

4.0.15
ACCESS TO SITE FOR INSPECTION BY BHEL AND CUSTOMER ENGINEERS SHALL BE MADE AVAILABLE BY THE CONTRACTOR AT ALL TIMES.

4.0.16
CONTRACTOR SHALL MOBILISE SUFFICIENT QUANTITY OF SLEEPERS FOR STACKING OF MATERIALS IN HIS CUSTODY.

4.0.17
THE CONTRACTOR'S SCOPE OF WORK IS FURTHER DESCRIBED IN THE FOLLOWING CLAUSES:

4.1 COLLECTION AND RETURN OF EQUIPMENTS, MATERIALS & CONSUMABLES

4.1.1
CONTRACTOR SHALL TAKE DELIVERY OF THE COMPONENTS, EQUIPMENTS, LUBRICANTS, CHEMICALS, SPECIAL CONSUMABLES, STEEL ETC FROM THE STORAGE YARD/STORES/SHEDS OF BHEL/ CLIENT. THE CONTRACTOR SHOULD NOTE THAT THE TRANSPORT OF EQUIPMENTS TO ERECTION SITE, ASSEMBLY YARDS ETC SHOULD BE DONE BY THE PRESCRIBED ROUTE, WITHOUT DISTURBING THE OTHER WORKS AND CONTRACTORS AND IN THE MOST PROFESSIONAL

MANNER. SPECIAL EQUIPMENTS SUCH AS LABORATORY EQUIPMENTS, MEASURING AND CONTROLS EQUIPMENTS, SPECIAL ELECTRODES, VALVES, SHIMS, PACKING MATERIALS FOR JOINTS AND SEALS, LUBRICANTS, ACTUATORS ETC, SHALL BE STORED, WHEN TAKEN OVER BY THE CONTRACTOR, IN APPROPRIATE MANNER AS PER BHEL'S INSTRUCTIONS.

4.1.2
THE CONTRACTOR SHALL RETURN ALL PARTS, MATERIALS, AND CONSUMABLES ETC. REMAINING EXTRA OVER THE NORMAL REQUIREMENT WITH PROPER IDENTIFICATION TAGS TO BHEL STORES. IN CASE OF ANY MISUSE OR USE OVER ACTUAL REQUIREMENT, BHEL RESERVES THE RIGHT TO RECOVER THE COST OF PARTS/MATERIALS USED IN EXCESS OR MISUSED, WITH DEPARTMENTAL CHARGES.

4.1.3
TRANSPORTATION OF LUBE OIL , GAS CYLINDERS ETC. FROM STORES, IS INCLUDED IN THE SCOPE OF THIS CONTRACT. THE CONTRACTOR SHALL HAVE TO RETURN ALL THE EMPTY AND EXCESS DRUMS TO THE CUSTOMER/BHEL STORES. SIMILARLY, TRANSPORT OF CHEMICALS FOR VARIOUS PRE-COMMISSIONING ACTIVITIES/ PROCESSES MENTIONED IN CLAUSES HEREIN FROM BHEL/CUSTOMER'S STORES AND CHARGING OF CHEMICALS INTO THE SYSTEM FOR CARRYING OUT VARIOUS PRE-COMMISSIONING ACTIVITIES AND PROCESSES MENTIONED HEREIN AND RETURNING OF REMAINING AND/OR THE EMPTY CONTAINERS OF THE CHEMICALS TO CUSTOMER/BHEL STORES IS THE RESPONSIBILITY OF CONTRACTOR. AFTER COMPLETION OF OIL FLUSHING OPERATION, THE USED OIL SHALL BE FILLED IN EMPTY DRUMS AND WHICH IN TURN SHALL BE RETURNED TO BHEL/CUSTOMER'S STORES.

4.2 PREPARATION OF FOUNDATION

4.2.1
BUILDINGS, FOUNDATIONS AND OTHER NECESSARY CIVIL WORKS FOR SUPPORTING STRUCTURES, EQUIPMENTS ETC, WILL BE PROVIDED BY THE CUSTOMER. THE CHECKING OF DIMENSIONAL ACCURACY, AXES, ELEVATION, LEVELS ETC, WITH REFERENCE TO BENCH MARKS OF FOUNDATIONS AND ANCHOR BOLT PITS AND ALSO ADJUSTMENTS OF FOUNDATION LEVEL, DRESSING AND CHIPPING OF FOUNDATION SURFACES OF ALL EQUIPMENTS CONTRACTOR/BHEL SHALL PREPARE PROTOCOLS BEFORE TAKING OVER THE FOUNDATIONS. DRESSING AND CHIPPING OF FOUNDATIONS UPTO 25MM FOR ACHIEVING PROPER LEVELS WILL BE WITHIN THE SCOPE OF WORK/SPECIFICATION.

4.2.2
ALL MINOR FOUNDATIONS AND ANCHOR POINTS REQUIRED FOR INSTALLING ERECTION EQUIPMENTS LIKE WINCHES, ANCHORS ETC. ARE TO BE CAST BY THE CONTRACTOR.

4.2.3
THE COMPLETE WORK OF SECONDARY GROUTING OF EQUIPMENTS IS INCLUDED IN THE SCOPE OF WORK/SPECIFICATION. CONTRACTOR SHALL ARRANGE ALL MANPOWER, T&P, FORM WORK AND SHUTTERING MATERIALS, ALL GROUTING MATERIALS SUCH AS ORDINARY PORTLAND CEMENT, SAND, STONE CHIPS ETC & QUICK-SETTING-NON-SHRINK-FREE-FLOW SPECIAL GROUT MIX OF REQUIRED SPECIFICATION (LIKE CONBEXTRA-GP-2 OR EQUIVALENT).

4.2.3.1
THE QUICK-SETTING-NON-SHRINK-FREE-FLOW SPECIAL GROUT MIX SHALL BE PURCHASED ONLY FROM THE FOLLOWING BHEL APPROVED VENDORS:

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

IN ORDER TO ENSURE THE QUALITY, THE MAJOR GROUTING OF EQUIPMENTS USING ANY OF ABOVE GROUT MIXES SHALL ESSENTIAL BE DONE AS PER THE RECOMMENDATIONS OF SUPPLIER

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

4.2.3.2
CLEANING OF THE FOUNDATION SURFACES, POCKET HOLES, ANCHOR BOLT PITS AND DE-WATERING AND MAKING THEM FREE OF OIL, GREASE, SAND AND OTHER FOREIGN MATERIALS BY SODA WASHING, WATER WASHING, COMPRESSED AIR AND OTHER APPROVED METHODS WILL BE WITHIN THE SCOPE OF THIS WORK.

4.2.4
BHEL WILL PROVIDE ONLY SHIMS AND PACKER PLATES (EITHER MACHINED OR PLAIN) WHICH ARE RECEIVED FROM BHEL'S MANUFACTURING PLANTS AND GO AS PERMANENT PART OF THE EQUIPMENT. ADDITIONAL PACKER PLATES AND SHIMS IF REQUIRED, WILL HAVE TO BE PREPARED BY THE CONTRACTOR OUT OF STEEL PLATES, STEEL SHEETS TO MEET SITE REQUIREMENTS. NECESSARY STEEL PLATES FOR THIS PURPOSE WILL BE PROVIDED BY BHEL FREE OF COST.

4.2.5
THE CONTRACTOR SHALL CARRY OUT SCRAPPING AND MATCHING OF EMBEDDED PLATES, PERMANENT SPACERS AND ALL THE MATCHING PARTS OF TURBINE, GENERATOR, PUMPS AND OTHER EQUIPMENTS WHEREVER REQUIRED. THE SUPPORT AND SOLE PLATES MATCHING AND CONCRETE SURFACE BEDDING IS ALSO COVERED IN THE SCOPE OF WORK. THE FINE DRESSING OF CONCRETE SHALL BE WITH PRUSSIAN BLUE-MATCH CHECKS.

4.2.6
PACKER PLATES SHALL NOT ONLY BE BLUE MATCHED WITH FOUNDATIONS BUT ALSO INTER-PACKER CONTACT SURFACES, CONTACT SURFACES BETWEEN PACKER AND PEDESTALS, CONTACT SURFACE BETWEEN PACKER AND FOUNDATION FRAME ETC. SHALL ALSO BE BLUE MATCHED AND REQUIRED PERCENTAGE CONTACT SHALL BE ACHIEVED BY CHIPPING AND SCRAPPING AS PER ENGINEER'S INSTRUCTIONS.

4.3 EQUIPMENTS INSTALLATION – COMMON REQUIREMENTS

4.3.1
FILLING OF LUBRICANTS FOR STEAM TURBINE, TURBO-GENERATOR AND OTHER ROTATING AUXILIARIES FOR PURPOSE OF OIL FLUSHING, INITIAL FILL UP AND SUBSEQUENT TOPPING UP DURING VARIOUS STAGES OF WORK.

4.3.2
ALL WORKS SUCH AS CLEANING, LEVELLING, ALIGNING, HOT ALIGNMENT, TRIAL ASSEMBLY, DISMANTLING OF CERTAIN EQUIPMENTS/COMPONENTS FOR CHECKING AND CLEANING, SURFACE PREPARATION, FABRICATION OF SHEETS, TUBES AND PIPES AS PER GENERAL ENGINEERING PRACTICE AND AS PER BHEL ENGINEER'S INSTRUCTIONS AT SITE, CUTTING, GRINDING, STRAIGHTENING, CHAMFERING, FILLING, MACHINING, CHIPPING, DRILLING, REAMING, SCRAPING, LAPPING, SHAPING, FITTING-UP, DRILLING OF HOLES, MAKING DOWEL PINS, MINOR RECTIFICATION OF FOUNDATION BOLTS ETC. ARE INCIDENTAL TO THE ERECTION/COMMISSIONING AND ANY OTHER WORK/ACTIVITY WHICH IS NECESSARY TO COMPLETE THE WORK SATISFACTORILY, SHALL BE CARRIED OUT BY THE CONTRACTOR AS PART OF THE WORK.

4.3.3

CLEANING, SERVICING, LUBRICATION OF ACTUATORS, PUMPS, HEADERS, GOVERNING SYSTEM, ESV & IV, CONTROL VALVES, LP BYPASS AND OTHER VALVES, TANKS, VESSELS ETC. DURING ERECTION AND COMMISSIONING STAGES IS IN THE SCOPE OF WORK. HOWEVER, GASKETS/PACKINGS/LUBRICANTS FOR REPLACEMENT WILL BE PROVIDED BY BHEL FREE OF COST.

4.3.4
ALL EQUIPMENT SHALL BE PRESERVED AND PROTECTED PERIODICALLY BEFORE AND AFTER ERECTION AS PER ADVICE OF BHEL ENGINEER. THE JOURNALS OF STEAM TURBINE ROTORS, GENERATOR ROTOR, HT MOTORS AND OTHER ROTATING MACHINES SHALL BE THOROUGHLY CLEANED, GREASED/PAINTED WITH PRESERVATIVE AGENTS PERIODICALLY AS INSTRUCTED BY BHEL ENGINEER.

4.3.5
TRIAL RUN OF ALL MOTORS INCLUDING CHECKING DIRECTION OF ROTATION IN UNCOUPLED CONDITION, CHECK ALIGNMENT AND RE-COUPLE THE MOTOR TO DRIVEN EQUIPMENT.

4.3.6
AFTER INITIAL TRIAL OF ROTATING EQUIPMENTS, CONTROL AND POWER CABLING FOR MOTORS AND OTHER EQUIPMENTS/INSTRUMENTATION MAY HAVE TO BE DISCONNECTED FOR CHECKING ALIGNMENT AND RESETTING/REALIGNMENT/HOT ALIGNMENT. CONTRACTOR WILL HAVE TO PROVIDE SERVICES FOR DISCONNECTION AND RECONNECTION OF CONTROL AND POWER CABLES.

4.3.7
ALL RACKS OR ASSEMBLED UNITS LIKE GOVERNING RACK, LP BYPASS RACK, SEAL OIL UNIT, GAS UNIT, SEAL OIL VALVE RACK, PRIMARY WATER UNIT, GAS CYLINDER RACKS ETC SUPPLIED FROM MANUFACTURING UNITS WILL BE TESTED IN BHEL/ CUSTOMER STORES OR AT SITE. THIS MAY REQUIRE TRANSPORTATION, FILLING OF OIL, WATER ETC IN THESE RACKS FOR CARRYING OUT TESTING OF THESE RACKS. DEFECTS NOTICED DURING TESTING OF THESE RACKS WILL HAVE TO BE RECTIFIED BY THE CONTRACTOR FREE OF CHARGES. FURTHER, ANY PIPELINE / FLANGES / FITTINGS NOT FOUND ASSEMBLED PROPERLY, THE SAME HAVE TO BE RECTIFIED / CORRECTED BY THE CONTRACTOR FREE OF CHARGES.

4.4 PIPING INSTALLATION

4.4.1
THE SCOPE OF WORK IN PIPING SYSTEM (AIR, WATER, OIL, STEAM ETC.) WILL INCLUDE CUTTING TO REQUIRED LENGTH, EDGE PREPARATION, LAYING, FIXING AND WELDING OF THE ELBOWS/FITTINGS/VALVES ETC., FIXING SUPPORTS/HANGERS/SHOCK ABSORBERS/ GUIDES AND RESTRAINTS ETC. AND CARRYING OUT ALL OTHER ACTIVITIES/WORKS TO COMPLETE THE ERECTION AND ALSO CARRYING OUT ALL PRE-COMMISSIONING/COMMISSIONING OPERATIONS MENTIONED IN THESE SPECIFICATIONS AS PER BHEL ENGINEER'S INSTRUCTIONS AND/OR AS PER APPROVED DRAWINGS.

THE SCOPE OF WORK FOR TG INTEGRAL AND MISCELLANEOUS PIPING COVERED UNDER THIS SPECIFICATION SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING SYSTEMS-

(A) CONDENSER AIR EVACUATION SYSTEM
(B) CONDENSER COOLING WATER SYSTEM
(C) CYCLE MAKE-UP SYSTEM
(D) CONTROL FLUID SYSTEM
(E) GLAND STEAM SEALING SYSTEM
(F) STEAM EVACUATION LINE (HPT EXHAUST) FROM CRH PIPING SYSTEM
(G) EQUIPMENT COOLING WATER SYSTEM
(H) LUBE OIL SYSTEM
(I) CENTRAL OIL STORAGE AND PURIFICATION SYSTEM
(J) EXHAUST HOOD SPRAY SYSTEM

(K) GLAND SEALING (OF VALVES AND PUMPS) SYSTEM.
(L) CONDENSER ON LOAD TUBE CLEANING SYSTEM.
(M) GENERATOR INTEGRAL PIPING

INDICATIVE LIST OF SCHEMES OF PIPING AND THEIR APPROXIMATE WEIGHTS ARE PROVIDED **VIDE APPENDIX-I.**

4.4.1.1

ALL THE ENVIRONMENTALLY CLEAR WASTE SHALL BE SUITABLY ROUTED TO CUSTOMER'S STORM WATER DRAINAGE SYSTEM THROUGH DRAINS BY THE CONTRACTOR. ALL THE VENTS TO ATMOSPHERE SHALL BE SUITABLY LED TO OUTSIDE THE MAIN PLANT BUILDING.

ALL OILS, CHEMICALS ETC. TO WASTE SHALL BE ROUTED TO A COMMON COLLECTION TANK INDIVIDUALLY IDENTIFIED BY BHEL FOR OIL OR ANY SUCH OBNOXIOUS MATERIAL WHICH CANNOT BE PUT INTO THE PLANT DRAINAGE.

THE OIL DRAINS FROM THE LUBE OIL SYSTEM IN TG AREA WHICH ARE COLLECTED IN A COMMON COLLECTION TANK, WILL BE TRANSFERRED TO DRUMS FOR FURTHER DISPOSAL / REUSE.

SIMILAR ARRANGEMENT WILL BE PROVIDED FOR THE OIL DRAINS IN CONTROL FLUID SYSTEM

4.4.2
CARRYING OUT OF PIPING AS PER THE SPECIFICATIONS BETWEEN EQUIPMENTS CONSTITUTING TERMINAL POINTS, WHETHER THE TERMINAL EQUIPMENTS FALL WITHIN THE SCOPE OF THE WORK/SPECIFICATION OR NOT, IS WITHIN THE SCOPE OF THE WORK/ SPECIFICATION. THE CONTRACTOR SHALL COMPLETE TERMINAL JOINTS AT EITHER ENDS, WITH DUE NDE & PWHT IF APPLICABLE, FOR ALL THE PIPING SCHEMES COVERED IN THE SCOPE OF WORK.

4.4.3
FIT UP AND WELDING/BOLTING/FASTENING OF PIPING TO THE TERMINAL POINTS (SUCH AS STUBS, VALVES, FLANGES ON TERMINAL POINTS/EQUIPMENTS, STUBS ON HEADERS, BATTERY LIMITS ETC) FORMING PART OF THE SCOPE OF WORK/SPECIFICATION AND STRESS RELIEVING AND RADIOGRAPHY OF JOINTS SO MADE ARE ALSO WITHIN THE SCOPE OF WORK. PERMANENT FASTENERS AND GASKETS WILL BE SUPPLIED BY BHEL.

4.4.4
INTERCONNECTION/ HOOK-UP, IF ANY, WITH THE EXISTING SYSTEM SHALL FORM PART OF WORK. SUCH INTERCONNECTIONS, HOOK-UPS 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.

4.4.5
ALL DRAINS / VENTS / RELIEF / ESCAPES / SAFETY VALVE PIPING TO VARIOUS TANKS/ SEWAGE / DRAIN CANAL / FLASH BOX / CONDENSER / SUMP / ATMOSPHERE ETC. FROM THE STUBS ON THE PIPING AND EQUIPMENTS ERECTED BY CONTRACTOR IS COMPLETELY COVERED IN THE SCOPE OF THIS TENDER.

4.4.6
THE FOLLOWING ITEMS OF WORK SHALL BE INCIDENTAL AND FORMING PART OF PIPING FABRICATION AND ERECTION:

1 TO LOCATE CAUSE OF VIBRATIONS IN EQUIPMENTS/AUXILIARIES/PIPELINES AND CARRYING OUT NECESSARY CORRECTIONS IN CASE THE SAME IS ATTRIBUTED TO THE CONTRACTOR.

2 FABRICATION AND ERECTION & WELDING OF RACKS, STEEL SUPPORTS, GUIDES, RESTRAINTS FOR ALL THE PIPING. STEEL FOR THIS PURPOSE WILL BE SUPPLIED BY BHEL FREE OF CHARGE IN RANDOM AND RUNNING LENGTHS.

3 PRE-ASSEMBLY OF SPRING SUSPENSION/HANGERS AND SHOCK ABSORBER AS PER REQUIREMENT.

4 ERECTION OF STEAM TRAPS, FILTERS, FLOW NOZZLES/ FLOW INDICATORS/ FLOW ORIFICES OTHER MEASURING ELEMENTS IN THE PIPING. THESE MAY HAVE BEEN SUPPLIED EITHER BY BHEL OR THEIR CUSTOMER. THIS MAY INVOLVE CUTTING OF PIPE LINES, FRESH EDGE PREPARATION AND WELDING WITH STRESS RELIEVING WHEREVER APPLICABLE.

5 FABRICATION / MAKING OF BENDS FOR PIPES AND TUBES OF DIAMETER UPTO 65MM.

6 MATCHING OF ALL FITTINGS LIKE TEES, BENDS, FLANGES, REDUCERS VALVES, SOCKET FITTINGS, ETC WITH PIPES FOR WELDING.

7 SERVICING OF VALVES AND ACTUATORS

8 CLEANING OF ALL PIPES BY WIRE BRUSHING / BLOWING BY COMPRESSED AIR.

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

10 WELDING OF BLANKS WITH STRESS RELIEVING IF REQUIRED ON A TEMPORARY BASIS.

4.4.7

PIPELINES WILL BE FIELD ROUTED AS PER SCHEMES/ SUGGESTIVE LAYOUT OR AS PER THE INSTRUCTIONS OF BHEL ENGINEER. PIPES & TUBES WILL BE SUPPLIED IN RANDOM LENGTHS AND RUNNING LENGTHS. THE CONTRACTOR SHALL HAVE TO LAY THE PIPING AFTER CARRYING OUT THE NECESSARY FABRICATION, EDGE PREPARATION, ROUTING ETC TO SUIT SITE REQUIREMENT IN BEST PROFESSIONAL MANNER.

4.4.8

AS FAR AS POSSIBLE PRE-ASSEMBLY SHALL BE DONE. THE PIPE LAYING SHALL BE CARRIED OUT FROM THE AVAILABLE TERMINAL POINT/POINTS OR ANY OTHER AREA BETWEEN THE TERMINAL POINTS. THE ERECTION CAN BE CARRIED OUT ON TEMPORARY SUPPORTS TO OBTAIN PROPER ALIGNMENT AND WELDING. AFTER FIXING THE PERMANENT SUPPORTS, ALL THE TEMPORARY SUPPORTS SHALL BE REMOVED. THE ALIGNMENT, DISTANCES AND LOADING OF THE SUPPORTS SHALL BE CHECKED AND THE REQUIRED SETTINGS TO BE ENSURED AS PER REQUIREMENT.

4.5 CONDENSER INSTALLATION

4.5.1

THE CONDENSER WILL BE DESPATCHED IN LOOSE PARTS MAINLY COMPRISING OF BOTTOM PLATES, DOME VALVES, FRONT AND REAR WATER CHAMBER, FRONT AND REAR WATER BOXES, SIDE WALLS, HOT WELL, SPRING ELEMENTS, SUPPORT PLATES, AIR EXTRACTION PIPES, BAFFLES, STIFFENING RODS AND PIPES ETC. THE CONDENSER IS TO BE ASSEMBLED AT SITE IN POSITION BY WELDING THE DIFFERENT PARTS. CONDENSER TUBING AND TUBE EXPANSION (ROLLER EXPANSION) IS TO BE DONE AT SITE BY THE CONTRACTOR, AFTER TAKING DUE CARE TO CLEAN ALL THE TUBE HOLES. AFTER FINAL ALIGNMENT AND LEVELLING OF TURBINE EXHAUST AND CONDENSER, THE SAME HAS TO BE WELDED TO THE EXHAUST POSITION OF LP EXHAUST AS PER THE SEQUENTIAL WELDING PROCEDURE. CONDENSER TUBE MATERIAL IS STAINLESS STEEL.

4.5.2
BEFORE INSERTION OF TUBES, THE CONTRACTOR SHALL CLEAN THE HOLES IN THE TUBE PLATES AND TUBE SUPPORT PLATES TO REMOVE PAINT, CORROSION SPOTS, OXIDE SCALES ETC. USAGE OF SUITABLE CLEANING AGENT MAY ALSO BE REQUIRED WHICH HAS TO BE SUPPLIED BY THE CONTRACTOR.

4.5.3
THE TUBES SHALL BE EXPANDED USING AN AUTOMATIC ELECTRONIC TORQUE CONTROLLED TUBE EXPANDING UNIT OR PNEUMATIC TUBE EXPANDER. TUBE EXPANSION SHALL BE CHECKED WITH DIAL BORE GAUGE. THE TOTAL SET UP INCLUDING TUBE EXPANDERS AND TUBE CUTTING TOOLS ETC. FOR CARRYING OUT THE COMPLETE CONDENSER TUBE EXPANSION WORKS SHALL BE PROVIDED BY THE CONTRACTOR.

4.5.4
THE CONTRACTOR SHALL CARRY OUT THE CONDENSER NECK WELDING WITH LP CYLINDER EXHAUST HOOD ONLY AFTER FINAL INSTALLATION OF LP CASING. NECK WELDING SHALL BE SUBJECTED TO SPECIFIED NON-DESTRUCTIVE TESTING.

4.5.5
THE HYDROSTATIC TESTING OF STEAM SPACE AND HYDRAULIC TESTING OF WATER SPACE UP TO THE TERMINAL POINT AFTER ASSEMBLY OF WATER BOXES ARE ALSO INCLUDED IN THE SCOPE.

4.5.6
WORK OF PAINTING OF CONDENSER SURFACES IN VARIOUS AREA AND AT VARIOUS STAGES OF WORK ARE SPECIFIED ELSEWHERE IN THESE SPECIFICATIONS.

4.6 GENERATOR INSTALLATION

4.6.1 GENERATOR STATOR
THE GENERATOR STATOR, WEIGHING 260 METRIC TONNES (APPROX.) , WILL BE DELIVERED TO SITE ON A SPECIAL WAGON CONSISTING OF 8 BOGIES (FOUR ON EITHER SIDE) WITH FACILITIES TO SWIVEL. THESE TWO SETS OF BOGIES ARE CONNECTED BY A CARRIER BEAM, WHICH CARRIES THE LOAD OF THE STATOR.

IN THE EVENT OF NON AVAILABILITY OF SPECIAL WAGON THE STATOR MAY BE TRANSPORTED BY ROAD USING SPECIAL TRAILER. THE TRAILER SHALL BE BROUGHT WITHIN THE REACH OF PORTAL GANTRY CRANE.

THE CONTRACTOR SHALL HAVE TO LIFT THE GENERATOR STATOR FROM THE ABOVE TRANSPORT ARRANGEMENT OUTSIDE THE MACHINE HALL.

4.6.2

THE GENERATOR STATOR SHALL BE LIFTED AND PLACED BY THE CONTRACTOR WITH THE HELP OF PORTAL GANTRY CRANE AS PER THE SCHEME ENVISAGED BY BHEL ON TO THE GENERATOR FOUNDATION. FOR THIS PURPOSE, THE PORTAL CRANE WILL BE PROVIDED BY BHEL FREE OF HIRE CHARGES TO THE CONTRACTOR. HOWEVER, THE TRANSPORTATION FROM STORE/ STORAGE YARD / SHED, ASSEMBLY, ERECTION, TESTING AND COMMISSIONING OF THIS PORTAL CRANE BEFORE THE STATOR LIFTING AND TRANSPORTING, DISMANTLING, CLEANING, SHIFTING/ PACKING BACK TO STORE/ STORAGE YARD/ SHED AFTER ITS USE WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.

THE ASSEMBLY OF THE SPECIAL WAGON FOR RETURN AFTER UNLOADING OF STATOR IS IN THE SCOPE OF THIS WORK.

4.6.3

CONTRACTOR SHALL HAVE TO KEEP THE LIASON WITH RAILWAYS ON ARRIVAL OF GENERATOR AT RAILWAY SODING

4.7 DEAERATOR INSTALLATION AND HANDLING OF HEAVY AND VOLUMINOUS EQUIPMENTS/COMPENENTS:

4.7.1

CONTRACTOR SHALL PROVIDE ALL REQUIRED SUITABLE CRANES AND TRAILERS FOR LOADING OF MATERIALS DURING COLLECTION OF FROM BHEL/ CLIENT'S STORES/ STORAGE YARD, TRANSPORTATION TO SITE OF WORK AND AT WORK SITE INCLUDING UNLOADING AT SITE OF WORKS FOR ALL EQUIPMENTS AND CONSIGNMENTS INCLUDING HEAVY AND VOLUMINOUS EQUIPMENTS/ COMPONENTS/ CONSIGNMENTS LIKE HP TURBINE MODULE, IP TURBINE MODULE, LP TURBINE INNER–OUTER CASING, LP TURBINE INNER CASING, LP ROTOR, GENERATOR ROTOR, BRUSHLESS EXCITER, HP HEATERS, DEAERATOR/ FST SECTIONS ETC.

BHEL/CUSTOMER SHALL NOT PROVIDE ANY T & P OTHER THAN MENTIONED IN **APPENDIX-III FOR THE PURPOSE IDENTIFIED.**

THE CONTRACTOR SHALL MAKE SUITABLE ARRANGEMENTS/ARRANGE CRANE WELL IN ADVANCE FOR LIFTING AND PLACEMENT TO FINAL POSITION, FITUP, WELDING ETC. OF DEAERATOR / FST SECTIONS AT REQUIRED ELEVATION / LOCATION WITH UTMOST CARE.

4.8 APPROACH AND OPERATING PLATFORMS

4.8.1

ERECTION OF PERMANENT APPROACH PLATFORM AND LADDERS ETC FOR DE-AERATOR AND FST GSC, FLASH TANKS, LUBE OIL / CONTROL OIL TANKS, HP/LP BY PASS VALVES, ESVS / IVS, hot / ELECTRIC MONORAIL HOISTS, LOCAL PLATFORMS FOR VARIOUS INACCESSIBLE VALVES AND EQUIPMENT ETC. ARE IN THE SCOPE OF WORK. THE STRUCTURAL STEEL AND OTHER MEMBERS WILL BE SUPPLIED IN RANDOM LENGTH/SIZE & WILL HAVE TO BE CUT TO REQUIRED SIZE AND PROFILE AS INCIDENTAL TO WORK.

4.9 CRANE, HOIST

4.9.1

HOT/MONORAIL HOIST INCLUDING MONORAIL BEAM / CRANE TO BE ERECTED COMMISSIONED FOR VARIOUS AREAS INDICATED BELOW -

(A) AUXILIARY COOLING WATER (CLARIFIED) PUMPS AND DM COOLING WATER PUMPS OF ECW SYSTEMS.
(B) VACUUM PUMPS.
(C) CW BUTTERFLY VALVES.
(D) CONTROL FLUID ROOM.
(E) CENTRAL LUBE OIL SYSTEM ROOM
(F) OTHER EQUIPMENT COVERED UNDER TG PACKAGE

4.10 EQUIPMENT COOLING WATER SYSTEM

ERECTION OF CLOSED CIRCUIT COOLING SYSTEM FOR COOLING OF THE VARIOUS AUXILIARIES OF TURBOGENERATOR IS IN THIS SCOPE. THE EQUIPMENT COOLING SYSTEM FOR EACH UNIT SHALL INCLUDE THE FOLLOWING :

(A) ONE COLD WATER HEADER TAPPED FROM CW PIPES TO THE CONDENSER.
(B) ONE HOT WATER HEADER DISCHARGING INTO THE HOT CW PIPES FROM THE CONDENSER.
(C) 2X100% CAPACITY SELF CLEANING TYPE FILTERS ON THE SECONDARY SIDE.
(D) 3X50% CAPACITY PLATE TYPE HEAT EXCHANGERS.

(E) 3X50% CAPACITY AUX. CIRCULATING WATER BOOSTER PUMPS WITH DRIVES.
(F) 3X50% CAPACITY, DM COOLING WATER PUMPS WITH DRIVES.
(G) OVERHEAD DM WATER TANK (ECW O/H TANK).
(H) ALKALI PREPARATION TANK, AGITATOR AND MOTOR, PIPING,VALVES ETC.
(I) COMPLETE PIPING, FITTINGS, SUPPORTS AND VALVES

4.11 HYDROSTATIC TESTING, PRESERVATION AND OTHER TESTS

4.11.1
CONTRACTOR SHALL CARRY OUT THE FOLLOWING TESTS REQUIRED TO COMPLETE THE ERECTION AND COMMISSIONING OF THE TG SET:

a. HYDRAULIC TESTING OF INDIVIDUAL EQUIPMENTS LIKE CONDENSER, COOLERS, HEATERS, OTHER AUXILIARIES AND EQUIPMENTS. REQUIRED CAPACITY HYDRAULIC TEST PUMP/ FILL PUMP AND OTHER NECESSARY ARRANGEMENT SHALL BE PROVIDED BY CONTRACTOR TO CARRY OUT HYDRAULIC TESTING OF THE EQUIPMENTS AND PIPING AS PART OF SCOPE OF WORK UNDER THIS TENDER SPECIFICATION.
b. ULTRASONIC TEST
c. DYE PENETRANT TEST
d. MAGNETIC PARTICLE TEST.

ALL ABOVE FACILITIES (MEN, MATERIALS, EQUIPMENTS, AND CONSUMABLES ETC) WITH OPERATING ENGINEER/EXPERIENCED PERSON AND PROPER APPROACH WHEREVER REQUIRED SHALL BE PROVIDED BY THE CONTRACTOR FOR SATISFACTORY COMPLETION OF THE ABOVE TESTS.

4.11.2
CONTRACTOR SHALL LAY ALL NECESSARY TEMPORARY PIPING, INSTALL PUMPS, VALVES, PRESSURE GAUGES, ELECTRIC CABLES AND SWITCHES ETC, REQUIRED FOR THE HYDRO TEST. AFTER THE TEST IS OVER, ALL THE TEMPORARY PIPING, PUMPS, ETC WILL BE REMOVED. IT MAY ALSO SPECIFICALLY BE NOTED THAT SERVICING, ERECTION AND DISMANTLING OF PIPING AND EQUIPMENTS FOR CONDUCTING HYDRAULIC TEST WILL BE DONE BY THE CONTRACTOR. NO SEPARATE PAYMENT SHALL BE MADE FOR THIS PURPOSE.

4.11.3
ALL THE ABOVE TESTS SHALL BE REPEATED TILL ALL THE EQUIPMENTS, PIPING AND SYSTEMS SATISFY THE TECHNICAL AND STATUTORY REQUIREMENTS. ALL RELATED WORKS FORM PART OF THE SCOPE.

4.11.4
SUITABLE WELDING AND STRESS RELIEVING OF TEMPORARY BLANKS OR SUITABLY FIXING TEMPORARY BLANK FLANGES WITH GASKETS AND FASTENERS AND WELDING AND PROVIDING SUITABLE DE-AERATION/ VENTING /DRAIN POINTS WITH VALVES AS PER BHEL ENGINEER'S INSTRUCTION, FOR PERFORMING HYDRO TEST OF PIPING IS WITHIN THE SCOPE OF WORK**.** REQUIRED VALVES, FASTENERS, BLANK FLANGES, BLANKS OR STEEL FOR BLANK FLANGES WILL BE PROVIDED BY CONTRACTOR. AFTER COMPLETION OF HYDRAULIC TEST, WELDED BLANKS SHALL BE CUT AND REMOVED AND WELD BURRS GROUND FINISHED AND CAVITIES/SCARS OF CUTTING WELD FILLED AND GROUND AS PER BHEL ENGINEERS' INSTRUCTION.

4.11.5
HYDRO TEST OF PIPING MAY HAVE TO BE REPEATED SEVERAL TIMES TO MEET TECHNICAL AND STATUTORY REQUIREMENTS BEFORE APPLICATION OF INSULATION.

4.11.6
WHILE CONDUCTING HYDRAULIC TEST OF STEAM LINES, WATER LINES, OIL LINES EITHER INDIVIDUALLY OR GROUPING A FEW LINES OR IN PORTIONS. BLANKS/SPOOLS MAY HAVE TO BE PUT UP AT TERMINAL POINTS, STRAINERS, WALLS, FLANGES ETC. AFTER CONDUCTING THE

TESTS, THE BLANKS SHALL BE REMOVED AND THE LINES RESTORED. ALSO INTERCONNECTING PIPING BETWEEN BOILER AND TURBINE, THE HYDRAULIC TEST MAY HAVE TO BE DONE SECTION WISE AND SOME –TIMES PIPING OF OTHER AGENCIES MAY HAVE TO BE COMBINED. CONTRACTOR SHALL CARRY OUT ALL SUCH INCIDENTAL WORK TO SATISFACTORILY CONDUCT THE HYDRO TEST. WHEREVER WORK IS INVOLVED IN THE TERMINAL POINTS, CONTRACTOR SHALL CARRYOUT THE SAME AS PER INSTRUCTION OF BHEL ENGINEER. THE DECISION OF BHEL ENGINEER IS FINAL AND THE SAME IS BINDING ON THE CONTRACTOR.

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

4.12 PRE-COMMISSIONING TESTS, COMMISSIONING AND POST COMMISSIONING

4.12.1
COMMISSIONING OF THE TG AND AUXILIARIES SHALL INVOLVE THE FOLLOWING TESTS AND ACTIVITIES OF THE EQUIPMENTS ERECTED :

(1) TRIAL RUN OF FEED PUMPS, CEP, AND VARIOUS ROTATING MACHINERIES / PUMPS.

(2) TRIAL RUN OF MOTORS/ DRIVES FOR VARIOUS AUXILIARIES.

(3) HYDRAULIC TEST OF PIPELINES, CLOSED SYSTEMS, TANKS AND VESSELS.

(4) FLUSHING OF ALL PIPELINES BY AIR/OIL/WATER/STEAM AS THE CASE MAY BE.

(5) SERVICING OF ALL VALVES AND FITTINGS.

(6) MANUAL/ MECHANICAL CLEANING OF OIL TANKS, DEAERATOR, FST, SUCTION STRAINERS / FILTER ELEMENTS OF CEP, BFP, BOOSTER PUMP AND OTHER VARIOUS EQUIPMENTS AND TANKS ERECTED BY THE CONTRACTOR. THIS MAY HAVE TO BE REPEATED SEVERAL TIMES DURING THE COMMISSIONING PROCESS.

(7) CHEMICAL CLEANING OF PIPING SYSTEMS, DEAERATOR AND FST AS PER REQUIREMENT. CONTRACTOR SHALL CARRY OUT DISASSEMBLY AND REASSEMBLY OF VULNERABLE COMPONENTS LIKE DEAERATOR SPRAY NOZZLES, GAUGES, INSTRUMENTS ETC. AS INSTRUCTED BY BHEL DURING THIS PROCESS.

(8) PUTTING TURBINE ON BARRING GEAR.

(9) ROLLING AND SYNCHRONISATION.

(10) FULL LOAD OPERATION.

(11) TRIAL OPERATION

THE ABOVE ACTIVITIES/TESTS/TRIAL RUNS MAY HAVE TO BE REPEATED TILL SATISFACTORY RESULTS ARE OBTAINED AND ALSO TO MEET THE TECHNICAL AND STATUTORY REQUIREMENTS.

4.12.2
CONTRACTOR SHALL LAY TEMPORARY PIPELINES WITH FITTINGS AND ACCESSORIES ETC. AS INSTRUCTED BY BHEL ENGINEER FOR THE PURPOSE OF PRE-COMMISSIONING AND COMMISSIONING ACTIVITIES LIKE HYDRAULIC TESTING, CHEMICAL CLEANING, OIL FLUSHING, STEAM BLOWING ETC. OF PIPING AND OTHER EQUIPMENTS AS PART OF THE SCOPE OF WORK. TEMPORARY INSTALLATIONS SHALL BE DISMANTLED BY CONTRACTOR AND RETURNED TO BHEL STORES AS SPECIFIED ELSEWHERE IN THIS T.S.

412.3
THE CONTRACTOR SHALL PROVIDE ALL ASSISTANCE FOR ELECTRICAL AND INSTRUMENTATION TESTING AND COMMISSIONING OF EQUIPMENTS UNDER THIS SCOPE OF WORK, TO BHEL AND THEIR TESTING & COMMISSIONING AGENCY.

4.12.4
THE CONTRACTOR SHALL CARRY OUT ANY OTHER TEST AS DESIRED BY BHEL ENGINEER ON ERECTED EQUIPMENTS COVERED UNDER THE SCOPE OF THIS CONTRACT DURING TESTING, PRE-COMMISSIONING AND COMMISSIONING, TO DEMONSTRATE THE COMPLETION OF ANY PART OR PARTS OF WORK PERFORMED BY THE CONTRACTOR.

4.12.5
IN CASE ANY MALFUNCTIONING AND / OR DEFECT IS FOUND DURING TESTS / TRIAL RUNS SUCH AS LOOSE COMPONENTS, UNDUE NOISE OR VIBRATIONS, STRAIN ON CONNECTED EQUIPMENTS ETC. THE CONTRACTOR SHALL IMMEDIATELY ATTEND TO THESE DEFECTS/ MALFUNCTIONING AND TAKE NECESSARY CORRECTIVE MEASURES. IF ANY READJUSTMENT AND REALIGNMENTS ARE NECESSARY, THE SAME SHALL BE DONE AS PER BHEL ENGINEER'S INSTRUCTIONS, FREE OF COST.

4.12.6
CLEANING OF OIL TANK BY SAND BLASTING OR OTHER METHODS AS PER INSTRUCTIONS OF BHEL ENGINEER BEFORE AND AFTER OIL FLUSHING IS RESPONSIBILITY OF CONTRACTOR.

4.12.7
THE CONTRACTOR SHALL ASSOCIATE FOR INITIAL AND SUBSEQUENT FILLINGS OF GAS IN GENERATOR GAS SYSTEM AS AND WHEN REQUIRED TILL UNIT IS HANDED OVER TO CUSTOMER.

4.12.8
THE CONTRACTOR SHALL CARRY OUT AIR TIGHTNESS TEST ON GENERATOR GAS COOLING SYSTEM AND WATER FLUSHING OF PRIMARY WATER SYSTEM TO THE SATISFACTION OF BHEL ENGINEER.

4.12.9
REPLACING/CHANGING MECHANICAL/OTHER SEALS OF EQUIPMENT, PUMPS ETC. DURING COMMISSIONING STAGE IS WITHIN THE SCOPE OF WORK.

4.12.10
DURING THE STAGES OF COMMISSIONING, AND TILL UNIT IS HANDED OVER, IF ANY PART OF TG AND AUXILIARIES NEED REPAIR/RECTIFICATION/REWORK/REPLACEMENT, THE SAME SHALL BE DONE EXPEDITIOUSLY AND PROMPTLY BY THE CONTRACTOR. CONTRACTOR'S CLAIM IF ANY, FOR SUCH REPAIR/RECTIFICATION/REWORK/ REPLACEMENT ETC. FOR REASONS NOT ATTRIBUTABLE TO THE CONTRACTOR, WILL BE GOVERNED BY CLAUSES 13.1 TO 13.8 OF THE SPECIFICATION. THE PARTS TO BE REPLACED SHALL HOWEVER, BE PROVIDED BY BHEL FREE OF COST.

4.12.11
DURING THIS PERIOD, THOUGH BHEL'S AND CUSTOMER'S ENGINEERS WILL ALSO BE ASSOCIATED IN THE WORK, THE CONTRACTOR'S RESPONSIBILITY WILL BE TO MAKE AVAILABLE RESOURCES IN HIS SCOPE TILL SUCH TIME THE COMMISSIONED UNITS ARE TAKEN OVER BY THE CUSTOMER.

4.12.12
IN CASE ANY MALFUNCTIONING AND/OR DEFECTS ARE FOUND DURING TESTS, TRIAL RUN SUCH AS LOOSE COMPONENT, UNDUE NOISE OR VIBRATION, STRAIN ON CONNECTED EQUIPMENT ETC., THE CONTRACTOR SHALL IMMEDIATELY ATTEND TO THESE DEFECTS/ MALFUNCTIONS AND TAKE NECESSARY CORRECTIVE MEASURES. IF ANY READJUSTMENT OR REALIGNMENT IS NECESSARY, SAME SHALL BE DONE AS PER BHEL ENGINEER'S INSTRUCTION.

4.12.13
THE PRE-COMMISSIONING ACTIVITIES WILL START PRIOR TO OIL FLUSHING OF THE TG AND VARIOUS TRIALS, COMMISSIONING OPERATIONS SHALL CONTINUE TILL THE TG IS HANDED OVER TO CUSTOMER. SIMULTANEOUS COMMISSIONING CHECKS, ACTIVITIES WILL BE IN PROGRESS IN VARIOUS AREAS LIKE TRIAL RUN OF VARIOUS EQUIPMENT, CHECKING OF EQUIPMENT ERECTED, MAKING READY FOR TRIAL RUNS, FILLING UP OF LUBRICANTS, CHEMICALS ETC. ALL THESE WORKS NEED SPECIALISED GANGS INCLUDING ELECTRICIANS, INSTRUMENT TECHNICIANS, FITTERS, IN EACH AREA TO RENDER ASSISTANCE TO BHEL COMMISSIONING STAFF. CONTRACTOR SHALL EARMARK SEPARATE MANPOWER FOR VARIOUS COMMISSIONING ACTIVITIES. THIS MANPOWER SHALL NOT BE DISTURBED OR DIVERTED. THE MOBILISATION OF THESE COMMISSIONING GANGS SHALL BE SUFFICIENT SO THAT PLANNED COMMISSIONING ACTIVITIES ARE TAKEN UP IN TIME AND ALSO COMPLETED AS PER SCHEDULE AND THE WORK IS TO BE UNDERTAKEN ROUND THE CLOCK IF REQUIRED.

4.12.14
CONTRACTOR SHALL CUT OPEN WORKS IF 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.

4.12.15
AFTER THE START OF COMMERCIAL OPERATION OF MACHINE, COMMISSIONING ACTIVITIES WILL CONTINUE. IT SHALL BE THE RESPONSIBILITY OF CONTRACTOR TO PROVIDE FOLLOWING MANPOWER ALONG WITH SUPERVISOR AS PART OF COMMISSIONING ASSISTANCE FOR A PERIOD OF **THREE MONTHS.** OVER RUN CHARGE SHALL NOT BE PAYABLE DURING SUCH ASSISTANCE IF NO MAJOR ERECTION/COMMISSIONING WORK ARE PENDING. HOWEVER, IF MAJOR ERECTION/COMMISSIONING WORKS ARE PENDING DURING THIS PERIOD FOR REASONS NOT ATTRIBUTABLE TO THE CONTRACTOR, OVER RUN CHARGE, IF ANY, SHALL BE PAYABLE TO THE CONTRACTOR AS PER SECTION-11.

1)	SUPERVISOR	2 NOS.
2)	PIPE FITTER/MILLWRIGHT FITTER	2 NOS.
3)	WELDER	2 NOS.
4)	RIGGER	3 NOS.
5)	ELECTRICIAN/INSTRUMENT TECHNICIAN	1 NO. EACH
6)	UNSKILLED WORKER	6 NOS.

4.12.16
THE ABOVE FIGURES SHOWS ONLY MINIMUM REQUIRED OVER AND ABOVE LABOUR REQUIRED FOR COMPLETING PENDING ERECTION AND COMMISSIONING WORKS AND CLEARING OF PUNCH LISTS. CONTRACTOR HAS TO PROVIDE NUMBER OF PERSONNEL AND OTHER RESOURCES AS PER WORK DEMAND.

4.12.17
IT SHALL BE SPECIFICALLY NOTED THAT ABOVE EMPLOYEES OF THE CONTRACTOR MAY HAVE TO WORK ROUND THE CLOCK ALONG WITH BHEL COMMISSIONING ENGINEERS.

4.12.18
DURING COMMISSIONING, OPENING OF VALVES, CHANGING OF GASKETS, CHECKING, REALIGNING OF ROTATING AND OTHER EQUIPMENT, ATTENDING TO LEAKAGES IN PIPING, TANKS ETC. AND ADJUSTMENTS OF ERECTED EQUIPMENT MAY ARISE. VALVES SHALL BE SERVICED AND LUBRICATED TO THE SATISFACTION OF BHEL ENGINEER DURING THE ERECTION AND COMMISSIONING AS PER BHEL ENGINEER'S INSTRUCTIONS.

4.12.19
IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE FOR NECESSARY RESOURCES TILL THE COMPLETION OF WORK UNDER THESE SPECIFICATION, EVEN IN CASE ERECTION, TESTING AND COMMISSIONING OF THE TG AND OTHER EQUIPMENTS ARE DELAYED DUE TO REASONS NOT ATTRIBUTABLE TO THE CONTRACTOR.

4.13 WELDING AND HEAT TREATMENT

4.13.1
REMOVAL OF WELDING SLAG AND BURRS BY HAND FILES, WITH BRUSHES AND/OR FLEXIBLE GRINDERS WILL BE CARRIED OUT SIMULTANEOUSLY.

4.13.2
ON ALL STEAM, OIL, INSTRUMENT, GAS, AIR PIPING ETC. BOTH TIG WELDING AND SUBSEQUENT ARC WELDING OR TOTAL TIG WELDING PROCESS IS TO BE ADOPTED AS INSTRUCTED BY BHEL ENGINEER.

4.13.3
ALL WELD JOINTS ON PIPING SHALL BE GROUND / FILED / DRESSED ON COMPLETION OF WELDING AND BEFORE RADIOGRAPHY AS PER INSTRUCTIONS BHEL ENGINEER.

4.13.4
ALL ELECTRODES AND FILLER WIRES SHALL BE PROCURED BY THE CONTRACTOR. THE SELECTION AND USE OF ELECTRODES WILL BE AS PER THE STANDARDS AND SPECIFICATIONS OF BHEL.

4.13.5
CONTRACTOR SHOULD PURCHASE THE ELECTRODES AS PER THE RECOMMENDATIONS OF BHEL ENGINEER, WELDING MANUAL, WELDING SCHEDULE AND OTHER RELEVANT DOCUMENTS. THE ELECTRODES SHALL BE PURCHASED ONLY FROM BHEL APPROVED MANUFACTURERS.

4.13.6
THE PURCHASE OF ELECTRODES SHALL BE ACCOMPANIED BY PROPER TEST CERTIFICATE AND THESE CERTIFICATES SHOULD BE SUBMITTED REGULARLY FOR THE SCRUTINY OF BHEL ENGINEER.

4.13.7
ALL ELECTRODES SHALL BE STORED IN A CLEAN DRY AREA. THE STORAGE ROOM SHALL BE OF PERMANENT NATURE AND DAMP PROOF, AND THE ROOM SHALL BE EXCLUSIVELY MEANT FOR STORAGE OF WELDING ELECTRODES AND FILLER WIRES. EXCEPTING FOR A VENT IN THE TOP, IT IS NOT PREFERRED TO HAVE ANY OTHER OPENING LIKE WINDOWS OR VENTILATORS. THE TEMPERATURE INSIDE THE ROOM HAS TO BE KEPT IN THE RANGE OF $8\text{-}10^0$ C ABOVE ATMOSPHERIC TEMPERATURE AND HUMIDITY SHOULD BE LESS THAN 50&. THIS IS TO BE ACCOMPLISHED BY USING ELECTRIC HEATERS OR INFRA RED LAMPS. THE STORAGE ROOM MUST BE PROVIDED WITH HYGROMETER AND THERMOMETER. TEMPERATURE AND HUMIDITY ARE TO BE MONITORED REGULARLY. 15-20 HOLDERS, WELDING CABLES, CONNECTING CABLES TO EQUIPMENTS AND OTHER WELDING ACCESSORIES INCLUDING TEMPORARY ELECTRICAL CONNECTION FROM CONSTRUCTION POWER POINT TO INDIVIDUAL EQUIPMENT LIKE WINCHES, HOISTING EQUIPMENT, WELDING GENERATORS, TRANSFORMERS, HEAT TREATMENT EQUIPMENT AND OTHER CONSTRUCTION EQUIPMENT SHALL BE ARRANGED BY CONTRACTOR.

4.13.8
ALL RACKS AND OTHER ITEMS USED FOR STORAGE OF ELECTRODES SHALL BE OF STEEL AND NOT OF WOOD.

4.13.9
ALL ELECTRODES SOON AFTER PURCHASE SHALL BE OFFERED FOR INSPECTION TO THE BHEL ENGINEER. CONTRACTOR SHALL BE STRICTLY PROHIBITED FROM USING ELECTRODES NOT INSPECTED/APPROVED BY BHEL ENGINEER.

4.13.10

ALL WELDING CONSUMABLES SHALL BE ISSUED TO THE WELDERS ONLY BY AUTHORISED PERSON WHO IS CONTROLLED BY CONTRACTOR'S WELDING ENGINEER. THE NECESSARY BAKING REQUIREMENTS ARE TO BE ENSURED BY CONTRACTOR'S WELDING ENGINEER.

4.13.11

ALL WELDERS SHALL BE TESTED AND APPROVED BY BHEL ENGINEER/ CUSTOMER BEFORE THEY ARE ACTUALLY ENGAGED ON WORK THOUGH THEY MAY POSSESS THE REQUISITE CERTIFICATE. BHEL RESERVES THE RIGHT TO REJECT ANY WELDER WITHOUT ASSIGNING ANY REASONS. STATUTORY REQUIREMENTS LIKE IBR APPROVAL FOR WELDERS ARE TO BE COMPLIED WITH BEFORE STARTING OF THE WORK. IF REQUIRED, THE WELDERS MAY HAVE TO UNDERGO PROCEDURE QUALIFICATION TEST ALSO. THE DECISION OF BHEL ENGINEER WILL BE FINAL IN THIS REGARD.

4.13.12

ALL CHARGES FOR TESTING OF CONTRACTOR'S WELDERS INCLUDING DESTRUCTIVE AND NON-DESTRUCTIVE TESTS CONDUCTED BY BHEL AT SITE SHALL HAVE TO BE BORNE BY THE CONTRACTOR INCLUDING SUPPLY OF TEST PLATES FOR TESTING OF WELDERS.

4.13.13

BHEL ENGINEER IS ENTITLED TO STOP ANY WELDER FROM HIS WORK IF HIS WORK IS UNSATISFACTORY FOR ANY TECHNICAL REASON OR IF THERE IS A HIGH PERCENTAGE OF REJECTION OF JOINTS WELDED BY HIM, WHICH, IN THE OPINION OF BHEL ENGINEERS, WILL ADVERSELY AFFECT THE QUALITY OF WELDING THOUGH THE WELDER HAS EARLIER PASSED THE TESTS PRESCRIBED. THE FACT THAT THE WELDERS HAVE PASSED THE TEST, DOES NOT RELIEVE THE CONTRACTOR FROM HIS CONTRACTUAL OBLIGATIONS TO CHECK THE PERFORMANCE OF THE WELDERS. CONTRACTOR SHALL SUBMIT A MONTHLY PERFORMANCE RECORD OF ALL WELDERS.

4.13.14

ALL WELDED JOINTS SHALL BE SUBJECT TO ACCEPTANCE BY BHEL ENGINEER WHOSE DECISION WILL BE FINAL AND BINDING.

4.13.15

PRE-HEATING AND STRESS RELIEVING BEFORE AND AFTER WELDING ARE PART OF ERECTION WORK AND SHALL BE PERFORMED BY THE CONTRACTOR IN ACCORDANCE WITH INSTRUCTIONS OF BHEL ENGINEER. CONTRACTOR HAS TO ARRANGE FOR THE RECORDERS ALONG WITH ACCESSORIES AND SUITABLE TECHNICIANS FOR HEAT TREATMENT PURPOSE. THE TEMPERATURE RECORDERS AND THERMOCOUPLES SHALL BE DULY CALIBRATED. DURING PREHEAT AND STRESS RELIEVING OPERATIONS THE TEMPERATURE SHALL BE MEASURED AS PER THE INSTRUCTIONS OF BHEL ENGINEERS BY THERMOCOUPLES AND RECORDED GRAPHS FOR THE HEAT TREATMENT WORKS CARRIED OUT SHALL BE THE PROPERTY OF BHEL.

4.13.16

FOR THE PURPOSE OF STRESS RELIEVING, THERMOCOUPLES HAVE TO BE ATTACHED TO THE WELD JOINT. THE NUMBER OF TEMPERATURE MEASURING POINTS AND LOCATIONS ARE AS PER THE STANDARDS OF BHEL. THERMOCOUPLES HAVE TO BE ATTACHED USING BATTERY OPERATED PORTABLE THERMOCOUPLE ATTACHMENT UNIT AND NOT BY MANUAL ARC WELDING. CONTRACTOR SHALL ARRANGE SUFFICIENT NUMBER OF THERMOCOUPLE ATTACHMENT UNITS.

4.13.17

WHEREVER NECESSARY, CONTRACTOR SHOULD PROVIDE TEMPERATURE INDICATOR/ TEMPERATURE RECORDER AS REQUIRED BY BHEL ENGINEER FOR MEASURING PREHEAT TEMPERATURE FOR WELDING OR FOR CONTROLLING TEMPERATURE OF METAL FOR HOT CORRECTION ETC. DECISION OF BHEL ENGINEER ON METHOD AND OF CHECKING PREHEAT TEMPERATURE OR CONTROLLING TEMPERATURE FOR HOT CORRECTION AND WELDING SHALL BE FINAL AND BINDING ON CONTRACTOR.

4.13.18

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 LABOUR REQUIRED FOR THE SAME AS PER DIRECTIONS OF BHEL.

4.13.19
HEAT TREATMENT REQUIREMENTS SHALL BE AS PER THE WELDING SCHEDULES OF BHEL

4.13.20
FOR WELD JOINTS OF HEAVY STRUCTURAL ITEMS LIKE BEAMS, I-SECTIONS, IF HEAT TREATMENT IS REQUIRED, THE SAME SHALL BE CARRIED OUT AS PART OF THE WORK.

4.13.21
CHECKING EFFECTIVENESS OF STRESS RELIEVING BY HARDNESS TESTS (EITHER BY POLDI 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.

4.13.22
TIG WELDING PROCESS IS TO BE USED FOR ALL ROOT PASS WELDS IN PIPES. SUBSEQUENT WELDING AFTER ROOT PASS CAN BE CARRIED OUT BY MANUAL METAL ARC WELDING WITH BASIC COATED ELECTRODES. FOR THE PIPE OF THICKNESS LESS THAN 6MM, THE ENTIRE WELDING HAS TO BE CARRIED OUT BY TIG WELDING. HOWEVER, BHEL SITE ENGINEER WILL HAVE THE OPTION OF CHANGING THE METHOD ADOPTED. FOR MANUAL ARC WELDING SHALL BE DONE AS PER WEAVING TECHNIQUE AND THE WIDTH OF WEAVING SHALL NOT EXCEED 1.5 TIMES OF THE DIA OF THE ELECTRODES.

4.13.23
TWO PIECES TO BE JOINED SHALL BE INDIVIDUALLY CHECKED FOR THE WELD EDGE PREPARATION AND PROFILE DIMENSIONS AND WITH RESPECT TO THE TEMPLATE. DYE PENETRANT CHECK SHALL BE CARRIED OUT ON EDGE PREPARED SURFACES AT RANDOM. THE PERCENTAGE SHALL DEPEND ON PIPING SYSTEM AS SPECIFIED BY BHEL ENGINEER.

4.13.24
JOINT FIT UP WILL BE A STAGE FOR INSPECTION.

4.13.25
ALL JOINTS SHALL BE OFFERED FOR VISUAL INSPECTION AFTER ROOT RUN. SUBSEQUENT WELDING SHOULD BE MADE ONLY AFTER THE APPROVAL OF ROOT RUN.

4.14 RADIOGRAPHY

4.14.1
RADIOGRAPHIC INSPECTION OF WELDS SHALL BE ARRANGED BY THE CONTRACTOR INCLUDING ALL CONSUMABLES LIKE ISOTOPE CAMERA, X-RAY FILM, CHEMICALS ETC. SCAFFOLDING AND APPROACHES FOR TAKING RADIOGRAPHS.

THE NECESSARY SKILLED TECHNICIAN AND LABOURERS FOR TAKING THE RADIOGRAPHS SHALL BE PROVIDED BY THE CONTRACTOR. WHILE TAKING RADIOGRAPHS, THE CONTRACTOR HAS TO USE PROPER PENETRAMETER/ IMAGE QUALITY INDICATORS AS INSTRUCTED BY THE BHEL ENGINEER. ALL THE PROCESSED AND ACCEPTED FILMS WILL BE THE PROPERTY OF BHEL. IN THIS REGARD, THE CONTRACTOR HAS TO ADHERE TO THE SAFETY RULES/REGULATIONS LAID BY BARC AUTHORITIES FROM TIME TO TIME. IT MAY PLEASE BE NOTED THAT INVARIABLY THE RADIOGRAPHIC WORK WILL BE CARRIED AFTER THE NORMAL WORKING HOURS.

4.14.2
CONTRACTOR SHALL NOTE THAT 100% RADIOGRAPHY SHALL BE TAKEN ON ALL HIGH PRESSURE WELDING TILL SUCH TIME THE WELDERS' PERFORMANCE IS FOUND 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/REJECTION OF THE JOINTS WILL BE FINAL AND BINDING ON THE CONTRACTOR.

4.14.3
WHEREVER RADIOGRAPHS ARE NOT ACCEPTED, ON ACCOUNT OF BAD SHOT, JOINTS SHALL BE RE-RADIOGRAPHED AND RE-SHOTS SUBMITTED FOR EVALUATION. RADIOGRAPHS SHALL BE TAKEN ON JOINTS AFTER CARRYING OUT REPAIRS. HOWEVER, IF DEFECT PERSISTS AFTER FIRST REPAIR, AS PER RADIOGRAPH, CARRYING OUT REPAIRS AND RADIOGRAPHY SHALL BE REPEATED TILL JOINT IS MADE ACCEPTABLE IN CASE, THE JOINT IS NOT REPAIRABLE, THE SAME SHALL HAVE TO BE CUT AND REPAIRED AT CONTRACTOR'S COST. DECISION OF BHEL ENGINEER IN ALL THESE MATTERS IS FINAL AND BINDING ON THE CONTRACTOR.

4.14.4
100% RADIOGRAPHY OF WELD JOINTS OF CERTAIN PIPING HAVE TO BE CARRIED OUT AS PER BHEL STANDARDS/ DRAWINGS / SPECIFICATION.

4.14.5
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. NECESSARY TRAINED PERSONNEL SHALL BE DEPLOYED FOR THIS PURPOSE.

4.15 ACID CLEANING / ALKALI FLUSHING / STEAM BLOWING / OIL FLUSHING ETC.

4.15.1
CONTRACTOR SHALL LAY TEMPORARY PIPELINES WITH FITTINGS AND ACCESSORIES AND ALSO ERECT/COMMISSION PUMPS AFTER SERVICING AS PER REQUIREMENTS, TANKS AND OTHER INSTALLATIONS, AS A SYSTEM AS INSTRUCTED BY BHEL FOR THE PURPOSE OF CHEMICAL CLEANING, STEAM BLOWING, STEAM WASHING, STEAM FLUSHING, WATER FLUSHING, WATER WASHING, OIL FLUSHING ETC. OF PIPING AND OTHER EQUIPMENTS WHICH ARE WITHIN THE SCOPE OF WORK AND ALSO SYSTEMS IN WHICH EQUIPMENTS AND PIPING ERECTED BY CONTRACTOR FORM A PART OF THE SCOPE OF WORK.

IT SHALL BE SPECIFICALLY NOTED BY THE CONTRACTOR THAT ALL PIPES FOR ABOVE WORKS SHALL BE SUPPLIED IN RANDOM LENGTH AND IN LOOSE CONDITION. CONTRACTOR HAS TO ASSEMBLE AND ERECT THEM AS PER SCHEMES / DRAWINGS PROVIDED BY BHEL. FURTHER, FLANGES , BEND ETC. FOR COMPLETING THE SCHEME SHALL BE MACHINED/ FABRICATED BY THE CONTRACTOR AT HIS OWN COST . HOWEVER, PLATES / STEEL ETC. FOR THE SAME WILL BE PROVIDED BY BHEL FREE OF CHARGES.

4.15.2
AFTER THE CHEMICAL CLEANING HAS BEEN SUCCESSFULLY COMPLETED, DISMANTLING OF ALL TEMPORARY INSTALLATIONS AS INSTRUCTED BY BHEL IS WITHIN THE SCOPE OF WORK UNDER THIS SPECIFICATION. THE DISMANTLED MATERIALS SHALL BE DRESSED AND RETURNED TO BHEL AS STATED ELSEWHERE IN THIS TENDER SPECS.

4.15.3
PRESERVATION OF THE CLEANED SURFACES WILL BE THE RESPONSIBILITY OF CONTRACTOR UNDER THE GUIDANCE OF BHEL ENGINEER.

4.15.4
HYDAULIC TEST OF TEMPORARY PIPING IS TO BE CARRIED OUT AS PER THE INSTRUCTIONS OF BHEL ENGINEER. CARRYING OUT REPAIRS, IF ANY, IS IN THE SCOPE OF WORK/ SPECIFICATION.

4.15.5

FOR CHEMICAL CLEANING OF THE PIPING SYSTEM, CONTRACTOR WILL HAVE TO LAY TEMPORARY PIPING TO CONNECT THE ENTIRE SYSTEM IRRESPECTIVE OF WHETHER THE EQUIPMENT/SYSTEM CONNECTED IS IN THE SCOPE OF CONTRACTOR OR NOT. DECISION OF BHEL ENGINEER IN THIS REGARD WILL BE FINAL AND BINDING ON THE CONTRACTOR.

4.15.6
DURING THE INITIAL STAGES OF WORK, TRENCHES FOR DRAINING WATER MAY NOT BE AVAILABLE AFTER ALKALI FLUSHING OR MASS FLUSHING FOR DISCHARGING AND EMPTYING. NECESSARY LOW POINT DRAINS AND TEMPORARY PIPING FOR THIS WILL HAVE TO BE PROVIDED BY CONTRACTOR FROM MATERIALS PROVIDED BY BHEL.

4.15.7
LAYING EFFLUENT DISCHARGE LINE FROM MIXING TANK (FOR ACID CLEANING OR ANY OTHER CHEMICAL CLEANING PROCESS) AS PER THE INSTRUCTIONS OF BHEL ENGINEER AND DISMANTLING, SERVICING FOR PRESERVATION AND HANDING OVER THE SAME TO BHEL STORES AFTER COMPLETION OF THE JOB IS WITHIN THE SCOPE OF WORK/SPECIFICATION.

4.15.8
RADIOGRAPHIC EXAMINATION OF WELD JOINTS ON TEMPORARY PIPES AS REQUIRED BY THE ENGINEER IN-CHARGE SHOULD BE CARRIED OUT.

4.15.9
CONTRACTOR SHALL ALSO CARRY OUT THE REPAIRS OR ATTEND LEAKS ETC., IN THE TEMPORARY PIPING AND EQUIPMENTS FOR THE ABOVE OPERATIONS / ACTIVITIES WHILE CARRYING OUT THE ABOVE ACTIVITIES / OPERATIONS.

4.15.10
FOR CHEMICAL CLEANING OF SYSTEM WHICH CONSIST OF EQUIPMENT/PIPING ERECTED BY THE CONTRACTOR AND ALSO EQUIPMENT/PIPING ERECTED BY OTHER CONTRACTORS OF BHEL/CUSTOMER'S CONTRACTOR HAS TO ARRANGE FOR WORKERS AND SUPERVISORY STAFF AS REQUIRED SUPPLEMENTING/COMPLIMENTING THE LABOUR AND SUPERVISORY STAFF MOBILISED BY OTHER AGENCIES FOR CHEMICAL CLEANING OF THE PORTION OF EQUIPMENT ERECTED BY THEM IN THE SYSTEM. DECISIONS ON THE STRENGTH OF GANGS AND SUPERVISORY STAFF FOR DEPLOYMENT OF LABOUR AND ALLOCATION OF WORK FOR THEM AT SITE, BY BHEL ENGINEER IS FINAL AND BINDING ON THE CONTRACTOR.

4.15.11
CONTRACTORS QUOTED RATE SHALL BE INCLUSIVE OF FABRICATION, COST OF CONSUMABLES, ERECTION, DISMANTLING OF TEMPORARY PIPING AND SERVICING OF THE EQUIPMENTS AND VALVES AND HANDING OVER TO BHEL.

4.15.12
AFTER ACID 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 MACHINERIES, COOLER ETC. BEFORE AND AFTER OIL FLUSHING IS THE RESPONSIBILITY OF THE CONTRACTOR.

4.15.13
FOR FULL WELDING OF STRUCTURES, TANKS AND PIPING ETC., ONLY WELDING GENERATORS SHALL BE USED. THE USE OF WELDING TRANSFORMERS WILL BE SUBJECT TO THE APPROVAL OF BHEL ENGINEER.

4.15.14
ERECTION AND COMMISSIONING OF CONNECTING PIPING – PERMANENT AND TEMPORARY FOR OIL PURIFICATION EQUIPMENTS AND ALL OPERATIONS FOR CLEANING, OIL FLUSHING, DISMANTLING OF TEMPORARY PIPING DURING PRE AND POST-COMMISSIONING OF EQUIPMENT UPTO FULL LOAD.

4.16 GENERAL

4.16.1
DURING THE COURSE OF ERECTION, PLATFORMS AND FLOOR GRILLS ARE TO BE CUT AT CERTAIN PLACES TO ROUTE STEAM, OIL, WATER AND AIR PIPING, CABLE TRAYS, ETC OR FOR ACCOMMODATING ERECTION, RIGGING ETC, THE CUTTING OF PLATFORMS AND GRILLS SHOULD BE MINIMUM AND AS APPROVED BY BHEL ENGINEER. AFTER COMPLETION OF WORK, THE PLATFORM/GRILLS CUT SHALL BE MADE GOOD NEATLY AS INSTRUCTED BY BHEL ENGINEER.

4.16.2
ERECTION AND WELDING OF STAINLESS STEEL FITTINGS INCLUDING SUPPLY OF NECESSARY STAINLESS STEEL WELDING ELECTRODES IS WITHIN THE SCOPE OF THE WORK/SPECIFICATION.

4.16.3
NO TEMPORARY SUPPORTS SHOULD BE WELDED ON TO THE PIPING.

4.16.4
CONTRACTOR SHALL CARRY OUT PRESERVATION PAINTING ON ALL ITEMS TAKEN FROM STORES. THE PRESERVATION PAINTING HAS TO BE CARRIED OUT ON MATERIAL TAKEN FROM STORES AND ALSO ON MATERIAL ERECTED WHEREVER THE SHOP PAINTING HAS GIVEN AWAY. PERIODICAL INSPECTION SHALL BE MADE AS PER THE INSTRUCTIONS OF BHEL ENGINEER AND THE PORTION OF ITEMS OR THE COMPLETE ITEMS NEEDING PAINTING SHALL BE CARRIED OUT TO THE SATISFACTION OF BHEL ENGINEER. THIS FACILITY SHALL BE PROVIDED BY THE CONTRACTOR TILL THE COMMISSIONING AND HANDING OVER OF THE EQUIPMENT TO THE CUSTOMER. PRESERVATIVE AND TOUCH UP PAINTING ON EQUIPMENTS COVERED UNDER THIS SPECIFICATION STORED AT STORES/STORAGE YARD SHALL ALSO BE CARRIED OUT BY THE CONTRACTOR.

4.16.5
ADJUSTMENT OF SPRING HANGERS FOR PIPING SHALL BE DONE BY THE CONTRACTOR DURING INITIAL ERECTION. AFTER INITIAL COMMISSIONING TRIALS, IT IS POSSIBLE THAT THE SPRING HANGERS HAVE TO BE ADJUSTED REPEATEDLY TILL THE CORRECT SPRING COMPRESSION IS ACHIEVED. CONTRACTOR SHALL DO THE SAME TO THE SATISFACTION OF BHEL ENGINEER. THE MARKING OF COLD AND HOT POSITIONS ON THE HANGERS SHALL BE DONE BY THE CONTRACTOR.

4.16.6
THE CONTRACTOR SHALL RETURN TO BHEL THE EXCESS MATERIALS LEFT OVER AFTER COMPLETION OF WORK, MATERIALS ISSUED FOR TEMPORARY PIPELINES FOR HT, CHEMICAL CLEANING, FLUSHING, BLOWING ETC. AND MATERIALS ISSUED ON RETURNABLE BASIS IN NEATLY DRESSED CONDITION. NECESSARY GRINDING, EDGE CUTTING (SQUARE FACING), EDGE PREPARATION (VEE), PAINTING ETC. TO THE CONDITION SIMILAR TO THE ONE AT THE TIME OF ISSUE SHALL BE IN SCOPE OF WORK.

4.16.7
WHEREVER THE EQUIPMENTS ARE ERECTED BY THE CONTRACTOR AND CONNECTED PIPING IS DONE BY OTHER AGENCY, CONTRACTOR SHALL WELD / TIGHTEN THE INCOMING PIPES TO EITHER THE EQUIPMENT OR THE COUNTERFLANGE PROVIDED ON THE EQUIPMENT.

4.17 PG TEST TAPPING POINTS

INSTALLATION AND WELDING OF TAPPING POINTS FOR TAKING PERFORMANCE TEST MEASUREMENTS SHALL BE CARRIED OUT BY THE CONTRACTOR AS PART OF THIS WORK FOR THE EQUIPMENTS COVERED UNDER THIS TENDER SPECIFICATION UNDER THE GUIDANCE OF BHEL ENGINEER. FOR PRESSURE TAPPING THE WORK SHALL BE INSTALLATION AND WELDING OF IMPULSE PIPE UPTO AND INCLUSSIVE OF ROOT VALVES. FOR TEMPERATURE TAPPING THE WORK

SHALL BE INSTALLATION AND FIXING OF THERMOWELL AND SEAL WELDING OF THE SAME. THIS SHALL BE LIMITED TO ALL THE TAPPING POINTS FOR WHICH MATERIALS ARE AVAILABLE AND THEIR LOCATIONS IDENTIFIED WITHIN THE REGULAR CONTRACT PERIOD AND EXTENSIONS THEREOF.

4.17.1
ALL PACKING AND FORWARDING MATERIAL SHALL BE RETURNED AS SOON AS THE MATERIAL IS UNPACKED. THE LOCATION FOR STORAGE OF SUCH MATERIALS SHALL BE AS INDICATED BY BHEL ENGINEER.

4.17.2
ALL MEASURING AND MONITORING DEVICES (MMD) USED FOR THE WORK IN SCOPE OF THIS TENDER SPECIFICATIONS, SHALL BE CALIBRATED BY THE ACCREDITED AGENCIES WHO ARE APPROVED BY BHEL OR CALIBRATION TRACTABILITY IS ESTABLISHED UPTO NATIONAL PHYSICAL LABORATORY.

4.17.3
CONTRACTOR SHALL FURNISH THE CONSUMPTION DETAILS OF CHEMICALS, LUBRICANTS, TIG WELDING FILLER WIRE, WELDING ELECTRODES AND OTHER CONSUMABLES ON MONTHLY BASIS.

4.18 SPECIFIC INCLUSIONS

4.18.1
ALL TERMINAL CONNECTIONS FOR EQUIPMENT & PIPING COVERED IN THIS SPECIFICATION.

4.18.2
IMPULSE/PNEUMATIC PIPING BETWEEN CUSTOMER'S BATTERY LIMIT AND EQUIPMENTS.

4.18.3
AUXILIARY COOLING WATER LINES BETWEEN BATTERY LIMITS OF CUSTOMER AND EQUIPMENTS.

4.18.4
SERVICING AND ASSEMBLY OF CONTROL VALVES/REGULATING VALVES, FIXING OF FILTER ELEMENTS/STRAINERS & STEAM BLOWING & BLANKING DEVICES IN LP BYPASS, M.S. STRAINER, HRH STRAINER & AND BLANKING OF LP BYPASS, ESV & IV SYSTEM, FOR HYDRO TEST, STEAM BLOWING ETC IS THE PART OF SCOPE OF WORK.

4.18.5
IT MAY BE SPECIFICALLY NOTED THAT IT SHOULD NOT BE CONSTRUED OR CLAIMED BY THE CONTRACTOR THAT WITH THE TECHNICAL SPECIFICATION AND "EXCLUSIONS AND/OR INCLUSIONS" DETAILED IN THIS TENDER SPECIFICATION, BHEL HAS COVERED THE ENTIRE SCOPE OF WORK AND/OR THE DETAILS THEREOF TO BE EXECUTED BY THE CONTRACTOR.

4.18.6
COMPLETE CONTROL FLUID SYSTEM OF BOTH HP AND LP BYPASS SYSTEM IS INCLUDED IN THIS SPECIFICATION. ASSOCIATED ASSISTANCE FOR COMMISSIONING LIKE LUBE OIL FLUSHING, FILLING AND TOPPING UP OF LUBE OIL ETC SHALL BE PART OF THE WORK.

4.18.7
ASSEMBLY AND INSTALLATION OF STRAINER ELEMENTS OF MS AND HRH SYSTEM IS WITHIN THE SCOPE OF WORK. CLEANING OF THESE STRAINER ELEMENTS DURING TRIAL OPERATION OF MACHINE IS ALSO COVERED UNDER THIS SCOPE.

4.18.8
CHIPPING OF FOUNDATION, PLACEMENT, ERECTION, ALIGNMENT, COMMISSIONING, GROUTING, MOUNTING OF EQUIPMENT MOUNT INSTRUMENTS, PANELS AND OTHER FITTINGS OF BHEL (PEM BOUGHT OUT ITEMS) SUPPLIED PUMPS & PACKAGES ARE IN SCOPE OF THE WORK. ERECTION

AND COMMISSIONING OF THESE EQUIPMENTS/PUMPS & PACKAGES WILL BE REQUIRED TO COMPLETE TO MEET THE COMMISSIONING SCHEDULE/ MILESTONE ACTIVITIES OF OTHER AREAS LIKE BOILER, ETC. CONTRACTOR SHALL PLAN AND COMPLETE ERECTION & COMMISSIONING OF THESE EQUIPMENTS ON PRIORITY AS PER DECISION OF BHEL ENGINEER/CUSTOMER REQUIREMENT. DETAILS OF SUCH SYSTEMS ARE FURNISHED IN **APPENDIX-I.**

4.18.9

ELECTRIC WIRE ROPE HOISTS SHALL BE ERECTED, TESTED AND COMMISSIONED FOR VACUUM PUMP MOTOR HANDLING AND CW BUTTERFLY VALVES HANDLING. CHAIN PULLY BLOCKS WITH TROLLEY (MANUAL OPERATED) SHALL BE ERECTED, TESTED AND COMMISSIONED FOR CONTROL FLUID SYSTEM, CENTRAL LUBE OIL SYSTEM ETC.

4.19 CW PIPINGS

4.19.1

ERECTION, WELDING, NDT (RADIOGRAPHY & DPT.), SUPPORTING, PROTECTIVE/PRESERVATIVE COATING INCLUDING FINISH PAINTING WITH SUPPLY OF REQUIRED PAINTS/PRIMER, HYDRAULIC TESTING COMMISSIOING/CHARGING OF CW SYSTEM OF CONDENSER COOLING WATER PIPING-SUPPLY & RETURN (FROM CONDESER TO B.F. VALVES, B.F. VALVES TO OUTSIDE THE TG HALL)

R E JOINTS AND BUTTERFLY VALVES ARE TO BE INSTALLED ON THE CW INLET AND OUTLET PIPES OF THE CONDENSER. CW INLET AND OUTLET PIPES FROM CONDENSER TO THE TERMINAL POINT ARE RELEASED IN PG 80. ERECTION OF THE PIPING IS IN THE SCOPE OF THIS CONTRACT.

4.20 WELD FIT-UP AND WELD JOINT PROTECTIVE PAINT, COMPONENT PRESERVATIVE PAINTING ETC.

1) ALL PROTECTIVE PAINTS FOR THE PROTECTION OF WELD JOINT FIT-UPS, APPLICATION OF PRIMERS ON FINISHED WELD JOINTS ARE IN THE SCOPE OF CONTRACTOR.

2) TWO COATS OF STEAM WASHABLE PAINTS SHALL BE APPLIED ON STEAM SIDE OF LP TURBINE AND CONDENSER COMPONENTS, AS ADVISED BY BHEL. THE STEAM WASHABLE PAINTS, PRIMER AND THINNER WILL BE SUPPLIED BY THE CONTRACTOR WITHIN THE SCOPE OF THIS CONTRACT. HOWEVER, ARRANGEMENTS FOR SURFACE PREPARATION AND PAINT APPLICATION LIKE SAND/SHOT-BLASTING, CONSUMABLES LIKE SURFACE CLEANING AGENTS, PAINT BRUSH, BRUSH CLEANSER, LABOUR AND NECESSARY TOOLS AND PLANTS ARE IN THE SCOPE OF CONTRACTOR.

3) ALL SITE WELD JOINTS FALLING IN STEAM SIDE SHALL BE PAINTED WITH TWO COATS OF STEAM WASHABLE PAINT.

4) THE WATER BOXES SHALL BE SANDBLASTED TO REMOVE ALL TRACES OF PRIMER APPLIED AT THE WORKS. THEREAFTER APPLY TWO COATS OF PRIMER PAINT FOLLOWED BY TWO/THREE COATS OF ALLOYED RESINE MACHINERY ENAMEL PAINTS AS APPROVED BY **BHEL**. CONTRACTOR SHALL SUBMIT MANUFACTURER'S BATCH TEST CERTIFICATE / TEST CERTIFICATE FROM **BHEL** APPROVED LABORATORY FOR THE PRIMERS AND PAINTS. PRIOR APPROVAL OF BHEL FOR EACH AND EVERY BATCH OF THE PRIMER & PAINTS SHALL BE MANDATORY. IN ORDER TO ACHIEVE A DESIRED MINIMUM PAINT DRY FILM THICKNESS (DFT) AS SPECIFIED IN BHEL DRAWING, NUMBER OF COATS MAY BE APPLIED AND METHOD OF APPLICATION SHALL BE AS RECOMMENDED BY THE PAINT MANUFACTURER. REQUIRED PAINTS & PRIMERS AND OTHER CONSUMABLES SHALL BE ARRANGED BY CONTRACTOR.

5) ALL WATER SIDE SURFACES OF WATER CHAMBERS INCLUDING TUBE PLATE SHALL BE THOROUGHLY SURFACE PREPARED AND PAINTED. REQUIRED PRIMER & PAINTS AND OTHER CONSUMABLES FOR CONDENSER WATER BOX AND TUBE PLATES SHALL BE PROVIDED BY CONTRACTOR.

6) AFTER THE SUCCESSFUL COMPLETION OF HYDRAULIC TESTING, THE INTERIOR SURFACES OF THE WATER BOXES, MAIN TUBE PLATES SHALL BE PAINTED WITH SUITABLE ANTICORROSIVE PAINTS AS PER SPECIAL PROCEDURES LAID DOWN BY BHEL. REQUIRED NECESSARY PAINTS ALONG WITH PRIMERS AND OTHER CONSUMABLES SHALL BE ARRANGED BY CONTRACTOR.

7) PRIOR TO HYDRAULIC TESTING OF WATER SIDE OF CONDENSER, INTERIOR SURFACES OF WATER BOXES SHALL BE PAINTED.

8) AFTER COMPLETION OF TUBING AND TUBE SIDE HYDRO TEST, ALL WATER SIDE SURFACES OF WATER CHAMBERS INCLUDING TUBE PLATE SHALL BE PAINTED.

9) PRESERVATION OF ALL COMPONENTS/EQUIPMENTS DURING VARIOUS STAGES OF ERECTION, COMMISSIONING TILL HANDING OVER IS IN THE CONTRACTOR'S SCOPE. ALL PRESCRIBED METHODS OF SURFACE CLEANING PRIOR TO APPLICATION OF PRESERVATIVE PAINT SHALL BE FOLLOWED BY THE CONTRACTOR. CONTRACTOR HAS TO ARRANGE ALL PRIMER AND PAINTS, AND OTHER CONSUMABLES LIKE WIRE BRUSH, PAINTING BRUSH REQUIRED FOR THIS WORK.

10) CONDENSER INTERNAL COMPONENTS/PARTS/SURFACES HAVE TO BE SURFACE PROTECTED WITH STEAM WASHABLE PAINT AS PER BHEL STANDARDS.

4.21 LINING AND INSULATION

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

1 TG INTEGRAL PIPING AND TANKS & VESSELS
2. DEAERATOR, FEED WATER STORAGE TANK
3. OTHER EQUIPMENTS INCLUDING BOIs, THOUGH NOT LISTED ABOVE BUT REQUIRED FOR COMPLETION
4. ST-TG AUXILIARIES INCLUDING, BUT NOT LIMITED, TO HEAT EXCHANGERS, PUMPS, TANKS AND VESSELS AND OTHER EQUIPMENTS
5. TG INTEGRAL PIPING INCLUDING CONDENSATE AND EXTRACTION SYSTEM PIPING

4.21.1

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.

4.21.2

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

4.21.3

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.

4.21.4

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

4.21.5

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

4.21.6

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.

4.21.6

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

4.21.7

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

4.21.8

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.

4.21.9

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

4.21.10

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

4.21.11

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.

4.21.12

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.

4.21.13

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.

4.21.14

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.

4.21.15

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 **(SHALL BE ARRANGED BY CONTRACTOR.)**

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

4.21.16

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.

4.21.17

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.

4.21.18

PRIOR TO APPLICATION OF REFRACTORY BITUMINOUS PAINTING ON THE PRESSURE PARTS AND OTHER AREA IS UNDER CONTRACTOR SCOPE. **THE BITUMINOUS PAINT (SHALL BE ARRANGED BY CONTRACTOR.)** NO SEPARATE PAYMENT WILL BE MADE FOR APPLICATION OF PAINT.

4.22 FINAL PAINTING

4.22.1

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.

4.22.2 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.

4.22.3

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.

4.22.4

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.

4.22.5

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.

4.22.6

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.

4.22.7

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.

4.22.8

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.

4.22.9

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

4.22.10

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.

4.22.11

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.

4.22.12

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.

4.22.13

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.

4.22.14

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

4.22.15

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

4.23 EXCLUSIONS

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

A) REGENERATIVE SYSTEM PIPING IS <u>EXCLUDED</u> FROM THE SCOPE. FOR DETAILS OF PIPING *<u>INCLUDED</u>* IN SCOPE OF THIS TENDER SPECIFICATION, PLEASE REFER 'APPENDIX-I' ENCLOSED HEREWITH.

B) ALL CABLE CONNECTIONS, EXCEPT THOSE SPECIFIED AS SCOPE OF WORK.

C) MEASURING INSTRUMENTS, MONITORING, RELAYING, PROTECTION AND SIGNALLING EQUIPMENTS OTHER THAN THOSE SUPPLIED WITH THE EQUIPMENTS BY / ON BEHALF OF BHEL AND WHICH HAVE BEEN INDICATED AS SCOPE OF WORK.

D) ERECTION, TESTING AND COMMISSIONING OF ELECTRICAL PANELS AND STARTING RESISTORS FOR DC JOP AND DC EOP PUMPS, OIL PURIFICATION UNIT PANELS OF LUBE OIL SYSTEM.

E) ERECTION, TESTING AND COMMISSIONING OF ELECTRICAL PANELS AND STARTING RESISTORS OF SEAL OIL, PRIMARY WATER, GAS SYSTEMS, C.W. PUMPS.

F) ELECTRICAL TESTING OF MOTORS, TURBO-GENERATOR. HOWEVER ERECTION THESE WILL BE UNDER THE SCOPE OF THIS TENDER SPECIFICATION.

G) IMPULSE PIPING AND FITTINGS FROM THE TAPPING POINTS OF VARIOUS EQUIPMENT OTHER THAN THOSE SPECIFIED AS SCOPE OF WORK.

H) CIVIL WORKS TO THE EXTENT NOT SPECIFICALLY PROVIDED FOR IN THIS TENDER.

I) SUPPLY OF MATERIALS FOR TEMPORARY PIPING (PIPE, VALVE, STRUCTURAL STEEL ETC.) REQUIRED FOR HYDRAULIC TEST, CHEMICAL CLEANING, FLUSHING OR STEAM/AIR BLOWING OF THE PIPELINES.

J) SUPPLY OF CHEMICALS AND LUBE OIL FOR PRE-COMMISSIONING AND COMMISSIONING ACTIVITIES.

K) SOME SUB-DELIVERY ITEMS AND ELECTRICAL COMPONENTS SUCH AS PUSH-BUTTONS, JUNCTION BOXES ETC.

L) E&C WORK OF CABLE TRAYS, CABLES AND EARTHING ETC

M) ALL ELECTRICAL AND CONTROL & INSTRUMENTATION ITEMS EXCEPT THOSE SPECIFIED ELSEWHERE IN THESE SPECIFICATIONS.

N) SUPPLY OF PRIMER AND PAINTS FOR FINAL PAINTING

O) PNEUMATIC COPPER TUBING AND FITTINGS THEREOF.

SECTION-5

SPECIAL CONDITIONS CONTRACT

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

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

a) ONLY OPEN SPACE FOR CONSTRUCTION OF LABOUR WILL BE PROVIDED BY THE CLIENT. DEVELOPMENT OF THE LAND AND COSTRUCTION OF LABOUR COLONY, WITH ARRANGEMENTS OF LIGHTING, DRINKING WATER, AND SANITATION ETC IS IN CONTRACTOR'S SCOPE.

b) BHEL/CLIENT WILL PROVIDE ELECTRICITY ON CHARGEABLE BASIS FOR LABOUR COLONY AT ONE POINT. FURTHER DISTRIBUTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

c) BHEL/CLIENT WILL PROVIDE DRINKING WATER FREE OF COST IN ONE POINT AT SITE. FURTHER DISTRIBUTION EITHER TO HIS LABOUR COLONY OR HIS WORK SITE OR TO HIS OFFICE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

d) THE CONTRACTOR HAS TO MAKE HIS OWN ARRANGEMENT FOR TRANSPORTATION OF HIS WORKMEN AND OTHER EMPLOYEES. BHEL/CLIENT SHALL NOT PROVIDE ANY FACILITY IN THIS REGARD.

5.2 TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES:

5.2.1

THE CONTRACTOR SHALL PROVIDE ALL (EXCEPTING THOSE INDICATED IN BHEL SCOPE) REQUIRED TOOLS AND PLANTS, MONITORING AND MEASURING DEVICES (MMD) AND HANDLING & TRANSPORTATION EQUIPMENTS FOR THE SCOPE OF WORK COVERED UNDER THESE SPECIFICATIONS. CONTRACTOR HAS TO PROVIDE SUITABLE CRANES FOR MATERIAL HANDLING AT BHEL/CLIENT'S STORES/STORAGE YARD. BHEL'S CRANE WILL NOT BE AVAILABLE FOR THIS PURPOSE. PLEASE REFER **APPENDIX-III** 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 CONTRACTOR HAS BEEN FURNISHED IN **APPENDIX-IV.** CONTRACTOR SHALL ALSO MOBILISE ALL OTHER T&P NECESSARY FOR TIMELY AND SATISFACTORY COMPLETION OF THE WORK IN SCOPE.

5.2.3

CONTRACTOR SHALL CARRY OUT INSTALLATION, COMMISSIONING, TESTING AND DISMANTLING OF THE 360 TON PORTAL GANTRY CRANE PROVIDED BY BHEL. CONTRACTORS SCOPE SHALL ALSO INCLUDE TO & FRO TRANSPORTATION OF THE PORTAL GANTRY CRANE BETWEEN BHEL STORES AND SITE OF WORK AND SHALL PROVIDE T & P INCLUDING CRANE ETC. REQUIRED FOR ASSEMBLY AND DISMATLING OF ABOVE PORTAL GANTRY CRANE.

5.2.4

CONTRACTOR SHALL PROVIDE ALL REQUIRED SUITABLE CRANES AND TRAILERS FOR MATERIALS HANDLING DURING COLLECTION FROM BHEL/ CLIENT'S STORES/ STORAGE YARD,

TRANSPORTATION TO SITE OF WORK AND AT WORK SITE FOR ALL EQUIPMENTS AND CONSIGNMENTS INCLUDING HEAVY AND VOLUMINOUS EQUIPMENTS/ COMPONENTS/ CONSIGNMENTS LIKE HP TURBINE MODULE, LP TURBINE INNER–OUTER CASING, LP TURBINE INNER CASING, LP ROTOR, GENERATOR ROTOR, BRUSHLESS EXCITER, HP HEATERS, DEAERATOR/FST SECTIONS ETC. BHEL/CUSTOMER SHALL NOT PROVIDE ANY T & P OTHER THAN MENTIONED IN **APPENDIX-III FOR THE PURPOSE IDENTIFIED. THE CONTRACTOR SHALL MAKE SUITABLE ARRANGEMENTS/ARRANGE CRANE WELL IN ADVANCE FOR LIFTING AND PLACEMENT TO FINAL POSITION OF DEAERATOR / FST SECTIONS AT REQUIRED ELEVATION / LOCATION WITH UTMOST CARE.**

5.2.5

CONTRACTOR SHALL PROVIDE THE COMPLETE OPERATING CREW LIKE OPERATOR, HELPERS FOR HANDLING TRAILING CABLE FOR EOT & PORTAL GANTRY CRANES. IT MAY BE SPECIFICALLY NOTED THAT THE EOT CRANE / GANTRY CRANE SHALL BE SHARED BY MANY OTHER AGENCIES WORKING WITHIN THE TG HALL. THE CONTRACTOR SHALL HAVE TO EXTEND THE SERVICES OF THE EOT CRANE OPERATION TO ALL SUCH OTHER AGENCIES AS INSTRUCTED BY BHEL, THE OPERATION COST (FOR CREW) WILL BE SHARED PROPORTIONATELY AMONGST THE BENEFICIARY AGENCIES ON MUTUALLY AGREED TERMS AND RATE.

PORTAL GANTRY CRANE WILL BE ISSUED IN PARTS / COMPONENTS AND ARE TO BE ASSEMBLED AT SITE BY THE CONTRACTOR AS PER THE INSTRUCTIONS OF BHEL ENGINEERS / ERECTION MANUAL. THE SCOPE INCLUDES RECEIPT OF THE MATERIALS FROM BHEL STORES, TRANSPORTATION TO SITE, SERVICING OF THE COMPONENTS / DRIVES / PULLEYS ETC,, CHECKING AND LUBRICATING WIRE ROPES , PRE ASSEMBLY AND ASSEMBLY OF COMPONENTS, PREPARATION OF FOUNDATION, ERECTION OF CRANE ON THE FOUNDATION, GROUTING OF CRANE BASE PLATES, CABLING, PRE-COMMISSIONING AND COMMISSIONING OF DRIVES, LOAD TESTING , CHECKING OF OVER-LOAD PROTECTION , REGULAR MAINTENANCE ETC. A QUALIFIED / EXPERIENCED OPERATOR IS TO BE PROVIDED BY THE CONTRACTOR. AFTER ERECTION OF THE GENERATOR STATOR, THE CONTRACTOR HAS TO DISMANTLE THE CRANE IN SEQUENCE AS INSTRUCTED BY BHEL AND APPLY PRESERVATIVES / TOUCH-UP PAINTS, WHEREVER REQUIRED AND RETURN THE SAME TO STORE IN GOOD CONDITION. NECESSARY CONSUMABLES, TOOLS AND PLANTS INCLUDING GAS WELDING M/C ETC. ARE TO BE PROVIDED BY THE CONTRACTOR. THERE IS NO SEPARATE RATE FOR THE ABOVE AND QUOTED RATES SHALL BE INCLUSIVE OF THIS.

THE REQUIRED LOADS WILL BE PROVIDED BY BHEL FREE OF CHARGES FOR LOAD TESTING OF PORTAL CRANES.

5.2.6

CONTRACTOR HAS TO PROVIDE SPANNERS OF ALL SIZES FOR CARRYING OUT THE COMPLETE ERECTION / COMMISSIONING WORKS. NO SPANNERS WILL BE PROVIDED BY BHEL TO THE CONTRACTOR.

5.2.7

CONTRACTOR HAS TO ARRANGE SLINGS OF ALL SIZES FOR COMPLETING THE WORKS COVERED UNDER THESE SPECIFICATIONS EXCEPT THE SPECIAL SLINGS FOR GENERATOR STATOR LIFTING/HANDLING, WHICH WILL BE PROVIDED BY BHEL FREE OF CHARGES ON RETURNABLE BASIS.

5.2.8

ALL TOOLS AND TACKLES TO BE DEPLOYED BY THE CONTRACTOR FOR THE WORK SHALL HAVE THE PRIOR APPROVAL OF BHEL ENGINEER WITH REGARD TO BRAND, QUALITY AND SPECIFICATION.

5.2.9

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

5.2.10

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.

5.2.11

COMPLETE SET OF HYDRAULIC JACKS OF 50 TONNES AND 100 TONNES CAPACITY SHALL BE ARRANGED BY THE CONTRACTOR FOR USE DURING ERECTION AND COMMISSIONING OF TURBINE. ALSO, THE CONTRACTOR SHALL ARRANGE HYDRAULIC JACKS OF 100 TONNES AND 63 TONNES CAPACITY ALONG WITH LONG HIGH PRESSURE HOSES OF SUITABLE LENGTH FOR GENERATOR ERECTION AND ALIGNMENT. THESE JACKS SHALL OF INTERNATIONALLY REPUTED MAKE, HIGHLY RELIABLE AND MAINTAINED IN EXCELLENT WORKING CONDITION. THEY SHALL BE TESTED FOR SAFE WORKING BEFORE DEPLOYING IN ACTUAL WORK. THESE JACKS SHALL NOT BE PERMITTED FOR USE ANYWHERE OTHER THAN STEAM TURBINE / GENERATOR AREA.

5.2.12

ALL JACK BOLTS THAT ARE REQUIRED DURING ERECTION FOR CARRYING OUT ROLL-CHECK ETC. WILL HAVE TO BE ARRANGED BY THE CONTRACTOR. NO JACK BOLTS WILL BE PROVIDED BY BHEL.

5.2.13

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.

5.2.14

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.

5.2.15

THE T&P TO BE ARRANGED BY THE CONTRACTOR SHALL BE IN PROPER WORKING CONDITION AND THEIR OPERATION SHALL NOT LEAD TO UNSAFE CONDITION. CONTRACTOR SHALL OBTAIN PRIOR APPROVAL OF BHEL FOR ALL THE T&P BEFORE DEPLOYING IN ACTUAL WORK. THE MOVEMENT 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.

5.2.16

NORMALLY, USE OF WELDING GENERATORS ONLY IS PERMITTED FOR WELDING. THE USE OF WELDING TRANSFORMERS WILL BE SUBJECT TO PRIOR APPROVAL OF BHEL.

5.2.17

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. MMD SHALL BE CALIBRATED ONLY AT ACCREDITED LABORATORY AS PER THE LIST AVAILABLE WITH BHEL OR ANY OTHER LABORATORY APPROVED BY BHEL. ALL CALIBRATION SHALL BE TRACEABLE TO NATIONAL OR INTERNATIONAL STANDARDS.

5.2.18 SCAFFOLDING MATERIALS

(A) THE CONTRACTOR SHALL PROVIDE ALL THE NECESSARY SCAFFOLDING MATERIALS, TEMPORARY STRUCTURES AND NECESSARY SAFETY DEVICES ETC, DURING ALL STAGES TILL COMPLETION OF WORK. SCAFFOLDING MATERIALS (MS PIPES, GRATINGS ETC)

SHALL BE OF LIGHT WEIGHT CONSTRUCTION. CONTRACTOR SHALL ARRANGE STEEL PIPES & CLAMPS WITH ACCESSORIES LIKE BASE PLATE ATTACHMENT, FIXING PINS, STRUTS ETC FOR SCAFFOLDING REQUIRED FOR THIS WORK. IT IS TO BE SPECIFICALLY NOTED THAT NO WOOD OR ANY SUCH OTHER INFLAMMABLE MATERIAL WILL BE PERMITTED TO BE USED FOR ABOVE APPLICATIONS. ANY SUCH USE ON EACH OCCASSION SHALL INVITE LEVY OF PENALTY AS DEEMED FIT BY BHEL ENGINEER.

(B) (i) CONTRACTOR SHALL DEPLOY ADEQUATE NUMBERS OF SCAFFOLDING MS PIPES (SIZE NOMINAL BORE – 40 mm, LENGTH : 6M EACH) WITH NECESSARY CLAMPS (AT LEAST ONE PAIR OF CLAMPS PER PIPE) AND FITTINGS.

(ii) BHEL WILL IMPOSE PENALTY FOR ANY SHORTFALL IN QUANTITY, OF PIPE AND ASSOCIATED PAIR OF CLAMPS. THE RECOVERY WILL CONTINUE TILL THE SHORTFALL IS MADE GOOD. THIS PROVISION WILL BE APPLICABLE TILL THE COMPLETION OF WORK. **PENALTY WILL BE IMPOSED AT THE RATE OF Rs.15/- PER PIPE AND ASSOCIATED PAIR OF CLAMPS PER MONTH ON PRO-RATA BASIS.**

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

5.3 CONSUMABLES

5.3.1

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

TG SPECIAL CONSUMABLES LIKE HYLOMAR / GOLDEN HERMETITE / STAG-B / MOLYKOTE/ ANABOND COMPOUNDS / RUBBER FIXING COMPOUNDS ETC. WILL HAVE TO BE ARRANGED BY THE CONTRACTOR.

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

BHEL WILL PROVIDE PAINT & PRIMER FOR FINAL PAINTING ONLY. PRIMERS AND PAINTS FOR OTHER REQUIREMENTS ARE IN CONTRACTOR'S SCOPE.

5.4 WELDING ELECTRODES, FILLER WIRES FOR TIG WELDING AND GASES

5.4.1

ALL WELDING CONSUMABLES INCLUDING FILLER WIRES IS IN THE CONTRACTORS SCOPE.

5.4.2

ALL THE REQUIRED WELDING ELECTRODES 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.

5.4.3

THE CONTRACTOR SHALL PROVIDE ALL CONSUMABLES REQUIRED FOR CARRYING OUT THE WORK COVERED UNDER THIS SCOPE OF WORK INCLUDING TIG WIRES FOR WELDING OF PIPING JOINTS.

5.4.4

ALL THE REQUIRED GASES LIKE ARGON, OXYGEN, ACETYLENE ETC INCLUDING REQUIRED HIGH PURITY NITROGEN GAS (FOR PURGING OF GENERATOR STATOR WATER SYSTEM) SHALL BE ARRANGED BY THE CONTRACTOR AT HIS COST.

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 MATERIALS MANAGEMENT, ERECTION & COMMISSIONING, QUALITY CONTROL, BILLING, MIRS, ETC. THIS SYSTEM CAN BE ACCESSED THROUGH NORMAL TELEPHONE LINES AND THROUGH LAN INSTALLED AT SITE.

ALL VENDORS ARE TO NOTE THAT ALL OPERATIONS IN THEIR SCOPE WHICH HAVE INTERFACES WITH BHEL SYSTEMS WILL HAVE TO BE DONE ONLY THROUGH THIS COMPUTERIZED SYSTEM. THE VENDOR HAS TO MAKE ALL ARRANGEMENTS FOR CONNECTIVITY, COMPUTING EQUIPMENT, PERSONNEL, SOFTWARE, ETC. TO OPERATE AND INTERACT WITH BHEL SYSTEM. NO MANUAL SYSTEMS OTHER THAN WHAT IS NOT COVERED BY COMPUTERIZED SYSTEM WILL BE ACCEPTABLE AT SITE.

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

5.7.2

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

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

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

5.7.4

CONTRACTOR SHALL BE WELL EQUIPPED WITH BACK-UP 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. CONTRACTOR SHALL TAKE SUITABLE INSURANCE POLICY FOR SUCH ACCIDENTAL LOSS/ DAMAGES.

5.8 RESPONSIBILITIES WITH REGARD TO LABOUR EMPLOYMENT ETC.

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

5.8.2

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

5.8.3

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.

5.8.4

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.

5.8.5

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

5.8.6

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

5.9 TAXES, DUTIES, LEVIES

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

5.9.1

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

5.9.2 Service Tax & Cess on Service Tax

Service Tax and Cess on Service Tax as applicable on output Services are excluded from contractor's scope; therefore contractor's price/rates shall be **exclusive** of Service Tax and Cess on Output Services. In case, it becomes mandatory for the contractor under provisions of relevant act/law to collect the Service Tax & Cess from BHEL and deposit the same with the concerned tax authorities, such applicable amount will be paid by BHEL.
Contractor shall submit to BHEL documentary evidence of Service Tax registration certificate specifying name of services covered under this contract. **Contractor shall submit serially numbered Service Tax and Cess Invoice, signed by him or a person authorized by him in respect of taxable service provided, and shall contain the following, namely,**

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

All the four conditions shall be fulfilled in the invoice before release of service tax payment.
Contractor shall obtain prior written consent from BHEL before billing the amount towards such taxes.
With introduction of Cenvat Credit Rules 2004, which came into force w.e.f. 10.09.2004, Excise Duty paid on Input Goods including Capital Goods and Service Tax paid on Input Services that are used for providing the output services can be taken credit of against the Service Tax payable on output services. However BHEL may opt for availing the abatement provision in which case cenvat credit may not be available on input duty.

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

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

5.9.6 **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.

5.10 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 CONDITION 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-VII. 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:

1) OVERALL PLANNING, MONITORING & CONTROL

2) MATERIALS MANAGEMENT

3) CONDENSER & AUXILIRIES

4) TURBINE & AUXILIARIES.

5) GENERATOR & AUXILIARIES.

6) PUMPS & AUXILIARIES.

7) PIPING.

8) QUALITY CONTROL AND QUALITY ASSURANCE

9) SAFETY, FIRE & SECURITY

10) INDUSTRIAL RELATIONS AND FULFILMENT OF LABOUR LAWS AND OTHER STATUTORY OBLIGATIONS.

SECTION-7
SPECIAL CONDITION 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 IN THIS TENDER SPECIFICATION.

7.1.4 TEST MATERIALS (PLATES & PIPES)

BHEL WILL PROVIDE SUITABLE PLATES AND PIPES FREE OF COST ONLY FOR SITE TEST OF WELDERS INCLUDING IBR WELDERS BEFORE THEIR DEPLOYMENT. HOWEVER, ALL DESTRUCTIVE AND NON-DESTRUCTIVE EXAMINATIONS OF TEST BLANKS / PIECES SHALL BE IN THE SCOPE OF CONTRACTOR. RESPONSIBILITIES WITH REGARD TO DEPLOYMENT OF IBR WELDERS AND MEETING THE STIPULATIONS SHALL BE THE RESPONSIBILITY OF CONTRACTOR.

7.2 FILLER WIRE FOR TIG WELDING

ALL FILLER WIRES SHALL BE ARRANGED BY THE CONTRACTOR. PLEASE REFER SECTION-5 IN THIS REGARD.

7.3 EQUIPMENTS – TOOLS & PLANTS

BHEL WILL MAKE AVAILABLE ONLY THOSE T&P'S THAT ARE LISTED IN **APPENDIX-III** FREE OF CHARGE. OTHER REQUIRED T&P'S SHALL BE ARRANGED BY THE CONTRACTOR. FURTHER DETAILS ARE AS UNDER:

7.3.3

BHEL WILL MAKE AVAILABLE ON SHAREABLE BASIS, FREE OF HIRE CHARGE, SERVICES OF EQUIPMENTS & T&P INDICATED IN **APPENDIX-III**. AS MOST OF THE EQUIPMENTS WILL BE IN THE CUSTODY OF BHEL AND HAVE TO BE SHARED AMONG OTHER CONTRACTORS, THE REQUIREMENTS SHALL BE INDICATED TO BHEL SUFFICIENTLY IN ADVANCE AND FINALISE ALLOTMENT OF THE SAME. IT MAY BE NOTED THAT THE CONTRACTOR HAS TO DEPLOY ALL NECESSARY TOOLS & PLANTS TO SUIT THE ACTIVITY SCHEDULES GIVEN BY BHEL/ CUSTOMER. T&P BEING SUPPLIED BY BHEL ARE ONLY TO SUPPLEMENT THE RESOURCES DEPLOYED BY THE CONTRACTOR.

7.3.3

EOT CRANE OF CUSTOMER WILL BE PROVIDED FREE OF CHARGE FOR ACTIVITIES OF HANDLING & ERECTION WITHIN TG HALL. PORTAL GANTRY CRANE WILL BE PROVIDED FOR HANDLING AND LIFTING OF GENERATOR STATOR BY BHEL.

EOT CRANE IN TG HALL WILL BE ISSUED ON NEED BASIS AND IS TO BE SHARED WITH OTHER CONTRACTORS. QUALIFIED & EXPERIENCED OPERATORS ARE TO BE PROVIDED BY THE CONTRACTOR ON FULL TIME BASIS. CARRYING OUT ROUTINE MAINTENANCE / SERVICING , PROVIDING MANPOWER, TOOL & TACKLES FOR ANY REPAIR / RECTIFICATION OF THE CRANES IS ALSO IN THE SCOPE OF THE CONTRACTOR. THE QUOTED RATES SHALL BE INCLUSIVE OF THE ABOVE.

7.3.3

ALL ARRANGEMENTS, INCLUDING PROVIDING & LAYING OF SLEEPER BEDS, BACKFILLING OF APPROACHES WHEREVER NECESSARY FOR SAFE MOVEMENT OF THE CRANES AS DIRECTED BY BHEL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. SLEEPERS FOR THIS PURPOSE SHALL BE PROVIDED BY THE CONTRACTOR.

7.4 OTHER T & P

7.4.1

THE RESPONSIBILITIES OF CONTRACTOR DEFINED ABOVE FOR BHEL CRANES (AS APPLICABLE) SHALL ALSO BE APPLICABLE, MUTATES-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 PACKAGES / DU / DESS NUMBERS IN VARIOUS PRODUCT GROUPS MAY BE ISSUED TO THE CONTRACTOR FREE OF CHARGES FOR SPECIFIC ACTIVITIES ONLY, AT THE DISCRETION OF BHEL. CONTRACTOR SHALL RETURN THEM IN GOOD WORKING CONDITION AFTER THE COMPLETION OF THE SPECIFIC ACTIVITY FOR WHICH THE TOOLS WERE SPARED.

7.4.3

ALL THE TOOLS AND PLANTS ISSUED TO CONTRACTOR WILL BE INSPECTED PERIODICALLY BY BHEL ENGINEER. IN CASE CONTRACTOR FAILS TO MAKE GOOD, THE DAMAGES CAUSED, BHEL WILL DO THE SAME AT CONTRACTOR'S COST. THE TOOLS AND TACKLES WILL BE ISSUED ONLY TO PERSONS NOMINATED BY THE CONTRACTOR.

7.4.4

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

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

7.5.1

ALL LUBRICANTS AND CHEMICALS REQUIRED FOR TESTING, CHEMICAL CLEANING, ACID CLEANING, OIL/CHEMICAL/GAS FLUSHING REQUIRED FOR TESTING, PRE-COMMISSIONING & COMMISSIONING UPTO TRIAL OPERATION OF EQUIPMENTS/UNIT WILL BE PROVIDED BY BHEL. CARBON-DIOXIDE AND HYDROGEN GAS FOR PURGING AND FILLING IN TURBO-GENERATOR WILL ALSO BE SUPPLIED BY BHEL. CONTRACTOR SHALL ARRANGE FOR TAKING DELIVERY AND LOADING OF ALL SUCH CONSUMABLES FROM BHEL/ CUSTOMER STORES/ YARD, TRANSPORTATION TO SITE OF WORK AND UNLOADING THEREON, FILLING IN THE SYSTEM AND RETURN THE USED LUBE OIL, BALANCE QUANTITY OF CONSUMABLES ETC, TO BHEL STORES DULY RECONCILED FOR QUANTITY.

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 CONDITIION 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 (Rev 01, 24/01/2009)
SPECIAL CONDITIONS OF CONTRACT

8.0 Inspection/Quality Assurance/Quality Control/ Statutory Inspection

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

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

The protocols between contractor and customer/ BHEL shall be made prior to installation for correctness of foundations, materials, procedures, at each stage of installation, generally as per the requirement of customer/ BHEL. This is necessary to ensure elimination of errors or keeping them within tolerable limits and to avoid accumulation and multiplication of errors.

8.3 A daily log book should be maintained by every supervisor/engineer of contractor on the job in duplicate (one for BHEL and one for contractor) for detailing and incorporating alignment/clearance / centering / leveling readings and inspection details of various equipments etc.

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

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

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

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

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

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

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

8.8

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

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

8.10 Re-work necessitated on account of use of invalid MMDs shall be entirely to the contractor's account. He shall be responsible to take all corrective actions, including resource augmentation if any, as specified by BHEL to make-up for the loss of time.

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

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

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

8.14 Stage Inspection By FES/QA Engineers

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

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

Statutory Inspection of Work

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

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

1) Inspectorate of steam boilers and smoke nuisance
2) Factory Inspector, Labour Commissioner, Electrical Inspector PF Commissioner and other authoritiy connected to this project work

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

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

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

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

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

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

8.22 The quality management system of BHEL, Power Sector – Western Region (PSWR) has already been certified and accredited under ISO 9002 standards in this regard. The basic philosophy of the quality management system is to define the organizational responsibility, work as per documented procedures, verify the output with respect to acceptance norms, identify the non-conforming product/ procedure and take corrective action for removal of non-conformance specifying the steps for avoiding recurrence of such non-conformities, & maintain the relevant quality records. The non-conformities are to be identified through the conduct of periodical audit of implementation of quality systems at various locations/stages of work. Suppliers/vendors of various products/services contributing in the work are also considered as part of the quality management system. .as such the contractor is expected not only to conform to the

quality management system of BHEL but also it is desirable that they themselves are accredited under any quality management system standard.

Field Quality Assurance

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

SECTION-9
SPECIAL CONDITIONS OF CONTRACT

SAFETY, OCCUPATIONAL HEALTH AND ENVIRONMENTAL MANAGEMENT

Introduction:-

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

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

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

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

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

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

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

9.2 SPECIAL CONDITIONS

9.2.1 Safety

9.2.1.1 Safety Plan

Before commencing the work, contractor shall submit a "safety plan" to the 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 <u>Emergency Response</u>

9.2.1.15.1

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.

9.2.1.15.2

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 <u>TRAINING & AWARENESS</u>

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

Sl no	**Equipment**	**Scope of inspection**	**Inspection by**	**Schedule**
1	Hand tools	To identify unsafe/defective tool	User	Daily
2	Power tools	To identify unsafe/defective tool	User	Daily
3	Fire Extinguishers	To check pressure and any defect	User / Safety Coordinator	Daily Every month
4	Lifting equipment/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 Norm**	**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

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

Memorandum of Understanding

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

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

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

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

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

Name :

Place & Date:

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

IS No	YEAR	Amd upto	DESCRIPTION
IS 10204	1982		PORTABLE FIRE EXTINGUISHERS MECHANICAL FOAM TYPE
IS 10245	1994		SPECIFICATION FOR BREATHING APPARATUS
IS 10291	1982		SAFETY CODE FOR DRESS DRIVERS IN CIVIL ENGINEERING WORKS
IS 10658	1983		HIGHER CAPACITY DRY POWDER FIRE EXTINGUISHERS (TROLLEY MOUNTED)
IS 10662	1992		COLOUR TELEVISION
IS 10667	1983		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR PROTECTION OF FOOT AND LEG
IS 11037	1984		ELECTRONIC FAN REGULATORS
IS 11057	1984		INDUSTRIAL SAFETY NETS
IS 11451	1998		RECOMMENDATION FOR SAFETY AND HEALTH REQUIREMENT RELATING TO OCCUPATION EXPOSURE TO ASBESTOS
IS 1169	1967		PEDESTAL FANS
IS 1179	1967		SPECIFICATION FOR EQUIPMENT FOR EYE AND FACE PROTECTION DURING WELDING
IS 11833	1986		DRY POWDER FIRE EXTINGUISHERS FOR METAL FIRES
IS 11972	1987		CODE OF PRACTICE FOR SAFETY PRECAUTION TO BE TAKEN WHEN ENTERING A 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 No	YEAR	Amd upto	DESCRIPTION
IS 13416	1992		RECOMMENDATIONS FOR PREVENTIVE MEASURES AGAINST HAZARDS AT WORKING PLACE PART 1 TO PART 5
IS 13430	1992		CODE OF PRACTICE FOR SAFETY DURING ADDITIONAL CONSTRUCTION AND ALTERATION TO EXISTING BUILDINGS
IS 13849	1993		PORTABLE FIRE EXTINGUISHERS DRY POWDER TYPE (CONSTANT PRESSURE)
IS 1446	1985		CLASSIFICATION OF DANGEROUS GOODS (FIRST REVISION)
IS 1476	1979		REFRIGERATORS
IS 1641	1988		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): GENERAL PRINCIPLES OF FIRE GRADING AND CLASSIFICATION
IS 1642	1989		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS- DETAILS OF CONSTRUCTION
IS 1643	1988		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): EXPOSURE HAZARD
IS 1646	1997		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): ELECTRICAL INSTALLATIONS
IS 1904	1986		CODE OF PRACTICE FOR DESIGN AND CONSTRUCTION OF FOUNDATIONS IN SOIL
IS 1905	1987		STRUCTURAL SAFETY OF BUILDINGS MASONARY WALLS
IS 2082	1985		ELECTRICAL GEYSERS
IS 2171	1985		PORTABLE FIRE EXTINGUISHERS DRY POWDER TYPE (CARTRIDGE)
IS 2309	1989		PRACTICE FOR THE PROTECTION OF BUILDINGS AND ALLIED BUILDINGS AGAINST LIGHTENING
IS 2312	1967		EXHAUST FANS
IS 2361	1994		SPECIFICATION FOR BUILDING GRIPS – FIRST REVISION
IS 2418	1977		TUBULAR FLUORSCENT LAMPS IS 2418 (FT-1)
IS 2750	1964		STEEL SCAFFOLDINGS
IS 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

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

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

IS No	YEAR	Amd upto	DESCRIPTION
			SLINGS
IS 996	1979		SINGLE PHASE ELECTRIC MOTORS
ISO 3873	1977		SAFETY HELMET

SECTION-10

SPECIAL CONDITIONS OF CONTRACT

10.0 DRAWINGS AND DOCUMENTS

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

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

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

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

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

SECTION-11

SPECIAL CONDITIONS OF CONTRACT

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

11.1 MOBILIZATION, TIME SCHEDULE, CONTRACT PERIOD AND GRACE PERIOD

11.1.1

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.

BASED ON THE AVAILABILITY OF CIVIL FOUNDATIONS FROM CUSTOMER AND MATERIALS FROM MANUFACTURING UNITS CONTRACTOR MAY HAVE TO ADVANCE THE START OF ERECTION AFTER GETTING CLEARANCE FROM CONSTRUCTION MANAGER.

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

ACTIVITY	SCHEDULE UNIT-5	SCHEDULE UNIT-6
CONDENSOR ERECTION START	16-09-2010	16-01-2011
TURBINE BOX UP	17-10-2011	17-02-2012
COMPLETION OF OIL FLUSHING	17-12-2011	17-04-2012
BARRING GEAR	11-01-2012	11-05-2012
SYNCHRONISATION & COAL FIRING	17-02-2012	17-06-2012
TRIAL OPERATION COMPLETION	27-04-2012	27-08-2012
COMPLETION OF ALL FACILITIES	27-05-2012	27-09-2012

THERE IS A GAP OF 4 MONTHS BETWEEN UNIT-5 & 6.

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 ON THE INSTRUCTIONS OF BHEL.

11.1.4

START OF CONTRACT PERIOD AND DURATION.

THE TOTAL CONTRACT PERIOD FOR COMPLETION OF ENTIRE WORK SHALL BE **29 (TWENTY NINE)** MONTHS FROM THE START OF ERECTION. ERECTION OF THE FIRST EQUIPMENT OR, MAJOR COMPONENT / SET OF COMPONENTS OF A LARGE EQUIPMENT, AS IDENTIFIED BY BHEL SITE-IN-CHARGE, ON ITS PERMANENT LOCATION/ FOUNDATION SHALL BE RECKONED AS THE START OF CONTRACT PERIOD. SMALL COMPONENTS LIKE PACKER PLATES, INSERT PLATES, ANCHORS ETC. WILL NOT BE CONSIDERED FOR THIS PURPOSE.

HOWEVER THE CONTRACTOR SHALL HAVE TO MOBILIZE HIS RESOURCES EARLIER THAN THE START OF CONTRACT PERIOD FOR PREPARATORY WORK LIKE TAKING OVER AND CHIPPING OF FOUNDATIONS, BLUE-MATCHING AND GROUTING OF PACKER PLATES ETC.

THE CONTRACTOR SHALL COMPLETE ALL THE WORKS IN THE SCOPE OF THIS CONTRACT WITHIN THE CONTRACT PERIOD. PENDING POINTS IDENTIFIED BY THE CUSTOMER/BHEL DURING THE EXECUTION OF THE CONTRACT ARE TO BE LIQUIDATED DURING THE CONTRACT PERIOD ITSELF.

11.1.5

GRACE PERIOD

NO GRACE PERIOD IS ALLOWED BEYOND THE CONTRACT PERIOD.

11.2 PROGRESS MONITORING, CONTRACT EXTENSION AND OVERRUN

SHALL BE AS PER GCC (GENERAL CONDITIONS OF CONTRACT) cl no: 2.9 (page 24 of 43) OF THIS TENDER

11.3 CONTRACT EXTENSION

SHALL BE AS PER GCC (GENERAL CONDITIONS OF CONTRACT) cl no: 2.11 (page 25 of 43) OF THIS TENDER

11.4 OVERRUN COMPENSATION

SHALL BE AS PER GCC (GENERAL CONDITIONS OF CONTRACT) cl no: 2.12 (page 25 & 26 of 43) OF THIS TENDER.

11.5 PRICE VARIATION (PVC)

PVC SHALL BE APPLICABEL TO THIS CONTRCAT AS PER PVC CL -2,17 OF GCC (GENERAL CONDITIONS OF CONTRACT)

11.6 CONTRACT VARIATIONS

SHALL BE AS PER GCC (GENERAL CONDITIONS OF CONTRACT) cl no: 2.14 (page 27 of 43) OF THIS TENDER

11.7 INTEREST BEARING RECOVERABLE ADVANCE

SHALL BE AS PER GCC (GENERAL CONDITIONS OF CONTRACT) cl no: 2.13 (page 28 of 43 OF THIS TENDER

11.8 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.

11.9 Liquidated damages (L D)

L D shall be applicable as per General Terms & Conditions (GCC) of contract CL NO 2.7.9 (Page 21 of 43).

11.10 EXTRA WORK

SHALL BE AS PER GCC (GENERAL CONDITIONS OF CONTRACT) cl no: 2.15 (page 27-28 of 43 OF THIS TENDER

SECTION-12

SPECIAL CONDITIONS OF CONTRACT

12.0 Terms of Payment

12.0.1
The contractor should submit his monthly on account bills with all the details required by BHEL on specified date every month covering progress of work in all respects and areas from the 25 of previous calendar month to 24th of the current month.

12.0.2
GCC (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 released as specified in GCC (Refer Cl no : 2.22 Page 32 of 43)

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 PAYMENT

RATE SCHEDULE FOR TG AND AUX PACKAGE

S N	DESCRIPTION	% TAGE
1.00	**CONDENSER (14.50%)**	
1.01	Preparation of foundation	1.00%
1.02	Placement, Alignment, Assembly and welding of bottom plate segments, Hot well with NDT and placement of Spring elements	2.00%
1.03	Assembly and positioning of water chambers, water boxes, side plates, bottom plates, welding and NDT	1.50%
1.04	Erection, Alignment and welding & NDT of tube support plates and internals like Baffle plates, Air evacuation pipes etc	1.50%
1.05	Assembly, welding and NDT of dome walls and stiffeners, extraction piping and steam throw device, LPH1, supports etc	1.50%
1.06	Insertion, expansion, end milling of Condenser tubes	3.00%
1.07	Hydaulic test of Steam and Water side	1.00%
1.08	Welding and NDT of Condenser neck joint and completion of balance works on condenser	2.00%
1.09	Erection of Condenser water box handling system	1.00%
	SUB TOTAL - 1	**14.50%**
2.00	**TURBINE (19.00%)**	
2.01	Matching, leveling, alignment of base plates and bearing pedestals	1.50%
2.02	Grouting of pedestais and base plate	1.00%
2.03	Placement and alignment of LP outer casing bottom half of LP cylinder and Centre guide keys	1.00%
2.04	Placement of LP rotor and alignment with inner casing and checking of blade clearance	1.00%
2.05	Assembly, alignment and welding of LP outer casing upper half	1.00%
2.06	Placement and alignment of IP Turbine outer casing and inner casing bottom half of IP cylinder	0.50%
2.07	Placement and alignment of IP rotor with lower casing and boxing up of inner & outer casing (Upper halves)	1.50%
2.08	Boxing up of LP inner - inner and inner - outer and roll check	1.00%
2.09	Placement of H.P. Turbine, lowering of HP rotor on bearings and checking of clearance, coupling etc	1.00%
2.1	Alignment of HP/IP/LP rotor	1.00%
2.11	Reaming and coupling of HP/IP/LP rotor	1.50%
2.12	Assembly of regulation system	1.00%
2.13	Erection, Alignment and welding of Cross around piping	1.00%
2.14	Installation of IVs, ESVs, LPBP valves, MS & HRH strainers (internals)	1.00%
2.15	Final box up of LP Turbine	1.00%
2.16	Completion of Turbovisory works	1.00%
2.17	Final boxing up of bearing pedestals after oil flushing completion	1.00%
2.18	Erection of extraction piping inside the condenser	1.00%

	SUB TOTAL - 2	**19.00%**
S N	**DESCRIPTION**	**% TAGE**
3.00	**GENERATOR (14.50%)**	
3.01	Checking and preparation of foundation, placement of foundation plate	1.00%
3.02	Grouting of foundation plates	1.00%
3.03	Erection and testing of Portal crane for stator lifting and dismantling of portal crane after stator lifting	1.00%
3.04	Unloading of Gen stator from Railway wagon, shifting and placing on foundation	2.00%
3.05	Fixing of bushings	1.00%
3.06	Leveling and alignment of stator	1.00%
3.07	Generator rotor insertion	1.00%
3.05	Box up of Generator and assembly of Hydrogen seals	1.00%
3.07	Alignment of generator rotor with LP rotor	1.00%
3.08	Coupling reaming and honing	1.00%
3.09	Preparation of Exciter set foundation and grouting	1.00%
3.1	Erection of Excitation equipment and alignment of Generator - Exciter rotors including swing check	1.00%
3.11	Excitation system completion	0.50%
3.12	Final Gas tightness test of stator with complete system	1.00%
	SUB TOTAL - 3	**14.50%**
4.00	**CONDENSATE EXTRACTION PUMPS (1.50%)**	
4.01	Preparation of foundation and placement of canister	0.50%
4.02	Placement of pump and motor	0.50%
4.03	Alignment of coupling	0.50%
	SUB TOTAL - 4	**1.50%**
5.00	**PIPING (9.00%)**	
5.01	Turbine lub oil piping, jacking oil piping	1.00%
5.02	Genrator seal oil piping	1.00%
5.03	Turbine water and Steam drainage piping	1.00%
5.04	Extraction piping	1.00%
5.05	Steam Evacuation piping (HPT exhaust)	0.50%
5.06	Gland Steam Sealing system piping for Turbine,	0.50%
5.07	Gland sealing of valves and pumps	0.50%
5.08	Control oil piping for ESV, IV, LPBP valves, NRV	1.00%
5.09	Desuperheater for wet steam washing, debris filter with associated piping	1.00%
5.1	Condensate spray piping and air evacuation piping	0.50%
5.11	Generator Primary water piping	1.00%
	SUB TOTAL - 5	**9.00%**

S N	DESCRIPTION	% TAGE
6.00	**OTHER SYSTEMS (12.50%)**	
6.01	Generator gas system with all equipments and fittings	1.00%
6.02	Erection of Central lube oil system (pumps, tanks, strainers and piping etc) with associated fittings	1.00%
6.03	Erection of lube oil pumps (AOP,EOP,JOP etc), Main oil tank and oil coolers	1.00%
6.04	Erection of Control fluid tank, CF coolers, CF pumps, purification unit etc	1.00%
6.05	Erection of Vacuum pumps and piping	1.00%
6.06	Erection of seal oil, Primary water and gas system units / racks / equipments	1.00%
6.07	Erection of gland steam condenser, drain cooler with fittings	0.50%
6.08	Erection of Boiler fill pump and Condensate transfer pumps with fittings	0.50%
6.09	Erection of HP / LP By Pass system with all equipment, piping and fittings	1.00%
6.10	Erection of Flash tanks and connection to incoming pipes	1.00%
6.11	Insulation of all equipments, piping etc except spray insulation	2.00%
6.12	Electric wire rope hoists and chain pulley blocks with traveling trolley	0.50%
6.13	Final painting of all equipments and system covered in the scope	1.00%
	SUB TOTAL - 6	**12.50%**
7.00	**HP/LP HEATERS AND DEAERATOR (4.00%)**	
7.01	Placement of HP Heaters	1.00%
7.02	Placement of LP Heaters	0.50%
7.03	Lifting and placement of Deaerator and Feed Storage Tank with fittings and associated platform	2.00%
7.04	Welding of FST shells	0.50%
	SUB TOTAL - 7	**4.00%**
8.00	**POWER CYCLE PUMPS (BOILER FEED PUMPS) (7.00%)**	
8.01	**Motor driven Boiler Feed Pump - 1 No**	
	a) Foundation chipping, blue matching of foundation and levelling, centring of grillage / foundation frame and bolt grouting	0.50%
	b) Placement of Feed pumps, Booster pump, motor, Hydraulic coupling and preliminary alignment	0.50%
	c) Grouting of grillage / foundation and final alignment of BFP, BP, Motor and HC	0.50%
	d) Erection of lub oil piping and other balance piping like mechanical seal etc, erection of panel / rack and oil flushing of oil piping	0.50%
8.02	**Turbine driven Boiler Feed Pump - 2 Nos**	
	a) Foundation chipping, blue matching of foundation and levelling, centring of grillage / foundation frame and bolt grouting	1.00%
	b) Placement of Turbine, Feed & Booster pump, Gear box and preliminary alignment	1.00%
	c) Grouting of grillage/foundation and alignment of Turbine, Gear box, BFP & BP	1.00%
	d) Erection of lub oil piping, jacking oil piping, Governing oil piping, Governing oil console, Oil tanks, oil pumps, oil purification units, coolers and other equipments, acid cleaning, oil flushing of pipelines	1.00%
	e) Erection of gland steam piping, drainage & cooling water piping, sealing lines etc	1.00%

	SUB TOTAL - 8	**7.00%**
S N	**DESCRIPTION**	**% TAGE**
9.00	**ON LINE CONDENSER TUBE CLEANING SYSTEM (1.00%)**	
9.01	Erection of condenser on line Tube cleaning system	1.00%
	SUB TOTAL - 9	**1.00%**
10.00	**CIRCULATING WATER SYSTEM (5.00%)**	
10.01	Piping for cycle make up system	1.00%
10.02	Installation of Cooling water piping at inlet and outlet of Condenser upto terminal point	2.00%
10.03	Installation of R E joints	1.00%
10.04	Installation of Butter fiy valves	1.00%
	SUB TOTAL - 10	**5.00%**
11.00	**EQUIPMENT COOLING WATER SYSTEM (3.50%)**	
11.01	Installation of Auxiliary Circulating water pumps with drives	0.50%
11.02	Installation of DM cooling water pumps with drives	0.50%
11.03	Installation of plate type heat exchangers and self cleaning filters	0.50%
11.04	Installation of Alkali preparation tank, agitator and motor piping etc	0.50%
11.05	Installation of DM water overhead tank	0.50%
11.06	Installation of ECW pipes, fitting, supports and valves etc	1.00%
	SUB TOTAL - 11	**3.50%**
12.00	**CHEMICAL DOSING SYSTEM (0.50%)**	
12.01	Erection of chemical dosing system	0.50%
	SUB TOTAL - 12	**0.50%**
13.00	**COMMISSIONING (8.00%)**	
13.01	Oil Flushing	1.00%
13.02	Barring Gear	1.00%
13.03	Commissioning of condensate system	1.00%
13.04	Commissioning of Feed water system	1.00%
13.05	Synchronisation	2.00%
13.06	Trial Operation	2.00%
	SUBTOTAL - 13	**8.00%**
	GRAND TOTAL	**100.00%**

12.2 MEASUREMENT OF THE WORK COMPLETED

A) PAYMENT IS TO BE MADE ON THE BASIS OF PERCENTAGE, THE PERCENTAGE GIVEN IN THE BHEL DOCUMENT ONLY SHALL BE TAKEN IN TO CONSIDERATION.

B) SPARES, SURPLUS QUANTITY, ERECTION CONTINGENCY MATERIALS WILL NOT BE PAID.

C) 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.

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

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

F) NO PAYMENT WILL BE MADE FOR THE SPECIAL TOOLS OR TEST WEIGHTS ETC. USED FOR ERECTION & TESTING IN VARIOUS ACTIVITIES OF THIS WORK.

SECTION-13
SPECIAL CONDITIONS OF CONTRACT

13.0 EXTRA CHARGES FOR RECTIFICATION AND MODIFICATION

SHALL BE AS PER GCC (GENERAL CONDITIONS OF CONTRACT)) cl no -2,15 (Page no27-28 of 43) OF THIS TENDER

SECTION-14
SPECIAL CONDITIONS OF CONTRACT

14.0 INSURANCE

SHALL BE AS PER GCC (GENERAL CONDITIONS OF CONTRACT) cl no -2,18 (Page no-30 & 31) OF THIS TENDER

SECTION-15
SPECIAL CONDITION OF CONTRACT

15.0 EARNEST MONEY DEPOSIT, SECURITY DEPOSIT & BANK GUARANTEE

EARNEST MONEY DEPOSIT(EMD) : *EMD of this tender is* ***RS.2,00,000/- (Rupees Two lakh only)*** *. EMD shall be deposited by bidder along with their offer as a part of technical bid as per Cl no : 1.9 (Page 11of 43) of General Terms & conditions of Contract (GCC) of this tender.*

Security Deposit & Bank Guarantee *:* SHALL BE AS PER GCC (GENERAL CONDITIONS OF CONTRACT) cl no -1.10,1.11 & 1.12 (Page no-12-12 0f 43) OF THIS TENDER

SECTION 16
SUSPENSION OF BUSINESS DEALING WITH CONTRACTORS

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

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

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

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

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

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

SECTION-17

IMPLEMENTION OF INTEGETY PACT IN BHEL

NOT APPLICABEL FOR THIS TENDER

SECTION 18
REVERSE AUCTION PROCEDURE (Dtd 08/04/2010)

Business Rules, Terms & Conditions of Online Reverse Auction for the procurement of:

COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE ; ERECTION ,TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF TURBINE AND GENERATOR SET AND ITS AUXILIARIES, HP/LP HEATER AND DEAERATOR, INSULATION AND FINAL PAINTING ETC OF 2X500 MW UNIT 5 & 6. AT**NATIONAL THERMAL POWER CORPORATION LIMTED,RIHAND SUPER THERMAL POWER PROJECT, STAGE- III (2X500MW), AND NAGAR, DIST.SONEBHADRA (UTTARPRADESH)**

TENDER SPECIFICATION NO: BHE/PW/PUR/RIT-STG/739

BUYER'S NAME	BHARAT HEAVY ELECTRICALS LIMITED POWER SECTOR – WESTERN REGION
AUCTION TO BE CONDUCTED BY	**M/s. e-Procurement Technologies Ltd. (abcprocure)** B-705, Wall Street-II, Opp. Orient Club, Nr. Gujarat College, Ellis Bridge, Ahmedabad – 380 006, Gujarat, India. Ph. Nos. : +91 79 – 4001 6860 / 861 / 863 / 864 / 866 / 874 / 875 / 877 / 878 / 880 / 882 Fax No. : +91 79 – 4001 6876 / 816 **Auction Website: https://bhel.abcprocure.com**
DATE & TIME OF AUCTION	Auction Date : **(Shall be informed later)** *Online Sealed Bid Time* : ***(Shall be informed later)*** Online Reverse Auction Time :**(Shall be informed later)**)
DOCUMENTS ATTACHED	1) Business rules for reverse auction 2) Terms & conditions of reverse auction 3) Process Compliance Statement (Annexure II) 4) Final Price Confirmation (Annexure III) 5) Contact Information

BUSINESS RULES FOR REVERSE AUCTION

GENERAL TERMS AND CONDITIONS OF REVERSE AUCTION

Against this Enquiry for the subject item/system with detailed scope of supply as per our specification, BHEL-PSWR may resort to "ONLINE REVERSE AUCTION PROCEDURE" i.e. **ONLINE BIDDING on INTERNET.**

1. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
2. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on Internet.
3. BHEL will inform the vendor in writing in case reverse auction, the details of service provider to enable them to contact and get trained.
4. Business rules like event date, time, start price, bid decrement, extensions, etc. also will be communicated through service provider for compliance.
5. Vendors have to email a scanned copy of the Process Compliance Form (**Annexure II**) in the prescribed (provided by service provider) before start of Online Initial Sealed Bid. Without this form, the vendor will not be eligible to participate in the event.
6. ~~BHEL will provide the calculation sheet (e.g.: EXCEL sheet), if any, which will help to arrive at "Total Cost to BHEL" like packing & forwarding charges, Taxes and duties, Freight charges, Insurance, Service tax for services and loading factors (for non-compliance to BHEL standard Commercial terms and conditions.) for each the vendor to enable them to fill-in the price and keep it ready for keying in during the auction.~~
7. Reverse auction will be conducted on schedule date & time.
8. At the end of reverse auction event, the lowest bidder value will be known on the network.
9. The lowest bidder has to email a scanned copy of the price break-up & confirmation duly signed filled-in prescribed format (as per BHEL's price excel sheet) as provided on case-to-case basis to BHEL through service provider within 24 hours of the reverse auction without fail.
10. Any variation between the on-line bid value and sealed price bid will be considered as sabotaging the tender process and will invite disqualification of vender to conduct business with BHEL as per prevailing procedure.
11. In case BHEL decides not to go for Reverse auction procedure for this tender enquiry, the price bids and price impacts, if any already submitted and available with BHEL shall be opened as per procedures mentioned in the tender specifications.
12. Only those vendors, who participate in the Online Initial Sealed Bid, will be eligible to participate in the subsequent Online English Reverse Auction.
13. **The reverse auction will be treated as closed only when the bidding process gets closed in all respects for the item listed in the tender.**

Business Rules for finalization of the procurement

BHEL shall finalise the procurement of the item against this Tender through reverse auction mode. BHEL has made arrangement with **M/s. e-Procurement Technologies Ltd., Ahmedabad**, who shall be BHEL's authorized service provider for the same. Please go through the guidelines given below and submit your acceptance to the same along with your Commercial Bid.

1. Computerized reverse auction shall be conducted by BHEL, on pre-specified date, while the vendors shall be quoting from their own offices/ place of their choice. Internet connectivity shall have to be ensured by vendors themselves. In extreme case of failure of Internet connectivity, (due to any reason whatsoever may be) it is the bidders' responsibility / decision to send fax communication immediately to M/s. e-Procurement Technologies Ltd., Ahmedabad. Furnishing the price the bidder wants to bid online with a request to the service provider to upload the faxed price on line so that the service provider will up load that price on line on behalf of the Bidder. It shall be noted clearly that the concerned bidder communicating this price to service provider has to solely ensure that the fax message is received by the service provider in a readable / legible form and also the Bidder should simultaneously check up with service provider about the clear receipt of the price faxed. It shall also be clearly understood that the bidder shall be at liberty to send such fax communications of prices to be up loaded by the service provider only within the closure of Bid time and under no circumstance it shall be allowed beyond the closure of Bid time / reverse auction. It shall also be noted that the service provider should be given a reasonable required time by the bidders, to upload such prices online and if such required time is not available at the disposal of the Service provider at the time of receipt of the fax message from the bidders, the service provider will not be uploading the prices and either BHEL or the service provider are not responsible for this unforeseen circumstances. In order to ward-off such contingent situation bidders are requested to make all the necessary arrangements/ alternatives whatever required so that they are able to circumvent such situation and still be able to participate in the reverse auction successfully. Failure of power at the premises of vendors during the Reverse auction cannot be the cause for not participating in the reverse auction. On account of this, the time for the auction cannot be extended and neither BHEL nor M/s. e-Procurement Technologies Ltd., Ahmedabad is responsible for such eventualities.

2. e-Procurement Technologies Ltd. shall arrange to train your nominated person (s), without any cost to you. They shall also explain you, all the Rules related to the Reverse Auction / Business Rules Document to be adopted along with bid manual. You are required to give your compliance on it before start of bid process.

3. **MATERIAL FOR BID**: Scope of Work as detailed in Tender Specification No: **BHE/PW/PUR/RIT-STG/739**

4.

5. **Starting Bid/Bid Decrement:** The opening price of the RA and the bid decrement value can be viewed by the bidders on the bidding screen.

6. **BIDDING CURRENCY AND UNIT OF MEASUREMENT:** Bidding and evaluation will be conducted in **Indian Rupees (INR)** of the item. The price bid placed during the "Sealed Bid Auction" as well as "Reverse Auction" shall be the total amount for the entire Scope of Work as mentioned in Price Bid Specification of Tender Specification No **BHE/PW/PUR/ RIT-STG/739**

7.

8. **BID PRICE**: The Bidder has to quote the Total Cost to BHEL for the entire Scope of work. Calculation sheet to arrive at the Total Cost to BHEL will be provided by BHEL if required.

9. The technical & commercial terms are as per BHEL Tender Specification No **BHE/PW/PUR/ RIT-STG/739** Vendors technical and commercial bid and subsequent correspondences between BHEL and the vendors regarding commercial terms & conditions.

10. **VALIDITY OF BIDS**: The Bid price shall be firm for a period mentioned in the subject tender and shall not be subjected to any change whatsoever.

11. At the end of the reverse auction, bidder has to provide a detailed price break-up & price confirmation for his lowest offer, as per the Annexure III format, within 24 hours of the reverse auction.

12. Procedure of Reverse Auctioning:

i. **Online Initial Sealed Bid:** The opening bid (In the initial auction) of the bidders shall place a bid which shall be same as that quoted in their Final Sealed price submitted to BHEL or lesser. The bidders shall confirm in writing to BHEL that their opening bid shall be same as that quoted in their final sealed price bid submitted against Tender Specification No **BHE/PW/PUR/RIT-STG/739**. If it is found to be otherwise at a later date, the bidder will be disqualified from the tender.

ii. **Online English Reverse (no ties) Auction {Reverse Auction}**: BHEL will declare its **Opening Price** (**OP**), which shall be visible to the all vendors during the start of the reverse Auction. You will be required to start bidding after announcement of Opening Price and decrement amount. Also, please note that the start price of an item in online reverse auction is open to all the participating bidders. Any bidder can start bidding, in the online reverse auction, from the start price itself. If the start price is your own price, you still need to bid in the online reverse auction. Also, please note that the first online bid that comes in the system during the online reverse auction can be equal to the auction's start price, or lesser than the auction's start price by one decrement, or lesser than the auction's start price by multiples of decrement. The second online bid and onwards will have to be lesser than the L1 rate by one decrement value, or lesser than the L1 rate by multiples of the decrement value.

iii. The vendor's who have participated in the Initial Sealed Bid Auction will only be eligible to participate in the subsequent English Reverse Auction.

iv. Online Initial Sealed Bid will be for **30 minutes** and Online English Reverse (no ties) Auction shall be for a **period of one hour**. If a bidder places a bid in the last 10 minutes of closing of the Reverse Auction and if that bid gets accepted, then the auction's duration

shall get extended automatically for another 10 minutes, for the entire auction, from the time that bid comes in. Please note that the auto-extension will take place only if a bid comes in those last 10 minutes and if that bid gets accepted. If the bid does not get accepted, the auto-extension will not take place even if that bid might have come in the last 10 minutes. In case, there is no bid in the last 10 minutes of closing of Reverse Auction, the auction shall get closed automatically without any extension. However, vendors are advised not to wait till the last minute or last few seconds to enter their bid during the auto-extension period to avoid complications related with internet connectivity, network problems, system crash down, power failure, etc.

v. The bid decrement amount shall be specified by BHEL before start of bidding.

~~vi. Any commercial loading shall be intimated to bidders in advance and it shall be added to price during dynamic auction process. For evaluation purpose, commercial loading if any, shall be added to the quoted price of respective bidder. However for ordering only the final bid placed by you shall be considered.~~

~~vii. After the completion of English Reverse (no ties), the **Closing Price** (**CP**) shall be available. In case, any commercial loading was made to L1 bidder's price, it shall be de-loaded from the closing price of L1 bidder (**CP**) for further processing.~~

viii. The ratio of CP and originally quoted price shall be applied on all elements of originally quoted prices to arrive at the final price break up.

13. Successful vendor shall be required to submit the final prices, quoted during the English Reverse (no ties) in the **Annexure III Format** after the completion of Auction to BHEL, duly signed and stamped as token of acceptance without any new condition other than those already agreed to before start of auction.

14. During the Online English Reverse (No Ties) Auction, if no bid is received in the auction system/website within the specified time duration of the reverse auction, then **BHEL**, at its discretion, may decide to revise the auction's Opening Price / scrap the online reverse auction process / proceed with the conventional mode of tendering (opening of the hard copy final bids submitted by you earlier to BHEL).

15. Your bid will be taken as an offer to supply. Bids once made by you, cannot be cancelled / withdrawn and you shall be bound to supply as mentioned above at your final bid price. **Should you back out and not supply as per the rates quoted, BHEL shall take action as appropriate**.

16. You shall be assigned a **Unique User Name** & **Password** by BHEL (or) e-Procurement Technologies Ltd. **You are advised to change the Password** and edit the information in the Registration Page after the receipt of initial Password from BHEL / e-Procurement Technologies Ltd. to ensure confidentiality. All bids made from the Login ID given to you will be deemed to have been made by your company.

17. You will be able to view the following on your screen along with the necessary fields in the English Reverse (no ties) {Reverse Auction}:
    a. Leading Bid in the Auction (only total price)
    b. Bid Placed by you
    c. Your Own Rank
    d. Opening Price & Bid Decrement value.

18. At the end of the Reverse Auction, BHEL will decide upon the winner. BHEL's decision on award of Contract shall be final and binding on all the Bidders.

19. BHEL shall be at liberty to cancel the reverse auction process / tender at any time, before ordering, without assigning any reason.

20. BHEL shall not have any liability to bidders for any interruption or delay in access to the site irrespective of the cause.

21. Other terms and conditions shall be as per your techno-commercial offers and other correspondences till date.

22. You are required to submit your acceptance (Process Compliance Form - Annexure II) to the terms/ conditions/ modality given above before participating in the reverse auction.

Terms & Conditions of Reverse Auction

1. **LOG IN NAME & PASSWORD:** Each Bidder is assigned a Unique User Name & Password by e-Procurement Technologies Ltd. The Bidders are requested to change the Password and edit the information in the Registration Page after the receipt of initial Password from e-Procurement Technologies Ltd., Ahmedabad. All bids made from the Login ID given to the bidder will be deemed to have been made by the bidder.

2. **BIDS PLACED BY BIDDER:** The bid of the bidder will be taken to be an offer to execute the work. Bids once made by the bidder cannot be cancelled. The bidder is bound to execute the work the as mentioned above at the price that they bid. Should any bidder back out and not make the supplies at per the rates quoted, BHEL and / or e-Procurement Technologies Ltd., Ahmedabad shall take action as appropriate.

3. **LOWEST BID OF A BIDDER:** In case the bidder submits more than one bid, the lowest bid will be considered as the bidder's final offer to execute the work.

4. **AUCTION TYPE:** 1). Online Initial Sealed Bid
   2). Online English Reverse (No Ties) Auction (refer Bidder Manual for details)

5. **DURATION OF AUCTION**: The duration of Auction will be for one hour. If a bidder places a bid in the last 10 minutes of closing of the Reverse Auction and if that bid gets accepted, then the auction's duration shall get extended automatically for another 10 minutes, for the entire auction, from the time that bid comes in. Please note that the auto-extension will take place only if a bid comes in those last 10 minutes and if that bid gets accepted. If the bid does not get accepted, the auto-extension will not take place even if that bid might have come in the last 10 minutes. In case, there is no bid in the last 10 minutes of closing of Reverse Auction, the auction shall get closed automatically without any extension. However, vendors are advised not to wait till the last minute or last few seconds to enter their bid during the auto-extension period to avoid complications related with internet connectivity, network problems, system crash down, power failure, etc. (THIS SCHEDULE IS TENTATIVE. IF ANY CHANGE IN SCHEDULE, THE SAME SHALL BE COMMUNICATED TO YOU)

6. **BID DECREMENT**: The minimum Bid decrement shall be available to the Bidders at the start of the auction. The bidder can view the same by clicking on the Item details at the start of the auction. The bidder can bid lower than the Lowest Bid in the auction by a decrement, multiple of the minimum Bid decrement or at least of minimum bid decrement plus multiples of Bid Decrement. Also, please note that the start price of an item in online reverse auction is open to all the participating bidders. Any bidder can start bidding, in the online reverse auction, from the start price itself. If the start price is your own price, you still need to bid in the online reverse auction. Also, please note that the first online bid that comes in the system during the online reverse auction can be equal to the auction's start price, or lesser than the auction's start price by one decrement, or lesser than the auction's start price by multiples of decrement. The second online bid and onwards will have to be lesser than the L1 rate by one decrement value, or lesser than the L1 rate by multiples of the decrement value.

7. **VISIBLITY TO BIDDER:** The Bidder shall be able to view the following on his screen along with the necessary fields during English Reverse –NO ties Auction:

   - Leading Bid in the Auction
   - Bid Placed by him
   - His Own Rank
   - Start Price & Bid Decrement Value

8. **AUCTION WINNER:** At the end of the Reverse Auction, BHEL will evaluate all the bids submitted and will decide upon the winner.

9. **PROXY BIDS**: Proxy bidding feature is a pro-supplier feature to safe guard the supplier's interest of any Internet failure or to avoid last minute rush. The Proxy feature allows Bidders to place an automated bid against other Bidders in an auction and bid without having to enter a new amount each time a competing Bidder submits a new offer.

The bid amount that a Bidder enters is the minimum that the Bidder is willing to offer. Here the software bids on behalf of the supplier.

- **The proxy amount is the minimum amount that the Bidder is willing to offer. During the course of bidding, the Bidder cannot delete or change the amount of a Proxy Bid.**

- **Bids are submitted in decrements (decreasing bid amounts). The application automates proxy bidding by processing proxy bids automatically, according to the decrement that the auction originator originally established when creating the auction, submitting offers to the next bid decrement each time a competing Bidder bids, regardless if competing bids are submitted as proxy or standard bids.**

- **This feature can be used only once during a particular Reverse Auction and only after the L1 rate is equal to or less than the minimum bid amount that the bidder has put in the system will he get the option to manually bid for the same. In no case during the bidding till the L1 rate or less is not reached as equivalent to the minimum bid amount offered by the bidder, will the bidder get the option to manually bid for the same.**

  GENERAL TERMS & CONDITIONS: Bidders are required to read the "Terms and Conditions" section of the auction website (https://bhel.abcprocure.com) using the Login IDs and passwords given to them.

10. **OTHER TERMS & CONDITIONS:**

- **The Bidder shall not involve himself or any of his representatives in Price manipulation of any kind directly or indirectly by communicating with other suppliers / bidders.**

- The Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party.

- BHEL's decision on award of Contract shall be final and binding on all the Bidders.

- BHEL along with e-Procurement Technologies Ltd., Ahmedabad can decide to extend, reschedule or cancel any Auction. Any changes made by BHEL and / or e-Procurement Technologies Ltd., after the first posting will have to be accepted if the Bidder continues to access the site after that time.

- e-Procurement Technologies Ltd., shall not have any liability to Bidders for any interruption or delay in access to the site irrespective of the cause.

- e-Procurement Technologies Ltd., is not responsible for any damages, including damages that result from, but are not limited to negligence.

- e-Procurement Technologies Ltd., will not be held responsible for consequential damages, including but not limited to systems problems, inability to use the system, loss of electronic information etc.

N.B.

- All the Bidders are required to submit the Agreement Form / Process Compliance Form **(Annexure - II)** duly signed to M/s e-Procurement Technologies Ltd., Ahmedabad before the due date (auction date). After the receipt of the Agreement Form, Login ID & Password shall be allotted to the suppliers (bidders).

- After the completion of the Auction event, all the Bidders have to submit the Price Break-up & confirmation as per the Annexure III format, within 24 hours of the reverse auction, to M/s e-Procurement Technologies Ltd., Ahmedabad for further proceedings.

ANNEXURE- I

The List of Items to be procured along with the Quantities and the Auction Start Time & Close Time is as follows:

DESCRIPTION OF WORK:

COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE ; ERECTION ,TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF TURBINE AND GENERATOR SET AND ITS AUXILIARIES, HP/LP HEATER AND DEAERATOR, INSULATION AND FINAL PAINTING ETC OF 2X500 MW UNIT 5 & 6. AT**NATIONAL THERMAL POWER CORPORATION LIMTED,RIHAND SUPER THERMAL POWER PROJECT, STAGE- III (2X500MW), AND NAGAR, DIST.SONEBHADRA (UTTARPRADESH)**

TENDER SPECIFICATION NO: BHE/PW/PUR/RIT-STG/739

Item	Quantity	Opening Prices in Rs	Bid Decrement in Rs	Opening Time	Closing Time
As Detailed IN subject tender	As Detailed IN subject tender	Would be displayed on the bidding screen	Would be displayed on the bidding screen	**Shall be informed later**	**Shall be informed later**

Annexure- II

Process Compliance Form

(The bidders are required to print this on their company's letterhead, sign & stamp before emailing a scanned copy)

To,
M/s. e-Procurement Technologies Ltd. (abcprocure)
B-705, Wall Street-II, Opp. Orient Club,
Nr. Gujarat College, Ellis Bridge,
Ahmedabad – 380 006, Gujarat, India.

Sub: Agreement to the Process related Terms and Conditions for the Reverse Auction

Dear Sir,

This has reference to the Terms & Conditions for the Reverse Auction mentioned in the Tender Specification No BHE/PW/PUR/RIT-STG/739

This letter is to confirm that:

1) The undersigned is authorized representative of the company.
2) We have studied the Commercial Terms and the Business rules governing the Reverse Auction as mentioned in your letter and confirm our agreement to them.
3) We also confirm that we have taken the training on the auction tool and have understood the functionality of the same thoroughly.
4) We also confirm that we will email a scanned copy or fax the Price Confirmation (Annexure-III) & break-up (as per Excel Sheet), if any, of our online quoted price, immediately after the completion of the Reverse Auction.
5) We, hereby, confirm that we will honor the Bids placed by us during the auction process.
6) We confirm that we have changed the password on the auction website after first log in.

With regards,

Signature with company seal
Name –
Company / Organization –
Designation within Company / Organization –
Address of Company / Organization –

- Scan & email this document to **abcprocure**.

Annexure III

Price Confirmation

(To be submitted by the bidder on their Letterhead, duly stamped & signed after the completion of the Reverse Auction)

To,
M/s. e-Procurement Technologies Ltd. (abcprocure)
B-705, Wall Street-II, Opp. Orient Club,
Nr. Gujarat College, Ellis Bridge,
Ahmedabad – 380 006.
Gujarat, India.

Sub: Final price quoted during Reverse Auction

Ref : 1. BHEL Tender Specification No **BHE/PW/PUR/RIT-STG/739**
2. Reverse Auction dtd. (Shall be informed later)
3. Our Offer No. dtd.

Dear Sir,

We confirm that we have quoted.

1. _____
2. _____

(Price quoted on Total Cost to BHEL basis)

as our final lump sum prices during the Reverse Auction conducted on _____ (date).

Thanking you and looking forward to the valuable order from BHEL.

Yours sincerely,

For _____

Name:
Company:
Date:
Seal:

CONTACT INFORMATION

M/s. e-Procurement Technologies Ltd., Ahmedabad (abcprocure)	Bharat Heavy Electricals Limited, PSWR
B-705, Wall Street-II, Opp. Orient Club, Nr. Gujarat College, Ellis Bridge, Ahmedabad – 380 006, Gujarat, India. **Ph. Nos. : +91 79 – 4001 6860 / 861 / 863 / 864 / 866 / 874 / 875 / 877 / 878 / 880 / 882** **Fax Nos. : +91 79 – 4001 6876 / 816** **Helpdesk Email-Id:** **helpdesk@tendertiger.com** **Mr. Parin Desai** **Cell : 0 – 93745 19754** **E-mail : parin@abcprocure.com**	**Mr S M BORKAR** **Sr Manager/Purchase** **E mail : smborkar@bhelpswr.co.in** **Phone : 0712 - 3048600** **Fax : 0712 - 3048605** **(Or)** **Mr. R K Ranade** **Manager/Purchase** **Email : rkranade@bhelpswr.co.in** **Phone: 0712 - 3048635** **Fax : 0712 - 3048605** **(Or)** **Mr. Pratish Gee Varghese** **Engineer/Purchase** **Email: pgv@bhelpswr.co.in** **Phone: 0712 - 3048713** **Fax : 0712 - 3048605**

PROPOSED PAINTING SCHEME FOR TG AREA

S N	AREA / DESCRIPTION	COLOUR	IS SPECIFICATION
1	A) HANGER SUPPORTS, B) PLATFORMS C) STAIR SIDE CHANNEL D) TG STRUCTURE, E) ELECTRIC HOIST & CHAIN PULLEY BLOCK STRUCTURE, F) FLOOR BEAMS. G) GALLERIES H) MANUAL DOORS	SMOKE GREY	SYNTHETIC ENAMEL AS PER IS:2932
2	A) FLOOR GRILLS, B) HANGERS, HANGER RODS C) SUSPENSION RODS, D) STAIR CASE STEP TREADS.	BLACK	SYNTHETIC ENAMEL AS PER IS:2932
3	A) TG LUB OIL PIPING	GOLDEN BROWN	SYNTHETIC ENAMEL AS PER IS:2932
4	A) LP PIPING DRAINS B) 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) MONORAIL BEAMS	GOLDEN YELLOW	SYNTHETIC ENAMEL AS PER IS:2932
6	TOE GUARD PLATE	POST OFFICE RED	SYNTHETIC ENAMEL AS PER IS:2932
7	A) SILENCERS FOR SAFETY VALVES B) INSTRUMENT TAPPING POINTS ON STEAM LINES	HEAT RESISTENT ALUMINIUM	IS13183 Gr-I
8	STEAM PIPING (BAND - EACH 5MTR)	POST OFFICE RED	SYNTHETIC ENAMEL AS PER IS:2932
9	EQUIPMENT(PUMPS, OIL COOLERS, EXHAUST FANS, HT & LT MOTORS, BFP HYD COUPLING, 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) CONDENSER AIR EVACUATION PIPING B) INSTRUMENT AIR PIPING C) SERVICE AIR PIPING	SKY BLUE	SYNTHETIC ENAMEL AS PER IS:2932
12	FIRE FIGHTING	FIRE RED	SYNTHETIC ENAMEL AS PER IS:2932
13	LP TURBINE	BOTTLE GREEN	SYNTHETIC ENAMEL AS PER IS:2932
14	GENERATOR	ORANGE	SYNTHETIC ENAMEL AS PER IS:2932
15	EXCITER	ORANGE	SYNTHETIC ENAMEL AS PER IS:2932
16	TG LUB OIL TANK AND PIPING	GOLDEN BROWN	SYNTHETIC ENAMEL AS PER IS:2932
17	CONDENSER	BOTTLE GREEN	SYNTHETIC ENAMEL AS PER IS:2932
18	LEGEND IN BLOCK LETTER OVER GOLDEN YELLOW BACKGROUND	BLACK	SYNTHETIC ENAMEL AS PER IS:2932

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

HARIDWAR SUPPLY

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
A.	**STEAM TURBINE**			
1	75001	EMBEDMENT FOR ANCHOR POINTS	4400x 1600x 1000	4940
2	75003	COMPONENTS FOR BASE PLATE	4900x 1200x 600	6350
3	75004	COMPONENTS OF BASE PLATE	2800x 1700x 600	3700
4	75101	BASE PLATE FOR LP CASING	1850x 1400x 500	7200
5	75102	LP OUTER CASING PARTS	9000x 2187x 3460	15520
6	75103	LP OUTER CASING PARTS	9000x 2190x 3460	15520
7	75104	LP OUTER CASING PARTS	5670x 3290x 1140	4600
8	75105	LP OUTER CASING PARTS	5670x 3290x 1140	4600
9	75106	LP OUTER CASING PARTS	3400x 1200x 1200	1255
10	75107	LP LONGITUDINAL GIRDER (LEFT)	8200x 1680x 1950	23380
11	75108	LP LONGITUDINAL GIRDER (RIGHT)	8200x 1680x 1950	23380
12	75109	LP FRONT WALL (TS)	8760x 3850x 1150	18300
13	75110	LP FRONT WALL (GS)	8760x 3850x 1150	18300
14	75111	LP SHAFT SEALING (FRONT)	1800x 1700x 740	2300
15	75112	LP SHAFT SEALING (REAR)	1800x 1700x 740	2300
16	75113	LP SHAFT SEAL COMPENSATOR (TS)	1500x 1500x 650	350
17	75114	LP SHAFT SEAL COMPENSATOR (GS)	1500x 1500x 650	350
18	75115	AUXILARIES OF LP TURBINE	2300x 1200x 900	2340
19	75201	HP/IP BRG.PED.ASSLY.	4080x 2005x 2126	13275
20	75202	HP/IP BRG.PED.PARTS	1000x 600x 600	400
21	75301	ASSEMBLY DEVICES	1000x 750x 750	300
22	75302	INSPECTION SHAFT FOR IPC	4050x 600x 900	1430
23	75304	COMPONENTS OF ASSEMBLY FIXTURE	3800x 2500x 1300	6860
24	75305	COMPONENTS OF ASSEMBLY FIXTURE	2300x 2100x 900	1800
25	75306	COMPONENTS OF ASSY FIXTURE FOR	3300x 1800x 1300	3350
26	75307	COMP.OF ASSY.FIXT.FOR H.P.T.	5450x 4050x 400	3400
27	75308	AUXILARIES OF LP TURBINE	3750x 1000x 1000	1680
28	75309	AUXLIARIES OF LP TURBINE	2000x 1000x 1550	890
29	75310	AUXLIARIES OF LP TURBINE	2000x 1000x 1550	890
30	75311	ASSEMBLY TOOLS	1700x 800x 400	1020
31	75312	AUXILIARIES OF IP TURBINE	1200x 500x 550	260
32	75313	AUXILIARIES OF IP TURBINE	1100x 500x 650	210
33	75314	AUXILIARIES OF IP TURBINE	1100x 500x 650	210
34	75315	BOLT HEATING EQUIPMENT AND	1700x 900x 700	150
35	75316	GROMMET SLINGS	1700x 1700x 300	625
36	75318	OIL FLUSHING AND PRESSURE TEST	750x 550x 400	250
37	75319	STEAM BLOWING & HYDRAULIC TEST	2900x 2100x 1200	4650
38	75320	TOOLS FOR GOV.SYST.&VALVES	1750x 1200x 1000	1500
39	75321	VALVE SUPPORT FOR HPT OVERHALL	1500x 750x 750	905
40	75401	IP-LP BEARING PEDESTAL ASSLY	3700x 1860x 2100	14500
41	75501	LP/GEN. PEDESTAL ASSEMBLY	3200x 2280x 2070	9370
42	75502	BEARING PEDESTAL (PARTS)	1600x 800x 600	1150
43	75601/1	FRONT BEARING PEDESTAL	3140x 3140x 2050	12386
44	75601/2	HYDRAULIC TURNING GEAR	2100x 1000x 600	750

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

HARIDWAR SUPPLY

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
45	75601/3	MAIN OIL PUMP ASSEMBLY.	1400x 1200x 1000	550
46	75704/1	LP CASING ASSEMBLY	2250x 1350x 750	3000
47	75704/2	PARTS OF LP OUTER CASING ASSLY	500x 500x 400	120
48	75705	LP EXTRACTION A1	4400x 1620x 870	1820
49	75706	LP EXTRACTION A1	4400x 1620x 850	1814
50	75707/1	LP EXTRACTION A1	3420x 1620x 870	1286
51	75707/2	LP EXTRACTION A1	950x 750x 750	330
52	75708	LP EXTRACTION A2	2920x 2120x 1370	1730
53	75709	LP EXTRACTION A2	3420x 1220x 1120	1350
54	75710	LP EXTRACTION A3	1920x 1120x 920	655
55	75711	LP EXTRACTION A3	3120x 920x 870	1050
56	75716	LP EXTRACTION PIPE SHEATHING	2900x 2050x 1180	2650
57	75717	INNER GUIDE PLATE OF DIFFUSER	2300x 2300x 500	1850
58	75718	DIFFUSER (TS)	5050x 1800x 2550	6800
59	75719	DIFFUSER (GS)	5050x 1800x 2550	6800
60	75720	LP INNER OUTER CASING (U/H)	8640x 3650x 2550	36100
61	75721	LP INNER CASING (L/H)	9100x 3890x 3180	54540
62	75722	LP INNER INNER CASING (U/H)	4600x 1900x 2350	13300
63	75723	LP CASING ASSEMBLY	5000x 2500x 800	5910
64	75724	LP INNER CASING ASSLY/FASTENER	2350x 1250x 750	2050
65	75725	INNER GUIDE PLATE OF DIFFUSER	2300x 2300x 500	1700
66	75728	STEAM INLET PIPE (LPT)	3200x 1500x 1500	1700
67	75801	LP ROTOR	8800x 4000x 4162	95240
68	75901	IP ROTOR	4800x 2120x 1995	23132
69	75902	IP OUTER CASING (U/H)	4050x 3800x 2650	25850
70	75903	IP OUTER CASING (L/H)	3400x 5250x 2600	25870
71	75904	IP INNER CASING (U/H)	2900x 3200x 1850	15200
72	75905	IP INNER CASING (L/H)	2900x 3200x 1850	15200
73	75906	IP INLET ASSEMBLY	4500x 3725x 1300	13550
74	75907	IP SHAFT SEALING	1400x 1200x 900	950
75	75908	IP TURBINE (PARTS)	2000x 1900x 1000	3125
76	75909	I.P. TURBINE PARTS	1000x 1000x 750	475
77	76001/1	HP TURBINE	5675x 3400x 2900	88650
78	76001/2	EMERGENCY GOVERN0R	495x 395x 695	57
79	76002	HP INLET ASSLY. & HP EXHAUST	1200x 1200x 500	80
80	76003	HP EXHAUST ASSEMBLY	1650x 1400x 900	2000
81	76004	HPT RELATED PARTS	1300x 1300x 700	200
82	76104	ESV & CV CASING WITH VALVES	3360x 3360x 2590	23146
83	76105/1	ESV SERVOMOTOR WITH LIMIT	2300x 1200x 1200	4250
84	76105/2	ESV SERVOMOTOR WITH LIMIT	2300x 1200x 1200	4250
85	76107	HP CONTROL VALVE SERVOMOTOR	2800x 1200x 2100	3280
86	76108	ESV & CV CASING WITH VALVES	3360x 3360x 2590	23146
87	76112	HP CONTROL VALVE SERVOMOTOR	2800x 1200x 2100	3288
88	76201	SUSPENSION OF VALVE (IV)	4250x 2640x 750	8078
89	76202	IV & CV CASING WITH VALVES	5040x 4690x 2770	33276

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

HARIDWAR SUPPLY

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
90	76203/1	IV SERVOMOTOR WITH LIMIT SW.	2700x 1450x 1400	3965
91	76203/2	IV SERVOMOTOR WITH LIMIT SW.	2700x 1450x 1400	3965
92	76204	IP CONTROL VALVE SERVOMOTOR	3240x 1240x 1950	3019
93	76205/1	FRAME FOR SUSPENSION (IV)	3400x 3150x 750	2026
94	76205/2	FRAME FOR SUSPENSION (IV)	3400x 3150x 750	2026
95	76205/3	LOOSE ITEMS FOR FRAME FOR	300x 200x 200	20
96	76206	IV & CV CASING WITH VALVES	5040x 4690x 2770	33276
97	76210	IP CONTROL VALVE SERVOMOTOR	3240x 1240x 1950	3003
98	76301/1	SUSPENSION OF VALVES (LPB)	3600x 1700x 800	1836
99	76301/2	SUSPENSION OF VALVES (LPB)	3600x 1700x 800	1836
100	76402	INJECTOR FOR SUC. PIPE NB 350	3300x 800x 800	588
101	76403	INJECTOR FOR SUC. PIPE NB 300	3300x 1750x 1200	999
102	76404	MAIN OIL TANK & NOZZLE ARRGT.	6180x 3260x 2650	10697
103	76405	MAIN OIL TANK & NOZZLE ARRGT.	4200x 1200x 900	402
104	76406	OIL STRAINERS	1500x 1000x 1200	228
105	76407	OIL STRAINERS	1500x 1000x 1200	228
106	76409	OIL STRAINERS	2050x 1200x 1410	470
107	76412	DIRTY/LEAKAGE OIL TANK	1000x 1000x 3000	515
108	76413	WASTE OIL TANK	1000x 1000x 3000	515
109	76414	VAR.ORIFICES THR.VALV.&FLUSH.P	1700x 700x 760	255
110	76415	VARIABLE ORIFICE 125	400x 300x 200	50
111	76601	PARTS OF A CROSS AROUND PIPE	3500x 1750x 1800	2150
112	76602	PARTS OF A CROSS AROUND PIPE	3500x 1750x 1800	2150
113	76603	COMPENSATOR ASSEMBLY	1900x 1950x 1750	3190
114	76604	COMPENSATOR ASSEMBLY	1900x 1950x 1750	3190
115	76605	COMPENSATOR ASSEMBLY	1900x 1950x 1750	3190
116	76606	COMPENSATOR ASSEMBLY	1900x 1950x 1750	3190
117	76607	COMPENSATOR ASSEMBLY	1900x 1950x 1750	3270
118	76608	COMPENSATOR ASSEMBLY	1900x 1950x 1750	3270
119	76609	REDUCER ASSEMBLY	1250x 1250x 500	242
120	76610	REDUCER ASSEMBLY	1250x 1250x 500	242
121	76611	CROSS AROUND PIPE (PARTS)	2000x 1150x 600	2030
122	76612	CROSS AROUND PIPE (PARTS)	2000x 1150x 600	2030
123	76613	MITRE BEND ASSEMBLY	3640x 1540x 2040	2240
124	76614	MITRE BEND ASSEMBLY	3640x 1540x 2040	2240
125	76701	CHANGE OVER VALVE	800x 500x 200	97
126	76702/1	CRH NRV WITH SERVOMOTOR	3200x 2300x 2600	10528
127	76702/2	STEAM BLOWING DEV.FOR NRV CRH	2500x 1600x 1200	5600
128	76703	RATING,COLLABORATION&COMPANY'S	400x 300x 300	20
129	76801	RATING,COLLABORATION&COMPANY'S	850x 550x 200	55
130	76901	OIL STRIPPER	600x 600x 850	133
131	76902	OIL STRIPPER	600x 600x 850	133
132	76903	HOUSING FOR M.S STRAINER	1725x 1250x 730	2370
133	76904	HOUSING FOR M.S STRAINER	1725x 1250x 730	2370
134	76908	HOUSING FOR HRH STEAM STRAINER	2275x 1650x 1100	3195

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

HARIDWAR SUPPLY

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
135	76909	HOUSING FOR HRH STEAM STRAINER	2275x 1650x 1100	3195
136	76912/1	BLANKING ARRANGEMENT FOR MS	1000x 900x 500	520
137	76912/2	BLANKING ARRANGEMENT FOR HRH	1600x 1200x 600	1390
138	76912/3	BLANKING ARRANGEMENT FOR MS	1000x 900x 500	520
139	76912/4	BLANKING ARRANGEMENT FOR HRH	1600x 1200x 600	1390
140	76913	GASKETS FOR MS & HRH STRAINER	1000x 1000x 600	37
141	76914	COMPENSATOR	600x 600x 900	50
142	76915	ASSY. & DISASSY. DEVICES FOR	2140x 1400x 500	564
143	76917	STEAM STRAINER (MS)	1200x 900x 500	350
144	76918	STEAM STRAINER (HRH)	1800x 1500x 800	750
145	76919	GOV.SYSTEM CONTROL RACK ASSLY.	1200x 900x 500	350
146	76920	GOV.SYSTEM CONTROL RACK ASSLY.	1800x 1500x 800	750
147	77001	GOV.SYSTEM CONTROL RACK ASSLY.	2800x 1360x 2750	1847
148	77002	SUPPLY RACK HP VALVE-2 (RIGHT)	2300x 1400x 2550	1797
149	77003	SUPPLY RACK HP VALVE-1 (LEFT)	2300x 1400x 2550	1797
150	77004	SUPPLY RACK FOR IP VALVES 1 &	2300x 1400x 2550	2080
151	77006	GOVERNING SYSTEM PROTECTION	2450x 1300x 2250	1622
152	77201	TURBINE INSTRUMENTS RACKS	2750x 1500x 800	2600
153	77202	TEMP. AND PRESSURE CONNECTIONS	1700x 750x 750	750
154	77203	IMPLUSE PIPES (CARBON STEEL)	6900x 650x 500	1225
155	77204	GAUGES AND SENSORS	2800x 1250x 1250	1035
156	77205	TRANSMITTERS & J.B.OF BEARINGS	500x 300x 200	118
157	77206	IMPULSE PIPES (ALLOY STEEL AND SS)	6900x 500x 500	1136
			SUB TOTAL (A)	**949211**
B.	**GENERATOR**			
1	501	STATOR	8830x 4100x 4120	258000
2	502	ROTOR WITH TOOLS AND TACKLES	14000x 1850x1750	73159
3	503	END SHIELD LOWER HALF (TE)	6000x 2296x 2640	31473
4	504	END SHIELD UPPER HALF (TE)	6000x 2296x 2640	28747
5	505	END SHIELD LOWER HALF (EE)	4700x 1500x 2420	12847
6	506	GENERATOR BEARING (2 NOS.).	1250x 1150x 1250	3006
7	508	BAFFLE RING,BAFFLE RING CARIER	1682x 1688x 1095	347
8	509	TERMINAL BUSHING (6 NOS.)	2200x 1830x 610	1427
9	510	TERMINAL BUSHING BOX WITH	3600x 2500x 1940	11580
10	511	SHAFT SEALS (EE & TE) AND OIL	2140x 1140x 840	1560
11	512	COMPRESSOR BAFFLE RING ASSLY.	1920x 1920x 1340	1745
12	515	GENERATOR END SHIELD BASE	1940x 1550x 980	3464
13	516	PRIMARY WATER TANK	8100x 2000x 1200	2000
14	517	P.W.TANK PIPE LINES	6800x 2100x 500	818
15	518	FOUNDATION PLATES	2895x 760x 840	3030
16	519	ANCHOR BOLTS	2740x 655x 600	1485
17	520	CHANNELS,ANGLES,PIPES & STUDS	4800x 1120x 520	1558
18	521	ROTOR & GENERAL ASSY.DEVICES	2460x 1170x 1240	2952
19	524	WIRE ROPE FOR ROTOR (2 NO.)	1800x 1800x 400	289
20	530	GENERATOR ACCESSORIES	2140x 2140x 1240	1608

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

HARIDWAR SUPPLY

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
21	530/1	GENERATOR ACCESSORIES	1350x 850x 300	472
22	531	GENERATOR ACCESSORIES	2240x 940x 1220	1525
23	532/1	DRY AIR BLOWER	1100x 1000x 700	80
24	532/2	GENERATOR MAINTENANCE DEVICES	2550x 1180x 1140	1649
25	533	ERECTION DEVICES/FOUNDTN ITEMS	1640x 1140x 1240	2781
26	534	BRUSHLESS EXCITER SET WITH	5750x 2350x 3400	32928
27	535	BRUSHLESS EXCITER FRONT COVER	4400x 3400x 3100	4478
28	536	BRUSHLESS EXCITER REAR COVER	4400x 3400x 3100	4978
29	537	EXCITER BED PLATE ACCESSORIES	3900x 1250x 1150	1741
30	539	SEAL OIL STORAGE TANK	3700x 1400x 1260	1532
31	540	PW PUMP AND FILTER UNIT	3450x 2750x 2815	5294
32	541	MEASURING INSTRUMENT RACK	1550x 910x 1715	831
33	542	SEAL OIL MOTOR PUMP UNIT	3600x 2100x 1600	3272
34	543	SEAL OIL UNIT	3100x 3000x 3400	7890
35	544	SEAL OIL VALVE RACK	2700x 1140x 2440	1935
36	545	GAS UNIT	1980x 1640x 2420	1205
37	547	CO2 VAPOURISER	1520x 840x 840	250
38	549	EXCITER BED PLATE ACCESSORIES	5800x 1140x 1240	2925
39	550	EXCITER ACCESSORIES	2200x 1200x 1100	1111
40	551	END SHIELD UPPER HALF (EE)	4700x 1500x 2420	9353
41	556	P.W.TANK PIPE LINES	3000x 600x 500	454
42	557	SPECIAL TOOLS & TACKLES	800x 700x 300	87
43	558	EMBEDMENTS	800x 800x 300	928
44	559	SEALING FOR TRANSPORT	3950x 2420x 150	869
45	561	SEAL RING	700x 700x 200	80
46	562	CONNECTION PIECE ASSEMBLY	1650x 1100x 450	862
47	563	GENERATOR ACCESSORIES	1700x 1200x 250	140
48	564	COOLER AIR VENT ASSEMBLY	5100x 200x 150	51
49	565	H2 DISTRIBUTOR	3480x 1540x 440	333
50	566	CO2 DISTRIBUTOR	4860x 1240x 440	353
51	567	N2 DISTRIBUTOR	1400x 1240x 440	143
52	568	TG SYSTEM INTEGRAL PIPING	6200x 800x 800	3410
53	569	TG SYSTEM INTEGRAL PIPING	3500x 1700x 1000	2576
54	570	TG SYSTEM INTEGRAL PIPING	7000x 1000x 1300	4502
55	571	TG SYSTEM INTEGRAL PIPING	6600x 1500x 2000	9380
56	572	TG SYSTEM INTEGRAL PIPING	1000x 1000x 500	2176
57	573	TG SYSTEM INTEGRAL PIPING	2500x 1200x 1000	1555
58	574	TG SYSTEM INTEGRAL PIPING	2750x 1400x 1400	3799
59	575	TG SYSTEM INTEGRAL PIPING	1000x 940x 900	177
60	576	TG SYSTEM INTEGRAL PIPING	1000x 1000x 500	630
61	577	EXCTR. BED PLATE ACCESSORIES	1000x 800x 800	775
62	578	RESINS	1200x 600x 600	100
63	580	EMBEDMENTS FOR PORTAL CRANE	1400x 1000x 400	1651
64	581	ALKALYSER UNIT	1150x 780x 1900	267

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

HARIDWAR SUPPLY

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
65	582	PLATFORM FOR P W TANK	5000x 1000x 500	852
66	583	TG SYSTEM INTEGRAL PIPING	7000x 800x 600	1338
67	584	RR WHEEL AIR GUIDE COVER	2800x 1500x 2000	1572
68	585	CONSUMABLES	800x 400x 200	55
			SUB TOTAL (B)	**566440**
C.	**CONDENSOR**			
1	78001	HOT WELL(FRONT HALF)	7680x 3280x 1800	7855
2	78002	HOTWELL (REAR HALF)	5680x 3280x 1870	6300
3	78004	FRONT / REAR BOTTOM PLATE	8760x 2050x 720	4736
4	78005	FRONT/REAR BOTTOM PLATE	8760x 2050x 720	4736
5	78006	MIDDLE BOTTOM PLATE-I	8760x 3000x 720	5052
6	78007	MIDDLE BOTTOM PLATE-I	8760x 3000x 720	5052
7	78008	MIDDLE BOTTOM PLATE-I	8760x 3000x 720	5052
8	78009	MIDDLE BOTTOM PLATE-II	8760x 2340x 720	5024
9	78010	BOTTOM PLATE LOOSE ITEMS	2400x 850x 100	750
10	78012	CONDENSER SUPPORT	2280x 2000x 740	5265
11	78013	CONDENSER SUPPORT	3060x 2080x 960	5265
12	78014	CONDENSER SUPPORT	3000x 2110x 1000	6400
13	78018	CONDENSER SUPPORT	1100x 800x 650	4552
14	78019	CONDENSER SUPPORT	1920x 1000x 660	6100
15	78020	FRONT WATER CHAMBER (GS)	7044x 4469x 540	10000
16	78022	FRONT WATER BOX (GS)	7645x 4460x 2640	28700
17	78023	FRONT WATER CHAMBER (TS)	7044x 4460x 540	10000
18	78025	FRONT WATER BOX (TS)	7645x 4460x 2640	28700
19	78026	REAR WATER CHAMBER (GS)	7044x 4469x 540	10000
20	78028	REAR WATER BOX (GS)	6655x 4460x 2495	21560
21	78029	REAR WATER CHAMBER (TS)	7044x 4469x 540	10000
22	78031	REAR WATER BOX (TS)	6655x 4460x 2495	21560
23	78032	SIDE WALL (TUR.SIDE)	7070x 2400x 120	14488
24	78038	SIDE WALL TUR.SIDE(LOOSE ITEM)	7050x 300x 230	880
25	78040	SIDE WALL (GEN.SIDE)	7070x 2400x 120	14488
26	78046	SIDE WALL GEN.SIDE(LOOSE IT	7050x 300x 230	880
27	78048	SHELL INTERNAL STIFFENING RODS	3616x 825x 500	4393
28	78049	SHELL INTERNAL STIFFENING RODS	3616x 800x 500	4393
29	78050	SHELL INTERNAL STIFFENING RODS	3616x 800x 500	4393
30	78051	SHELL INTERNAL STIFFENING RODS	3616x 800x 500	4393
31	78052	SHELL INTERNAL STIFFENING RODS	3616x 800x 500	4393
32	78053	SHELL INTERNAL STIFFENING RODS	3616x 800x 500	4393
33	78054	SHELL INTERNAL STIFFENING RODS	2550x 750x 500	4424
34	78055	SHELL INTERNAL STIFFENING RODS	2550x 500x 500	2328
35	78056	SHELL INTERNAL STIFFENING RODS	3840x 500x 500	3591
36	78057	SHELL INTERNAL DETAILS	1800x 550x 550	1100
37	78058	AIR EXTRACTION PIPE	6550x 1030x 750	2200
38	78059	TUBE SUPPORT PLATE	6490x 4225x 224	8620
39	78060	TUBE SUPPORT PLATE	6490x 4225x 224	8620

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

HARIDWAR SUPPLY

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
40	78061	TUBE SUPPORT PLATE	6490x 4225x 224	8620
41	78062	TUBE SUPPORT PLATE	6490x 4225x 224	8620
42	78063	TUBE SUPPORT PLATE	6490x 4225x 224	8620
43	78064	TUBE SUPPORT PLATE	6490x 4225x 224	8620
44	78065	TUBE SUPPORT PLATE	6490x 4225x 224	8620
45	78066	TUBE SUPPORT PLATE	6490x 4225x 224	8620
46	78069	SHELL INTERNAL DETILS	1500x 800x 450	6320
47	78070	SHELL INTERNAL DETAILS	6300x 900x 600	4430
48	78071	SHELL INTERNAL DETAILS	1300x 1200x 600	3196
49	78075	LOWER DOME WALL (TUR.SIDE)	13350x 4030x 550	10775
50	78076	LOWER DOME WALL (TUR.SIDE)	10200x 1600x 113	4306
51	78077	LOWER DOME WALL (TUR.SIDE)	4900x 700x 360	1090
52	78103	LOWER DOME WALL (GEN. SIDE)	13350x 4030x 930	11171
53	78104	LOWER DOME WALL (GEN.SIDE)	10200x 1600x 1073	4002
54	78105	LOWER DOME WALL(GEN.SIDE)LOOSE	4900x 1400x 900	1170
55	78109	LOWER DOME WALL (FWB SIDE)	9052x 4266x 1000	7710
56	78110	LOWER DOME WALL (FWB SIDE)	7808x 2192x 865	3280
57	78111	LOWER DOME WALL (FWB SIDE)	1650x 1100x 1100	837
58	78115	LOWER DOME WALL (RWB.SIDE)	7805x 2182x 510	3650
59	78116	LOWER DOME WALL (RWB SIDE)	9052x 4158x 1525	9845
60	78117	LOWER DOME WALL (RWB SIDE)	1800x 1800x 1500	942
61	78121	DOME INTERNAL STIFFENING	1840x 1350x 1535	3988
62	78122	DOME INTERNAL STIFFENING	2176x 1500x 1285	4919
63	78123	DOME INTERNAL STIFFENING	2766x 1500x 1120	6370
64	78124	DOME INTERNAL STIFFENING	5250x 2270x 220	981
65	78125	DOME INTERNAL STIFFENING	1470x 750x 500	2880
66	78126	DOME INTERNAL STIFFENING	5250x 2270x 220	981
67	78129	LP HEATER NO-1 SUPPORT ARRANGE	2250x 1700x 1070	3425
68	78130	LP HEATER SUPPORT ARRANGEMENT	7125x 1125x 580	3665
69	78132	UPPER DOME WALL (TURBINE SIDE)	8700x 1600x 296	2628
70	78133	UPPER DOME WALL(GEN SIDE)	8700x 1600x 296	2628
71	78136	UPPER DOME WALL (FWB SIDE)	7180x 3000x 300	5410
72	78137	UPPER DOME WALL (FWB SIDE)	3600x 550x 200	692
73	78139	UPPER DOME WALL (RWB SIDE)	7180x 3000x 450	5754
74	78140	UPPER DOME WALL (RWB SIDE)	3600x 550x 200	692
75	78142	W/BOX HINGE ARRANGEMENT	2450x 1650x 400	3710
76	78143	W/BOX HINGE ARRANGEMENT	500x 500x 250	60
77	78144	W/BOX HINGE ARRANGEMENT	2500x 600x 750	1630
78	78149	W/BOX HINGE ARRANGEMENT	800x 660x 300	300
79	78151	W/BOX HINGE ARRANGEMENT	1670x1040x480	914
80	78154	STEAM THROW DEVICE	2400x 1250x 1100	2356
81	78155	STEAM THROW DEVICE	2400x 1250x 1100	2356
82	78157	CONDENSER LOOSE ITEMS	4250x 1050x 1150	1212
83	78158	CONDENSER LOOSE ITEMS	800x 600x 500	103
84	78159	LOOSE ITEMS	1150x 1150x 1000	2737

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

HARIDWAR SUPPLY

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
85	78160	LOOSE ITEMS (TOOLS & TACKLES)	300x 350x 500	45
86	78161	CONDENSER LOOSE ITEMS	550x 550x 150	146
87	78166	CONDENSER STAND PIPES NO.1,2	3500x 600x 600	184
88	78167	LOOSE ITEMS CONDENSER STAND	3100x 250x 250	383
89	78175	CONDENSER INSTRUMENTATION	1500x 1300x 700	733
90	78176	CONDENSER INSTRUMENTATION	1550x 600x 600	242
91	78301	GLAND STEAM CONDENSER	1750x 1200x 1700	1610
92	78304	LOOSE ITEMS OF GSC	700x 300x 200	60
93	78305	LOOSE ITEMS OF GSC (FRAGILE)	600x 500x 350	35
94	78315	LP HEATER 1	13000x 2100x2000	21100
95	78316	STAND PIPES OF LPH-1	2800x 350x 350	150
96	78317	LOOSE ITEMS OF LPH NO.1	500x 400x 400	135
97	78318	LOOSE ITEMS OF LP HEATER NO.1	700x 400x 400	75
98	78319	LOOSE ITEMS OF LPH -1(NFRAGILE	2100x 500x 400	170
99	78320	TROLLEY FOR LP HEATER NO.1	1350x 800x 200	664
100	78401	TURBINE OIL COOLER	5850x 1700x 2300	13830
101	78402	TURBINE OIL COOLER	5850x 1700x 2300	13830
102	78406	LOOSE ITEMS OF TOC	800x 800x 500	130
103	78417	PRIMARY WATER COOLER	4300x 1350x 1350	2220
104	78418	PRIMARY WATER COOLER	4300x 1350x 1350	2220
105	78420	LOSE ITEMS OF PWC	400x 300x 300	38
106	78424	HYDROGEN COOLER	4600x 1450x 800	2665
107	78425	HYDROGEN COOLER	4600x 1450x 800	2665
108	78426	HYDROGEN COOLER	4600x 1450x 800	2665
109	78427	HYDROGEN COOLER	4600x 1450x 800	2665
110	78428	LOOSE ITEMS (HYDROGEN COOLERS)	1300x 1000x 600	2140
111	78431	EXCITER AIR COOLER	3780x 920x 830	1980
112	78432	EXCITER AIR COOLER	3780x 920x 830	1980
113	78436	CONTROL FLUID COOLER	3300x 850x 1030	1506
114	78437	CONTROL FLUID COOLER	3300x 850x 1030	1506
115	78438	LOOSE ITEMS(CFC)	600x 600x 500	103
			SUB TOTAL (C)	**563346**
			TOTAL(A+B+C)	**2078997**

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

BHOPAL SUPPLY

S.N	DESCRIPTION	QTY	SIZE (MM)	Unit Wt (Kg.)	Total Wt (Kg.)
A.	**FLASH TANKS**				
1	HP Flash Tank	1	3500Dx5600L	7900	7900
2	LP Flash Tank	1	3000Dx5300L	6600	6600
3	Steam Drain F/T	1	2500Dx3700L	3700	3700
4	Unit F/T	1	1700Dx1800L	1800	1800
5	F.W.H.S.V.D. F/T	1	1700Dx1800L	1800	1800
6	Boxes for Loose items	6	2000Lx1000Wx1000H	1000	6000
				SUB TOTAL (A)	**27800**
B.	**MISC. TANKS**				
1	Clean Oil Tanks (Common for 2 units)	1	6100Lx3500Wx4500H	9500	9500
2	Dirty Oil Tank (Common for 2 units)	1	6100x3500Wx4500H	9500	9500
3	Oil Unloading Tank (Common for 2 units)	1	2300Lx1200Wx800H	550	550
4	DMCW Tank	1	7200Lx3000Wx2900H	6000	6000
5	Boxes for Loose items	4	2000Lx1000Wx1000H	1000	4000
				SUB TOTAL (B)	**29550**
C.	**RE JOINTS**				
1	Inlet -Pipe Assy. (RH)	1	2600Dx1050L	2305	2305
2	Inlet –Pipe Assy(LH)	1	2600Dx1050L	2305	2305
3	Inlet –Pipe Detail	2	1500Wx3000L	5477	10954
4	Inlet –Pipe Assy.	2	3200Dx450H	5211	10422
5	Inlet - Blank Flange Assy.	2	3650Dx125TH	7416	14832
6	Inlet – Bellows	4	2600Dx500H	400	1600
7	Outlet – Pipe Assy. (RH)	1	2600Dx350H	1428	1428
8	Outlet – Pipe Assy. (LH)	1	2600Dx350H	1428	1428
9	Outlet – Pipe Details	2	1500Wx3000L	5477	10954
10	Outlet – Pipe Assy.	2	3200Dx450H	5211	10422
11	Outlet –Blank Flange Assy.	2	3650Dx125TH	7416	14832
12	Outlet – Bellows	4	2600Dx500H	400	1600
13	Boxes for loose items	9	2000x1000x1000	1000	9000
				SUB TOTAL (C)	**92082**
D.	**H.T. MOTORS**				
1	BFP	1	4300Lx4500Wx2400H	23500	23500
2	CEP	3	2050Lx1600Wx2550H	5400	16200
3	Boxes for Loose Items	6	2500Lx1000Wx1000H	1000	6000
				SUB TOTAL (D)	**45700**
E.	**BF VALVES**				
1	2200 Dia	4	2530Lx3000Wx1110H	9353	37412
2	800 Dia	9	1030Lx1250Wx415H	1311	11799
3	600 Dia	7	815Lx1000Wx300H	765	5355
4	500 Dia	9	700Lx865Wx300H	600	5400
5	400 Dia	14	600Lx750Wx275H	336	4704
6	Boxes for Loose items	52	700Lx700Wx300H	300	15600
				SUB TOTAL (E)	**80270**
				TOTAL (A+B+C+D+E)	**275402**

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

HYDERABAD SUPPLY

S.N.	DESCRIPTION	QTY./UNIT	UNIT. WT. (KGS)	GROSS. WT. (KGS)
A.	**BOILER FEED PUMP (MD & TD)**			
1	Motor Driven Boiler Feed Pump (MD BFP) with Base Plate & Tubing	1	11500	11500
2	Turbine Driven Boiler Feed Pump (TD BFP) with Base Plate & Tubing	2	11100	22200
3	Motor Driven Boiler Feed Booster Pump (MD BP) with Base Plate & Tubing	1	4600	4600
4	Turbine Driven Boiler Feed Booster Pump (TD BP) with Base Plate & Tubing	2	4710	9420
5	MDBFP + Booster Pump Mech.seal skid	2	1000	2000
5	TDBFP + Booster Pump Mech.seal skid	4	1000	4000
6	MD BFP + Hydraulic Coupling Grillage	1	3800	3800
7	MD BFP Motor + BP Grillage	1	3710	3710
8	Hydraulic Coupling	1	10500	10500
9	HC L.O & W.O Oil Coolers & accessorie	1 SET	3285	3285
10	Recirculation Valve	3	900	2700
11	Conical Suction Strainer at BFP suction	3	1200	3600
12	Basket type Suction Strainer at BP suction	3	2350	7050
13	Local Gauge Rack (LGB)–1,2&3	9	400	3600
14	Local instrument Transmitter Rack(LIR)	1(For 2 TDBFPs)	250	250
15	Local instrument Transmitter Rack(LIR)	1	150	150
			SUB TOTAL (A)	**92365**
B.	**CONDENSATE EXTRACTION PUMP**			
1	Condensate Extraction Pump	3	6220	18660
2	Foundation Frame	3	580	1740
3	Canister	3	2700	8100
4	Basket type Suction Strainer at CEP suction	3	1350	4050
5	Local Gauge Rack	3	300	900
6	LIR Rack for Pr.Transmitters	1 (Common for 3 pumps)	250	250
7	LIR Rack for Diff.Pr.Transmitters	1 (Common for 3 pumps)	150	150
			SUB TOTAL (B)	**33850**
C.	**DRAIN COOLER**			
1	DRAIN COOLER ASSLY	1	5400	5400
2	LOOSE ITEMS			143
			SUB TOTAL (C')	**5543**
D.	**DEAERATOR**			
1	DEAERATOR STORAGE TANK SECTION -I	1	30280	30280
2	DEAERATOR STORAGE TANK SECTION -II	1	25388	25388
3	DEAERATOR STORAGE TANK SECTION -III	1	31897	31897
4	HEADER ASSLY	1	28532	28532
5	LOOSE ITEMS			23130
			SUB TOTAL (D)	**139227**

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

HYDERABAD SUPPLY

S.N.	DESCRIPTION	QTY./UNIT	UNIT. WT. (KGS)	GROSS. WT. (KGS)
E.	**L.P. HEATERS**			
1	L.P. HEATER 2	1	26000	26000
2	L.P. HEATER 3	1	18000	18000
3	LOOSE ITEMS			1784
			SUB TOTAL (E)	**45784**
F.	**H.P.HEATERS**			
1	H.P.HEATER 5A	1	44500	44500
2	H.P.HEATERS 6A	1	54000	54000
3	H.P.HEATERS 5B	1	44500	44500
4	H.P.HEATERS 6B	1	54000	54000
5	LOOSE ITEMS			5186
			SUB TOTAL (F)	**202186**
G.	**DRIVE TURBINE**			
1	TWIN OIL COOLER(BFP AND DT)	2	5700	11400
2	DC STARTER CUIBICAL	2	2000	4000
3	ASSEMBLED DRIVE TURBINE	2	14560	29120
4	GEAR BOX	2	1000	2000
5	LUBE OIL CONSOLE ASSEMBLY 1	2	9011	18022
6	LUBE OIL CONSOLE ASSEMBLY 2	2	65818	131636
7	EMERGENCY OIL PUMP	2	1700	3400
8	THERMAL INSULATION	2	800	1600
9	JACKING OIL PUMP	2	175	350
10	TURBINE OIL PURIFICATION UNIT	2	1500	3000
11	OIL ACCUMULATOR	2	30	60
12	CHARGING KIT	2	10	20
13	CENTRIFUGAL EXAUST FAN	4	150	600
14	TRANSFER OIL PUMP	2	350	700
15	SERO PRIME-46 OIL	2	21000	42000
16	ACCOUSTICS ENCLOSURE	2	3000	6000
18	LOOSE ITEMS			41126
			SUB TOTAL (G)	**295034**
			TOTAL (A+B+C+D+E+F+G)	**813989**

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

HARIDWAR-BOI SUPPLY

SN	ITEM ID	ITEM DESCRIPTION	QTY	UNIT	WT Gross (KG)
(A)	**Generator & Auxilaries**				
1	BG001	Empty H_2 Cylinder	123	Nos.	10835
2	BG002	Empty CO_2 Cylinder	62	Nos.	
3	BG003	Empty N_2 Cylinder	12	Nos.	
4	BG004	Portable Gas Analyser	1	No.	
5	BG005	Moisture Measuring Equipment	1	Set	16
6	BG007	Vapour Exhauster	2	Nos.	80
7	BG009	Hydrogen Gas Analyser Cabinet	2	Nos.	
8	BG011	Refrigeration Gas Dryer	2	Nos.	2000
9	BG018	Starting Resistor for DC Seal Oil Motor	1	No.	250
10	BG019	Sound Absorbing Lining for Exciter Cover & Coupling Cover	1	Set	1500
11	BG021	Grounding Brush Monitor	1	Set	
12	BG023	Continuous On-line Partial Discharge Monitoring System	1	Set	39
13	BG066	Generator End Winding Vibration Monitoring Equip.	1	Set	
14	BG080	Stroboscope	1	No.	
15	BG082	Hydraulic Unit Assembly (Common for both units)	1	Set	
				SUB TOTAL (A)	**14720**
(B)	**Condenser & Heat Exchanger**				
1	BH001	Welded Austenitic S.S. Tubes GR.304 (For Condensor)	1	Set	300000
2	BH010	Condenser Air Evacuation Package (Vacuum Pump)	2	Nos.	8556
3	BH012	Air Exhauster with Motor (GSC Air Exhauster)	2	Nos.	300
4	BH013	Front Water Box Handling Arrangement	1	Set	3000
				SUB TOTAL (B)	**311856**
(C)	**Turbine & Auxilaries**				
1	BT001	Lifting Beam (Common for both units)	1	No.	6200
2	BT002	Jacking oil pumps	1	Set	2630
3	BT003	AOP & EOP	1	Set	1000
4	BT004	Duplex Filter (Lub. Oil)	1	No.	620
5	BT005	Duplex Filter (Jacking Oil)	1	No.	163
6	BT006	Butterfly Valves	1	Set	80
7	BT007	Three Way Temp. Control Valve	1	Set	615
8	BT008	Double Three way valves	1	Set	230
9	BT009	NRV with Aluminum Flap	1	Set	35
10	BT010	Pressure Limit Valve	2	No.	
11	BT011	Oil Purification Unit (Oil Centrifuge)	1	No.	
12	BT012	Oil Vapour Exhauster	2	Nos.	180
13	BT013	Lead Diaphragm	4	Nos.	108
14	BT014	Spray Nozzles	1	Set	1.5

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

HARIDWAR-BOI SUPPLY

SN	ITEM ID	ITEM DESCRIPTION	QTY	UNIT	WT Gross (KG)
15	BT015	Dirt Catchers	1	No.	27
16	BT016	Damper	1	Set	125
17	BT017	Variable load spring Cages	1	Set	1370
18	BT018	Flexible Bends	1	Set	
19	BT019	Vacuum Breaker Valve Assy. Alongwith solinoid valve	1	No.	
20	BT023	Turbine Oil	1	Ltr	98070
21	BT024	Dry Air Preservation system	1	No.	
22	BT025	Oil Purification System (Ctrl	1	No.	
23	BT027	Turbine Integral Piping	1	Set	62658
24	BT028	H&S For Turbine Integral Piping	1	Set	15321
25	BT029	Flow Nozzles for PG Test	1	Set	
26	BT031	Through Port Gate Valve	1	Set	300
27	BT032	Globle Valve	2	Nos.	500
28	BT033	Spring Loaded NRV	1	Set	200
29	BT035	Control Fluid Pump	2	Nos.	500
30	BT036	Control Fluid Vapour Exhauster	2	Nos.	
31	BT037	Control Fluid Purification Unit	1	No.	
32	BT038	Control Fluid Tank (SS)	1	No.	
33	BT039	On Line Control Fluid Heater	1	No.	
34	BT040	Remote Trip Solenoid Valve	1	No.	
35	BT043	Control Fluid (FRF)	1	Lot	
36	BT044	Gear Pumps	1	Set	
37	BT046	LP Bypass Stop & Control Valve with EHA and Water Injection Valve	1	Set	500
38	BT067	Hydraulic Accumulators along with Filling and Gauging device	1	Set	500
39	BT068	Power Cables for 24 V Solenoid Valves (5x2.5mm2)	1	Set	
40	BT075	Seal Steam Supply & Leakage Steam Control Valve With Pneumatic Actuator	1	Set	
41	BT081	HPT Steam Evacuation Valve	1	No.	
42	BT093	TG Deck Embedment	1	Set	
				SUB TOTAL (C)	**191933.5**
				TOTAL (A+B+C)	**518509.5**

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

PEM-BOI SUPPLY

S.No	Package	WT Gross (KG)
1	AIR RELEASE VALVE	600
2	AIR TRAPS	500
3	ALUMINIUM SHEET	62500
4	CHAIN PULLEY BLOCK	6000
5	CHEMICAL DOZING SYSTEM	12000
6	COLTCS	16000
7	CONTROL VALVES	
8	ELECTRIC HOIST	3000
9	FLOW ELEMENTS	6000
10	LUBE OIL TRANSFER PUMPS	500
11	ME BELLOWS	34500
12	MISC. PUMPS: HORIZONTAL	60000
13	PLATE HEAT EXCHANGERS	3000
14	PORTABLE OIL PURIFICATION SYSTEM	500
15	PRESSURE GAUGE	
16	TEMPERATURE GAUGES	
17	DIFF. PRESSURE SWITCH	
18	ROTAMETER	
19	SELF CLEANING STRAINER	
20	STEAM TRAPS	100
21	SUMP PUMPS/ SUBMERSIBLE PUMPS	2000
22	TEMPERATURE ELEMENT	
23	THERMAL INSULATION	265000
24	VALVES: ANGLE VALVE	500
25	VALVES: BALL VALVES	700
26	VALVES: BF VALVES (STEAM SERVICE)	11000
27	VALVES: BF VALVES (WATER SERVICE)	4000
28	VALVES: CI/GATE/GLOBE/NRV	3000
29	VALVES: Dual Plate check valve	3600
30	VALVES: FS / FSS GATE/GLOBE/NRV	2000
31	VALVES: GM VALVES	800
32	VALVES: STEEL GATE/GLOBE/NRV	800
33	VIS FOR BFP FOUNDATION	6432.5
34	VIS FOR TG FOUNDATION	45039.5
	TOTAL	**550072**

NOTE :

1. THE LIST IS **FOR ONE UNIT** & TENTATIVE AND HAS BEEN GIVEN TO ENABLE THE CONTRACTOR TO STUDY THE NATURE OF WORK TO BE DONE IN THIS CONTRACT. THERE MAY BE VARIATION IN SIZE, WEIGHT ETC. AND NO CLAIM, WHATSOEVER, WILL BE ENTERTAINED ON ACCOUNT OF THIS BY BHEL.
2. SOME OF THE PACKAGES MAY BE SENT IN PARTS TO SUIT THE SITE CONDITION / TRANSPORTATION, THE SAME IS TO BE ASSEMBLED AT SITE WITHOUT ANY EXTRA COST, LIKEWISE THE PACKAGE MAY BE ASSEMBLED TOGETHER AND SEND AS A SINGLE ASSY. CONTRACTOR MAY HAVE TO DISMANTLE AND ERECT OR, ERECT AS SINGLE ASSEMBLY AS PER THE INSTRUCTION OF BHEL ENGINEERS WITHOUT ANY EXTRA COST.

WEIGHT DETAILS

S.N.	EQUIPMENT / PACKAGE	GR.WT (IN KG.)	APPROX. WT. (IN MT)
1	STEAM TURBINE	949211	949.211
2	GENERATOR	566440	566.44
3	CONDENSOR	563346	563.346
4	FLASH TANKS	27800	27.8
5	MISC TANKS	29550	29.55
6	RE JOINTS	92082	92.082
7	MOTORS	45700	45.7
8	BUTTERFLY VALVES	80270	80.27
9	BOILER FEED PUMPS	92365	92.365
10	CONDENSATE EXTRACTION PUMPS	33850	33.85
11	DRAIN COOLER	5543	5.543
12	DEAERATOR	139227	139.227
13	LP HEATERS	45784	45.784
14	HP HEATERS	202186	202.186
15	DRIVE TURBINE	295034	295.034
16	HARIDWAR BOI	518509.5	518.5095
17	PEM BOI	550072	550.072
TOTAL (FOR ONE UNIT ONLY)		**4236969.5**	**4236.9695**

NOTE:

a. THE WEIGHT INDICATED ABOVE FOR **ONE UNIT** ONLY.

b. THE WEIGHT INDICATED ABOVE IS APPROXIMATE AND THERE MAY BE A VARIATION IN WEIGHT OF EQUIPMENT / PACKAGE. NO CLAIM, WHATSOEVER, WILL BE ENTERTAINED BY BHEL ON ACCOUNT OF VARIATION IN WEIGHT QUANTITIES.

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

TOOLS AND PLANTS TO BE PROVIDED BY BHEL FREE OF HIRE CHARGES ON SHARING BASIS

SL.NO.	DESCRIPTION & CAPACITY OF T&P	QUANTITY	PURPOSE
01	EOT CRANE IN TG HALL 105/15 MT CAPACITY	01	FOR HANDLING AND ERECTION WITHIN TG HALL.
02	CRAWLER CRANE 75 MT CAPACITY	01	FOR LOADING HEAVY ITEMS OF TURBINE, DEAERATOR ETC AT BHEL STORE
02	PORTAL GANTRY CRANE WITH ACCESSORIES (360 MT CAP.)	01	FOR GENERATOR STATOR HANDLING & LIFTING ONLY

NOTE:

1. **OPERATOR** FOR EOT CRANE AND PORTAL CRANE WILL BE PROVIDED **BY THE CONTRACTOR**.

2. EOT CRANE WILL BE USED ON SHARING BAISIS BY OTHER AGENCIES WORKING WITHIN THE TG HALL UNDER THE INSTRUCTION OF BHEL. THE CONTRACTOR SHALL EXTEND THE SERVICES OF HIS OPERATOR TO SUCH OTHER AGENCIES AS WELL ON MUTUALLY AGREED MODE OF COST SHARING.

3. ABOVE T&P WILL BE PROVIDED ON SHARING BASIS ONLY. CONTRACTOR HAS TO PLAN HIS ACTIVITIES WELL IN ADVANCE AND INFORM BHEL ENGINEER IN CHARGE/ CONSTRUCTION MANAGER THE DATE OF ACTUAL USE.

4. IN CASE BHEL CRANES, AT SL NO 1&2, ARE NOT AVAILABLE DUE TO ANY REASON, CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENTS AND CARRY OUT THE JOB WITHOUT ANY FINANCIAL IMPLICATION TO BHEL.

5. CONTRACTOR SHALL PROVIDE ALL NECESSARY TOOLS & TACKLES, CRANE, TRAILERS ETC. FOR TRANSPORTATION OF PORTAL GANTRY CRANE COMPONENTS/PARTS FROM BHEL STORES/ STORAGE YARD, ASSEMBLY/ERECTION AT SITE, TESTING, COMMISSIONING, DISMANTLING AFTER COMPLETION OF WORKS AND RETURNING TO BHEL STORES/STORAGE YARD AS PER INSTRUCTION OF BHEL ENGINEER.

APPENDIX – IV

LIST OF MAJOR T & P TO BE DEPLOYED BY THE CONTRACTOR

A: MAJOR TOOLS AND PLANTS & MMDS TO BE DEPLOYED BY THE CONTRACTOR

S.N.	DESCRIPITION	QUANTITY
1	HYDRA CRANES 14 MT CAPACITY	2 NOS
2	TRAILER WITH HORSE, 30 TON CAP	1 NO
3	TRAILER TROLLEY, 20 TON CAP	1 NO
4	WELDING GENERATOR SETS (ELECTRIC AS WELL DIESEL)	AS REQD
5	3- PHASE COMPLETE SET UP FOR DRAWAL OF POWER	DO
6	RADIOGRAPHY ARRANGEMENT INCLUDING THE SOURSE AND FILM VIEWER	DO
7	TIG WELDING SET	DO
8	STRESS RELIEVING EQUIPMENT WITH TEMPERATURE RECORDERS	DO
9	ELECTRICAL BAKING OVEN - BIG	DO
10	ELECTRODE BAKING OVEN - PORTABLE	DO
11	MIXER FOR GROUTING OF EQUIPMENT FOUNDATIONS	DO
12	VACUUM CLEANER (INDUSTRIAL)	DO
13	PIPE CUTTING AND BEVELLING MACHINE	DO
14	PIPE BENDING M/C (ELECTRIC/ ELECTRO - HYDRAULIC - UPTO 4" SIZE)	DO
15	AIR COMPRESSOR 120 CFM	01 NO
16	STEP DOWN TRANSFORMER, 230V/24V	AS PER REQUIREMENT
17	CONDENSER TUBE EXPANDER SET	DO
18	ELECTRICALLY OPERATED WINCHES 3T/5T CAP.	DO
19	JACKING BOLTS / PRESSOUT BOLTS OF ALL SIZES (FOR ST. TURBINE ROLL CHECKS ETC.)	DO
20	**HYDRAULIC JACKS OF VARIOUS CAPACITIES FOR ST. TURBINE AND GENERATOR :**	
	A) - JACKS OF 100 MT CAPACITY (WITH HAND OPERATED PUMPS)	06 NOS.
	B) - JACKS OF 50 MT CAPACITY (WITH HAND OPERATED PUMPS)	06 NOS.
	GANG OPERATED JACKS CONSISTING OF THE FOLLOWING :	
	A) - JACKS OF 100 MT CAPACITY (HAVING BROAD BASE ONE INCH LIFT)	06 NOS.
	B) - JACKS OF 63 MT CAPACITY (WITH 4-6 INCH LIFT , FOR GEN. END SHIELDS)	04 NOS.
	C) - LONG HIGH PRESSURE HOSES (FOR GENERATOR ALIGNMENT)	12 NOS.
	ABOVE JACKS FOR GENERATOR ALIGNMENT SHOULD HAVE SUITABLE COUPLING FOR JOINING THE TWO OR MORE HOSES TOGETHER TO GET DESIRED LENGTH OF HOSES, SHOULD HAVE HAND OPERATED PUMPS & ALSO SHOULD BE ABLE TO FIT WITH HYDRAULIC UNIT.	
21	TORQUE WRENCH (0 TO 200 N-M CAP.)	01 NO.
22	TORQE WRENCH (UPTO 2000 N-M CAP.)	01 NO.
23	SLINGS FOR LP TURBINE ROTOR	01SET
24	SLINGS FOR HP TURBINE MODULE	01SET
25	SLINGS FOR GENERATOR ROTOR	01SET
26	BOLT STRETCHING DEVICE (FOR TURBINE & GENERATOR FOUNDATION BOLTS)	AS REQUIRED
27	LONG FEELER GAUGE SET	AS REQUIRED
28	SPANNERS / EYE BOLTS (OF ALL SIZES)	AS REQUIRED
29	HYDRAULIC TEST PUMPS AND FILL PUMPS	AS REQUIRED

ANY OTHER MAJOR T&P REQUIRED FOR SATISFACTORY COMPLETION OF THE WORKS.

B: MEASURING AND MONITORING DEVISES (MMD):

AS PER REQUIREMENT TO BE FINALIZED AT SITE.

NOTE:

THIS ABOVE LIST IS ONLY INDICATIVE AND NEITHER EXHAUSTIVE NOR LIMITING. QUANTITIES INDICATED ABOVE ARE ONLY THE MINIMUM REQUIRED. CONTRACTOR SHALL DEPLOY ALL NECESSARY T&P TO MEET THE SCHEDULES & AS PRESCRIBED BY BHEL.

APPENDIX-V

ANALYSIS OF UNIT RATE QUOTED

SL.N.	DESCRIPTION	% OF QUOTED RATE	REMARKS
01	SITE FACILITIES VIZ., ELECTRICITY, WATER OTHER INFRASTRUCTURE.		
02	SALARY AND WAGES + RETRENCHMENT BENEFITS		
03	CONSUMABLES		
04	T&P DEPRECIATION & MAINTENANCE		
05	ESTABLISHMENT & ADMINISTRATIVE EXPENSES		
06	OVERHEADS		
07	PROFIT		
	TOTAL	100%	

SIGNATURE OF THE TENDERER

DATE:

APPENDIX-VI

FORMAT FOR MONTH-WISE MANPOWER DEPLOYMENT PLAN
(CATEGORY-WISE NUMBERS TO BE INDICATED FOR EACH MONTH FOR TOTAL CONTRCT PERIOD)

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

SIGNATURE OF TENDERER
DATE:

APPENDIX–VII
FORMAT FOR DEPLOYMENT PLAN FOR MAJOR TOOLS AND PLANTS FOR TOTAL CONTRCT PERIOD

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

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

SIGNATURE OF THE TENDERER

DATE:

APPENDIX–VII

DETAILS OF SIMILAR WORK DONE DURING THE LAST SEVEN YEARS

SL. NO.	FULL POSTAL ADDRESS OF CLIENT & NAME OF OFFICER IN CHARGE	DESCRIP-TION OF WORK	VALUE OF CONTRACT	DATE OF AWARD OF WORK	DATE OF COMMENCE MENT OF WORK	ACTUAL COMPLETION TIME (MONTHS)	DATE OF ACTUAL COMPLETION OF WORK	REMARKS
1								
2								
3								
4								
5								
6								

BIDDERS SHALL ENCLOSE COPIES OF DETAILED WORK ORDER (GIVING BILL OF QUANTITIES AND SCOPE OF WORK) AND COMPLETION CERTIFICATE IN SUPPORT OF THIS STATEMENT. BIDDER MAY USE SEPARATE SHEET AS REQUIRED

DATE

SIGNATURE OF TENDERER WITH SEAL