

TENDER SPECIFICATION

No. - BHE/PW/PUR/MAUDT-STG/721

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 STEAM TURBINE, TURBO- GENERATOR SET AND ITS AUXILIARIES, HP/LP HEATER AND DEAERATOR, INSULATION AND FINAL PAINTING, ETC OF 2X500 MW MAUDA SUPER THERMAL POWER PROJECT UNIT Nos -01 & 02

AT

MAUDA SUPER THERMAL POWER STATION

NTPC LIMITED

TEHSIL-MAUDA, DIST-NAGPUR

MAHARASHTRA

PART I - TECHNICAL BID SPECIFICATION



BHARAT HEAVY ELECTRICALS LIMITED

(A GOVERNMENT OF INDIA UNDERTAKING)

POWER SECTOR : WESTERN REGION

345, KINGSWAY : NAGPUR 440 001

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Bharat Heavy Electricals Limited: PSWR: NAGPUR

Tender Specifications No. BHE/PW/PUR/MAUDT-STG/721

Part-I: Technical Bid Specification

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LEGEND:

\$: Included in Tender Specifications Part-I. Hosted in BHEL web page (www.bhel.com) as file titled “**NIT+GCC-721**”.

@: Issued as separate hard copy booklet 'Tender Specifications Part-II (Price Bid-721)'. Hosted in BHEL web page (www.bhel.com) as file titled “**PRICE BID-721**”

Note:

Rest of the tender documents are included in Tender Specifications Part-I. Hosted in BHEL web page (www.bhel.com) as file titled “**TECH BID-721**”

BHARAT HEAVY ELECTRICALS LIMITED

(A GOVERNMENT OF INDIA UNDERTAKING)

POWER SECTOR - WESTERN REGION

SHREEMOHINI COMPLEX

345, KINGS WAY - NAGPUR 440 001

TENDER SPECIFICATION

No. - BHE/PW/PUR/MAUDT-STG/721

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
STEAM TURBINE,TURBO- GENERATOR SET AND ITS AUXILIARIES, HP/LP
HEATER AND DEAERATOR, INSULATION AND FINAL PAINTING, ETC OF
2X500 MW MAUDA SUPER THERMAL POWER PROJECT UNIT Nos -01 & 02**

AT

MAUDA SUPER THERMAL POWER STATION

NTPC LIMITED

TEHSIL-MAUDA, DIST-NAGPUR

MAHARASHTRA

EARNEST MONEY DEPOSIT : REFER NOTICE INVITING TENDER

LAST DATE AND TIME FOR : REFER NOTICE INVITING TENDER

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

M/s.

.....

NOTE :

THESE TENDER DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

Sr. Dy.GEN MANAGER (PURCHASE)

PLACE: NAGPUR

DATE:

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Bharat Heavy Electricals Limited: PSWR: NAGPUR

Tender Specifications No. BHE/PW/PUR/MAUDT-STG/721

Part-I: Technical Bid Specification

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BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking)
POWER SECTOR - WESTERN REGION
345-KINGSWAY, NAGPUR 440 001

PROCEDURE FOR SUBMISSION OF SEALED TENDERS

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

PART-I (TECHNICAL BID) COVER-I

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

PART-II (PRICE BID) COVER-II

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

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

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

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

- CONTRACTOR SHOULD HAVE ADEQUATE RESOURCES INCLUDING MAJOR T&PS AT HIS DISPOSAL FOR THIS JOB.
- CONTRACTOR SHOULD HAVE SOUND FINANCIAL STABILITY.
- TENDERER SHOULD MEET QUALITY REQUIREMENT REGARDING WORKMANSHIP, DEPLOYMENT OF PERSONNEL, ERECTION TOOLS AND NECESSARY INSPECTION, MEASUREMENT & TESTING INSTRUMENTS.
- ALL INFORMATION AS CALLED FOR IN VARIOUS APPENDICES AND CLAUSES OF TENDER SPECIFICATION SHOULD BE FURNISHED IN COMPLETENESS. PLEASE REFER THE CHECKLIST.
- CLARIFICATION ON TENDER IF ANY, SHALL BE OBTAINED BY THE TENDERER BEFORE SUBMITTING THEIR OFFER.
- OFFERS MUST BE SUBMITTED WITHOUT ANY DEVIATION.
- OFFERS RECEIVED WITH ANY DEVIATION OR WITHOUT RELEVANT INFORMATION AS DESCRIBED ABOVE ARE LIABLE TO BE REJECTED. PRICE BIDS RECEIVED IN THE FORM OTHER THAN SPECIFIED IN PART-II (PRICE BID) ARE LIABLE TO BE REJECTED.
- In case customer approval is required for this package, bidder's offer will be accepted subject to approval of bidder by customer.

PROJECT INFORMATION

BHEL's Client M/s NTPC Limited has decided to set up a new Coal based super thermal power plant at Mauda Tehsil, Distt-Nagpur, Maharashtra. The said client has decided to set up two power generation units of 500 MW ratings each in this Greenfield project.

LOCATION & APPROACH

- 1) Project Name: Mauda Super thermal Power Station Units # 01 & 02 (500 MW each).
- 2) Project Location: Tehsil- Mauda, Dist: Nagpur, Maharashtra.
- 3) Transport facilities:
 - A) Nearest Railway: Chacher Railway Station is on Nagpur-Kolkata Broad Gauge (BG) section of south eastern Railway (Main line) is 8 kms away.
 - B) Road: Mauda STPS is connected to Mauda town by 04 Kms long all-weather road. Mauda town is 40 Kms from Nagpur on NH-6.
 - C) Nearest Airport: Nagpur / 50 Kms, from Mauda town.

CLIMATIC CONDITIONS:

General:

- 1) Maximum ambient Temperature: 50° Centigrade
- 2) Minimum ambient Temperature: 6° Centigrade
- 3) Relative Humidity: 60 %
- 4) Wind Speed: 44 m/s at ten metres above the ground level as per IS 875(Part-3).

GEOGRAPHICAL CONDITIONS:

- 1) Latitude – 21°-10'-50" N
- 2) Longitude – 79° -23'-52" E

CHECK LIST

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

20	PROGRAMME FOR THE SUBJECT WORK FURNISHED	YES	NO
21	BIDDER HAS FAMILIARIZED HIMSELF WITH ALL RELEVANT LOCAL LAWS & CONDITIONS.	YES	NO
22	WHETHER ALL THE PAGES OF THE TENDER DOCUMENTS ARE READ, UNDERSTOOD AND SIGNED	YES	NO
23	<p>WHETHER THE FOLLOWING DETAILS PERTAINING TO YOUR BANK ACCOUNT DULY ENDORSED BY THE BANK HAVE BEEN FURNISHED {TO ENABLE BHEL RELEASE PAYMENTS THROUGH ELECTRONIC FUND TRANSFER (EFT/RTGS) AS SPECIFIED IN SECTION 12 }</p> <ol style="list-style-type: none"> 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 <p>NOTE: In case Bank endorsed certificate regarding above has already been submitted earlier, Kindly submit photocopy of the same</p>	YES	NO

NOTE : STRIKE OFF YES OR NO, AS APPLICABLE

DATE :

SIGNATURE OF TENDERER

DECLARATION SHEET

I, _____, HEREBY CERTIFY THAT ALL THE INFORMATION AND DATA FURNISHED BY ME WITH REGARD TO THE TENDER SPECIFICATION NO.BHE/PW/PUR/MAUDT-STG/721 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/MAUDT-STG/721

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

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

DATE:

SIGNATURE OF THE TENDERER

SECTION-3
OFFER OF THE CONTRACTOR

DGM (PURCHASE)
BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR - WESTERN REGION
SHREEMOHINI COMPLEX
345, KINGS WAY
NAGPUR 440 001

DEAR SIR,

I/WE HEREBY OFFER TO CARRY OUT THE WORK DETAILED IN TENDER SPECIFICATION NO. BHE/PW/PUR/MAUDT-STG/721 FOR UNIT-1 & 2 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 LAKH ONLY). DETAILS OF EMD PAYMENT ARE FURNISHED IN THE CHECK LIST.

EMD SHALL BE REFUNDED SHOULD OUR OFFER NOT BE ACCEPTED / EMD **NEED NOT BE REFUNDED AND THE AMOUNT MAY BE TREATED AS "ONE TIME EMD" FOR ERECTION AND COMMISSIONING TENDERS OF BHEL-PSWR, NAGPUR.** SHOULD OUR OFFER BE ACCEPTED, I/WE FURTHER AGREE TO DEPOSIT SECURITY DEPOSIT FOR THE WORK AS PROVIDED FOR IN THE TENDER SPECIFICATION WITHIN THE STIPULATED TIME AS MAY BE INDICATED BY BHEL, POWER SECTOR-WESTERN REGION, NAGPUR.

OR,

WE HAVE ALREADY DEPOSITED ONE TIME EMD OF Rs. 2,00,000/- (RUPEES TWO LACS ONLY), DETAILS OF WHICH ARE FURNISHED IN THE CHECK LIST.

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

PLACE:
DATE :

SIGNATURE OF TENDERER:
ADDRESS:

WITNESSES WITH THEIR ADDRESS

SIGNATURE

NAME

ADDRESS

1.

2.

.....
Bharat Heavy Electricals Limited: PSWR: NAGPUR
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SECTION- 4

SPECIAL CONDITIONS OF CONTRACT

4.0 GENERAL

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

- 1) COLLECTION OF MATERIALS AT BHEL/ CLIENT STORES, STORAGE YARD, LOADING, TRANSPORTATION TO, UNLOADING AT SITE OF WORK, PRE-ASSEMBLY, IF ANY, PRE-ERECTION CHECKS AS APPLICABLE
- 2) ERECTION, ALIGNMENT AND WELDING, BOLTING, FASTENING, GROUTING AS APPLICABLE OF:
 - a) COMPLETE SET OF 2X500 MW STG AND AUXILIARIES AND INCLUDING HP/LP HEATER AND DEAERATOR, INSULATION AND FINAL PAINTING, ETC
 - b) BOUGHT OUT ITEMS SUCH AS PUMPS, HOISTS, ETC
 - c) MAIN CIRCULATING WATER PIPING INCLUDING BUTTERFLY VALVES OF CONDENSER INLET AND OUTLET UP TO CUSTOMER TERMINAL POINT IN TG AREA
- 3) NON-DESTRUCTIVE EXAMINATION & POST WELD HEAT TREATMENT
- 4) PRE-COMMISSIONING CHECKS/TEST, TRIAL RUN/TESTING AND COMMISSIONING ASSISTANCE
- 5) TRIAL OPERATION AND PERFORMANCE GUARENTEE TEST.
- 6) HANDING OVER OF THE UNIT

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

4.1.1 GENERAL REQUIREMENTS – COMMON TO ALL WORK

4.1.1.1

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

4.1.1.2

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

4.1.1.3

THE WORK SHALL BE EXECUTED UNDER THE USUAL CONDITIONS AFFECTING MAJOR POWER PLANT CONSTRUCTION AND IN CONJUNCTION WITH NUMEROUS OTHER OPERATIONS AT SITE. THE CONTRACTOR AND HIS PERSONNEL SHALL COOPERATE WITH

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Bharat Heavy Electricals Limited: PSWR: NAGPUR
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PERSONNEL OF BHEL, BHEL'S CUSTOMER, CUSTOMER'S CONSULTANTS AND OTHER CONTRACTORS, COORDINATING HIS WORK WITH OTHERS AND PROCEED IN A MANNER THAT SHALL NOT DELAY OR HINDER THE PROGRESS OF WORK OF THE PROJECT AS A WHOLE.

4.1.1.4

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

4.1.1.5

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

4.1.1.6

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

4.1.1.7

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

4.1.1.8

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

4.1.1.9

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

4.1.1.10

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

4.1.1.11

BHEL RESERVES RIGHT TO RECOVER FROM THE CONTRACTOR ANY LOSS WHICH ARISES OUT OF UNDUE DELAY/DISCREPANCY/SHORTAGE/DAMAGE OR ANY OTHER CAUSES DUE TO CONTRACTOR'S LAPSE DURING ANY STAGE OF WORK. ANY LOSS TO BHEL DUE TO CONTRACTOR'S LAPSE SHALL HAVE TO BE MADE GOOD BY THE CONTRACTOR.

4.1.1.12

ALL CRANES, TRANSPORT EQUIPMENT, HANDLING EQUIPMENT, TOOLS, TACKLES, FIXTURES, EQUIPMENT, MANPOWER, SUPERVISORS/ENGINEERS, CONSUMABLES ETC, EXCEPT OTHERWISE SPECIFIED AS BHEL SCOPE AS FREE ISSUE, REQUIRED FOR THIS SCOPE OF WORK SHALL BE PROVIDED BY THE CONTRACTOR. ALL EXPENDITURE INCLUDING TAXES AND INCIDENTALS IN THIS CONNECTION WILL HAVE TO BE BORNE BY HIM UNLESS OTHERWISE SPECIFIED IN THE RELEVANT CLAUSES. THE CONTRACTOR'S QUOTED RATES SHALL BE INCLUSIVE OF ALL SUCH CONTINGENCIES.

4.1.1.13

DURING THE COURSE OF ERECTION, TESTING AND COMMISSIONING CERTAIN REWORK / MODIFICATION / RECTIFICATION / REPAIR / FABRICATION ETC MAY BECOME NECESSARY ON ACCOUNT OF FEED BACK / REVISION OF DRAWING. THIS WILL ALSO INCLUDE MODIFICATIONS / RE-WORKS SUGGESTED BY BHEL / CUSTOMER / OTHER INSPECTION GROUP. CONTRACTOR SHALL CARRY OUT SUCH REWORK / MODIFICATION / RECTIFICATION / FABRICATION / REPAIR ETC PROMPTLY AND EXPEDITIOUSLY. DAILY LOG SHEETS SIGNED BY BHEL ENGINEER AND INDICATING THE DETAILS OF WORK CARRIED OUT, MAN-HOURS ETC SHALL BE MAINTAINED BY THE CONTRACTOR FOR SUCH REWORKS. CLAIM OF CONTRACTOR IF ANY, FOR SUCH WORKS WILL BE GOVERNED BY CLAUSES OF SECTION-13 SPECIAL CONDITIONS OF CONTRACT.

4.1.1.14

ALL WORKS SUCH AS CLEANING, LEVELING, ALIGNING, TRIAL ASSEMBLY, DISMANTLING OF CERTAIN EQUIPMENTS / COMPONENTS FOR CHECKING AND CLEANING, SURFACE PREPARATION, FABRICATION OF STRUCTURES, TUBES AND PIPES AS PER GENERAL ENGINEERING PRACTICE AND AS PER BHEL ENGINEER'S INSTRUCTIONS AT SITE, CUTTING, GOUGING, WELD DEPOSITING, GRINDING, STRAIGHTENING, CHAMFERING, FILING, CHIPPING, DRILLING, REAMING, SCRAPPING, LAPPING, FITTING UP, DRILLING OF HOLES, MAKING DOWEL PINS AND MINOR RECTIFICATION OF FOUNDATION BOLTS ETC AS MAY BE APPLICABLE IN SUCH ERECTION WORKS AND WHICH ARE TREATED INCIDENTAL TO THE ERECTION WORKS AND NECESSARY TO COMPLETE THE WORK SATISFACTORILY, SHALL BE CARRIED OUT BY THE CONTRACTOR AS PART OF THE WORK WITHIN THE QUOTED RATES.

4.1.1.15

THE CONTRACTOR SHALL MAKE ALL FIXTURES, TEMPORARY SUPPORTS, STEEL STRUCTURES REQUIRED FOR JIGS & FIXTURES, ANCHORS FOR LOAD AND GUIDE PULLEYS REQUIRED FOR THE WORK. NECESSARY STEEL SHALL BE ARRANGED BY CONTRACTOR.

4.1.1.16

THE CONTRACTOR SHALL TAKE DELIVERY OF THE COMPONENTS, EQUIPMENTS, CHEMICALS, AND LUBRICANTS ETC FROM THE BHEL STORES/ STORAGE AREA AFTER GETTING THE APPROVAL OF BHEL ENGINEER ON STANDARD INDENT FORMS OF BHEL. COMPLETE AND DETAILED ACCOUNT OF THE MATERIALS AND EQUIPMENTS AFTER USAGE SHALL BE SUBMITTED TO THE BHEL AND RECONCILED PERIODICALLY. MATERIALS ISSUED EXCESS/ UNSPENT AS ALSO THE PARTIALLY FILLED/ EMPTY CONTAINERS AFTER USE HAVE TO BE RETURNED TO BHEL STORES DULY ACCOUNTED AND IDENTIFIED.

4.1.1.17

THE ROAD LENGTH TO STORAGE YARD FROM THE PROJECT SITE IS ABOUT 4-5 KM. THESE ARE APPROXIMATE DISTANCES ANY VARIATION IN THESE DISTANCES SHALL NOT ENTITLE CONTRACTOR ANY ADDITIONAL COMPENSATION OR ANY CLAIM OF ANY KIND.

4.1.1.18

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

4.1.1.19

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

4.1.1.20

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

4.1.1.21

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

4.1.1.22

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

4.1.1.23

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

SIMILARLY, CONTRACTOR SHALL MOUNT ALL FLOW INDICATORS, CENTRIFUGAL/SPEED SWITCHES OF MOTORS, ACCUMULATORS, PRESSURE REGULATORS, ETC WHICH ARE RECEIVED LOOSE AND WHICH ARE TO BE ERECTED/MOUNTED AT SITE ON AIR, WATER, OIL, AND STEAM LINES, AUXILIARIES ETC. THESE ARE TO BE MOUNTED DURING ERECTION FOR FINALISING ROUTING/POSITION ETC. THEY ARE TO BE DISMANTLED AFTER COMPLETION OF ERECTION WORK AND HANDED OVER TO BHEL FOR CALIBRATION. AFTER CALIBRATION, THESE INSTRUMENTS SHALL BE REMOUNTED BY THE CONTRACTOR IN THEIR RESPECTIVE POSITIONS JUST BEFORE COMMISSIONING.

4.1.1.24

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

4.1.1.25

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

4.1.1.26

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

4.1.1.27

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

4.1.1.28

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

4.1.1.29

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

4.1.1.30

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

4.1.1.31

ALL THE HT MOTORS SHALL BE PRESERVED WITH SPACE HEATERS ON, AND PROVIDED WITH PROPER COVER TILL THE COMMISSIONING OF THE MOTORS.

4.1.1.32

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

4.1.2 COLLECTION AND RETURN OF EQUIPMENTS, MATERIALS & CONSUMABLES

4.1.2.1

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.

4.1.2.2

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.

4.1.2.3

TRANSPORTATION OF LUBE OIL, GAS CYLINDERS ETC. FROM STORES, IS INCLUDED IN THE SCOPE OF THIS CONTRACT. THE CONTRACTOR SHALL HAVE TO RETURN THE ENTIRE 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 FOUNDATIONS, AND GROUTING OF EQUIPMENT OF STG & AUXILIARIES

4.2.1

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

4.2.2

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

4.2.3

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

4.2.3.1

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

4.2.3.2

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 (MACHINED AND/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

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

4.2.6

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.

4.3 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

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 AS FREE ISSUE.

4.3.3

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.

4.3.4

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

4.3.5

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.

4.3.6

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. FURTHER, ANY PIPELINE / FLANGES / FITTINGS NOT FOUND ASSEMBLED PROPERLY, THE SAME HAVE TO BE RECTIFIED / CORRECTED BY THE CONTRACTOR.

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 ENGINEER'S INSTRUCTIONS AND/OR AS PER APPROVED DRAWINGS.

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

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.

4.4.5

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

- A) TO LOCATE CAUSE OF VIBRATIONS IN EQUIPMENTS/AUXILIARIES/PIPELINES AND CARRYING OUT NECESSARY CORRECTIONS IN CASE THE SAME IS ATTRIBUTED TO THE CONTRACTOR.
- B) 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.
- C) PRE-ASSEMBLY OF SPRING SUSPENSION/HANGERS AND SHOCK ABSORBER AS PER REQUIREMENT.
- D) 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 ANY OTHER AGENCY. THIS MAY INVOLVE CUTTING OF PIPE LINES, FRESH EDGE PREPARATION AND WELDING WITH STRESS RELIEVING WHEREVER APPLICABLE.
- E) FABRICATION / MAKING OF BENDS FOR PIPES AND TUBES OF DIAMETER UPTO 65MM.
- F) MATCHING OF ALL FITTINGS LIKE TEES, BENDS, FLANGES, REDUCERS VALVES, SOCKET FITTINGS, ETC WITH PIPES FOR WELDING.
- G) SERVICING OF VALVES AND ACTUATORS
- H) CLEANING OF ALL PIPES BY WIRE BRUSHING / BLOWING BY COMPRESSED AIR.
- I) 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.
- J) WELDING OF BLANKS WITH STRESS RELIEVING IF REQUIRED ON A TEMPORARY BASIS.

4.4.6

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.

4.4.7

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.

4.4.8

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.

4.5 CONDENSER INSTALLATION

4.5.1

THE CONDENSER WILL BE DESPATCHED IN LOOSE PARTS MAINLY COMPRISING OF BOTTOM PLATES, DOME WALLS, 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 PRESERVATION AND PAINTING OF CONDENSER SURFACES IN VARIOUS AREA AND AT VARIOUS STAGES OF WORK

A. STEAM SIDE PAINTING

TWO COATS OF STEAM WASHABLE PAINTS SHALL BE APPLIED ON STEAM SIDE OF LP TURBINE AND **CONDENSER SHELL INTERNALS**, AS ADVISED BY BHEL. THE STEAM WASHABLE PAINTS, PRIMER AND THINNER WILL BE SUPPLIED BY BHEL FREE. HOWEVER, ARRANGEMENTS FOR SURFACE PREPARATION AND PAINT APPLICATION, CONSUMABLES LIKE SURFACE CLEANING AGENTS, PAINT BRUSH, BRUSH CLEANSER, LABOUR AND NECESSARY TOOLS AND PLANTS ARE IN THE SCOPE OF CONTRACTOR.

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

B. WATER SIDE PAINTING

THE WATER BOXES SHALL BE SANDBLASTED TO REMOVE ALL TRACES OF PRIMER APPLIED AT THE WORKS. THEREAFTER TWO COATS OF EPOXIDE PRIMING PAINT FOLLOWED BY TWO/THREE COATS OF HIGH BUILD BLACK COAL TAR EPOXY (E.G., "APCODUR CP684" OF ASIAN PAINTS **OR EQUIVALENT FROM ANY OTHER BHEL/NTPC APPROVED MANUFACTURER**). CONTRACTOR SHALL SUBMIT MANUFACTURER'S BATCH TEST CERTIFICATE / TEST CERTIFICATE FROM BHEL/NTPC 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.

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. **CARE SHALL BE TAKEN TO PLUG THE EXPANDED TUBE ENDS TO PREVENT ENTRY OF PAINT INTO THE TUBES. THE CONTRATOR SHALL ARRANGE FOR THE PLUGS IF NOT PROVIDED ALONGWITH THE TUBES.**

THE WATER SIDE PAINTING ON WATER BOXES, WATER CHAMBERS AND TUBE PLATES SHALL BE DONE PRIOR TO THE WATER SIDE HYDRAULIC TEST OF THE CONDENSER.

4.5.7 MAIN CIRCULATING COOLING WATER PIPING

THE WORK OF COMPLETE INSTALLATION OF MAIN CIRCULATING COOLING WATER PIPING OF CONDENSER INLET AND OUTLET WITH ASSOCIATED RE JOINTS AND BUTTERFLY VALVES ETC WITH NECESSARY HANGERS AND SUPPORTS UPTO CUSTOMER TERMINAL POINT IN TG AREA IS TO BE EXECUTED AS PART OF THIS WORK. IT WILL ALSO INCLUDE ANY PAINTING / COATING TO BE DONE ON OUTSIDE AND INSIDE OF PIPE NEAR WELD JOINTS. NDE AS SPECIFIED SHALL BE PERFORMED.

4.6 GENERATOR INSTALLATION

4.6.1 GENERATOR STATOR

THE GENERATOR STATOR, WEIGHING **258** METRIC TONNES (APPROX.) , WILL BE DELIVERED TO SITE EITHER (1) ON A TRAILOR OR (2) ON A SPECIAL WAGON

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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. THE CONTRACTOR SHALL HAVE TO LIFT THE GENERATOR STATOR FROM THE ABOVE TRANSPORT ARRANGEMENT IN THE UNLOADING BAY 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. REFER SECTION-7 WITH REGARD TO PORTAL GANTRY CRANE.

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

4.7 FST & DE-AERATOR INSTALLATION

4.7.1

BHEL WILL PROVIDE ITS CRAWLER CRANE, ON SHARING BASIS, TO LIFT THE DE-AERATOR AND FEED STORAGE TANK COMPONENTS TO THE NEAREST POSSIBLE FLOOR/ELEVATION. CONTRACTOR HAS TO MAKE ARRANGEMENTS FOR DRAGGING, PLACEMENT ON FOUNDATION/PROPER ELEVATION AND FURTHER WORKS LIKE ALIGNMENT, FITUP, WELDING ETC. CONTRACTOR SHALL ALSO MAKE HIS OWN ARRANGEMENTS FOR LOADING OF THESE COMPONENTS AT STORES, TRANSPORTATION TO SITE AND UNLOADING AT SITE.

4.7.2

ERECTION OF PERMANENT APPROACH PLATFORM AND LADDERS ETC FOR DE-AERATOR AND FST IS 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.

4.8 WELDING, RADIOGRAPHY AND OTHER NON-DESTRUCTIVE TESTING, POST WELD HEAT TREATMENT

4.8.1 WELDING

4.8.1.1

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

4.8.1.2

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

4.8.1.3

ALL WELDING SHALL BE DONE ONLY BY DULY QUALIFIED WELDERS TESTED FOR RESPECTIVE AREA OF WORK AT SITE. ALL THE EXPENDITURE IN TESTING/QUALIFICATION OF THE CONTRACTOR'S WELDER SHALL BE BORNE BY CONTRACTOR.

4.8.1.4

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

4.8.1.5

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

4.8.1.6

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

4.8.1.7

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

4.8.1.8

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

4.8.1.9 SOCKET WELDING :

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

4.8.1.10

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

4.8.1.11

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

4.8.2 HEAT TREATMENT:

4.8.2.1

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

4.8.2.2

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

4.8.2.3

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

4.8.2.4

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

4.8.2.5

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

4.8.2.6

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

4.8.2.7

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

4.8.3 NON DESTRUCTIVE EXAMINATION :

4.8.3.1

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

4.8.3.2

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

4.8.3.4

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

4.8.3.5

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

4.8.3.6

WHERE REQUIRED, SURFACE PREPARATION, LIKE SMOOTH GRINDING OF WELDED AREA, PRIOR TO RADIOGRAPHY SHALL BE DONE. IT MAY ALSO BECOME NECESSARY TO ADOPT INTER-LAYER NDE DEPENDING UPON THE SITE/ TECHNICAL REQUIREMENT NECESSITATING INTERRUPTIONS IN CONTINUITY OF THE WORK AND MAKING NECESSARY ARRANGEMENTS FOR CARRYING OUT THE ABOVE WORK. THE CONTRACTOR SHALL TAKE

ALL THIS INTO ACCOUNT IN HIS OFFER. THE REQUIRED NDT METHOD/PROCEDURE WILL BE DECIDED BY BHEL ENGINEER AT SITE.

4.8.3.7

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

4.8.3.8

RADIOGRAPHY SHOTS TO BE TAKEN BY DOUBLE WALL TECHNIQUE OR ANY OTHER METHOD TO BE ADOPTED IN CONSULTATION WITH BHEL ENGINEER AT SITE.

4.8.3.9

NO SEPARATE PAYMENT FOR ANY NDE ACTIVITIES IS ENVISAGED.

4.9 TESTS, TRIALS, PRE-COMMISSIONING & COMMISSIONING ETC

4.9.1

COMMISSIONING OF THE STG AND AUXILIARIES WILL BRIEFLY & GENERALLY INVOLVE THE FOLLOWING TESTS AND ACTIVITIES OF THE EQUIPMENTS ERECTED :

- (i) TRIAL RUN OF FEED PUMPS, CEP, AND VARIOUS ROTATING MACHINERIES / PUMPS.
- (ii) TRIAL RUN OF MOTORS/ DRIVES FOR VARIOUS AUXILIARIES.
- (iii) HYDRAULIC TEST OF PIPELINES, CLOSED SYSTEMS, TANKS AND VESSELS.
- (iv) FLUSHING OF ALL PIPELINES BY AIR/OIL/WATER/STEAM AS THE CASE MAY BE.
- (v) SERVICING OF ALL VALVES AND FITTINGS.
- (vi) MANUAL/MECHANICAL CLEANING OF OIL TANKS, DE-AERATOR, 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.
- (vii) CHEMICAL CLEANING OF PIPING SYSTEMS, DE-AERATOR AND FST AS PER REQUIREMENT. CONTRACTOR SHALL CARRY OUT DISASSEMBLY AND REASSEMBLY OF VULNERABLE COMPONENTS LIKE DE-AERATOR SPRAY NOZZLES, GAUGES, INSTRUMENTS ETC. AS INSTRUCTED BY BHEL DURING THIS PROCESS.
- (viii) PUTTING TURBINE ON BARRING GEAR.
- (ix) ROLLING AND SYNCHRONISATION.
- (x) FULL LOAD OPERATION.
- (xi) TRIAL OPERATION

THE ABOVE LIST IS ONLY INDICATIVE AND OTHER TESTS/ TRIALS AS INDICATED DURING ERECTION & COMMISSIONING TO DEMONSTRATE THE COMPLETION OF ANY PART OR PARTS OF WORK PERFORMED BY THE CONTRACTOR HAVE TO BE PERFORMED. THESE ACTIVITIES/TESTS/TRIAL RUNS MAY HAVE TO BE REPEATED TILL SATISFACTORY RESULTS ARE OBTAINED AND ALSO TO MEET THE TECHNICAL AND STATUTORY REQUIREMENTS.

4.9.2

THE TESTING, TRIALS & PRE-COMMISSIONING ACTIVITIES WILL START AT APPROPRIATE STAGE OF MECHANICAL COMPLETION OF VARIOUS EQUIPMENTS AND SHALL CONTINUE

TILL THE UNIT IS HANDED OVER. SIMULTANEOUS ACTIVITIES LIKE CHECKING OF EQUIPMENTS ERECTED, PREPARING FOR TRIAL RUNS, FILLING UP OF LUBRICANTS, CHEMICALS, TRIAL RUN OF VARIOUS EQUIPMENT ETC WILL BE IN PROGRESS IN VARIOUS AREAS. ALL THESE WORKS NEED SPECIALISED CREW OF WORKMEN INCLUDING ELECTRICIANS, INSTRUMENT TECHNICIANS, FITTERS, IN EACH AREA TO RENDER ASSISTANCE TO BHEL COMMISSIONING STAFF. CONTRACTOR SHALL EARMARK SEPARATE MANPOWER IN ADEQUATE STRENGTH AND PROPERLY QUALIFIED/SKILLED FOR SUCH ACTIVITIES. THIS MANPOWER SHALL NOT BE DISTURBED OR DIVERTED. FURTHER, THESE WORKMEN MAY BE REQUIRED TO WORK ON EXTENDED HOURS AND ON ROUND THE CLOCK BASIS ALONG WITH BHEL ENGINEERS.

4.9.3

CONTRACTOR SHALL LAY TEMPORARY PIPELINES WITH FITTINGS AND ACCESSORIES ETC. AS INSTRUCTED BY BHEL ENGINEER FOR THE PURPOSE OF TESTING, 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 SUBJECT TO NECESSARY TESTING, NDE ETC AND DISMANTLED AFTER USE BY THE CONTRACTOR AND RETURNED TO BHEL STORES AS SPECIFIED ELSEWHERE IN THIS T.S.

4.9.4

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

4.9.5

IN CASE DURING VARIOUS STAGES OF THE TESTING/TRIALS/ PRE-COMMISSIONING OF EQUIPMENT COVERED HEREIN, ANY DEFECT IS NOTICED NECESSITATING REPAIR/ RECTIFICATION/ REWORK/ REPLACEMENT THEN CONTRACTOR ATTEND THE SAME EXPEDITIOUSLY AND PROMPTLY. CONTRACTOR'S CLAIM IF ANY, FOR SUCH REPAIR/RECTIFICATION/REWORK/ REPLACEMENT ETC WILL BE GOVERNED BY RELEVANT CLAUSES OF 'GCC' PROVIDED THE CAUSE OF SUCH WORK IS NOT ATTRIBUTABLE TO THE CONTRACTOR. THE PARTS TO BE REPLACED SHALL HOWEVER, BE PROVIDED BY BHEL FREE OF COST.

4.9.6

- i) CONTRACTOR SHALL CUT / OPEN / DISMANTLE WORK, IF NEEDED, AS PER BHEL ENGINEER'S INSTRUCTIONS DURING COMMISSIONING FOR INSPECTION, CHECKING AND MAKE GOOD THE WORKS AFTER INSPECTION IS OVER.
- ii) SIMILARLY, DURING THE COURSE OF ERECTION, IF CERTAIN PORTION OF EQUIPMENTS ERECTED BY THE CONTRACTOR HAS TO BE UNDONE FOR ENABLING OTHER CONTRACTORS / AGENCIES OF BHEL / CUSTOMER TO CARRY OUT THEIR WORK, CONTRACTOR SHALL CARRY OUT SUCH JOBS EXPEDITIOUSLY AND PROMPTLY AND MAKE GOOD THE JOB AFTER COMPLETION OF WORK BY OTHER CONTRACTORS / AGENCIES OF BHEL / CUSTOMER AS PER BHEL ENGINEER'S / AGENCIES OF BHEL / CUSTOMERS INSTRUCTIONS. CLAIMS, IF ANY, IN THIS REGARD SHALL BE GOVERNED AS PER CLAUSES of 'Extra Work' indicated in 'General Conditions of Contract', if applicable.

4.9.7

DURING THESE TESTS/ TRIALS AND PRE-COMMISSIONING ACTIVITIES REPLACING/ CHANGING MECHANICAL/OTHER SEALS OF EQUIPMENT, PUMPS, 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.

4.9.8

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.

4.9.9

THE CONTRACTOR SHALL RENDER ALL ASSISTANCE FOR INITIAL AND SUBSEQUENT FILLINGS OF GAS IN GENERATOR GAS SYSTEM AS AND WHEN REQUIRED TILL UNIT IS HANDED OVER.

4.9.10

CLEANING OF OIL TANK AS PER INSTRUCTIONS OF BHEL ENGINEER BEFORE AND AFTER OIL FLUSHING IS RESPONSIBILITY OF CONTRACTOR.

4.9.11

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.

4.9.12

IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE FOR NECESSARY RESOURCES TILL THE COMPLETION OF WORK UNDER THESE SPECIFICATION, EVEN IN CASE THE WORK GETS DELAYED DUE TO REASONS NOT ATTRIBUTABLE TO THE CONTRACTOR.

4.9.13

CONTRACTOR SHALL INSTALL BOTH PERMANENT AND TEMPORARY CONNECTING PIPING FOR OIL PURIFICATION EQUIPMENTS. FURTHER, ALL OPERATIONS FOR CLEANING, OIL PURIFICATION/ FLUSHING, DISMANTLING OF TEMPORARY PIPING DURING PRE AND POST-COMMISSIONING OF EQUIPMENT UPTO FULL LOAD SHALL BE DONE AS PART OF WORK.

4.10 GENERAL

4.10.1

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.

4.10.2

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

4.10.3

NO TEMPORARY SUPPORTS SHOULD BE WELDED ON TO THE PIPING.

4.10.4

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.

4.10.5

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.

4.10.6

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.

4.10.7

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.

4.11 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. THE SCOPE WILL BE LIMITED TO ALL THE TAPPING POINTS FOR WHICH MATERIALS ARE AVAILABLE AND THEIR LOCATIONS IDENTIFIED WITHIN THE REGULAR CONTRACT PERIOD AND EXTENSIONS THEREOF.

4.11.1

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.

4.11.2

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.

4.11.3

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

4.12 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 BHEL FREE. 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/NTPC**). CONTRACTOR SHALL SUBMIT MANUFACTURER'S BATCH TEST CERTIFICATE / TEST CERTIFICATE FROM **BHEL/NTPC** 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.

4.13 LINING AND INSULATION

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

1. 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/PIPING ETC

4.13.1

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 DEDEDCTED FROM CONTRACTOR'S BILLS TOWARDS EXPENDITURE INCURRED INCLUDING 30% DEPARTMENTAL CHARGES.

4.13.2

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

4.13.3

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.

4.13.4

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

4.13.5

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

4.13.6

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.

4.13.6

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

4.13.7

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

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- 4.13.8 THE CLADDING AND OUTER CASING ARE ALUMINIUM SHEETS. ALL RELEVANT SPECIFICATIONS AND PROCEDURES WITH REGARDS TO BEADING, SEALING ETC FOR ALUMINIUM SHEETS HAVE TO BE ADHERED TO.
- 4.13.9 CLADDING/OUTER CASING SHALL BE FIXED EXPEDITIOUSLY, SO AS TO AVOID DAMAGE TO THE INSULATION FROM THE WEATHER.
- 4.13.10 THE OVERLAPPING SURFACE OF OUTER CASING/CLADDING SHEET SHALL BE COATED WITH SEALING COMPOUND, WHICH WILL BE SUPPLIED BY BHEL FREE OF COST.
- 4.13.11 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.
- 4.13.12 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.
- 4.13.13 A LOG BOOK SHALL BE MAINTAINED BY THE CONTRACTOR FOR THE CLEARANCE OF THE AREA FOR APPLICATION OF REFRACTORY AND INSULATION. WHERE THE CONTRACTOR DOES THE WORK ON HIS OWN ACCORD WITHOUT PRIOR PERMISSION. THE WORK SHOULD BE RE-DONE, AT HIS OWN COST, WHERE NECESSITATED.
- 4.13.14 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.
- 4.13.15 THE FOLLOWING WORKS ARE ALSO INCLUDED IN THE SCOPE OF THIS CONTRACT.

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

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

4.13.16

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.

4.13.17

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.

4.13.18

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

4.14 FINAL PAINTING

4.14.1

ALL EXPOSED METAL PARTS OF THE EQUIPMENT INCLUDING PIPING, STRUCTURES, RAILINGS 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.

4.14.2 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 SHALL BE PROVIDED AT THE TIME OF EXECUTION. DURING 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.

4.14.3

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.

4.14.4

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.

4.14.5

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.

4.14.6

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.

4.14.7

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.

4.14.8

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

4.14.9

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

4.14.10

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.

4.14.11

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.

4.14.12

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.

4.14.13

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.

4.14.14

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

4.14.15

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

4.15 SPECIFIC INCLUSIONS

4.15.1

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.

4.15.2

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.

4.15.3

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.

4.15.4

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, DM WATER TREATMENT PLANT, ASH HANDLING PLANT, SERVICE WATER REQUIREMENT, FUEL OIL HANDLING PLANT ETC. CONTRACTOR SHALL PLAN AND COMPLETE ERECTION & COMMISSIONING OF THESE EQUIPMENTS ON PRIORITY AS PER DECISION OF BHEL ENGINEER/CUSTOMER REQUIREMENT. INDICATIVE DETAILS OF SUCH SYSTEMS ARE FURNISHED IN APPENDIX-I.

4.16 EXCLUSIONS

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

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

ALL CONTROL & INSTRUMENTATION WORK THAN OTHERWISE SPECIFIED HEREIN.

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

ERECTION, TESTING AND COMMISSIONING OF ELECTRICAL PANELS AND STARTING RESISTORS OF SEAL OIL, PRIMARY WATER, GAS SYSTEMS.

ELECTRICAL TESTING OF MOTORS (EXCEPT THOSE SPECIFIED HEREIN), TURBO-GENERATOR. HOWEVER ERECTION THESE WILL BE UNDER THE SCOPE OF THIS TENDER SPECIFICATION.

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

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

4.17

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.

SECTION-5

SPECIAL CONDITIONS OF CONTRACT

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

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

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

SPACE AS JOINTLY DECIDED WITH CUSTOMER & BHEL WILL BE PROVIDED FREE OF CHARGES FOR CONSTRUCTION OF LABOUR COLONY, TEMPORARY STRUCTURES/FACILITIES LIKE OFFICE, STORAGE SHEDS, PRE-ASSEMBLY AND FABRICATION AREAS, TOILETS, ETC. CONTRACTOR SHALL CONSTRUCT LABOUR COLONY INCLUDING LIGHTING, INTERNAL, ROADS, WATER DISTRIBUTION ENSURING PROPER HYGIENE AND PROVIDE FACILITIES FOR PROPER SANITATION AND DRAINAGE. CONTRACTOR SHALL COMPLY WITH THE STIPULATIONS OF MAHARASHTRA POLLUTION CONTROL BOARD WHILE CONSTRUCTING THE LABOUR COLONY CONTRACTOR SHALL MAKE ALL ARRANGEMENTS HIMSELF FOR THE SUPPLY OF POTABLE WATER AT HIS OWN COST AND SERVICES.

CONTRACTOR SHALL MAKE COMPLETE ARRANGEMENT FOR DRINKING WATER AT HIS OWN COST AND SERVICES FULFILLING ALL THE REQUIREMENTS INCLUDING STATUTORY & SAFETY REQUIREMENTS IN THIS REGARD AS PER THE INSTRUCTIONS FROM NTPC/BHEL.

5.2 TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES:

5.2.1

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

5.2.2

ALL TOOLS AND TACKLES TO BE DEPLOYED BY THE CONTRACTOR FOR THE WORK SHALL HAVE THE PRIOR APPROVAL OF BHEL ENGINEER WITH REGARD TO BRAND, QUALITY AND SPECIFICATION. INDICATIVE LIST OF MAJOR T&P TO BE ARRANGED BY 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 WELL IN ADVANCE FOR LIFTING AND PLACEMENT TO FINAL POSITION OF DEAERATOR / FST SECTIONS AT REQUIRED ELEVATION / LOCATION WITH UTMOST CARE.**

5.2.5

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. 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.

BHEL MAY PROVIDE STRAND JACK SYSTEM FOR STATOR LIFTING IN PLACE OF PORTAL CRANE. VENDOR TO PROVIDE ALL THE REQUIRED T&P, MANPOWERS, GROUND PREPARATION, CONSOLIDATION OF LAND ETC INCLUDING FIUNDATIONS IF REQUIRED AS PER BHEL SITE ENGINEER TO SUIT THE STATOR LIFTING REQUIREMENT. VENDOR SHALL UNLOAD, THE STRAND JACK, WHICH 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 ETC, CHECKING AND LUBRICATING WIRE ROPES, PRE ASSEMBLY AND ASSEMBLY OF COMPONENTS, PREPARATION OF FOUNDATION, ERECTION OF STRAND JACK ON THE FOUNDATION, GROUTING OF BASE PLATES, CABLING, PRE-COMMISSIONING AND COMMISSIONING OF DRIVES, LOAD TESTING, 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 STRAND JACK AS INSTRUCTED BY BHEL AND RETURN THE SAME TO STORE IN GOOD CONDITION.

THERE IS NO SEPARATE RATE FOR THE ABOVE AND QUOTED RATES SHALL BE INCLUSIVE OF THIS.

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

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 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 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 BE 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 AS PER SITE REQUIREMENT**
- (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

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SPACE AS JOINTLY DECIDED WITH CUSTOMER & BHEL WILL BE PROVIDED FREE OF CHARGES FOR CONSTRUCTION OF SITE OFFICE & STORES. CONTRACTOR SHALL CONSTRUCT SITE OFFICE & STORES INCLUDING LIGHTING COMPLETE ARRANGEMENT FOR WATER INCLUDING SOURCE AND PROVIDE FACILITIES FOR PROPER SANITATION AND DRAINAGE.

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. VENDOR SHOULD ALSO HAVE COMPUTERISED SYSTEM INCLUDING FAST INTERNET CONNECTIVITY FOR EFFECTIVE COMMUNICATION THROUGH E-MAIL, DAILY PROGRESS REPORT AND BILLING ETC.

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 AT 415V SHALL BE PROVIDED FREE OF CHARGE NORMALLY AT ONE LOCATION IN THE SITE AND MORE LOCATIONS DEPENDING UPON MUTUAL DISCUSSION AND AGREEMENT. FURTHER DISTRIBUTION SHALL BE ARRANGED BY THE CONTRACTOR AT HIS OWN COST AND SERVICES. ALL TEMPORARY WIRINGS MUST COMPLY WITH THE LOCAL REGULATIONS AND WILL BE SUBJECT TO NTPC & BHEL INSPECTION AND APPROVAL BEFORE CONNECTION TO SUPPLY. CONTRACTOR SHALL BE RESPONSIBLE FOR FULFILMENT OF ALL SUCH TYPE REQUIREMENTS INCLUDING STATUTORY REQUIREMENTS IN THIS REGARD.

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.

15.2.2 CONSTRUCTION WATER

CONTRACTOR SHALL MAKE ALL ARRANGEMENTS HIMSELF FOR THE SUPPLY OF CONSTRUCTION WATER AT HIS OWN COST AND SERVICES WITH ALL FURTHER DISTRIBUTION NETWORK AS AND WHEN REQUIRED. CONTRACTOR SHALL BE RESPONSIBLE FOR FULFILMENT OF ALL REQUIREMENTS INCLUDING STATUTORY & SAFETY REQUIREMENTS IN THIS REGARD AS PER THE INSTRUCTIONS FROM NTPC/BHEL.

5.7.4

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

5.7.5

BHEL IS NOT RESPONSIBLE FOR ANY LOSS OR DAMAGE TO THE CONTRACTOR'S EQUIPMENT AS A RESULT OF VARIATIONS IN VOLTAGE OR FREQUENCY OR INTERRUPTIONS IN POWER SUPPLY. CONTRACTOR SHALL TAKE SUITABLE INSURANCE POLICY FOR SUCH ACCIDENTAL LOSS/ DAMAGES.

5.8 RESPONSIBILITIES WITH REGARD TO LABOUR EMPLOYMENT ETC.

REFER RELEVANT CLAUSES 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.

5.9.0 TAXES, DUTIES, LEVIES

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.

5.9.4 Modalities of Tax Incidence on BHEL

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

5.9.5 New Taxes/Levies

In case the Government imposes any new levy/tax on the output service/ goods/work after award of the contract, the same shall be reimbursed by BHEL at actual.

In case any new tax/levy/duty etc. becomes applicable after the date of Bidder's offer, the Bidder/Contractor must convey its impact on his price duly substantiated by documentary evidence in support of the same **before opening of Price Bid**. Claim for any such impact after opening the Price Bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.

No reimbursement/recovery on account of increase/reduction in the rate of taxes, levies, duties etc. on input goods/services/work shall be made. Such impact shall be taken care of by the Price Variation/Adjustment Clause (PVC) if any. In case PVC is not applicable for the contract, Bidder has to make his own assessment of the impact of future variation if any, in rates of taxes/duties/ levies etc. in his price bid.

5.10 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 CONDITIONS OF CONTRACT

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

6.1

THE CONTRACTOR SHALL DEPLOY ALL THE SKILLED/SEMISKILLED/ UNSKILLED LABOUR INCLUDING HIGHLY SKILLED WORKMEN ETC. THESE WORKMEN SHOULD HAVE PREVIOUS EXPERIENCE ON SIMILAR JOB. THEY SHALL HOLD VALID CERTIFICATES WHEREVER NECESSARY. BHEL RESERVES THE RIGHT TO INSIST ON REMOVAL OF ANY EMPLOYEE OF THE CONTRACTOR AT ANY TIME IF HE IS FOUND TO BE UNSUITABLE AND THE CONTRACTOR SHALL FORTHWITH REMOVE HIM. CONTRACTOR SHOULD FURNISH A TENTATIVE DEPLOYMENT PLAN OF HIS MANPOWER AS REQUIRED VIDE APPENDIX-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 & AUXILIARIES
- 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 CONDITIONS OF CONTRACT

7.0 OBLIGATIONS OF BHEL

7.1 FACILITIES TO BE PROVIDED BY BHEL

7.1.1 SPACE FOR SITE OFFICE / STORES

REFER SECTION-5 IN THIS REGARD.

7.1.2 CONSTRUCTION POWER & WATER

REFER SECTION-5 IN THIS REGARD.

7.1.3 OTHER MATERIALS AND CONSUMABLES:

BHEL SHALL NOT PROVIDE ANY MATERIAL / CONSUMABLES EXCEPT THOSE SPECIFICALLY MENTIONED 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:

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

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

- 8.17 Contractor should be qualified to execute pressure parts & piping work coming under the purview of IBR, for which he should register himself with CIB of state concerned. contractor also should be aware of the latest IBR regulations and Electricity Act, including the amendments thereof.
- 8.18 All fees connected with the contractors for testing his welders / men / workers and testing, inspection, calibrating of his instruments and equipments, shall be paid by the contractor. It shall be contractor's responsibility to obtain approval of Statutory Authorities, wherever applicable, for the conducting of any work which comes under the purview of these authorities.
- 8.19 Other fees like fees for periodic visits, hydraulic test fees, light up inspection fees etc. shall be borne by the contractor.
- 8.20 Payment of Registration fees for Boiler is excluded from the scope.
- 8.21 BHEL shall pay the ground inspection fees of Boiler Inspectorate. All other arrangements for site visits periodically by Boiler Inspector to site, for obtaining Inspection certificate etc, will have to be made by contractor.
- 8.22 The quality management system of BHEL, Power Sector – Western Region (PSWR) has already been certified and accredited under ISO 9002 standards in this regard. The basic philosophy of the quality management system is to define the organizational responsibility, work as per documented procedures, verify the output with respect to acceptance norms, identify the non-conforming product/ procedure and take corrective action for removal of non-conformance specifying the steps for avoiding recurrence of such non-conformities, & maintain the relevant quality records. The non-conformities are to be identified through the conduct of periodical audit of implementation of quality systems at various locations/stages of work. Suppliers/vendors of various products/services contributing in the work are also considered as part of the quality management system. as such the contractor is expected not only to conform to the quality management system of BHEL but also it is desirable that they themselves are accredited under any quality management system standard.

Field Quality Assurance

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

SECTION-9

SPECIAL CONDITIONS OF CONTRACT

Safety, Occupational Health and Environmental Management

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

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

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

9.1 The Contractor shall:

9.1.1

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

9.1.2

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

9.1.3

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

9.1.4

Be fully responsible for the identity, conduct and integrity of the personnel/workers engaged by them for carrying out the contract work and ensure that none of them are ever engaged in any anti national activity

9.1.5

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

- i) Name of Contractor
- ii) Name of Contractor Site-in-charge & Telephone number
- iii) Job Description in short
- iv) Date of start of job

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- v) Date of expected completion
- vi) Name of BHEL Site-in-charge.

9.1.6

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

9.1.7

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

9.2 **SPECIAL CONDITIONS**

9.2.1 **Safety**

9.2.1.1 **Safety Plan**

Before commencing the work, contractor shall submit a "safety plan" to the authorized BHEL official. The safety plan shall indicate in detail the measures that would be taken by the contractor to ensure safety to men, equipment, material and environment during execution of the work. The plan shall take care to satisfy all requirements specified hereunder.

The contractor shall submit "safety plan" before start of work. During negotiations, before placing of work order and during execution of the contract, BHEL shall have right to review and suggest modifications in the safety plan. Contractor shall abide by BHEL's decision in this respect.

9.2.1.2

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

9.2.1.3

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

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

9.2.1.4

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

9.2.1.5

All electrical equipment, connections and wiring for construction power, its distribution and use shall conform to the requirements of Indian Electricity Act and Rules. Only electricians licensed by the appropriate statutory authority shall be employed by the contractor to carryout all types of electrical works. All electrical appliances including

portable electric tools used by the contractor shall have safe plugging system to source of power and be appropriately earthed.

9.2.1.6

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

9.2.1.7

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

9.2.1.8

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

9.2.1.9

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

9.2.1.10

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

9.2.1.11

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

9.2.1.12

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

9.2.1.13

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

9.2.1.14

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

9.2.1.15

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

9.2.1.16

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

9.2.1.17

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

9.2.1.18

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

9.2.1.19

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

9.2.1.20

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

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

9.2.1.21

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

9.2.1.22

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

9.2.1.23

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

9.2.1.24

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

9.2.1.25

If the contractor fails to improve the standards of safety in its operation to the satisfaction of BHEL after being given a reasonable opportunity to do so, and/or if the contractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instructions regarding safety issued by the authorized BHEL official, BHEL shall have the right to take corrective steps at the risk and cost of the contractor after giving a notice of not less than seven days indicating the steps that would be taken by BHEL.

9.2.1.26

Emergency Response

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

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

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

9.2.1.27

At least 5% Contractors supervisors and workmen shall undergo training in administering 'First Aid'. The trained persons should represent for all categories of work and for all areas of work. Adequate number of trained persons should be available for each shift. These first aides shall be included in the emergency response team. Contractor employees and workmen are encouraged to participate in first aid training programmes whenever organized by BHEL.

9.2.2 OCCUPATIONAL HEALTH

9.2.2.1

Specific occupational health hazards will be identified through the hazard evaluation processes in consultation with BHEL engineers and the necessary prevention/reduction/elimination methods implemented.

9.2.2.2

All personnel working in an activity with a potential risk to health shall be made aware of all those risks and the actions they must take to reduce/control/eliminate the risk

9.2.2.3

Safety coordinator shall conduct periodic checks to ensure that every group of workers engaged in similar activities are aware of potential risks to health and the actions required to be taken to mitigate the risk

9.2.2.4

In order to protect personnel from associated health hazards, the following main areas will be focused

- Issue of approved Personnel Protective Equipment
- Verification that the PPE are adequate/maintained and worn by all staff involved in operations that are potentially hazardous to their health
- Ensure that the personnel deployed are physically fit for the operation/work concerned
- Provide hygienic and sanitary working conditions

9.2.2.5

Contractor workers employees engaged in noise risk areas shall be issued with hearing protection aids and the use of the same will be enforced. Further, these workers will be educated on the hazards of noise

9.2.2.6

Contractor workers engaged in dust environment shall be issued with necessary dust protection aids and the use of the same shall be enforced

9.2.2.7

Workers engaged in exposure to bright light/rays as in welding or radiation shall be issued with eye protection devices and the use of the same shall be enforced

9.2.2.8

Adequate arrangements shall be made to provide safe drinking water

9.2.2.9

Health monitoring records on at least sample basis for contractor employees & workmen shall be maintained for persons engaged in specified categories of work. These shall include

- Noise induced hearing loss
- Lung Function test
- Ergonomic Test
- Eye Test for Welders, Grinders, Drivers etc

9.2.3.0 HYGIENE and HOUSEKEEPING

9.2.3.1

Good house keeping and proper hygiene is one of the key requirements of Occupational Health Safety and Environment management. Towards this the contractor shall encourage his workers and supervisors to maintain cleanliness in their area of work.

9.2.3.2

The Contractor shall arrange to place waste bins/chutes at convenient locations for the collection of scrap and other wastes. The bins shall be clearly marked and segregated for metal, non-metal, hazardous and non hazardous wastes.

9.2.3.3

BHEL may take up appropriate remedial measures at the cost of the contractors if the contractors fail in good house keeping and if there is an imminent risk of pollution

9.2.4 ENVIRONMENT MANAGEMENT

9.2.4.1

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

9.2.4.2 WASTE MANAGEMENT

9.2.4.3.1

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

9.2.4.3.2

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

9.2.4.3.3

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

9.2.4.3.4

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

9.2.4.3.5

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

9.2.4.3.6

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

9.3 SUPERVISION

9.3.1

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

9.3.2

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

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

9.3.3

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

9.3.4

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

9.4.0 **TRAINING & AWARENESS**

9.4.1

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

9.4.2

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

9.4.3

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

9.4.4

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

9.4.5

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

9.5.0 **REPORTING**

9.5.1

The contractor shall submit report of all accidents, fires and property damage, dangerous occurrences to the authorized BHEL official immediately after such occurrence but in any case not later than twelve hours of the occurrence. Such report shall be furnished in the manner prescribed by BHEL and also to meet statutory requirement.

9.5.2

Any injury sustained by any of the contractor's employees within the Project premises must be reported to BHEL supervisor and FIRST AID should be immediately

administered. The Contractor shall be responsible for keeping and maintaining proper records of Accidents to his personnel.

9.5.3

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

9.5.4

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

9.5.5

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

9.5.6

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

9.6 AUDIT REVIEW AND INSPECTION

9.6.1

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

9.6.2

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

- Compliance with procedures and systems
- Availability, condition and use of PPE
- Condition of maintenance tools, equipments, facilities
- Availability of fire fighting equipments and its condition
- Use of fire fighting equipments and first aid kit
- Awareness of occupational health hazard
- Awareness of safe working practices
- Presence of quality supervision
- Housekeeping

The Safety coordinator shall visit and inspect work sites daily. All unsafe acts, unsafe conditions that have imminent potential for causing harm/injury/damage will be immediately corrected. He shall maintain a daily logbook giving details of unsafe

acts or conditions observed and the corrective action taken and recommendations for preventing recurrence. Adequacy of corrective actions will be verified

The contractor shall take remedial measures as per the findings of each inspection Besides the above, the contractor shall be required to carry out the following inspections

SI no	Equipment	Scope of inspection	Inspection by	Schedule
1	Hand tools	To identify unsafe/defective tool	User	Daily
2	Power tools	To identify unsafe/defective tool	User	Daily
3	Fire Extinguishers	To check pressure and any defect	User / Safety Coordinator	Daily Every month
4	Lifting equipment/tackles	To check for defects and efficacy of brakes	User Third party	Daily Every Year
5	PPE	To check for defects	User	Daily

9.7 **NON COMPLIANCE:-**

9.7.1

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

Sl. No	Instance of Violation	Fine (in Rs)
01	Not Wearing Safety Helmet	50/-
02.	Not wearing Safety Belt	100/-
03.	Grinding Without Goggles	50/-
04.	Not using 24 V Supply For Internal Work	500/-
05.	Electrical Plugs Not used for hand Machine	100/-
06.	Not Slings property	200/-
07.	Using Damaged Sling	200/-
08.	Lifting Cylinders Without Cage	500/-
09.	Not Using Proper Welding Cable With Lot of Joints And Not Insulated Property.	200/-
10.	Not Removing Small Scrap From Platforms	200/-
11.	Gas Cutting Without Taking Proper Precaution or Not Using Sheet Below Gas Cutting	200/-
12.	Not Maintaining Electric Winches Which are Operated Dangerously	500/-
13.	Improper Earthing Of Electrical T&P	500/-
	Major Accident or Accidents causing partial loss of earning to the victim	50,000/- per victim
14	Fatal Accident or Accidents causing permanent loss of earning to the victim	1,00,000/- per victim

Any other non-conformity noticed not listed above will also be fined as deemed fit by BHEL. The decision of BHEL engineer is final on the above. The amount will be deducted from running bills of the contractor. The amount collected above will be utilised for giving award to the employees who could avoid accident by following safety rules. Also the amount will be spent for purchasing the safety appliances and supporting the safety activity at site.

9.8

CITATION: -If safety record of the contractor in execution of the awarded job is to the satisfaction of safety department of BHEL, issue of an appropriate certificate to recognize the safety performance of the contractor may be considered by BHEL after completion of the job

9.9 Memorandum of Understanding

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

Memorandum of Understanding

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

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

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

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

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

Name :

Place & Date:

9.10

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

IS No	YEAR	Amd upto	DESCRIPTION
IS 10204	1982		PORTABLE FIRE EXTINGUISHERS MECHANICAL FOAM TYPE
IS 10245	1994		SPECIFICATION FOR BREATHING APPARATUS
IS 10291	1982		SAFETY CODE FOR DRESS DRIVERS IN CIVIL ENGINEERING WORKS

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IS No	YEAR	Amd upto	DESCRIPTION
IS 10658	1983		HIGHER CAPACITY DRY POWDER FIRE EXTINGUISHERS (TROLLEY MOUNTED)
IS 10662	1992		COLOUR TELEVISION
IS 10667	1983		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR PROTECTION OF FOOT AND LEG
IS 11037	1984		ELECTRONIC FAN REGULATORS
IS 11057	1984		INDUSTRIAL SAFETY NETS
IS 11451	1998		RECOMMENDATION FOR SAFETY AND HEALTH REQUIREMENT RELATING TO OCCUPATION EXPOSURE TO ASBESTOS
IS 1169	1967		PEDESTAL FANS
IS 1179	1967		SPECIFICATION FOR EQUIPMENT FOR EYE AND FACE PROTECTION DURING WELDING
IS 11833	1986		DRY POWDER FIRE EXTINGUISHERS FOR METAL FIRES
IS 11972	1987		CODE OF PRACTICE FOR SAFETY PRECAUTION TO BE TAKEN WHEN ENTERING A SEWAGE SYSTEM
IS 1287	1986		ELECTRIC TOASTER
IS 13063	1991		STRUCTURAL SAFETY OF BUILDINGS ON SHALLOW FOUNDATIONS ON ROCKS
IS 13385	1992		SPECIFICATIONS FOR FIRE EXTINGUISHERS 50 LITRE WHEEL MOUNTED WATER TYPE (GAS CARTRIDGES)
IS 13386	1992		SPECIFICATIONS FOR FIRE EXTINGUISHERS 50 LITRE MECHANICAL FOAM TYPE
IS 13415	1992		CODE OF SAFETY FOR PROTECTIVE BARRIERS IN AND AROUND BUILDINGS
IS 13416	1992		RECOMMENDATIONS FOR PREVENTIVE MEASURES AGAINST HAZARDS AT WORKING PLACE PART 1 TO PART 5
IS 13430	1992		CODE OF PRACTICE FOR SAFETY DURING ADDITIONAL CONSTRUCTION AND ALTERATION TO EXISTING BUILDINGS
IS 13849	1993		PORTABLE FIRE EXTINGUISHERS DRY POWDER TYPE (CONSTANT PRESSURE)
IS 1446	1985		CLASSIFICATION OF DANGEROUS GOODS (FIRST REVISION)
IS 1476	1979		REFRIGERATORS
IS 1641	1988		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): GENERAL PRINCIPLES OF FIRE GRADING AND CLASSIFICATION
IS 1642	1989		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS- DETAILS OF CONSTRUCTION
IS 1643	1988		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): EXPOSURE HAZARD
IS 1646	1997		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): ELECTRICAL INSTALLATIONS
IS 1904	1986		CODE OF PRACTICE FOR DESIGN AND CONSTRUCTION OF FOUNDATIONS IN SOIL
IS 1905	1987		STRUCTURAL SAFETY OF BUILDINGS MASONARY WALLS
IS 2082	1985		ELECTRICAL GEYSERS
IS 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 No	YEAR	Amd upto	DESCRIPTION
IS 2418	1977		TUBULAR FLUORSCENT LAMPS IS 2418 (FT-1)
IS 2750	1964		STEEL SCAFFOLDINGS
IS 2762	1964		SAFE WORKING LOADS IN KGS FOR WIRE ROPE SLINGS
IS 2878	1986		FIRE EXTINGUISHERS CARBON DIOXIDE TYPE (PORTABLE AND TROLLEY MOUNTED)
IS 2925	1984		SPECIFICATION FOR INDUSTRIAL SAFETY HELMETS
IS 3016	1982		CODE OF PRACTICE FOR FIRE PRECAUTIONS IN WELDING AND CUTTING OPERATIONS- FIRST REVISION
IS 3315	1974		DESERT COOLERS
IS 3521	1989		INDUSTRIAL SAFETY BELTS AND HARNESS
IS 368	1983		IMMERSION WATER HEATERS
IS 3696	1991		SAFETY CODE OF SCAFFOLDS AND LADDERS PART 1 TO 2
IS 3737	1996		LEATHER SAFETY BOOTS FOR WORKERS IN HEAVY METAL INDUSTRIES
IS 374	1979		CEILING FANS INCLUDING REGULATORS
IS 3764	1992		EXCAVATION WORK - CODE OF SAFETY
IS 3786	1983		METHOD FOR COMPUTATION OF FREQUENCY AND SEVERITY RATES FOR INDUSTRIAL INJURIES AND CLASSIFICATION OF INDUSTRIAL ACCIDENTS
IS 3935	1966		CODE OF PRACTICE FOR COMPOSITE CONSTRUCTION
IS 4014	1967		CODE OF PRACTICE FOR STEEL TUBULAR SCAFFOLDING
IS 4081	1986		SAFETY CODE FOR BLASTING AND RELATED DRILLING OPERATIONS
IS 4082	1977	1996	STACKING AND STORAGE OF CONSTRUCTION MATERIALS AND COMPONENTS AT SITE
IS 4130	1991		DEMOLITION OF BUILDINGS - CODE OF SAFETY PART 1 TO 2
IS 4138	1977		SAFETY CODE FOR WORKING IN COMPRESSED AIR (FIRST REVISION)
IS 4155	1966		GLOSSARY OF TERMS RELATING TO CHEMICAL AND RADIATION HAZARDS AND HAZARDOUS CHEMICALS
IS 4209	1967		CODE OF SAFETY FOR CHEMICAL LABORATORY
IS 4250	1980		FOOD MIXERS
IS 4262	1967		CODE OF SAFETY FOR SULFURIC ACID
IS 4756	1978		SAFETY CODE FOR TUNNELING WORK
IS 4912	1978		SAFETY REQUIREMENTS FOR FLOOR AND WALL OPENINGS, RAILINGS AND TOE BOARDS
IS 5121	1969		SAFETY CODE FOR PILING AND OTHER DEEP FOUNDATIONS
IS 5182	1969	1982	METHODS FOR MEASUREMENT OF AIR POLLUTION
IS 5184	1969		CODE OF SAFETY FOR HYDROFLUORIC ACID
IS 5216	1982	2000	RECOMMENDATIONS ON SAFETY PROCEDURES AND PRACTICE IN ELECTRICAL WORK PART I AND II
IS 555	1979		TABLE FANS
IS 5557	1995		INDUSTRIAL AND SAFETY LINED RUBBER BOOTS (SECOND REVISION)
IS 5916	1970		SAFETY CODE FOR CONSTRUCTION INVOLVING USE OF HOR BITUMINOUS MATERIALS

IS No	YEAR	Amd upto	DESCRIPTION
IS 5983	1980		SPECIFICATION FOR EYE PROTECTORS - FIRST REVISION
IS 6234	1986		PORTABLE FIRE EXTINGUISHERS WATER TYPE (STORED PRESSURE)
IS 692	1994		CRITERIA FOR SAFETY AND DESIGN OF STRUCTURES SUBJECTED TO UNDERGROUND BLASTS
IS 6994	1973		SPECIFICATION FOR SAFETY GLOVES
IS 7155	1986		CODE OF RECOMMENDED PRACTICE FOR CONVEYOR SAFETY (PART 1 TO 8)
IS 7205	1974		SAFETY CODE FOR ERECTION OF STRUCTURAL STEEL WORK
IS 7293	1974		SAFETY CODE FOR WORKING WITH CONSTRUCTION MACHINERY
IS 7323	1994		GUIDELINES FOR OPERATIONS OF RESERVOIRS
IS 7812	1975		CODE OF SAFETY FOR MERCURY
IS 7969	1975		SAFETY CODE FOR HANDLING AND STORAGE OF BUILDING MATERIALS
IS 8089	1976		CODE OF SAFE PRACTICE FOR LAYOUT OF OUTSIDE FACILITIES IN AN INDUSTRIAL PLANT
IS 8091	1976		CODE OF PRACTICE FOR INDUSTRIAL PLANT LAYOUT
IS 8095	1976		ACCIDENTS PREVENTION TAGS
IS 818	1968	1997	CODE OF PRACTICE FOR SAFETY AND HEALTH REQUIREMENTS IN ELECTRIC AND GAS WELDING, AND CUTTING OPERATIONS
IS 8448	1989		AUTOMATIC LINE VOLTAGE CORRECTOR (STABILISER)
IS 8519	1977		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR BODY PROTECTION
IS 8520	1977		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR EYE, FACE AND EAR PROTECTION
IS 875	1987		STRUCTURAL SAFETY OF BUILDING: LOADING STANDARD PART 1 TO 5
IS 8807	1978		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR PROTECTION OF ARMS AND HANDS
IS 8978	1985		INSTANTANEOUS WATER HEATERS
IS 8989	1978		SAFETY CODE FOR ERECTION OF CONCRETE FRAMED STRUCTURES
IS 940	1989		PORTABLE FIRE EXTINGUISHERS WATER TYPE (GAS CARTRIDGE)
IS 9457	1980		SAFETY COLOURS AND SIGNS
IS 9679	1980		CODE OF SAFETY FOR WORK ENVIRONMENTAL MONITORING
IS 9706	1997		CODE OF PRACTICE FOR THE CONSTRUCTION OF AERIAL RPEWAYS FOR THE TRANSPORTATION OF MATERIAL
IS 9759	1981		GUIDELINES FOR DEWATERING DURING CONSTRUCTION
IS 9815	1989		SERVO MOTOR OPERATED LINE VOLTAGE CORRECTOR (SERVO STABILISER)
IS 9944	1992		RECOMMENDATIONS ON SAFE WORKING LOAD FOR NATURAL AND MAN-MADE FIBRE ROPE SLINGS
IS 996	1979		SINGLE PHASE ELECTRIC MOTORS
ISO 3873	1977		SAFETY HELMET

SECTION-10

SPECIAL CONDITIONS OF CONTRACT

10.0 DRAWINGS AND DOCUMENTS

10.1

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

10.2

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

10.3

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

10.4

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

10.5

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

10.6

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

SECTION-11

SPECIAL CONDITIONS OF CONTRACT

TIME SCHEDULE, MOBILIZATION, PROGRESS MONITORING, OVERRUN, VARIATION ETC.

TIME SCHEDULE & MOBILIZATION

11.1.1

THE CONTRACTOR SHALL COMPLETE INITIAL MOBILIZATION SO AS TO START THE CONTRACTUAL WORK WITHIN ONE MONTH FROM THE DATE OF ISSUE OF FAX LETTER OF INTENT OR AS PER ADVISE OF CONSTRUCTION MANAGER OF BHEL. FURTHER MOBILIZATION SHALL BE DONE IN SUCH A MANNER THAT THE ENTIRE WORK IS COMPLETED TO ACHIEVE THE FOLLOWING MILESTONE SCHEDULE:

SN	MAJOR MILESTONE	COMPLETION DATES FOR UNIT # 1	COMPLETION DATES FOR UNIT # 2
1	COMMENCEMENT OF CONDENSER ERECTION	27-Jul-10	27-Dec-10
2	BOXING UP OF TURBINE AND GENERATOR	27-Sep-11	27-Feb-12
3	OIL FLUSHING COMPLETION	27-Nov-11	27-Apr-12
4	COMPLETION OF GOVERNING SYSTEM / BARRING GEAR	20-Dec-11	20-May-12
5	ROLLING AND SYNCHRONISATION	29-Jan-12	27-Jun-12
6	TRIAL OPERATION COMPLETION AND HANDING OVER	27-April-12	27-Sep-12

IN ORDER TO MEET ABOVE SCHEDULE IN GENERAL, AND ANY OTHER INTERMEDIATE TARGETS SET, TO MEET CUSTOMER REQUIREMENTS, CONTRACTOR SHALL ARRANGE ALL NECESSARY RESOURCES IN CONSULTATION WITH BHEL.

11.2 START OF CONTRACT PERIOD AND DURATION.

THE TOTAL CONTRACT PERIOD FOR COMPLETION OF ENTIRE WORK SHALL BE **26 (TWENTY SIX)** MONTHS FROM THE START OF ERECTION. START OF ERECTION SHALL BE RECKONED FROM THE DATE WHEN A MAJOR ACTIVITY OF ERECTION AND/OR ASSEMBLY OF ANY EQUIPMENT/ PART IS STARTED AS DIRECTED BY BHEL ENGINEER. THE WORK OF PACKER MATCHING AND PLACEMENT OF PACKER PLATES, INSERT PLATES, ETC. WILL NOT BE CONSIDERED FOR THIS PURPOSE.

11.3 GRACE PERIOD

NOT APPLICABLE

11.4 PROGRESS MONITORING

REFER 'GENERAL CONDITIONS OF CONTRACT'

11.5 CONTRACT EXTENSION

REFER 'GENERAL CONDITIONS OF CONTRACT'

11.6 OVERRUN COMPENSATION

REFER 'GENERAL CONDITIONS OF CONTRACT'

11.7 PRICE VARIATION

REFER 'GENERAL CONDITIONS OF CONTRACT'

11.8 CONTRACT VARIATIONS

11.8.1 VARIATION IN QUANTITY

QUANTITY & WEIGHT OF VARIOUS EQUIPMENTS AND ITEMS OF WORK COVERED UNDER THE TENDER SPECIFICATION ARE LIKELY TO VARY. FOR ANY UPWARD OR DOWNWARD VARIATION IN QUANTITIES AS WELL AS WEIGHT IN RESPECT OF TG & AUXILIARIES UNDER ITEM SL. NO.1 OF RATE SCHEDULE, THE ACCEPTED PRICE SHALL REMAIN FIRM.

11.9 INTEREST BEARING RECOVERABLE ADVANCE

REFER 'GENERAL CONDITIONS OF CONTRACT'

11.10 DEFINITION OF WORK COMPLETION

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

SECTION-12

SPECIAL CONDITIONS OF CONTRACT

12.0 TERMS OF PAYMENT

12.0.1

The contractor shall submit his monthly RA account bills with all the details required by BHEL on specified date every month covering progress of work in all respects and areas for the previous calendar month. However, first RA Bill shall be released only after signing of Contract Agreement.

12.0.2

General conditions of contract shall be referred to as regards mode of payment, and measurement of the work completed.

12.0.3

Release of payment in each running bill will be restricted to 95% of the value of work admitted, as per the percentage break-up for the stage of work completion stipulated vide clauses hereinafter.

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

12.0.4

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

12.0.5

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

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

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

12.1 STAGES OF PROGRESSIVE PRO-RATA PAYMENTS

12.1.1 FOR SL. NO. 01 OF RATE SCHEDULE – ST-TG SET AND AUXILIARIES INCLUDING PEM SUPPLIED BOIs (EXCEPT HOISTS & CRANES):

12.1.1.1

THE ACCEPTED PRICE WILL BE PROGRESSIVELY RELEASED UNDER FOLLOWING MAJOR HEADS OF WORK. THESE HEADS ARE NOT INTENDED TO DEFINE OR TO LIMIT THE SCOPE OF WORK; IT IS GIVEN ONLY TO FACILITATE PROGRESSIVE RELEASE OF PAYMENTS TO THE CONTRACTOR. ACCORDINGLY, ALL THE WORK UNDER THESE SPECIFICATIONS SHALL BE COMPLETED WITHIN QUOTED RATES. BHEL SHALL HAVE THE RIGHT TO CLASSIFY ANY EQUIPMENT UNDER APPROPRIATE WORK HEAD AS DEEMED FIT AND SAME SHALL BE FINAL & BINDING ON THE CONTRACTOR.

12.1.1.2

CONTRACTOR SHALL, IN CONSULTATION WITH AND ON APPROVAL OF BHEL ENGINEER AT SITE, MAKE DETAILED BILLING BREAK-UP FOR FURTHER USE.

S N	DESCRIPTION	% TAGE
I	STEAM TURBINE, GENERATOR AND AUX	
1	CONDENSER (15.50%)	
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	Hydraulic 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%
1.1	Assembly, Erection, Fixing and supporting of Condenser R E joints and Butterfly valves with fittings	1.00%
	SUB TOTAL - 1	15.50%
2	TURBINE (19.00%)	
2.01	Matching, leveling, alignment of base plates and bearing pedestals	1.50%
2.02	Grouting of pedestals 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 strainers (internals), 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	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 Gantry crane for stator lifting and dismantling of Gantry Crane after stator lifting	1.00%
3.04	Unloading of Gen stator from Trailer & dragging to reach of Portal Crane reach	0.50%
3.05	Lifting of Gen stator and placing on foundation	1.50%
3.06	Fixing of bushings	1.00%
3.07	Leveling and alignment of stator	1.00%
3.05	Generator rotor insertion	1.00%
3.07	Box up of Generator and assembly of Hydrogen seals	1.00%
3.08	Alignment of generator rotor with LP rotor	1.00%
3.09	Coupling reaming and honing	1.00%
3.1	Preparation of Exciter set foundation and grouting	1.00%
3.11	Erection of Excitation equipment and alignment of Generator - Exciter rotors including swing check	1.00%
3.12	Excitation system completion	0.50%
3.13	Final Gas tightness test of stator with complete system	1.00%
	SUB TOTAL - 3	14.50%

4	CONDENSATE EXTRACTION PUMPS (3.00%)	
4.01	Preparation of foundation and placement of canister	1.00%
4.02	Placement of pump and motor	1.00%
4.03	Alignment of coupling	1.00%
	SUB TOTAL - 4	3.00%
5	PIPING (7.50%)	
5.01	Turbine lub oil piping, jacking oil piping	1.00%
5.02	Generator seal oil piping	1.00%
5.03	Turbine water and Steam drainage piping	1.00%
5.04	Extraction piping	1.00%
5.05	Control oil piping for ESV, IV, LPBP valves, NRV	1.00%
5.06	Desuperheater for wet steam washing, debris filter with associated piping	1.00%
5.07	Condensate spray piping	0.50%
5.08	Generator Primary water piping	1.00%
	SUB TOTAL - 5	7.50%
6	OTHER SYSTEMS (12.50%)	
6.01	Generator gas system with all equipments and fittings	1.00%
6.02	Erection of Central lub 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%
6.1	Erection of Flash tanks and connection to incoming pipes	1.00%

S N	DESCRIPTION	% TAGE
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	0.50%

	trolley	
6.13	Final painting of all equipments and system covered in the scope	1.00%
	SUB TOTAL - 6	12.50%
II	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%
III	POWER CYCLE PIPING (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 pumps, 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 piping, cooling water piping, sealing lines etc	1.00%
	SUB TOTAL - 8	7.00%
IV	CONDENSATE POLISHING UNIT (0.50%)	
9.01	Erection of condensate polishing unit	0.50%
	SUB TOTAL - 9	0.50%
V	ON LINE CONDENSER TUBE CLEANING SYSTEM (1.00%)	
10	Erection of condenser on line Tube cleaning system	1.00%
	SUB TOTAL - 10	1.00%

VI	MISCALLENIOUS PUMP (6.00%)	
11	Preparation of foundation and frame grouting	1.00%
11	Placement of pumps	2.00%
11	Placement of motor and alignment	2.00%
11	Installation of Butter fiy valves	1.00%
	SUB TOTAL - 11	6.00%

S N	DESCRIPTION	% TAGE
VII	ELECTRIC HOIST (3.00%)	
12	Assembly of the Hoists	1.50%
12	Erection of the Hoist with Accessories	1.50%
	SUB TOTAL - 12	3.00%
VIII	CHEMICAL DOSING SYSTEM (0.50%)	
13	Erection of chemical dosing system	0.50%
	SUB TOTAL - 13	0.50%
IX	COMMISSIONING (6.00%)	
14	Oil Flushing	1.00%
14	Barring Gear	1.00%
14	Commissioning of condensate system	1.00%
14	Commissioning of Feed water system	1.00%
14.1	Synchronisation	2.00%
	SUBTOTAL - 14	6.00%
	GRAND TOTAL	100.00%

12.2 MEASUREMENT OF THE WORK COMPLETED

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

SECTION-13

SPECIAL CONDITIONS OF CONTRACT

EXTRA CHARGES FOR MODIFICATION AND RECTIFICATION

REFER 'GENERAL CONDITIONS OF CONTRACT'

SECTION-14
SPECIAL CONDITIONS OF CONTRACT

INSURANCE

REFER 'GENERAL CONDITIONS OF CONTRACT'

SECTION-15
SPECIAL CONDITION OF CONTRACT

15.0 EARNEST MONEY DEPOSIT, SECURITY DEPOSIT & BANK GUARANTEE

15.1 Earnest Money Deposit:

REFER 'GENERAL CONDITIONS OF CONTRACT'

15.2 Security Deposit

REFER 'GENERAL CONDITIONS OF CONTRACT'

15.3 BANK GUARANTEE

REFER 'GENERAL CONDITIONS OF CONTRACT'

15.3.1 Guidelines for acceptance of Bank Guarantees are as follows :

- Vendors are advised to obtain BG from any of the following BHEL consortium banks

State Bank of India	The Hongkong and Shanghai banking Corporation Ltd.
ICICI Bank Ltd	ABN Amro Bank N.V
Bank of Baroda	IDBI Ltd
Canara Bank	Punjab National Bank
Citi bank N.A	Standard Chartered Bank
Corporation Bank	State Bank of Travancore
Detshe Bank	State Bank of Hyderabad
HDFC Bank Ltd	Syndicate Bank

- The Bank Guarantees of all Public sector banks shall be accepted (Other than consortium banks also).
- The Bank Guarantees of Co-operative banks shall not be accepted.
- Bank Guarantees of other banks (banks other than consortium bank, public sector bank, & Co-operative banks) can be accepted subject to an overall exposure limit (at BHEL, PSWR, Nagpur) of RS. 10 crores for banks with net worth of more than Rs. 500 crores as on last balance sheet date and Rs 5 crores for banks with net worth between Rs. 350 to Rs 500 crores (A certificate and copy of latest Balance Sheet to be given at the time of submission of bank guarantees .
- In case Bank Guarantees given by non consortium banks (Private sector or Public sector), the bank Guarantees shall be enforceable at Nagpur, Maharastra.

SECTION 16
SUSPENSION OF BUSINESS DEALING WITH CONTRACTORS
(w.e.f 18.05.09)

- 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.

APPENDIX – I
WEIGHT DETAILS FOR EACH UNIT

S.No.	EQUIPMENT / PACKAGE	APPROX. WT.FOR EACH UNIT (MT)
1	STEAM TURBINE	948
2	GENERATOR	564
3	CONDENSOR	613
4	BOI	3
5	ACG	2
6	BOOSTER PUMPS	19
7	BOILER FEED PUMPS	100
8	CONDENSATE EXTRACTION PUMPS	38
9	DRAIN COOLER	5.5
10	DEAERATOR	139
11	LP HEATERS	46
12	HP HEATERS	202
13	DRIVE TURBINE	251.4
14	FLASH TANKS	28
15	MISC TANKS	30
16	RE JOINTS	92
17	HT MOTORS	45.7
18	BUTTERFLY VALVES	67
19	PEM - SUPPLY	272
20	BOUGHT OUT ITEMS FROM HARDWAR	505.72
21	MAIN CW PIPING	106
22	LINING & INSULATION	320.88
	TOTAL	4398.2
	TOTAL for both units	8796.4

NOTE :

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 and or quantities.

APPENDIX – II

TENTATIVE LIST OF PACKAGES, ODC DETAILS, WEIGHTS ETC. FOR EACH UNIT HARIDWAR SUPPLIES :

S No	Pkg. No	Short Description	Pkg. Size	Gross Wt (Kg)
1. STEAM TURBINE				
1	75001	EMBEDMENT FOR ANCHOR POINTS	4400x1600x1000	4940
2	75003	COMPONENTS FOR BASE PLATE ASSEMBLY	4900x1200x600	6350
3	75004	COMPONENTS OF BASE PLATE	2800x1700x600	3700
4	75101	BASE PLATE FOR LP CASING	1850x1400x500	7200
5	75102	LP OUTER CASING PARTS	9000x2187x3460	15520
6	75103	LP OUTER CASING PARTS	9000x2187x3460	15520
7	75104	LP OUTER CASING PARTS	5670x3290x1140	4600
8	75105	LP OUTER CASING PARTS	5670x3290x1140	4600
9	75106	LP OUTER CASING PARTS	3400x1200x1200	1255
10	75107	LP LONGITUDINAL GIRDER (LEFT)	8200x1680x1950	21412
11	75108	LP LONGITUDINAL GIRDER (RIGHT)	8200x1680x1950	21412
12	75109	LP FRONT WALL (TS)	8760x3850x1150	18300
13	75110	LP FRONT WALL (GS)	8760x3850x1150	18300
14	75111	LP SHAFT SEALING (FRONT) LP SHAFT SEALING (FRONT)	1800x170x740	2300
15	75112	LP SHAFT SEALING (REAR)	1800x170x740	2300
16	75113	LP SHAFT SEAL COMPENSATOR (TS)	1500x1500x650	350
17	75114	LP SHAFT SEAL COMPENSATOR (GS)	1500x1500x650	350
18	75115	AUXILIARIES OF LP TURBINE	2300x1200x900	2340
19	75201	HP/IP BRG.PED.ASSLY.	4080x2005x2126	13275
20	75202	HP/IP BRG.PED.PARTS	1000x600x600	400
21	75301	ASSEMBLY DEVICES	1000x750x750	300
22	75302	INSPECTION SHAFT FOR IPC	4050x600x900	1430

23	75304	COMPONENTS OF ASSEMBLY FIXTURE FOR HPT	3800x2500x1300	6860
24	75305	COMPONENTS OF ASSEMBLY FIXTURE FOR HPT	2300x2100x900	1800
25	75306	COMPONENTS OF ASSLY FIXTURE FOR HPT	3300x1800x1300	3350
26	75307	COMPONENTS FOR ASSLY FIXTURE FOR HPT	5450x4050x400	3400
27	75308	AUXILIARIES OF LP TURBINE	3750x1000x1000	1680
28	75309	AUXILIARIES OF LP TURBINE	2000x1000x1550	890
29	75310	AUXILIARIES OF LP TURBINE	2000x1000x1550	890
30	75311	ASSEMBLY TOOLS	1700x800x400	1020
31	75312	AUXILIARIES OF IP TURBINE	1200x500x550	260
32	75313	AUXILIARIES OF IP TURBINE	1100x500x650	210
33	75314	AUXILIARIES OF IP TURBINE	1100x500x650	210
34	75315	BOLT HEATING EQUIPMENT AND BREECH NUT HEATING DEVICE	1700x900x700	150
35	75316	GROMMET SLINGS	1700x1700x300	3910
36	75318	OIL FLUSHING AND PRESSURE TEST DEVICE	750x550x400	900
37	75319	STEAM BLOWING & HYDRAULIC TEST DEVICES	2900x2100x1200	4650
38	75320	TOOLS FOR GOV.SYST.&VALVES	1750x1200x1000	1500
39	75321	VALVE SUPPORT FOR HPT OVERHALL	1500x750x750	905
40	75401	IP-LP BEARING PEDESTAL ASSLY	3700x1860x2100	14500
41	75501	LP/GEN. PEDESTAL ASSEMBLY	3200x2280x2070	9370
42	75502	BEARING PEDESTAL (PARTS)	1600x800x600	1150
43	75601/1	FRONT BEARING PEDESTAL	3140x3140x2050	12386
44	75601/2	HYDRAULIC TURNING GEAR	2100x1000x600	750
45	75601/3	MAIN OIL PUMP ASSEMBLY.	1400x1200x600	550
46	75704/1	LP CASING ASSEMBLY	1900x1200x600	3000

47	75704/2	PARTS OF LP OUTER CASING ASSLY	500x500x400	120
48	75705	LP EXTRACTION A1	4400x1620x870	1820
49	75706	LP EXTRACTION A1	4400x1620x850	1814
50	75707/1	LP EXTRACTION A1	3420x1620x870	1286
51	75707/2	LP EXTRACTION A1	950x750x750	330
52	75708	LP EXTRACTION A2	2920x2120x1370	1730
53	75709	LP EXTRACTION A2	3420x1220x1120	1350
54	75710	LP EXTRACTION A3	1920x1120x920	655
55	75711	LP EXTRACTION A3	3120x920x870	1050
56	75716	LP EXTRACTION PIPE SHEATHING	2900x2050x1180	2650
57	75717	INNER GUIDE PLATE OF DIFFUSER (TS)	2300x2300x500	1850
58	75718	DIFFUSER (TS)	5050x1800x2550	6800
59	75719	DIFFUSER (GS)	5050x1800x2550	6800
60	75720	LP INNER OUTER CASING (U/H)	8640x3650x2550	36100
61	75721	LP INNER CASING (L/H)	9100x3890x3180	54540
62	75722	LP INNER INNER CASING (U/H)	4600x1900x2350	13300
63	75723	LP CASING ASSEMBLY	5000x2500x800	5910
64	75724	LP INNER CASING ASSLY/FASTENER	2000x1000x600	2050
65	75725	INNER GUIDE PLATE OF DIFFUSER (GS)	2300x2300x500	1700
66	75728	STEAM INLET PIPE (LPT)	3200x1500x1500	1700
67	75801	LP ROTOR	8800x4000x4162	95240
68	75901	IP ROTOR	4800x2120x1995	23132
69	75902	IP OUTER CASING (U/H)	4050x3800x2650	25850
70	75903	IP OUTER CASING (L/H)	3400x5250x2600	25870
71	75904	IP INNER CASING (U/H)	2900x3200x1850	15200
72	75905	IP INNER CASING (L/H)	2900x3200x1851	15200
73	75906	IP INLET ASSEMBLY	4500x3725x1300	13550
74	75907	IP SHAFT SEALING	1400x1200x900	950
75	75908	IP TURBINE (PARTS)	2000x1900x1000	3125
76	75909	I.P. TURBINE PARTS	1000x1000x750	475
77	76001/1	HP TURBINE	5675x3400x2900	88650
78	76001/2	EMERGENCY GOVERNOR	495x395x695	57
79	76002	HP INLET ASSLY. & HP EXHAUST ASSLY. (PARTS)	1200x1200x500	80
80	76003	HP EXHAUST ASSEMBLY	1650x1400x900	2000
81	76004	HPT RELATED PARTS	1300x1300x700	200

82	76104	ESV & CV CASING WITH VALVES	3360x3360x2590	23146
83	76105/1	ESV SERVOMOTOR WITH LIMIT SWITCHES	2300x1200x1200	4250
84	76105/2	ESV SERVOMOTOR WITH LIMIT SWITCHES	2300x1200x1200	4250
85	76107	HP CONTROL VALVE SERVOMOTOR	2800x1200x2100	3280
86	76108	ESV & CV CASING WITH VALVES	3360x3360x2590	23146
87	76112	HP CONTROL VALVE SERVOMOTOR	2800x1200x2100	3288
88	76201	SUSPENSION OF VALVE (IV)	4250x2640x750	8078
89	76202	IV & CV CASING WITH VALVES	5040x4690x2770	33276
90	76203/1	IV SERVOMOTOR WITH LIMIT SW. MOUNTIGS	2700x1450x1400	3965
91	76203/2	IV SERVOMOTOR WITH LIMIT SW. MOUNTIGS	2700x1450x1400	3965
92	76204	IP CONTROL VALVE SERVOMOTOR	3240x1240x1950	3019
93	76205/1	FRAME FOR SUSPENSION (IV)	3400x3150x750	2026
94	76205/2	FRAME FOR SUSPENSION (IV)	3400x3150x750	2026
95	76205/3	LOOSE ITEMS FOR FRAME FOR SUSPENSION(IV)	300x200x200	20
96	76206	IV & CV CASING WITH VALVES	5040x4690x2770	33276
97	76210	IP CONTROL VALVE SERVOMOTOR	3240x1240x1950	3003
98	76301/1	SUSPENSION OF LPBP VALVE	3600x1700x800	1836
99	76301/2	SUSPENSION OF LPBP VALVE	3600x1700x800	1836
100	76402	INJECTOR FOR SUC. PIPE NB 350	3300x800x800	588
101	76403	INJECTOR FOR SUC. PIPE NB 300	3300x1750x1200	999
102	76404	MAIN OIL TANK & NOZZLE ARRGT. ASSY.	6180x3260x2650	10697
103	76405	MAIN OIL TANK & NOZZLE ARRGT. ASSY.	4200x1200x900	402
104	76406	OIL STRAINERS	1500x1000x1200	228
105	76407	OIL STRAINERS	1500x1000x1200	228
106	76409	OIL STRAINERS	2050x1200x1410	470
107	76412	DIRTY/LEAKAGE OIL TANK	1000x1000x3000	515
108	76413	WASTE OIL TANK	1000x1000x3000	515

109	76414	VAR.ORIFICES THR.VALV.&FLUSH.P ARTS	1700x700x760	255
110	76415	VARIABLE ORIFICE 125	400x300x200	50
111	76601	CROSS AROUND PIPE (PARTS)	3500x1750x1800	2150
112	76602	CROSS AROUND PIPE (PARTS)	3500x1750x1800	2150
113	76603	COMPENSATOR ASSEMBLY (CAP)	1900x1950x1750	3190
114	76604	COMPENSATOR ASSEMBLY (CAP)	1900x1950x1750	3190
115	76605	COMPENSATOR ASSEMBLY (CAP)	1900x1950x1750	3190
116	76606	COMPENSATOR ASSEMBLY (CAP)	1900x1950x1750	3190
117	76607	COMPENSATOR ASSEMBLY (CAP)	1900x1950x1750	3270
118	76608	COMPENSATOR ASSEMBLY (CAP)	1900x1950x1750	3270
119	76609	REDUCER ASSEMBLY (CAP)	1250x1250x500	242
120	76610	REDUCER ASSEMBLY (CAP)	1250x1250x500	242
121	76611	CROSS AROUND PIPE (PARTS)	2000x1150x600	2030
122	76612	CROSS AROUND PIPE (PARTS)	2000x1150x600	2030
123	76613	MITRE BEND ASSEMBLY (CAP)	3640x1540x2040	2240
124	76614	MITRE BEND ASSEMBLY (CAP)	3640x1540x2040	2240
125	76701	CHANGE OVER VALVE	800x500x200	97
126	76702/1	CRH NRV WITH SERVOMOTOR	3200x2300x2600	10528
127	76702/2	STEAM BLOWING DEV.FOR NRV CRH LINE	2500x1600x1200	5600
128	76703/1	GLAND STEAM PRESSURE INDICATOR	400x300x300	20
129	76801	RATING,COLLABORATION&COMPANY'S MONOGRAM PLATE	850x550x200	55
130	76901	OIL STRIPPER	600x600x850	133
131	76902	OIL STRIPPER	600x600x850	133
132	76903	HOUSING FOR M.S STRAINER	1725x1250x730	2370
133	76904	HOUSING FOR M.S STRAINER	1725x1250x730	2370
134	76908	HOUSING FOR HRH STEAM STRAINER	2275x1650x1100	3195
135	76909	HOUSING FOR HRH STEAM STRAINER	2275x1650x1101	3195

136	76912/1	BLANKING ARRANGEMENT FOR MS STRAINER HOUSINGS	1000x900x800	948
137	76912/2	BLANKING ARRANGEMENT FOR HRH STEAM STRAINER HOUSINGS	1600x1200x1000	2535
138	76913	GASKETS FOR MS & HRH STRAINER HOUSINGS	1000x1000x600	37
139	76914	COMPENSATOR	600x600x900	50
140	76915	ASSY. & DISASSY. DEVICES FOR MS & HRH STEAM STRAINERS	2140x1400x500	564
141	76917	STEAM STRAINER (MS)	1200x900x500	350
142	76918	STEAM STRAINER (HRH)	1800x1500x800	750
143	77001	GOV.SYSTEM CONTROL RACK ASSLY. & TRANSPORT DEVICE	2800x1360x2750	1847
144	77002	SUPPLY RACK HP VALVE-2 (RIGHT)	2300x1400x2550	1797
145	77003	SUPPLY RACK HP VALVE-1 (LEFT)	2300x1400x2550	1797
146	77004	SUPPLY RACK FOR IP VALVES 1 & 2	2300x1400x2550	2080
147	77006	GOVERNING SYSTEM PROTECTION RACK & TRANSPORT DEVICE	2450x1300x2250	1622
148	77201	TURBINE INSTRUMENTS RACKS (FRAMES)	2750x1500x800	2600
149	77202		1700x750x750	750
150	77203	IMPLUSE PIPES (CARBON STEEL)	6900x650x500	1225
151	77204	GAUGES AND SENSORS	2800x1250x1250	1035
152	77205	TRANSMITTERS & J.B.OF BEARINGS	500x300x200	118
153	77206	IMPULSE PIPES (ALLOY STEEL AND S.S.)	6900x500x500	1136
		TOTAL WT (KGs)		947773

S No	Pkg. No	Short Description	Pkg. Size	Gross Wt (Kg)
2. GENERATOR				
1	501	STATOR	8830x4100x4120	258000
2	502	ROTOR WITH TOOLS AND TACKLES	14000x1850x1750	73159
3	503	END SHIELD LOWER HALF (TE)	6000x2296x2640	31473
4	504	END SHIELD UPPER HALF (TE)	6000x2296x2640	28747
5	505	END SHIELD LOWER HALF (EE)	4700x1500x2420	12847
6	506	GENERATOR BEARING (2 NOS.).	1250x1150x1250	3006
7	508	BAFFLE RING,BAFFLE RING CARRIER & AIR GAP SEAL ASSLY	1682x1688x1095	347
8	509	TERMINAL BUSHING (6 NOS.)	2200x1830x610	1427
9	510	TERMINAL BUSHING BOX WITH COVER	3600x2500x1940	11580
10	511	SHAFT SEALS (EE & TE) AND OIL CATCHER (INNER & OUTER)	2140x1140x840	1560
11	512	COMPRESSOR BAFFLE RING ASSLY.	1920x1920x1340	1745
12	515	GENERATOR END SHIELD BASE EE & TE (2 NOS. EACH)	1940x1550x980	3464
13	516	PRIMARY WATER TANK	8100x2000x1200	2000
14	517	P.W.TANK PIPE LINES	6800x2100x500	818
15	518	FOUNDATION PLATES	2895x760x840	3030
16	519	ANCHOR BOLTS	2740x655x600	1485
17	520	CHANNELS,ANGLES,PIPES & STUDS	5800x1120x520	1558
18	521	ROTOR & GENERAL ASSY.DEVICES	2460x1170x1240	2952
19	524	WIRE ROPE FOR ROTOR (2 NO.)	1800x1800x400	289
20	530	GENERATOR ACCESSORIES	2140x2140x1240	1608
21	530/1	GENERATOR ACCESSORIES	1350x850x300	472
22	531	GENERATOR ACCESSORIES	2240x940x1220	1525
23	532/1	DRY AIR BLOWER	1100x1000x700	80

24	532/2	GENERATOR MAINTENANCE DEVICES	2550x1180x1140	1405
25	533	ERECTION DEVICES/FOUND TN ITEMS	1640x1140x1240	2781
26	534	BRUSHLESS EXCITER SET WITH COVERS	5750x2350x3400	32928
27	535	BRUSHLESS EXCITER FRONT COVER WITH PACKING	4400x3400x3100	4478
28	536	BRUSHLESS EXCITER REAR COVER WITH PACKING	4400x3400x3100	4978
29	537	EXCITER BED PLATE ACCESSORIES & RACK ASSEMBLY	3900x1250x1150	1741
30	539	SEAL OIL STORAGE TANK	3700x1400x1260	1532
31	540	PW PUMP AND FILTER UNIT	3450x2750x2815	5294
32	541	INSTRUMENT RACK	1550x910x1715	831
33	542	SEAL OIL MOTOR PUMP UNIT	3320x1740x1340	3035
34	543	SEAL OIL UNIT	3100x3000x3400	7890
35	545	GAS UNIT	1980x1640x2420	1205
36	547	CO2 VAPOURISER	1520x840x840	250
37	549	EXCITER BED PLATE ACCESSORIES (NON TEST BED)	5800x1140x1240	2925
38	550	EXCITER ACCESSORIES	2200x1100x1000	1111
39	551	END SHIELD UPPER HALF (EE)	4700x1500x2420	9353
40	556	P.W.TANK PIPE LINES	3000x600x500	454
41	557	SPECIAL TOOLS & TACKLES	800x700x300	87
42				
43	558	EMBEDMENTS	800x800x300	928
44	559	SEALING FOR TRANSPORT	3950x2420x150	869
45	561	SEAL RING	700x700x200	80
46	562	CONNECTION PIECE ASSEMBLY	1600x1050x400	862

47	563	GENERATOR ACCESSORIES	1700x1200x250	140
48	564	COOLER AIR VENT ASSEMBLY	8300x150x100	51
49	565	H2 DISTRIBUTOR	3480x1540x440	333
50	566	CO2 DISTRIBUTOR	4860x1240x440	353
51	567	N2 DISTRIBUTOR	1400x1240x440	143
52	568	TG SYSTEM INTEGRAL PIPING (HANGER & SUPPORTS)	6200x1500x1200	3410
53	569	TG SYSTEM INTEGRAL PIPING (FITTINGS)	3500x1700x1000	2576
54	570	TG SYSTEM INTEGRAL PIPING (STRAIGHT PIPES)	7000x1000x1300	5560
55	571	TG SYSTEM INTEGRAL PIPING (STRAIGHT PIPES)	6600x1500x2000	9380
56	572	TG SYSTEM INTEGRAL PIPING (FLANGES)	3500x1700x300	2576
57	573	TG SYSTEM INTEGRAL PIPING (HANGER & SUPPORTS)	2500x1200x1000	1555
58	574	TG SYSTEM INTEGRAL PIPING (VALVES)	2750x1400x1400	3799
59	575	TG SYSTEM INTEGRAL PIPING (INSTRUMENTS)	1000x940x900	177
60	576	TG SYSTEM INTEGRAL PIPING (FASTENERS & SEALINGS)	1000x1000x500	630
61	577	EXCTR. BED PLATE ACCESSORIES (NON TEST BED ITEMS)	1000x800x800	775
62	578	RESINS	1200x600x600	100
63	580	EMBEDMENTS FOR PORTAL CRANE	1400x1000x400	1651
64	581	ALKALYSER UNIT	1150x780x1900	267
65	582	PLATFORM FOR P W TANK	5000x1000x500	852
66	583	TG SYSTEM INTEGRAL PIPING (STRAIGHT PIPES)	7000x400x300	230
67	584	RR WHEEL AIR GUIDE COVER	2800x1500x2000	1572
68	585	CONSUMABLES	800x400x200	55

		TOTAL WT (KGs)	564374
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S No	Pkg. No	Short Description	Pkg. Size	Gross Wt (Kg)
3.CONDENSOR				
1	78001	HOTWELL(FRONT HALF)	7300x3300x1800	7005
2	78002	HOT WELL(REAR HALF)	7560x3300x1850	7527
3	78004	BOTTOM PLATE(FRONT/REAR PART)	8760x3555x725	8177
4	78005	BOTTOM PLATE(FRONT/REAR PART)	8760x3560x725	8177
5	78006	BOTTOM PLATE(MIDDLE PART)	8760x3850x675	8364
6	78007	BOTTOM PLATE(MIDDLE PART)	8760x3850x625	8364
7	78008	MIDDLE BOTTOM PLATE -I	8760X3000X720	5052
8	78009	MIDDLE BOTTOM PLATE -II	8760X2340X720	5024
9	78010	LOOSE ITEMS(BOTTOM PLATE)	2485x780x180	492
10	78012	SPRING ELEMENT(CONDENSER SUPPORT)	1970x1320x1320	6780
11	78013	SPRING ELEMENT(CONDENSER SUPPORT)	1970x1320x1320	6780
12	78014	SPRING ELEMENT(CONDENSER SUPPORT)	1970x1320x1320	6780
13	78018	LOOSE ITEMS(CONDENSER SUPPORT)	1920x1000x660	4094
14	78019	LOOSE ITEM(CONDENSER SUPPORT)	1600x1100x600	4584
15	78020	FRONT WATER CHAMBER(GEN.SIDE)	7050x4470x540	9900
16	78022	FRONT WATER BOX(GEN.SIDE)	7645x4460x2640	28300
17	78023	FRONT WATER CHAMBER(TUR.SIDE)	7050x4470x540	9900
18	78025	FRONT WATER BOX(TUR.SIDE)	7645x4460x2640	28300
19	78026	REAR WATER CHAMBER(GEN.SIDE)	7050x4470x540	9900
20	78028	REAR WATER BOX (GEN.SIDE)	6655x4460x2495	21560
21	78029	REAR WATER CHAMBER(TUR.SIDE)	7050x4470x540	9900
22	78031	REAR WATER BOX (TUR.SIDE)	6655x4460x2495	21560
23	78032	PLATES(SIDE WALL-TUR.SIDE)	6925x2470x120	15804
24	78038	LOOSE ITEMS(SIDE WALL-TUR.SIDE)	7800x330x230	1100
25	78040	PLATES(SIDE WALL-GEN.SIDE)	6925x2470x120	15804
26	78046	LOOSE ITEMS(SIDE WALL-GEN.SIDE)	7800x330x230	1100
27	78048	RODS(SHELL INTERNALS)	3530x900x270	4376
28	78049	RODS(SHELL INTERNALS)	3530x900x270	4376
29	78050	RODS(SHELL INTERNALS)	3530x900x270	4376

30	78051	RODS(SHELL INTERNALS)	3530x900x270	4376
31	78052	RODS(SHELL INTERNALS)	3530x900x270	4376
32	78053	RODS(SHELL INTERNALS)	3530x900x270	4376
33	78054	RODS(SHELL INTERNALS)	3530x900x270	4376
34	78055	RODS(SHELL INTERNALS)	3530x900x270	4376
35	78056	RODS(SHELL INTERNALS)	3630x590x380	4705
36	78057	RODS(SHELL INTERNALS)	1000x680x390	1421
37	78058	AIR EXTRACTION PIPE	7100x900x560	2452
38	78059	SUPPORT TUBE PLATES(SHELL INTERNALS)	6500x4225x224	8614
39	78060	SUPPORT TUBE PLATES(SHELL INTERNALS)	6500x4225x224	8614
40	78061	SUPPORT TUBE PLATES(SHELL INTERNALS)	6500x4225x224	8614
41	78062	SUPPORT TUBE PLATES(SHELL INTERNALS)	6500x4225x224	8614
42	78063	SUPPORT TUBE PLATES(SHELL INTERNALS)	6500x4225x224	8614
43	78064	SUPPORT TUBE PLATES(SHELL INTERNALS)	6500x4225x224	8614
44	78065	SUPPORT TUBE PLATES(SHELL INTERNALS)	6500x4225x224	8614
45	78066	SUPPORT TUBE PLATES(SHELL INTERNALS)	6500x4225x224	8614
46	78069	LOOSE ITEMS(SHELL INTERNALS)	2190x970x775	6823
47	78070	LOOSE ITEMS(SHELL INTERNALS)	6200x900x570	5915
48	78071	LOOSE ITEMS(SHELL INTERNALS)	1920x1000x660	1820
49	78075	LOWER DOME WALL(TUR.SIDE)-	13350X4030X550	10775
50	78076	LOWER DOME WALL(TUR.SIDE)- LOWER PART	13150x4050x550	9894
51	78077	LOWER DOME WALL(TUR.END)-UPPER PART	10520x2140x1130	4000
52	78103	LOWER DOME WALL (GEN END)	4900x900x500	11171
53	78104	LOWER DOME WALL(GEN.SIDE)- LOWER PART	13150x4050x930	10450
54	78105	LOWER DOME WALL(GEN.SIDE)- UPPER PART	10520x2140x1080	3700
55	78109	LOWER DOME WALL(FWB SIDE)	9052x4266x1000	7710
56	78110	LOWER DOME WALL(FWB SIDE)- LOWER PART	9150x4600x870	8365
57	78111	LOWER DOME WALL(FWB SIDE)- UPPER PART	7850x2300x920	3450
58	78112	LOWER DOME WALL(FWB SIDE)- LOOSE ITEMS	1650x1100x1100	808
59	78116	LOWER DOME WALL(RWB SIDE)- LOWER PART	9140x4430x1530	9300
60	78117	LOWER DOME WALL(RWB SIDE)- UPPER PART	7850x2320x520	3677

61	78121	PIPES(DOME INTERNAL STIFFENIN G)	1840x1350x1535	3895
62	78122	PIPES(DOME INTERNAL STIFFENING)	2176x1500x1285	4940
63	78123	PIPES(DOME INTERNAL STIFFENING)	2766x1500x1120	6300
64	78124	PIPES(DOME INTERNAL STIFFENING)	5250x2270x220	1963
65	78125	PIPES(DOME INTERNAL STIFFENING)	1470x750x850	2930
66	78126	PIPES(DOME INTERNAL STIFFENING)	5250x2270x220	1963
67	78129	LOOSE ITEMS(LP HEATER SUPPORT S)	2250x1700x1070	2965
68	78130	LOOSE ITEMS(LP HEATER SUPPORTS)	7125x1125x580	3665
69	78132	UPPER DOME WALL (TUR.SIDE)	8700x1600x296	2628
70	78133	UPPER DOME WALL(GEN.SIDE)	8700x1600x296	2628
71	78136	UPPER DOME WALL (FWB SIDE)	7180x3000x300	5410
72	78137	LOOSE ITEMS(UPPER DOME WALL- FWB SIDE)	3600x550x200	731
73	78139	UPPER DOME WALL(RWB SIDE)	7180x3000x450	5754
74	78140	LOOSE ITEMS(UPPER DOME WALL- RWB SIDE)	3600x550x200	731
75	78142	FRONT & REAR W/BOX HING ARRANGEMENT	2450X1650X800	6852
76	78143	FRONT & REAR W/BOX HING ARRANGEMENT	500X500X500	135
77	78144	FRONT & REAR W/BOX HING ARRANGEMENT	2500X600X750	1650
78	78149	FRONT & REAR W/BOX HING ARRANGEMENT	800 X660 X580	564
79	78150	FRONT & REAR W/BOX HING ARRANGEMENT	1670X1040X480	914
80	78151	FRONT & REAR W/BOX HING ARRANGEMENT	1670X1040X480	914
81	78154	STEAM THROW DEVICE	1850x1040x860	2120
82	78155	STEAM THROW DEVICE	1850x1040x860	2120
83	78157	LOOSE ITEMS(CONDENSER)	4500x1000x1000	1955
84	78158	LOOSE ITEMS(CONDENSER)	800x600x500	103
85	78159	FASTENERS(CONDENSER)	1200x1100x350	2737
86	78162	TOOLS & TACKLES(CONDENSER)	300x350x500	45
87	78166	STAND PIPE NO.1(CONDENSER)	3500x600x600	69
88	78167	LOOSE ITEMS(STAND PIPE NO.1&2- CONDENSER)	3650x550x300	375
89	78169	STAND PIPE NO.2(CONDENSER)	3500x600x600	69
90	78175	INSTRUMENTATION-NON FRAGILE (CONDENSER)	1500x1300x700	733
91	78176	INSTRUMENTATION-FRAGILE (CONDENSER)	1500x600x600	252
92	78301	GLAND STEAM CONDENSER	1750x1200x1700	1610

93	78304	LOOSE ITEMS OF GSC	700x300x200	60
94	78305	LOOSE ITEMS OF GSC (FRAGILE)	600x500x350	35
95	78315	LP.HEATER NO.1	13000x2100x2000	21100
96	78316	STAND PIPE(LPH NO.1)	2600x350x350	55
97	78317	LOOSE ITEMS(LPH NO.1)	500x400x400	135
98	78318	LOOSE ITEMS-FRAGILE(INSTRUMENTATION,LPH NO.1)	700x400x400	85
99	78319	LOOSE ITEMS(INSTRUMENTATION, LPH NO.1)	2100x500x400	170
100	78320	TROLLEY FOR LP HEATER NO.1	1350x800x200	200
101	78401	TURBINE OIL COOLER	5850x1700x2300	13250
102	78402	TURBINE OIL COOLER	5850x1700x2300	13250
103	78406	LOOSE ITEMS(TOC)	800x800x500	130
104	78417	PRIMARY WATER COOLER	4300 X1350X1350	2220
105	78418	PRIMARY WATER COOLER	4300 X1350X1350	2220
106	78420	LOOSE ITEMS OF PWC	0 X 0 X 0	38
107	78424	HYDROGEN COOLER	4600x1450x800	2665
108	78425	HYDROGEN COOLER	4600x1450x800	2665
109	78426	HYDROGEN COOLER	4600x1450x800	2665
110	78427	HYDROGEN COOLER	4600x1450x800	2665
111	78428	LOOSE ITEMS (HYDROGEN COOLERS)	1300x1000x600	2140
112	78431	EXCITER AIR COOLER	3780x920x830	1980
113	78432	EXCITER AIR COOLER	3780x920x830	1980
114	78436	CONTROL FLUID COOLER	3300x850x1030	1506
115	78437	CONTROL FLUID COOLER	3300x850x1030	1506
116	78438	LOOSE ITEMS(CFC)	600x600x500	103
TOTAL WT (KGs)				613227

4. BOI

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
1	10001	STARTER CABINET FOR DC S.OIL STARTER CABINET FOR DC S.OIL	1230x1060x2550	675
2	10002	GEN INSTRUMENTATION CABINET GEN INSTRUMENTATION CABINET	1230x1060x2550	675
3	10003	LOOSE INSTRUMENTS	600x600x400	65
4	10004	LOOSE INSTRUMENTS	1000x800x400	76
5	10005	STARTER CABINET FOR DC JOP STARTER CABINET FOR DC JOP	1230x1060x2550	675
6	10006	STARTER CABINET FOR DC EOP STARTER CABINET FOR DC EOP	1230x1060x2550	675
TOTAL				2841

5. ACG

SL	PKG.N O	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
1	12002	GENERATOR INSTRUMENTATION	1230x 1060x 2550	550
2	12003	LOOSE ITEMS	600x 600x 400	60
3	12004	LOOSE ITEMS	600x 600x 400	60
4	12005	STARTER CABINET FOR DC JACKING	1230x 1060x 2550	550
5	12006	STARTER CABINET FOR DC	1230x 1060x 2550	550
			SUB TOTAL D	2220

HYDERABAD SUPPLIES :

PUMPS, DEARATOR, COOLER, H.P. HEATERS AND DRIVE TURBINE FROM HYD.

SL	ITEM DESCRIPTION	TOTAL QTY.	UNIT WT. IN KG	TOTAL WT. KG.
6	BOOSTER PUMPS			
1	BOOSTER PUMPS (MD+TDA+TDB)	3	5370	16020
2	B.P. SKIDS	3	1000	3000
	LOOSE ITEMS			115
			SUB TOTAL (6)	19135
7	BOILER FEED PUMPS			
1	BOILER FEED PUMP(MD+TDA+TDB)	3	10933	32799
2	GRILLAGE ASSLY. (BP+MOTOR)	1	3710	3710
3	GRILLAGE ASSY. (BPF+HC)	1	3800	3800
4	BFP SKIDS	3	1000	3000
5	HYDRAULIC COUPLING	1	15000	15000
6	R.C. VALVES	3	900	2700
7	CONICAL TYPE SUCTION STRAINER	3	1200	3600
8	BASKET TYPE SUCTION STRAINER	3	2350	7050
9	PORTABLE OIL CENRIFUSE	1	1000	1000
10	LOCAL GUAGE BOARD	3	1000	3000
11	CONNECTING COUPLING (BFP AND HC)	1	80	80
12	CONNECTING COUPLING (MOTOR AND HC)	1	300	300
13	CONNECTING COUPLING (BP AND MOTOR)	1	31	31
14	LOCAL INSTRUMENT RACK	1	200	200
15	LOCAL GUAGE BOARD	3	1000	3000
16	LOCAL GUAGE BOARD	3	800	2400

17	HYDRAULIC COUPLING WORKING OIL	1	8820	8820
18	LOOSE ITEMS			9800
			SUB TOTAL 7	100290
8	CONDENSATE EXTRACTION PUMPS			
1	CONDENSATE EXTRACTION PUMP(A, B, C)	3	6220	18660
2	CEP CANISTERS ASSLY	3	2910	8730
3	SUCTION STRAINER SIMPLEX	3	1500	4500
4	CONNECTING COUPLING FOR CEP	3	50	150
5	LOCAL INSTRUMENT RACK	1	250	250
6	LOCAL GUAGE BOARD	1	400	400
7	LOCAL GUAGE BOARD	1	1000	1000
8	LOOSE ITEMS			4350
			SUB TOTAL 8	38040
9	DRAIN COOLER			
1	DRAIN COOLER ASSLY	1	5400	5400
2	LOOSE ITEMS			143
			SUB TOTAL 9	5543
10	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 10	139227
11	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 11	45784
12	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 (12)	202186
13	DRIVE TURBINE			
1	TWIN OIL COOLER(BFP AND DT)	2	5700	11400

2	DC STARTER CUBICAL	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	6518	131636
7	EMERGENCY OIL PUMP	2	1700	3400
8	JACKING OIL PUMP	2	175	350
9	TURBINE OIL PURIFICATION UNIT	2	1450	3000
10	OIL ACCUMULATOR	2	30	60
11	CHARGING KIT	2	10	20
12	CENTRIFUGAL EXHAUST FAN	4	150	600
13	TRANSFER OIL PUMP	2	350	700
14	ACCOUSTICS ENCLOSURE	2	3000	6000
15	URBINE BLADED ROTOR	1		0
16	LOOSE ITEMS			41126
			SUB TOTAL (13)	251400

BHOPAL SUPPLIES :

S.No	DESCRIPTION	QTY	SIZE (MM)	Unit Wt(K g.)	Total wt. (kg)	REMAR KS
(14)	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 (14)		27800	
(15)	MISC. TANKS					
1	Clean Oil Tanks	1	6100Lx3500Wx4500H	9500	9500	for both units
2	Dirty Oil Tank	1	6100x3500Wx4500H	9500	9500	for both units
3	Oil Unloading Tank	1	2300Lx1200Wx800H	550	550	for both units
4	ECW O/H Tank	1	7200Lx3000Wx2900H	6000	6000	
5	Boxes for Loose items	4	2000Lx1000Wx1000H	1000	4000	
			SUB TOTAL (15)		29550	
(16)	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 (16)		92082	
(17)	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 (17)		45700	
(18)	BF VALVES					
1	2200 Dia	4	2530Lx3000Wx1110H	9353	37412	
2	800 Dia	6	1030Lx1250Wx415H	1311	7866	
3	700 Dia	3	930Lx1160Wx405H	1164	3492	
4	600 Dia	6	815Lx1000Wx300H	765	4590	
5	500 Dia	16	700Lx865Wx300H	660	10560	
6	400 Dia	7	600Lx750Wx275H	336	2352	
7	Boxes for Loose items	52	700Lx700Wx300H	300	300	
			SUB TOTAL (18)		66572	

PEM SUPPLIES :

19. PEM MATERIAL :

SL.NO.	ITEM DESCRIPTION	TOTAL WT. KG.	TOTAL WT. MT
1	CONTROL VALVES		

2	FLOW ELEMENTS	6000	6
3	CHAIN PULLEY BLOCK / HOIST:		
a)	ELECTRIC HOIST	3000	3
b)	CHAIN PULLEY BLOCK	6000	6
4	CHEMICAL DOZING SYSTEM	12000	12
5	LUBE OIL TRANSFER PUMPS	500	0.5
6	AIR TRAPS	500	0.5
7	ALUMINIUM SHEET	62500	62.5
8	ANCILLIARY MATERIALS FOR INSULATION	35000	35
9	ME BELLOWS	34500	34.5
10	STEAM TRAPS	100	0.1
11	VALVES:		
a)	AIR RELEASE VALVE	600	0.6
b)	BALL VALVES	700	0.7
c)	BUTTER FLY VALVES(STEAM SERVICE)	11000	11
d)	BUTTER FLY VALVES(WATER SERVICE)	4000	4
e)	DUAL PLATE CHECK VALVE	3600	3.6
f)	STEEL GATE/GLOBE/NRV(WATER SYSTEM VALVES)	800	0.8
12	AUX PRDS	1000	1
13	COLTCS	16000	16
14	DEBRIS FILTERS	10000	10
15	DESUPERHEATER FOR WET STEAM WASHING	1000	1
16	MISC. PUMPS: HORIZONTAL	60000	60
17	PORTABLE OIL PURIFICATION SYSTEM	500	0.5
18	STRAINERS - SIMPLE	3000	3
	TOTAL	272000	

20. BOI FROM HARIDWAR

ITEM ID	QTY	U	ITEM DESC	GROSS WT.(IN KGS.)
BG001	105	NO	EMPTY H2 CYLINDER	8855
BG002	44	NO	EMPTY CO2 CYLINDER	
BG003	12	NO	EMPTY N2 CYLINDER	
BG004	1	NO	PORTABLE GAS ANALYSER	5
BG005	1	ST	MOISTURE MEASURING SYSTEM	16
BG007	2	NO	VAPOUR EXHAUSTER	80

BG009	2	NO	H2 GAS ANALYSER CABINET	full lcv load (1 no.)
BG011	2	NO	REFRIGERATION GAS DRYER	2000
BG018	1	NO	STARTING RESISTOR FOR DC S.O MOTOR	250
BG019	1	ST	SOUND ABSORBING LINING FOR EXCITER COVER & COUPLING COVER	1500
BG021	1	ST	GROUNDING BRUSH MONITOR	
BG023	1	ST	CONTINUOUS ON-LINE PARTIAL DISCHARGE MONITORING SYSTEM	
BG066	1	ST	GENERATOR END WINDING VIBRATION MONITORING EQUIPMENT FOR TURBOGENERATOR	39
BG080	1	NO	STROBOSCOPE	
BG082	1	NO	HYDRAULIC UNIT ASSEMBLY	1000
BH001	1	ST	WELDED AUSTENITIC S.S. TUBES GR.304 (FOR CONDENSOR)	300000
BH010	2	NO	CONDENSOR AIR EVACUATION PACKAGE (VACUUM PUMP)	8556
BH012	2	NO	AIR EXHAUSTER WITH MOTOR (GSC AIR EXHAUSTER)	300
BT001	1	NO	LIFTING BEAM	6200
BT002	1	ST	JACKING OIL PUMPS	2630
BT003	1	ST	AOP & EOP	FTL
BT004	1	NO	DUPLEX FILTER (LUB.OIL)	620
BT005	1	NO	DUPLEX FILTER (JACKING OIL)	163
BT006	1	ST	BUTTERFLY VALVES	80
BT007	1	ST	THREE WAY TEMP. CONTROL VALVE	615
BT008	1	ST	DOUBLE THREE WAY VALVES	230
BT009	1	ST	NRV WITH ALUMINIUM FLAP	35
BT010	1	NO	PRESSURE LIMIT VALVE	

BT011	1	NO	OIL PURIFICATION UNIT (OIL CENTRIFUGE)	5680
BT025	1	NO	OIL PURIFICATION SYSTEM (CENTRAL)	
BT012	2	NO	OIL VAPOUR EXHAUSTER	180
BT013	4	NO	LEAD DIAPHRAGM	108
BT014	1	ST	SPRAY NOZZLES	1.5
BT015	1	NO	DIRT CATCHERS	27
BT016	1	ST	DAMPER	125
BT017	1	ST	VARIABLE LOAD SPRING CAGES	1370
BT018	1	ST	FLEXIBLE BENDS	
BT019	1	NO	VACCUM BREAKER VALVE ASSY ALONG WITH SOLINOID VALVE	338
BT021	1	ST	THERMAL INSULATION OF TIP	
BT022	1	NO	TURBINE CLEADING	
BT023	1	M3	TURBINE OIL	98070 lt
BT024	1	NO	DRY AIR PRESERVATION SYSTEM	FTL
BT027	1	ST	TURBINE INTEGRAL PIPING	62658
BT028	1	ST	H & S FOR TURBINE INTEGRAL PIPING	15321
BT029	1	ST	FLOW NOZZLES FOR PG TEST	2050
BT031	1	ST	THROUGH PORT GATE VALVE	350
BT032	2	NO	GLOBE VALVE	1085
BT033	1	ST	SPRING LOADED NRV	37
BT035	2	NO	CONTROL FLUID PUMP	4130
BT036	2	NO	CONTROL FLUID VAPOUR EXHAUSTER	95
BT037	1	NO	CONTROL FLUID PURIFICATION UNIT	2762
BT038	1	NO	CONTROL FLUID TANK (SS)	6500
BT039	1	NO	ON LINE CONTROL FLUID HEATER	500
BT040	1	NO	REMOTE TRIP SOLENOID VALVE	20
BT043	1	M3	CONTROL FLUID (FRF)	42467
BT044	1	ST	GEAR PUMPS	

BT046	1	ST	LP BYPASS STOP & CONTROL VALVE WITH EHA AND WATER INJECTION VALVE	19797
BT067	1	ST	HYDRAULIC ACCUMULATORS ALONG WITH FILLING & GAUGING DEVICE	2400
BT068	1	ST	POWER CABLES FOR 24 V SOLENOID VALVES (5x2.5mm ²)	
BT075	1	ST	SEAL STEAM SUPPLY & LEAKAGE STEAM CONTROL VALVE WITH PNEUMATIC ACTUATOR	
BT081	1	NO	HPT STEAM EVACUATION VALVE	
BT093	1	ST	TG DECK EMBEDMENTS	
	TOTAL			505720

21. MAIN COOLING WATER PIPING AND H&S : 106 MT APPROX.

22.THERMAL INSULATION

SL.NO.	ITEM DESCRIPTION	TOTAL WT. MT
1	Thermal insulation of Turbine (Haridwar supply)	54.28
2	Thermal insulation (PEM Supply)	265
3	Drive Turbine insulation	1.6
	TOTAL	320.88
	TOTAL FOR BOTH UNITS	641.76

NOTE :

1. The list above is 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 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.

APPENDIX-III

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

SL.NO.	DESCRIPTION & CAPACITY OF T&P	QUANTITY	PURPOSE
01	EOT CRANE IN TG HALL 105/15T CAPACITY	01 No	FOR HANDLING AND ERECTION WITHIN TG HALL.
02	PORTAL GANTRY CRANE WITH ACCESSORIES (360 T CAP.)	01 SET	FOR GENERATOR STATOR ERECTION ONLY. REF CL 4.6.2 & 5.2.2
03	75T/180T CRAWLER CRANE	01	FOR LIFTING OF DEAERATOR SHELL AND FEED STORAGE TANK SHELL SEGMENTS TO THE NEAREST POSSIBLE FLOOR. THIS SHALL BE PROVIDED DEPENDING ON THE AVAILABILTY AT SITE. REF ALSO CLAUSE 4.7.1, 5.2.3 & 5.2.5

APPENDIX-IV

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

A: TOOL & PLANTS

Sl.No.	DESCRIPTION	MIN QUANTITY
1	CRANES OF SUITABLE CAPACITY - FOR MATERIAL HANDLING AT STORES, YARDS, AND AT SITE (12 MT ,18MT ETC)	1 NO.
2	TRAILER WITH HORSE - SUITABLE CAPACITY FOR TRANSPORT OF MATERIALS TO SITE	1 NO.
3	TRACTOR TROLLEY -SUITABLE CAPACITY FOR TRANSPORT OF MATERIALS TO SITE	1 NO.
4	WELDING GENERATOR SETS (ELECTRIC AS WELL DIESEL)	1 SET
5	3- PHASE COMPLETE SET UP FOR DRAWL OF POWER INCLUDING POWER CABLE ETC	1 SET
6	RADIOGRAPHY SOURCE OF ADEQUATE STRENGTH	1 NO.
7	RADIOGRAPH FILM VIEWER	AS PER REQUIREMENT
8	TIG WELDING SETS	AS PER REQUIREMENT
9	STRESS RELIEVING EQUIPMENTWITH TEMPERATURE RECORDERS	AS PER REQUIREMENT
10	ELECTRODE BAKING & HOLDING OVEN	1 NO.
11	ELECTRODE BAKING OVEN-- PORTABLE	AS PER REQUIREMENT
12	MIXER FOR GROUTING OF EQUIPMENT FOUNDATIONS	AS PER REQUIREMENT
13	VACUUM CLEANER (INDUSTRIAL)	AS PER REQUIREMENT
14	PIPE CUTTING AND BEVELLING MACHINE	AS PER REQUIREMENT
15	PIPE BENDING M/C (ELECTRIC/ ELECTRO-HYDRAULIC-UP TO 4" SIZE)	AS PER REQUIREMENT
16	AIR COMPRESSOR 120 CFM	1 NO.
17	STEP DOWN TRANSFORMER, 230V/24V	AS PER REQUIREMENT
18	CONDENSER TUBE EXPANDER SET	AS PER REQUIREMENT
19	ELECTRICALLY OPERATED WINCHES 3T/5T CAP.	AS PER REQUIREMENT

20	JACKING BOLTS / PRESSOUT BOLTS OF ALL SIZES	AS PER REQUIREMENT
21	MANUAL HYDRAULIC JACKS OF 100 T CAPACITY	12 Nos.
22	MANUAL HYDRAULIC JACKS OF 50 T CAPACITY	12 Nos.
23	GANG OPERATED JACKS OF 100 T CAPACITY	12 Nos. with broad base and 1" Lift
24	GANG OPERATED JACKS OF 63 T CAPACITY	4 Nos. with 4"-6" lift
25	HIGH PRESSURE HYDRAULIC HOSES AND COUPLING SETS ETC	12 Nos
26	TORQUE WRENCH 0 TO 200 N-M CAP.	01 NO.
27	TORQUE WRENCH UPTO 2000 N-M CAP.	01 NO.
28	SLINGS FOR LP TURBINE ROTOR	01 SET
29	SLINGS FOR HP TURBINE MODULE	01 SET
30	SLINGS FOR GENERATOR ROTOR	01 SET
31	BOLT STRETCHING DEVICE (FOR TURBINE & GENERATOR FDN. BOLTS)	AS PER REQUIREMENT
32	LONG FEELER GAUGE SET	AS PER REQUIREMENT
33	SPANNERS / EYE BOLTS (OF ALL SIZES)	AS PER REQUIREMENT

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

SIGNATURE OF THE TENDERER

DATE:

APPENDIX-VI

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

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

: Please use additional sheets for remaining contract period in the same format.

SIGNATURE OF TENDERER

DATE:

APPENDIX-VII
FORMAT FOR DEPLOYMENT PLAN FOR MAJOR TOOLS AND PLANTS

SL. NO.	DESCRIPTION & CAPACITY OF T&P	MONTHS										
		1	2	3	4	5	6	7	8	9	10	SO ON#
01	CRANE OF SUITABLE CAPACITY FOR MATERIAL HANDLING AT YARD											
02	TRAILER WITH HORSE - SUITABLE CAPACITY FOR TRANSPORT OF MATERIALS TO SITE											
03	TRACTOR TROLLEY -SUITABLE CAPACITY FOR TRANSPORT OF MATERIALS TO SITE											
04	WELDING GENERATOR SETS (ELECTRIC AS WELL DIESEL)											
05	3- PHASE COMPLETE SET UP FOR DRAWL OF POWER INCLUDING POWER CABLE ETC											
06	RADIOGRAPHY SOURCE OF ADEQUATE STRENGTH											
07	ELECTRODE BAKING & HOLDING OVEN											
08	ELECTRODE BAKING OVEN-- PORTABLE											
09	AIR COMPRESSOR 120 CFM											
10	STEP DOWN TRANSFORMER, 230V/24V											
11	CONDENSER TUBE EXPANDER SET											
12	MANUAL HYDRAULIC JACKS OF 100 T CAPACITY											
13	MANUAL HYDRAULIC JACKS OF 50 T CAPACITY											
14	GANG OPERATED JACKS OF 100 T CAPACITY											
15	GANG OPERATED JACKS OF 63 T CAPACITY											
16	HIGH PRESSURE HYDRAULIC HOSES AND COUPLING SETS ETC											

: Please use additional sheets for remaining contract period in the same format.

Date

Signature of Tenderer

APPENDIX-VIII

CONCURRENT COMMITMENTS

SL.NO	FULL POSTAL ADDRESS OF CLIENT AND NAME OF OFFICER IN-CHARGE	DESCRIPTION OF THE WORK	VALUE OF THE CONTRACT	COMMENCEMENT DATE	SCHEDULED COMPLETION	% COMPLETED. AS ON DATE	ANTICIPATED COMPLN. DATE	REMARKS

DATE:

SIGNATURE OF THE TENDERER

APPENDIX–IX

DETAILS OF SIMILAR WORK DONE DURING THE LAST SEVEN YEARS

S N	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								

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

DATE

SIGNATURE OF TENDERER WITH SEAL

.....

Bharat Heavy Electricals Limited: PSWR: NAGPUR
Tender Specifications No. BHE/PW/PUR/MAUDT-STG/721

Part-I: Technical Bid Specification

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