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

NO. BHE / PW / PUR / GFI- MECH+MMS/644

FOR

RECEIPT/COLLECTION, UNLOADING, HANDLING, STACKING, VERIFICATION OF ENTIRE PROJECT MATERIALS INCLUDING ELECTRICAL, CONTROL & INSTRUMENTATION EQUIPMENTS / ITEMS AND OTHER MATERIALS IN BHEL/CUSTOMER'S STORES/STORAGE YARD AS RECEIVED BY ROAD FROM MANUFACTURING UNITS/ TRANSPORTERS GODOWN UNDER MATERIALS MANAGEMENT, RECEIPT / COLLECTION / LOADING / UNLOADING/ TRANSPORTATION OF MATERIALS FROM BHEL / CLIENT'S STORES / STORAGE YARDS TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING, FINAL PAINTING AND HANDING OVER OF 1X62 TPH HEAT RECOVERY STEAM GENERATOR WITH AUXILIARIES, STACK/ STEEL CHIMNEY WITH ASSOCIATED AUX, 1 XFr6 GAS TURBINE-GENERATOR SET WITH THEIR AUXILIARIES, BALANCE OF PLANT EQUIPMENTS / SYSTEMS WITH RELATED AUXILIARIES, INTEGRAL PIPING, FIELD / POWER CYCLE PIPING AND APPLICATION OF THERMAL INSULATION OF EQUIPMENTS / PIPING/VESSELS & TANKS ETC. FOR 1X33.3 MW COGENERATION POWER AND STEAM PLANT UNIT

AT

1X33.3 MW COGENERATION POWER AND STEAM UNIT
GUJARAT NARMADA VALLEY FERTILIZERS COMPANY LIMITED
DISTT. BHARUCH
(GUJARAT)

PART I - TECHNICAL BID

BOOK NO.

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

C O N T E N T S

SN	DESCRIPTION	SECTION/ APPENDIX NO.	NO. OF PAGES
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22.	DETAILS OF QUANTITIES/SCOPE OF WORK	APPENDIX-II	9
23.	LIST OF T&P TO BE PROVIDED BY BHEL FREE OF CHARGE ON SHARING BASIS	APPENDIX-III	1
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26.	FORMAT FOR DEPLOYMENT PLAN FOR MAJOR TOOL & PLANTS OF CONTRACTOR	APPENDIX-VI	1
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29.	DETAILS OF SIMILAR WORK DONE IN LAST SEVEN YEARS	APPENDIX-IX	1
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31.	**RATE SCHEDULE** (PART-II: PRICE BID)		**@**

LEGEND:

$: Attached at the end of hard copy of Tender Specifications Part-I. Hosted in BHEL web page (www.bhel.com) as file titled **"NIT+GCC-644".**

@: Issued as separate hard copy booklet 'Tender Specifications Part-II (Price Bid-644)'. Hosted in BHEL web page (www.bhel.com) as file titled **"PRICE BID-644"**

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-644"**

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 / GFI- MECH+MMS/644

NAME OF THE WORK:

RECEIPT/COLLECTION, UNLOADING, HANDLING, STACKING, VERIFICATION OF ENTIRE PROJECT MATERIALS INCLUDING ELECTRICAL, CONTROL & INSTRUMENTATION EQUIPMENTS / ITEMS AND OTHER MATERIALS IN BHEL/CUSTOMER'S STORES/STORAGE YARD AS RECEIVED BY ROAD FROM MANUFACTURING UNITS/ TRANSPORTERS GODOWN UNDER MATERIALS MANAGEMENT, RECEIPT / COLLECTION / LOADING / UNLOADING/ TRANSPORTATION OF MATERIALS FROM BHEL / CLIENT'S STORES / STORAGE YARDS TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING, FINAL PAINTING AND HANDING OVER OF 1X62 TPH HEAT RECOVERY STEAM GENERATOR WITH AUXILIARIES, STACK/ STEEL CHIMNEY WITH ASSOCIATED AUX, 1 XFr6 GAS TURBINE-GENERATOR SET WITH THEIR AUXILIARIES, BALANCE OF PLANT EQUIPMENTS / SYSTEMS WITH RELATED AUXILIARIES, INTEGRAL PIPING, FIELD / POWER CYCLE PIPING AND APPLICATION OF THERMAL INSULATION OF EQUIPMENTS / PIPING/VESSELS & TANKS ETC. FOR 1X33.3 MW COGENERATION POWER AND STEAM PLANT UNIT AT 1X33.3 MW COGENERATION POWER AND STEAM UNIT GUJARAT NARMADA VALLEY FERTILIZERS COMPANY LIMITED, DIST. BHARUCH (GUJARAT)

EARNEST MONEY DEPOSIT: Please see Special Conditions of Contract.

LAST DATE FOR TENDER SUBMISSION:	Please obtain updated information from web page "http://www.bhel.com" → Tender Notifications → View Corrigendums.

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

M/s. ……

…….

PLEASE NOTE:
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

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

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

PROCEDURE FOR SUBMISSION OF SEALED TENDERS

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

PART-I (TECHNICAL BID) COVER-I

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

PART-II (PRICE BID) COVER-II

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

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

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

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

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

PROJECT INFORMATION

INTRODUCTION

1X33.3MW Cogeneration Power & Steam Unit is being set up by Gujarat Narmada Valley Fertilizers Company Limited, Bharuch District in the state of Gujarat.

The Bidder shall acquaint himself by a visit to the site, if felt necessary, with the conditions prevailing at site before submission of the bid. The information given herein under is for general guidance and shall not be contractually binding on BHEL/Owner. All relevant site data /information as may be necessary shall have to be obtained /collected by the Bidder.

APPROACH TO SITE

Location:
Project site is located near Chavaj village in Bharuch Dist. Of Gujarat State & it is at a distance of about 4 kms from Bharuch on the NH-8.

Access by Road:
The project site is connected by national highway No. 8

Nearest Railway Station:
The nearest railway station is Bharuch 4kms from site.

Nearest Airport:
The nearest airport is Vadodara 80 kms.

1. Owner :Gujarat Narmada Valley Fertilizers Company Limited
2. Project Title :1X33.3MW CPSU Bharuch
3. Location :Bharuch, Gujarat
4. Nearest Railway Stn. : Bharuch, 4 Kms. From Site location
5. Temperature:
    a. Highest temperature 48 Deg.C
    b. Lowest temperature 5 Deg.C
6. Rainfall:
    a. Annual Average - 1000 mm in the period June to October.
7. Wind Data:
    a. 44 m/sec (annual mean speed)
8. Seismic Zone - Zone III as per IS: 1893-2005 (Part – IV)

THE BIDDER IS ADVISED TO VISIT AND EXAMINE THE SITE OF WORKS AND ITS SURROUNDINGS AND OBTAIN FOR HIMSELF ON HIS OWN RESPONSIBILITY ALL INFORMATION THAT MAY BE NECESSARY FOR PREPARING THE BID AND ENTERING INTO THE CONTRACT. ALL COSTS FOR AND ASSOCIATED WITH SITE VISITS SHALL BE BORNE BY THE BIDDER.

CHECK LIST

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

1	NAME OF THE TENDERER WITH ADDRESS		
2	NATURE OF THE FIRM	LIMITED / PARTNERSHIP / PROPRIETARY	
3	EMD DETAILS (Rs. 2.0 LACS BY DD ONLY OR ONE TIME EMD)		
4	VALIDITY OF OFFER (REQUIRED 6 MONTHS FROM DUE DATE)		
5	MOBILIZATION TIME (NOT EXCEEDING TWO WEEKS FROM FAX LOI)		
6	WHETHER NO DEVIATION CERTIFICATE FURNISHED	YES	NO
7	TENDERER HAS VISITED THE PROJECT SITE AND ACQUAINTED WITH THE SITE CONDITIONS	YES	NO
8	DETAILS OF CONCURRENT JOBS ARE FURNISHED (AS PER RELEVENT 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 (ANNEXURE 'A' OF GCC) IS FURNISHED	YES	NO
12	PROFIT & LOSS ACCOUNT FOR PRECEDING THREE YEARS IS FURNISHED	YES	NO
13	LATEST SOLVENCY CERTIFICATE FROM THE BANKER IS FURNISHED	YES	NO
14	LATEST INCOME TAX CLEARANCE CERTIFICATE OR COPY OF PAN CARD ACCOMPANIED BY 'IT RETURN' COPY IS FURNISHED	YES	NO
15	MANPOWER DEPLOYMENT PLAN AS PER RELEVANT APPENDIX IS FURNISHED	YES	NO
15A	MANPOWER DEPLOYMENT PLAN FOR MM SERVICES AS PER RELEVANT APPENDIX IS FURNISHED	YES	NO
16	MONTHWISE DEPLOYMENT PLAN FOR MAJOR T&P AS PER RELEVANT IS FURNISHED	YES	NO
17	ANALYSIS OF UNIT RATES QUOTED AS PER RELEVANT 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 AS PER RELEVENT AND SUPPORTING DOUCMENTS FURNISHED.	YES	NO
20	ERECTION AND COMMISSIONING PROGRAMME.	YES	NO
21	BIDDER HAS FMILIARIZED HIMSELF WITH ALL RELEVANT LOCAL LAWS & CONDITIONS.	YES	NO
22	WHETHER ALL THE PAGES OF THE TENDER DOCUMENTS ARE READ, UNDERSTOOD AND SIGNED	YES	NO
23	WHETHER THE FOLLOWING DETAILS PERTAINING TO YOUR BANK ACCOUNT DULY ENDORSED BY THE BANK HAVE BEEN FURNISHED {TO ENABLE BHEL RELEASE PAYMENTS THROUGH ELECTRONIC FUND TRANSFER (EFT/RTGS) AS SPECIFIED IN SECTION 12 } 1. Name of the Company 2. Name of Bank 3. Name of Bank Branch 4. City/Place 5. Account Number 6. Account type 7. IFSC code of the Bank Branch 8. MICR Code of the Bank Branch	YES	NO

NOTE: STRIKE OFF YES OR NO, AS APPLICABLE

DATE: SIGNATURE OF TENDERER

DECLARATION BY BIDDER'S AUTHORIZED SIGNATORY

I,.....HEREBY CERTIFY THAT ALL THE INFORMATION AND DATA FURNISHED BY ME WITH REGARD TO THIS TENDER SPECIFICATION NO. **BHE / PW / PUR / GFI- MECH+MMS/644**
ARE TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE. I HAVE GONE THROUGH THE SPECIFICATION, CONDITIONS AND STIPULATIONS IN DETAIL AND AGREE TO COMPLY WITH THE REQUIREMENTS AND INTENT OF THE SPECIFICATION.I FURTHER CERTIFY THAT I AM DULY AUTHORISED REPRESENTATIVE OF THE UNDER MENTIONED TENDERER AND A COPY OF VALID POWER OF ATTORNEY TO THIS EFFECT IS ALSO ENCLOSED.

SIGNATURE OF TENDERER

DATE:

CERTIFICATE OF NO DEVIATION

TENDER SPECIFICATION NO.

BHE / PW / PUR / GFI- MECH+MMS/644

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 CONDITIONS STIPULATED BY BHEL, EITHER TECHNICAL OR COMMERCIAL AND I/WE AGREE TO ALL THE TERMS AND CONDITIONS STIPULATED BY BHEL IN THE TENDER SPECIFICATION INCLUDING ASSOCIATED AMENDMENTS AND CLARIFICATIONS.

SIGNATURE OF THE TENDERER

DATE:

Section-3
Offer of the Contractor

DGM (Purchase)
Bharat Heavy Electricals Limited
Power Sector - Western Region
Shreemohini Complex
345, Kingsway
Nagpur - 440 001

Dear Sir,

I/we hereby offer to carry out the work detailed in tender specification no. **BHE / PW / PUR / GFI- MECH+MMS/644** for 1X33.3 MW Cogeneration Power & Steam Unit, Gujarat Narmada Valley Fertilizers Company Limited, Bharuch, Gujarat 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 bidders
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.

I/we further agree to execute all the works referred to in the said documents upon the terms and conditions contained or referred to therein and as detailed in the appendices annexed thereto.

Place: Signature of Bidder:
Date: Address:

Witnesses with Their Address

	Signature	Name	Address
1.			
2.			

SECTION– 4

SPECIAL CONDITIONS OF CONTRACT

4.0 GENERAL

THE SCOPE OF WORK COVERS THE COMPLETE WORK OF RECEIPT/COLLECTION, UNLOADING, HANDLING, STACKING, VERIFICATION OF ENTIRE PROJECT MATERIALS INCLUDING ELECTRICAL, CONTROL & INSTRUMENTATION EQUIPMENTS / ITEMS AND OTHER MATERIALS IN BHEL/CUSTOMER'S STORES/STORAGE YARD AS RECEIVED BY ROAD / RAIL FROM MANUFACTURING UNITS/ TRANSPORTERS GODOWN UNDER MATERIALS MANAGEMENT, RECEIPT / COLLECTION / LOADING / UNLOADING/ TRANSPORTATION OF MATERIALS FROM BHEL / CLIENT'S STORES / STORAGE YARDS TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING, FINAL PAINTING AND HANDING OVER OF 1X62 TPH HEAT RECOVERY STEAM GENERATOR WITH AUXILIARIES, STACK/ STEEL CHIMNEY WITH ASSOCIATED AUX, 1 XFR6 GAS TURBINE-GENERATOR SET WITH THEIR AUXILIARIES, BALANCE OF PLANT EQUIPMENTS / SYSTEMS WITH RELATED AUXILIARIES, INTEGRAL PIPING, FIELD / POWER CYCLE PIPING AND APPLICATION OF THERMAL INSULATION OF EQUIPMENTS / PIPING/VESSELS & TANKS ETC. FOR 1X33.3 MW COGENERATION POWER AND STEAM PLANT UNIT AT 1X33.3 MW COGENERATION POWER AND STEAM UNIT GUJARAT NARMADA VALLEY FERTILIZERS COMPANY LIMITED, DISTT. BHARUCH (GUJARAT)

THE WORK UNDER THESE SPECIFICATIONS BROADLY COMPRISES OF THE FOLLOWING:

A) RECEIPT / COLLECTION / LOADING / UNLOADING / TRANSPORTATION OF MATERIALS FROM BHEL/CLIENT'S STORES / STORAGE YARDS TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING AND FINAL PAINTING OF 1X62 TPH HRSG AND ITS AUXILIARIES, INSULATION, INCLUDING ASSEMBLY, FIT UP, WELDING, NDT/ RADIOGRAPHY/ PRE-HEAT TREATMENT/POST-HEAT TREATMENT REQUIREMENT, SUPPORTING OF INTEGRAL PIPING, FIELD PIPING & POWER CYCLE PIPING.

B) ASSEMBLY, ERECTION INCLUDING WELDING & NDE ETC. OF STEEL STACK / CHIMNEY OF 45 METER HEIGHT, TOTAL NO OF SHELLS 18, EACH WILL HAVE 2.5 M HEIGHT WITH ASSOCIATED ELECTRICAL WORKS OF AVIATION LAMP/LIGHTS, EARTHING & LIGHTENING ARRESTORS, LADDER & LANDING PLATFORMS AND INSULATION WITH CLADDINGS ETC. AS PER DRAWING REQUIREMENTS. THE CHIMNEY IS TENTATIVELY TO BE INSULATED TO THE HEIGHT OF ABOUT 25 METERS, HOWEVER THE ACTUAL HEIGHT OF INSULATION & CLADDING SHALL BE AS PER DRAWING REQUIREMENT AND SAME SHALL BE CARRIED OUT BY CONTRACTOR.

C) RECEIPT / COLLECTION / LOADING / UNLOADING / TRANSPORTATION OF MATERIALS FROM BHEL/CLIENT'S STORES / STORAGE YARDS TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING AND FINAL PAINTING OF 1XFR. 6 GAS

TURBINE - GENERATOR SET WITH BYPASS STACK AND THEIR AUXILIARIES, TANKS, VESSELS & PUMPS ETC..

D) RECEIPT/COLLECTION/ LOADING/ UNLOADING/ TRANSPORTATION OF MATERIALS FROM BHEL/CLIENT'S STORES /STORAGE YARDS TO SITE OF WORK, ASSEMBLY, FIT UP, ERECTION, WELDING INCLUDING NDT/ RADIOGRAPHY/ PRE-HEAT TREATMENT/POST-HEAT TREATMENT REQUIREMENT, SUPPORTING AND PRESERVATIVE & FINAL PAINTING OF INTEGRAL PIPING, VALVES/FITTINGS AND SUPPORTS ALL PIPING SCHEMES LIKE FUEL, LUBE OIL, PRESSURE OIL, CONTROL OIL / GOVERNING OIL, GAS, INSTRUMENT AIR & SERVICE AIR, MAIN STEAM/AUX. STEAM, FEED WATER, DM WATER, CONDENSATE PIPING, COOLING WATER PIPING ETC. FOR GT SYSTEM WITH AUX AND BALANCE OF PLANT EQUIPMENTS INCLUDING DEAERATOR (FST & HEATER) & ASSOCIATED APPROACH PLATFORM.

E) RECEIPT/COLLECTION/ LOADING/ UNLOADING/ TRANSPORTATION OF THERMAL INSULATION/CLADDING MATERIALS FROM BHEL/CLIENT'S STORES /STORAGE YARDS TO SITE OF WORK, APPLICATION OF THERMAL INSULATION OF INTEGRAL PIPING, FIELD /POWER CYCLE PIPING, VALVES WITH FITTINGS, EQUIPMENTS, TANKS & VESSELS INCLUDING DEAERATOR WITH HEATER, GTG AUXILIARIES INCLUDING BYPASS STACK AND BALANCE OF PLANT (MECHANICAL) EQUIPMENTS & AUXILIARIES.

F) RECEIPT, UNLOADING/ HANDLING OF MATERIALS, STACKING, VERIFICATION, PRESERVATION, GENERATION OF SHORTAGES/DAMAGES REPORT OF ALL MATERIALS RECEIVED BY ROAD AND FROM TRANSPORTER'S GODOWN FOR 1X62 TPH HEAT RECOVERY STEAM GENERATOR AND ITS AUXILIARIES, INSULATION, CHIMNEY/STEEL STACK, PIPING, 1XFR6 GAS TURBINE - GENERATOR SET & ITS AUXILIARIES, BYPASS STACK, BALANCE OF PLANT (MECHANICAL) AND RELATED EQUIPMENTS OF ALL PACKAGES AND ELECTRICAL, CONTROL & INSTRUMENTATION EQUIPMENTS / ITEMS INCLUDING HEAVY EQUIPMENTS LIKE HRSG DRUMS, GAS TURBINE, GAS TURBINE GENERATOR, ACCESSORY BASE, GENERATOR TRANSFORMER, STATION TRANSFORMER, LT AUX. TRANSFORMER ETC. AND ALL OTHER ITEMS SUPPLIED BY BHEL UNITS, THEIR SUB-VENDORS, BOUGHT-OUT ITEMS, ANY OTHER MATERIAL LIKE BHEL'S T&P, FURNITURE ETC. UNDER MATERIAL HANDLING AND MATERIAL MANAGEMENT.

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

1) RECEIPT OF MATERIALS OF HRSG, GT, AND GTG, ELECTRICAL AND CONTROL & INSTRUMENTATION AT BHEL'S STORES / STORAGE YARD, VERIFICATION, STACKING, AND PRESERVATION. THIS WILL ALSO INCLUDE RECEIPT AND UNLOADING OF ODC CONSIGNMENTS LIKE GT, GTG, BOILER DRUMS, GENERATOR TRANSFORMER, STATION TRANSFORMERS, LT AUX. TRANSFORMER ETC.

2) MATERIALS MANAGEMENT SERVICES INVOLVING PRESERVATION OF MATERIALS, MANUAL AND COMPUTERIZED RECORD KEEPING AND GENERATING MIR AND ALLIED SERVICES

3) COLLECTION OF MATERIAL FROM BHEL/ CLIENT'S STORES/STORAGE YARD AND TRANSPORTATION TO SITE OF WORK/ PRE-ASSEMBLY

4) RECEIPT, UNLOADING & TRANSPORTATION TO BHEL STORES/STAGE YARD OF MATERIALS RECEIVED BY RAIL (RAILWAY SIDING WITHIN THE PROJECT PREMISE)

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

6) ERECTION, ALIGNMENT AND WELDING/BOLTING/FASTENING/ GROUTING

7) NON-DESTRUCTIVE EXAMINATION & POST WELD HEAT TREATMENT

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

9) TRIAL OPERATION

10) PREPARATION & CHIPPING OF CIVIL FOUNDATIONS AND GROUTING OF FOUNDATION / PACKERS / FOUNDATION BOLTS / FRAMES ETC.

11) APPLICATION OF THERMAL INSULATION & LINING ON HRSG WITH ASSOCIATED AUXILIARIES / EQUIPMENTS, STEEL STACK, BYPASS STACK, TANKS / VESSELS, PIPINGS WITH VALVES & FITTINGS INCLUDING GAS TURBINE, DEAERATOR WITH HEATER, TANKS, VESSELS & PIPINGS ETC.

12) CHEMICAL CLEANING/ FLUSHING,FLUSHING WITH AIR/ WATER/ OIL ETC., HYDRO TESTING, STEAM BLOWING INCLUDING LUBE OIL FLUSHING ETC. OF EQUIPMENTS, PIPINGS AND OTHER ASSOCIATED SYSTEMS COVERED UNDER THE SCOPE

13) FINAL PAINTING INCLUDING SURFACE PREPARATION, CLEANING, MARKING OF IDENTIFICATION MARKS, COLOR BANDS, DIRECTION OF ROTATION / FLOW MARKS, LEGENDS ETC. AS PER SITE REQUIREMENT.

4.1 SCOPE OF WORK FOR MATERIALS HANDLING & MATERIAL MANAGEMENT SERVICES FOR THE SCOPE OF EQUIPMENTS / ITEMS / SYSTEMS COVERED UNDER THESE TENDER SPECIFICATIONS SHALL BROADLY AS UNDER:

.

- UNLOADING OF ALL TYPES OF MATERIALS INCLUDING THE HEAVY CONSIGNMENTS AND / OR OD CONSIGNMENTS (E.G., HRSG DRUMS, GAS TURBINE, GAS TURBINE GENERATOR, GENERATOR TRANSFORMERS, STATION TRANSFORMER, LT AUX. TRANSFORMER, DEAERATOR WITH HEATER, GT ACCESSORY BASE ETC) DIRECTLY FROM TRAILERS/WAGON BY SUITABLE CRANE OR BY JACK AND SLEEPER METHOD (ALL TO BE

ARRANGED BY THE CONTRACTOR), INCLUDING LEVELING OF THE UNLOADING AREA AND ATTENDANT WORK.

- RECEIPT OF MATERIALS DISPATCHED BY ROAD TRANSPORT ON DOOR DELIVERY BASIS AT THE BHEL STORES AND UNLOADING THEREOF.

- For **INCOMING AND OUTGOING SMALLS:** CONTRACTOR SHALL ARRANGE COLLECTION, FROM TRANSPORTERS' GODOWNS, OF MATERIALS (SMALLS) DISPATCHED BY ROAD TRANSPORT ON GODOWN DELIVERY BASIS, LOADING AT TRANSPORTERS GODOWN, LOCAL TRANSPORT UP TO BHEL/CLIENT'S STORES/SITE AND UNLOADING. PAYMENT FOR LOADING AT THE TRANSPORTER'S GODOWN, UNLOADING AT STORES/STORAGE YARD/SITE, VERIFICATION AND STACKING WILL BE MADE AS PER UNIT RATE VIDE ITEM SL. NO. B.2 OF RATE SCHEDULE AND TERMS OF PAYMENT AS PER SECTION-12. HOWEVER, FOR TRANSPORT OF SMALLS FROM GODOWN TO SITE, PRO-RATA PAYMENT @ RS. 5/ PER KM FOR TOTAL TO AND FRO DISTANCE, AS CERTIFIED BY BHEL ENGINEER, SHALL BE MADE. NO OTHER PAYMENT SUCH AS MINIMUM CHARGES FOR CARRIER ETC WILL BE MADE. ALL ARRANGEMENTS INCLUDING TRANSPORT, LABOUR AND OTHER T&P ETC IS IN CONTRACTOR'S SCOPE. PRIOR APPROVAL OF BHEL ENGINEER SHOULD BE OBTAINED FOR SUCH TRIPS TO TRANSPORTERS' GODOWN(S). THESE GODOWNS ARE EXPECTED TO BE LOCATED WITHIN A RADIUS OF 20 KM APPROX FROM THE PROJECT SITE.

  SIMILARLY, FOR ANY SMALLS TO BE SENT TO DIFFERENT LOCATIONS/SITES FROM SITE AND WHICH NEEDS TO BE BROUGHT TO TRANSPORTER'S/RAILWAY GODOWN FOR BOOKING SAME ARRANGEMENT AS ABOVE SHALL BE ADOPTED.

  IN CASE OF CONSIGNMENTS IN SMALLS, THE WEIGHT OF PACKAGE SHALL BE CHECKED WITH THE INVOICED WEIGHT OF THE PACKAGES AND ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO BHEL/TRANSPORTER.

- PRELIMINARY VERIFICATION OF MATERIALS AT THE TIME OF UNLOADING FROM ROAD TRANSPORT VEHICLE OR WHILE RECEIVING CONSIGNMENTS FROM RAILWAY/ TRANSPORTERS' GODOWN - AS THE CASE MAY BE, REPORTING IMMEDIATELY THE DISCREPANCIES LIKE DAMAGES AND SHORTAGES NOTICED.
- DETAILED VERIFICATION OF MATERIALS WITH REFERENCE TO PACKING LIST AND LOADING ADVICE SLIP AFTER UNPACKING OF BOXES & CRATES; REPACKING, WHERE CALLED FOR, AFTER DETAILED VERIFICATION; PREPARATION OF RECEIPT INSPECTION REPORTS.
- STACKING AND STORING AT BHEL OPEN STORAGE YARD/ COVERED STORES/ CLOSED & SEMI-CLOSED SHEDS, SUBMISSION OF STACKING/STORING RECORDS.
- PRESERVATION OF THE MATERIALS IN ACCORDANCE WITH BHEL PRESERVATION MANUAL AND/OR AS PER BHEL INSTRUCTIONS.
- GENERAL CLEANING, GRASS CUTTING AND UPKEEP OF STORAGE YARD, COVERED AND SEMI-CLOSED STORES SHEDS WITHIN THE QUOTED RATES FOR UNLOADING, VERIFICATION AND STACKING.
- PROVIDING MATERIALS MANAGEMENT SERVICES (REFER CLAUSE NO. 4.2.19.6).

- RE-HANDLING AND RESTACKING OF MATERIALS AS AND WHEN CALLED FOR BY BHEL. THIS ALSO INCLUDES EXCESS/REDUNDANT/ SCRAP MATERIALS RETURNED TO STORES BY BHEL CONSTRUCTION & ERECTION CONTRACTORS.
- HANDLING AND LOADING OF OUTGOING MATERIALS THOSE ARE TO BE SENT TO OTHER DESTINATIONS.
- THERMAL INSULATION AND LINING
- BOILER CONTROLS & INSTRUMENTATION AND ACCESSORIES
- GT & GTG CONTROLS AND INSTRUMENTATION AND ACCESSORIES
- GENERATOR TRANSFORMER, STATION TRANSFORMER & UNIT AUXILIARY TRANSFORMER PACKAGES
- ELECTRICAL MOTORS, PANELS, SWITCHGEAR AND BUS DUCTS/ CABLE ETC
- FILED /POWER CYCLE AND FIELD PIPING, TANKS, VESSELS AND BALANCE OF PLANT EQUIPMENTS & RELATED ITEMS/PACKAGES AND STRUCTURAL STEEL MATERIALS ETC.
- OTHER BHEL SUPPLIED (MANUFACTURED/BOUGHT OUT ITEMS) PACKAGES
- OTHER ITEMS SENT BY BHEL SITES/REGIONS ETC.
- SOME OF THE MAJOR HEAVY / OD CONSIGNMENT ARE:

S.NO.	DESCRIPTION	APPROX. WT
1)	BOILER DRUM	
	A) HP DRUM	51.50
	B) LP DRUM	10.0
2)	GAS TURBINE	68.0
3)	GAS TURBINE GENERATOR	87.0
4)	GENERATOR TRANSFORMER	68.0
5)	STATION TRANSFORMER	30.0
6)	LT AUX. TRANSFORMER	7.0
7)	DEAERATOR SET	17.0
8)	GT ACCESSORY BASE	31.0
9)	3.3 KV SW BOARD	10.8
10)	415 V PMCC	15.2
11)	415 V BOP MCC	6.6
12)	415 GT MCC	9.1
13)	EMERGENCY MCC	6.0
14)	230V UPS DB	5.0
15)	DIVERTER DAMPER	18.0
16)	VERTICAL DUCT	18.64

THE WEIGHT INDICATED ABOVE ARE ONLY THE TENTATIVE INDICATION AND SHOULD IN NO WAY BECOME A BASIS FOR ANY CLAIM ON ACCOUNT OF ANY VARIATION IN ACTUAL WEIGHT. CONTRACTOR SHALL MAKE ALL ARRANGEMENTS INCLUDING ALL T & P SUCH AS CRANE / SLEEPERS ETC. TO UNLOAD THESE AT THE LOCATIONS / ON RESPECTIVE FOUNDATION AS INSTRUCTED BY BHEL ENGINEER.

4.2.
RESPONSIBILITIES OF CONTRACTOR AND SCOPE OF WORK RECEIPT, UNLOADING, VERIFICATION AND STACKING (REFER 'SECTION-B' OF RATE SCHEDULE).

RECEIPT AT BHEL STORES/ STORAGE YARD, UNLOADING FROM TRANSPORT VEHICLES, VERIFICATION, STACKING, STORING, PRESERVATION INCLUDING UNLOADING OF SOME HEAVIER COMPONENTS DIRECTLY AT SITE WITH ATTENDANT WORKS AS ABOVE AND PROVIDING ASSISTANCE FOR MATERIALS MANAGEMENT.

AN ALL INCLUSIVE COMMON UNIT RATE PER MT APPLICABLE TO ALL CONSIGNMENTS, INCLUDING HEAVY / ODC SUCH AS GAS TURBINE, GAS TURBINE ACCESSORY BASE, GAS-TURBINE-GENERATOR, BOILER DRUMS, TRANSFORMERS ETC, IRRESPECTIVE OF DIMENSIONS & WEIGHT OF CONSIGNMENT IS CALLED FOR VIDE ITEM NO. B.1 OF RATE SCHEDULE FOR UNLOADING, VERIFICATION STACKING ETC. PAYMENT FOR ALL ITEMS INCLUDING HEAVY/ ODC WILL BE RELEASED BASED ON COMMON UNIT RATE.

4.2.1
IT WILL BE RESPONSIBILITY OF THE CONTRACTOR TO KEEP IN TOUCH WITH OFFICIALS OF BHEL REGARDING ADVANCE INFORMATION ABOUT ARRIVAL OF CONSIGNMENTS. THE CONTRACTOR SHALL COLLECT LORRY WAY BILLS, OTHER SUCH DISPATCH DOCUMENTS.

4.2.2
THE CONTRACTOR SHALL REMAIN IN REGULAR CONTACT WITH THE CONCERNED TRANSPORTERS BASED ON THE DISPATCH DETAILS OBTAINED AS STATED ABOVE AND MAKE ALL NECESSARY ARRANGEMENTS FOR COLLECTION / RECEIPT OF THE CONSIGNMENT AS APPLICABLE. CONTRACTOR SHALL TAKE ADVANCE ACTION TO DEPLOY ALL NECESSARY RESOURCES FOR LOCAL TRANSPORTATION, HANDLING AND UNLOADING OF THE ANTICIPATED CONSIGNMENTS SO AS TO ENSURE NO LOSS OF TIME UPON ARRIVAL OF THE CONSIGNMENTS.

4.2.3
CONTRACTOR SHALL ARRANGE COLLECTION, FROM TRANSPORTERS' GODOWNS, OF MATERIALS (SMALLS) DISPATCHED BY ROAD TRANSPORT ON GO DOWN DELIVERY BASIS, LOADING AT TRANSPORTERS GO DOWN, LOCAL TRANSPORT UP TO BHEL/ CLIENT'S STORES/ SITE AND UNLOADING. PAYMENT FOR LOADING AT THE TRANSPORTER'S GO DOWN, UNLOADING AT STORES/STORAGE YARD/SITE, VERIFICATION AND STACKING WILL BE MADE AS PER UNIT RATE VIDE ITEM S.N. B.2 OF RATE SCHEDULE.

4.2.4
PAYMENT OF DEMURRAGE/ WHARFAGE ETC., WHICH RESULT DUE TO CONTRACTOR'S FAULT, SHALL BE THE RESPONSIBILITY OF CONTRACTOR AND TO HIS ACCOUNT. IF BHEL HAS TO MAKE PAYMENT OF SUCH DEMURRAGE/WHARFAGE TOGETHER WITH FREIGHT (PAYMENT OF

FREIGHT ALONE IS IN BHEL'S SCOPE), THE AMOUNTS SO PAID AS DEMURRAGE/WHARFAGE FOR THE REASONS STATED ABOVE SHALL BE PAID TO BHEL BY THE CONTRACTOR FORTHWITH OR SHALL BE RECOVERED FROM THE BILL PAYMENTS DUE TO THE CONTRACTOR.

4.2.5
IT WOULD BE RESPONSIBILITY OF THE CONTRACTOR TO EXAMINE THE PACKAGES, CONSIGNMENTS ETC. IMMEDIATELY ON ARRIVAL AND BRING TO THE NOTICE OF BHEL AUTHORITIES REGARDING LOSS/DAMAGE/SHORTAGE/DISCREPANCY, IF ANY, OBSERVED IN THE CONSIGNMENTS BEFORE TAKING DELIVERY OF THE SAME.

4.2.6
IN CASE OF CONSIGNMENTS IN SMALLS, THE WEIGHT OF PACKAGE SHALL BE CHECKED WITH THE INVOICED WEIGHT OF THE PACKAGES AND ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO BHEL/ TRANSPORTER.

4.2.7
FOR ALL SUCH CONSIGNMENTS, OBSERVATIONS REGARDING LOSS/DAMAGE/ SHORTAGE/ DISCREPANCY ARE TO BE RECORDED IN APPROPRIATE DOCUMENT AND INFORMED TO BHEL. IN CASE IT BECOMES NECESSARY TO TAKE 'OPEN DELIVERY' FROM THE AUTHORITIES, CONTRACTOR SHALL MAKE ALL ARRANGEMENTS INCLUDING TRANSPORTATION FOR TAKING OPEN DELIVERIES. ALL EXPENSES CONNECTED THEREWITH SHALL BE TO THE ACCOUNT OF CONTRACTOR. ANY LOSS THAT ACCRUES TO BHEL ON ACCOUNT OF SUCH FAILURES SHALL BE DEBITED TO THE CONTRACTOR AND RECOVERY EFFECTED FROM HIS RUNNING BILLS.

4.2.8
ANY DISCREPANCY/SHORTAGE/DAMAGE FOUND IN THE CONSIGNMENT AFTER TAKING CLEAN DELIVERY FROM THE CARRIERS SHALL BE THE RESPONSIBILITY OF CONTRACTOR AND THE RESULTANT LOSS TO BHEL ON SUCH ACCOUNT SHALL BE RECOVERABLE FROM THE CONTRACTOR.

4.2.9
CONSIGNMENTS ARE EXPECTED TO ARRIVE DURING ANY TIME OF THE DAY, AND COUNT DOWN FOR DEMURRAGE/WHARF AGE WILL START IMMEDIATELY, UNLOADING OF SUCH CONSIGNMENTS MAY BE NECESSITATED EVEN IN THE NIGHT OR ROUND THE CLOCK. CONTRACTOR SHALL ARRANGE TO DEPLOY HIS RESOURCES IMMEDIATELY AND CONTINUE ROUND THE CLOCK ON SUCH OCCASIONS WITHOUT ANY ADDITIONAL COST TO BHEL. CONTRACTOR SHALL ARRANGE NECESSARY SPOT LIGHTING FOR WORKING AT NIGHT. THE CONTRACTOR SHALL SIMILARLY UNLOAD CONSIGNMENTS ARRIVING ON WEEKLY OFF DAYS AND HOLIDAYS.

4.2.10
UNLOADING AT STORAGE AREA/WORK SITE, STACKING AND RESTACKING IF NECESSITY ARISES, OF HEAVY/SOPHISTICATED EQUIPMENTS LIKE TABBED WALL PANELS OF BOILER, HEAVY MOTORS, HEAVY BEARING

PEDESTALS, FAN IMPELLER AND SERVOMOTORS, ELECTRICAL PANELS AND GT & GTG EQUIPMENTS LIKE HEAVY TURBINE & GENERATOR COMPONENTS, PUMPS, PANELS, ETC. SHALL BE DONE AS PER STORAGE AND PRESERVATION MANUAL OF BHEL AND/OR AS PER DIRECTIONS OF BHEL ENGINEER.

4.2.11
THE CONTRACTOR SHALL VERIFY THE CONSIGNMENTS IN DETAIL WITHIN THE TIME FRAME PRESCRIBED BY BHEL. CONTRACTOR SHALL ARRANGE ALL FACILITIES TO OPEN PACKAGES - WHERE REQUIRED IN THE PRESENCE OF BHEL ENGINEER, VERIFY THE CONTENTS, REPACK WHEREVER AND WHENEVER CALLED FOR AND PROPERLY STACK THEM AS PER STORAGE MANUAL OR/AND AS MAY BE DIRECTED BY BHEL.

4.2.12
THE MATERIAL SHALL BE SO STACKED THAT IT SHOULD FACILITATE EASY IDENTIFICATION, RETRIEVAL AND HANDLING FOR ISSUE AS AND WHEN NEED ARISES.

4.2.13
PRE-DEFINED IDENTIFICATION SYSTEM OF THE LOCATIONS OF OPEN STORAGE YARD, CLOSED SHED, COVERED STORES AS WELL AS STORAGE RACKS HAS TO BE DESIGNED BY THE CONTRACTOR WITH THE APPROVAL OF BHEL. CONTRACTOR SHALL PUT UP PROMINENT IDENTIFICATION BOARDS OF SEGMENTAL LOCATIONS (FOR OPEN AND SEMI-CLOSED STORES) OR INSCRIPTION (ON THE STORAGE RACKS) WITH CLEAR VISIBILITY FROM A DISTANCE. CONTRACTOR SHALL ALSO ARRANGE TO DISPLAY PLOT PLAN AT REGULAR INTERVALS IN THE COVERED/SEMI-CLOSED/OPEN STORAGE. THE CONTRACTOR SHALL ARRANGE PROPER DISPLAYS/SIGNS FOR VARIOUS REQUIREMENTS AS PER INSTRUCTIONS OF BHEL.

4.2.14
THE CONTRACTOR SHALL EXECUTE THE WORK IN A PROFESSIONAL MANNER. THE STORES SHALL BE HANDLED WITH DUE CARE AND DILIGENCE. THE CONTRACTOR AT HIS RISK AND COST SHALL MAKE GOOD ANY LOSS TO BHEL DUE TO CONTRACTOR’S LAPSE.

4.2.15
LOADING ON TO THE TRANSPORTER'S TRAILER/TRUCK FOR ONWARD TRANSPORTATION TO OTHER DESTINATIONS IS ALSO SCOPE OF WORK OF CONTRACTOR. PAYMENT FOR THESE SHALL BE MADE AS PER RELEVANT ITEMS OF RATE SCHEDULE.

4.2.16
CONTRACTOR SHALL ARRANGE FOR CUTTING AND REMOVAL OF VEGETATION GROWTH/GRASS ETC. IN THE STORAGE YARD AS AND WHEN CALLED FOR BY BHEL AS INCIDENTAL TO WORK. BHEL WILL TAKE APPROPRIATE ACTION AT THE RISK & COST OF THE CONTRACTOR IN CASE OF FAILURE IN THIS REGARD.

4.2.17 GENERATOR **TRANSFORMER, STATION TRANSFORMER, UNIT AUX TRANSFORMERS**

THESE TRANSFORMERS WILL ALSO BE RECEIVED INSIDE THE PROJECT PREMISES AND SHALL BE UNLOADED USING SLEEPER AND JACKS OR SUITABLE CRANES FROM THE TRAILERS. AFTER UNLOADING, THESE HAVE TO BE MOVED TO WITHIN 10 (TEN) METER DISTANCE FROM THEIR RESPECTIVE FOUNDATIONS.

4.2.18 **HANDLING OF MATERIALS ARRIVING ON RAILS**

THERE IS RAILWAY SIDING INSIDE THE PROJECT PREMISES. CONSIGNMENTS ARRIVING BY RAIL WILL BE CONSIGNED TO CHARGED POINT OF "GNFC, BHARUCH" RAILWAY SIDING. GNFC WILL PROVIDE THE LOCOMOTIVE ENGINE TO HAUL THE RACK TO & FRO BETWEEN THE RAILWAY SIDING AND THE EARMARKED UNLOADING BAY/LOCATION WITHIN THE PLANT PREMISES AND TO RETURN THE EMPTY RACK TO THE RAILWAY AUTHORITIES AT CHARGED POINT OF GNFC BHARUCH RLY SIDING.

4.2.18.1
CONTRACTOR SHALL HAVE LIAISON WITH RAILWAYS AT ALL CONCERNED LOCATIONS TO OBTAIN PRIOR INTIMATION OF ARRIVAL OF CONSIGNMENTS, AND LINE UP RESOURCES ACCORDINGLY AND MAKE OTHER ARRANGEMENTS AS MAY BE NECESSARY.

4.2.18.2
CONTRACTOR SHALL CO-ORDINATE, SUFFICIENTLY IN ADVANCE OF ARRIVAL OF RAIL CONSIGNMENTS, WITH GNFC AUTHORITIES FOR ENSURING TIMELY AVAILABILITY OF THE SERVICES OF LOCOMOTIVE ENGINE WITH DRIVER. THE LOCOMOTIVE ENGINE WILL BE PROVIDED BY GNFC. THE CHARGES AS APPLICABLE WILL BE SETTLED BY BHEL. CONTRACTOR SHALL ENSURE RETURN OF LOCOMOTIVE BACK TO GNFC WITHIN SHORTEST POSSIBLE TIME SO THAT NO AVOIDABLE CHARGES ARE LEVIED UPON BHEL. CONTRACTOR SHALL BE HELD RESPONSIBLE AND ACCOUNTABLE FOR SUCH EXCESS OVER NORMAL CHARGES DUE TO REASONS ATTRIBUTABLE TO THE CONTRACTOR.

4.2.18.3
CONTRACTOR SHALL MOVE THE LOCOMOTIVE TO THE GNFC RLY SIDING, ARRANGE FOR ATTACHMENT WITH THE RACK, AND MOVEMENT OF THE RACK TO THE PLANT AREA SOONEST ON RECEIVING INFORMATION OF PLACEMENT OF RACK IN THE GNFC RLY SIDING. SIMILARLY, RETURN THE EMPTY RACK TO RAILWAYS AT GNFC RLY SIDING, DETACH THE LOCO AND RETURN THE SAME TO GNFC WITHIN SHORTEST POSSIBLE TIME.

4.2.18.4
CONTRACTOR SHALL KEEP HIS RESOURCES READY AT UNLOADING BAY/ LOCATION BEFORE BRINGING THE RACK INSIDE PLANT SO AS NOT TO LOOSE ANY TIME AND RETURN THE EMPTY RACK AT THE EARLIEST. ANY DEMURRAGE LEVIED SHALL BE TO THE CONTRACTOR'S ACCOUNT.

4.2.18.5
CONTRACTOR SHALL DEPLOY HIS CRANE, TRAILERS/TRUCKS AND ALL OTHER T&P INCLUDING ADDITIONAL T&P AND MANPOWER ETC FOR HANDLING OF MATERIALS AT SUCH UNLOADING BAY/ LOCATION AND TRANSPORT TO STORES/ STORAGE YARD.

4.2.18.6

CONTRACTOR SHALL PROVIDE AREA LIGHTING AT RAILWAY SIDING FOR HANDLING OF MATERIALS DURING EVENING/ NIGHT AND ANY OTHER SITUATION NECESSITATING THE SAME.

4.2.18.7
IN ADDITION TO ABOVE, ALL THE RESPONSIBILITIES SPECIFIED IN THE CONTRACTOR'S SCOPE FOR THE MATERIALS RECEIVED BY ROAD SHALL ALSO BE APPLICABLE MUTATIS-MUTANDIS FOR ALL THE CONSIGNMENTS RECEIVED BY RAIL.

4.2.18.8
FOR THE CONSIGNMENTS RECEIVED BY RAIL THE PAYMENT WILL BE MADE ON PRO-RATA BASIS AT THE RATE OF 1.25 (ONE POINT TWO FIVE) TIMES THE ACCEPTED RATE APPLICABLE FOR UNLOADING OF CONSIGNMENTS RECEIVED BY ROAD.

CONTRACTOR SHALL COMPLETE THE WORK SATISFACTORILY IN RESPECT OF CONSIGNMENTS RECEIVED BY RAIL AS SPECIFIED ABOVE. THE PAYMENT WILL BE RELEASED AS PER TERMS OF PAYMENT SPECIFIED IN SECTION-12 SPECIAL CONDITIONS OF CONTRACT.

4.2.19
SCOPE OF WORK FOR PROVIDING MATERIALS MANAGEMENT SERVICES

4.2.19.1
THE PERSONNEL DEPLOYED FOR MATERIALS MANAGEMENT SERVICES SHALL BE EXCLUSIVELY AVAILABLE TO BHEL. THEY SHOULD POSSESS QUALIFICATION AND EXPERIENCE AS PER BHEL'S REQUIREMENT.

4.2.19.2
BHEL IS OPERATING COMPUTERIZED SITE OPERATIONS MANAGEMENT SYSTEM (SOMS) THAT INCLUDES MATERIALS MANAGEMENT, PROGRESS REPORTING, SUB-CONTRACTOR BILLING AND MATERIAL RECONCILIATION THROUGH A FULLY COMPUTERIZED DATA BASE MANAGEMENT SYSTEM. CONTRACTOR SHALL ENGAGE PERSONNEL WITH PROFICIENCY IN OPERATION OF COMPUTERIZED DATA BASE MANAGEMENT SYSTEM FOR THE PURPOSE OF REGULAR OPERATION AND UP-DATION OF "SOMS". THE PERSONS SHALL ALSO BE FLUENT IN BASIC COMPUTER OPERATIONS LIKE 'MS OFFICE' ETC.

4.2.19.3
SCOPE OF SERVICES SHALL INCLUDE MAINTENANCE OF STORES RECORDS, SUPERVISION OF ISSUE AND RETURN OF MATERIALS IN RESPECT OF BHEL'S ERECTION AGENCIES.

4.2.19.4
CONTRACTOR SHALL GENERATE PERIODIC STATUS REPORTS AS REQUIRED BY BHEL (REPORTS REGARDING MATERIAL DISPATCHES, RECEIPTS, SHORTAGE, DAMAGE, LOSS, ISSUE, RETURN, PENDING AND CRITICAL MATERIALS ETC.

4.2.19.5
SHIFTING/RE-STACKING/RE-ARRANGING:
OVER A PERIOD OF TIME, RESTACKING / REARRANGING OF THE MATERIALS STACKED EARLIER MAY ARISE DUE TO VARIOUS REASONS. THE HANDLING OF SUCH ITEMS WILL ALSO BE IN THE SCOPE OF THIS CONTRACT. THE RESTACKING/RE-HANDLING MAY BE NECESSITATED FOR ANY EQUIPMENT / MATERIALS COVERED WITHIN THIS WORK SPECIFICATION. CONTRACTOR SHALL DEPLOY NECESSARY RESOURCES LIKE

MANPOWER, T&P, EQUIPMENTS ETC. TO CARRY OUT THIS EXERCISE INCLUDING PROPER INSCRIPTION OF IDENTIFICATION MARKS IF NEEDED, PREPARATION AND SUBMISSION OF LIST OF ITEMS RESTACKED, UPDATING STOCK RECORDS ABOUT CHANGE IN LOCATION ETC.

SEPARATE ITEM RATE SHALL BE QUOTED FOR RESTACKING/RE-ARRANGING/ SHIFTING OF STAKED MATERIALS AS ASKED IN THE RATE SCHEDULE (REFER SL. NO.B-2 OF RATE SCHEDULE)

4.2.19.6 SCOPE OF MATERIALS MANAGEMENT SERVICES

THE CONTRACTOR UNDER THIS CONTRACT SHALL PROVIDE FOLLOWING FOUR CATEGORIES OF SERVICES TOWARDS PROPER MATERIALS MANAGEMENT AT THE PROJECT SITE.

(a) SUPERVISION SERVICES (MAXIMUM TWO SERVICE POINTS SIMULTANEOUSLY)

(1) SCOPE INCLUDES SUPERVISION OF VARIOUS ACTIVITIES AS FOLLOWS.

(i) RECEIPT, UNLOADING, CARRYING OUT RECEIPT INSPECTION, DETAILED VERIFICATION, STACKING AND REGULAR STOCK VERIFICATION OF PROJECT MATERIALS AT SITE.

(ii) PREPARING VARIOUS REPORTS AT APPROPRIATE STAGES AND REPORTING DAMAGE/LOSS DURING RECEIPT AS WELL AS STORAGE AND ANY OTHER ASSOCIATED RESPONSIBILITY AS ASSIGNED BY BHEL FROM TIME TO TIME. RESPONSIBILITY SHALL INCLUDE THE FOLLOWING ACTIVITIES:

A. EXAMINATION OF INCOMING CONSIGNMENTS TO DETECT ANY LOSS OR SHORTAGE OR OUTWARD DAMAGE AND RECORDING IT ON THE LR/LWB BEFORE MAKING ACKNOWLEDGEMENT OF IT'S RECEIPT FROM THE TRANSPORTER AND SIMULTANEOUSLY OBTAINING ENDORSEMENT OF THE VEHICLE DRIVER ON THE SAME.

B. REPORTING SUCH DISCREPANCY TO BHEL IMMEDIATELY ON RECEIPT OF CONSIGNMENT.

C. ASSISTING BHEL IN LODGING INSURANCE CLAIMS IN RESPECT OF LOSS/DAMAGE AS STATED ABOVE.

(iii) ISSUE OF MATERIALS TO BHEL'S ERECTION CONTRACTORS, PRESERVATION OF STACKED MATERIALS, RE-STACKING/RE-HANDLING AS NECESSARY, PROGRESSIVE AND FINAL RECONCILIATION WITH BHEL'S ERECTION AGENCIES AND PREPARATION OF NECESSARY DOCUMENT/RECORD IN RESPECT OF THESE ACTIVITIES.

(iv) RETURN OF EXCESS/DEFECTIVE MATERIALS BY VARIOUS ERECTION CONTRACTORS OF BHEL.

(v) LOADING AND DISPATCH OF OUTGOING MATERIALS.

(2) EXPECTED MINIMUM QUALITY OF SERVICE

CONTRACTOR SHALL RENDER THE SUPERVISORY SERVICES BY ENSURING DEPLOYMENT OF REQUISITE PERSONNEL WITH ADEQUATE EDUCATIONAL QUALIFICATION OF ENGINEERING/ TECHNICAL BACKGROUND, HAVING THOROUGH EXPERIENCE IN RELATED FIELD TO ENABLE UNDERSTANDING THE INTRICACIES OF AND SPECIAL REQUIREMENTS INVOLVED IN HANDLING OF PROJECT MATERIALS, INCONSISTENCIES AND UNCERTAINTIES ASSOCIATED WITH IN/OUT FLOW OF MATERIALS, PROJECT ACTIVITIES AT ODD HOURS & HOLIDAYS AND IRREGULAR WORKING HOURS. CONTRACTOR SHALL ENSURE PROMPT AND TIMELY AVAILABILITY OF SUCH SERVICES AS AND WHEN REQUIRED BY BHEL.

(b) PRESERVATION OF COMPONENTS (ONE SERVICE POINT)

CONTRACTOR SHALL ARRANGE FOR PRESERVATION OF COMPONENTS AS PER BHEL'S STORAGE AND PRESERVATION MANUAL AND/OR AS PER INSTRUCTIONS OF BHEL ENGINEER.

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

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

ONE OR MORE OF FOLLOWING METHODS SHALL BE ADOPTED FOR PRESERVATION:

- COATING WITH PRESERVATIVE PAINTS/LUBRICANT/INHIBITORS.
- CAPPING / WRAPPING / COVERING.
- FILLING / IMMERSION IN OIL/CHEMICALS ETC.
- PERIODIC CHECKS/MAINTAINING REQUIRED NITROGEN PRESSURE IN TANKS OF ALL TRANSFORMERS. BHEL WILL PROVIDE THE NITROGEN GAS FOR THE SAME. HOWEVER CONTRACTOR SHALL HANDLE THE CYLINDERS, FIT-UP REFILLS AND RETURN EMPTY CYLINDERS TO BHEL STORES.

- **HT MOTORS :**

FOR PRESERVATION OF HT MOTORS, SPACE HEATERS HAVE TO BE KEPT ENERGIZED TO AVOID INGRESS OF MOISTURE. INSULATION RESISTANCE HAS TO BE MEASURED AND RECORDED AT SPECIFIED INTERVALS TILL THESE ARE ISSUED FOR ERECTION. BHEL WILL PROVIDE NECESSARY CABLES, SWITCHES ETC. FOR THIS HOWEVER CONTRACTOR SHALL INSTALL AND MAINTAIN THE SAME.

BHEL WILL PROVIDE FREE OF COST ALL PRESERVATIVES LIKE PRESERVATIVE OIL, LUBRICANTS, CHEMICALS, INHIBITORS, CAPS, PAINTS WITH PRIMER FOR FINAL PAINTING. HOWEVER CONTRACTOR SHALL PROVIDE RED OXIDE ZINC CHROMATE (ROZC) PRIMER CONFORMING TO IS: 2074 OF REPUTED MANUFACTURERS (E.G. ASIAN PAINTS, BERGER, JENSON & NICHOLSON, BOMBAY PAINTS, SHALIMAR PAINTS ETC.) REQUIRED FOR PRESERVATION.

ALL OTHER RESOURCES INCLUDING CONSUMABLES (EXCLUDING THOSE IN BHEL'S SCOPE), TOOLS AND PLANTS AND MANPOWER HAVE TO BE PROVIDED BY THE CONTRACTOR INCLUDING PROVIDING CRANES ETC. WHEREVER REQUIRED FOR HANDLING OF MATERIALS DURING SUCH PRESERVATION. SAME SHALL BE PROVIDED BY CONTRACTOR AS PART OF SCOPE OF WORK.

IN THIS PROCESS THE IDENTIFICATION MARKS, COMPONENT/MATERIAL CODES, MATCH MARKS, MAY HAVE TO BE REPAINTED. THE CONTRACTOR SHALL PROVIDE HIS OWN SUPERVISORS FOR THIS WORK. AFTER PRESERVATION, COMPONENTS ARE TO BE STACKED PROPERLY. PERIODICAL REPORTS ON THE PRESERVATION CARRIED OUT SHOULD BE SUBMITTED TO BHEL IN THE PRESCRIBED FORMATS.

(c) **RECORD KEEPING AND REPORT GENERATION**: (MAXIMUM TWO SERVICE POINTS SIMULTANEOUSLY)

CONTRACTOR SHALL PREPARE, MAINTAIN AND UPDATE VARIOUS MM RECORDS, ASSOCIATED WITH MATERIALS MANAGEMENT OPERATION OF BHEL AT PROJECT SITE. TWO SYSTEMS OF RECORD KEEPING/CAPTURING INFORMATION & DATA AT VARIOUS STAGES ARE IN VOGUE VIZ.

MANUAL LEDGERS & RECORDS.

COMPUTERIZED DATABASE APPLICATION: BHEL HAS DEVELOPED A SOFTWARE APPLICATION NAMED SITE OPERATIONS MANAGEMENT SYSTEM (SOMS) THAT CAPTURES ALL THE DATA IN THE ENTIRE CHAIN OF TRANSACTIONS STARTING WITH MASTER LIST OF PROJECT MATERIALS, RECORDS OF DISPATCH, RECEIPT, INSPECTION, ISSUE, RETURN, CONSUMPTION ETC.

SOME OF THESE RECORDS ARE MASTER SHIPPING/PACKING LIST, LR/RR REGISTER, DAYBOOK REGISTER, STOCK REGISTER, RECORDS OF ISSUES TO & RETURN OF MATERIALS IN RESPECT OF VARIOUS ERECTION SUBCONTRACTORS, INSURANCE CLAIM RECORDS, PERIODICAL STATUS REPORTS IN VARIOUS FORMATS COVERING DESIRED ASPECTS AND OUTPUT INFORMATION AS PER BHEL/CLIENT'S REQUIREMENT.

BHEL WILL PROVIDE NECESSARY HARDWARE, SOFTWARE & STATIONARY ETC. FOR THE ABOVE. CONTRACTOR SHALL TAKE UTMOST CARE OF ENSURE THAT THESE PROPERTIES AND RECORDS ARE PROTECTED FROM ANY DAMAGE OR LOSS. BHEL WILL RECOVER THE COST OF SUCH PROPERTY / EXPENSES OF RESTORATION FROM THE CONTRACTOR WITH 30% OVERHEAD CHARGES IN CASE OF ANY LOSS / DAMAGE ATTRIBUTABLE TO NEGLIGENCE/FAILURE ON CONTRACTOR'S PART.

ALL THE ABOVE FUNCTIONS OF MATERIAL DISPATCHES, RECEIPT, STACKING, PRESERVATION, ISSUING ETC WILL HAVE TO BE PROPERLY RECORDED IN THE PRESCRIBED FORMATS, REGISTERS ETC. MANUALLY AND ON COMPUTER AND MADE AVAILABLE FOR VERIFICATION BY BHEL. THE REPORT GENERATION WILL BE EXHAUSTIVE AND WILL COVER DETAILS LIKE STOCK AT SITE, PENDING MATERIALS TO BE RECEIVED, MATERIALS IN TRANSIT, COMPONENTS ISSUED TO THE CONTRACTOR, LOCATION PLANS OF ITEMS STACKED AND OTHER MATERIAL STATUS DOCUMENTS.

ALL PERSONNEL DEPLOYED FOR MATERIALS MANAGEMENT SHOULD NECESSARILY BE PROFICIENT IN COMPUTER OPERATION. THEY SHOULD BE CAPABLE OF DATA ENTRY IN COMPUTERS, REPORT GENERATION AS PRESCRIBED AND INFORMATION MANAGEMENT.

PRINT-OUT OF REQUIRED INFORMATION IN THE PRESCRIBED MANNER SHALL BE TAKEN BY THESE PERSONNEL.

D. SECRETARIAL & OTHER MISC. SERVICES (MAXIMUM THREE SERVICE POINTS SIMULTANEOUSLY)

THESE SERVICES SHALL INCLUDE SECRETARIAL SERVICES AT BHEL OFFICE AND STORES, SERVICES OF OFFICE BOY, MESSENGER/PEON, CARPENTER, ELECTRICIAN'S SERVICES.

4.2.19.6.1 PARAMETERS AND QUANTIFICATION OF MM SERVICES, PERIODIC MONITORING

FOR THE PURPOSE OF DELIVERY OF THE ABOVESAID MM SERVICES AND PROGRESSIVE MONTHLY BILLING BY THE CONTRACTOR AND RELEASE OF PAYMENT THEREOF BY BHEL, THERE SHALL BE AN ACTION PLAN JOINTLY AGREED BY BHEL AND CONTRACTOR. THIS ACTION PLAN SHALL BE DRAWN AT THE BEGINNING OF EACH QUARTER/EACH MONTH/ANY CONVENIENT NUMBER OF MONTHS AS PER ACTUAL PROJECT NEED. THE PLAN SHALL DETAIL THE FOLLOWING ASPECTS.

- PLAN PERIOD (NUMBER OF MONTHS PLANNED).
- LIST OF ACTIVITIES/TARGETS TO BE CARRIED OUT/ACHIEVED BY THE CONTRACTOR UNDER THE SCOPE OF THESE MM SERVICES IN THE DEFINED PLAN PERIOD.
- IDENTIFICATION OF NECESSARY RESOURCES TO BE DEPLOYED BY THE CONTRACTOR FOR DELIVERY OF THE PLANNED ACTIVITIES/TARGETS IN THE DEFINED PLAN PERIOD.
- DECIDING ON THE BREAK UP OF THE ASSIGNED AMOUNT TOWARDS MM SERVICES IN THE PLAN PERIOD TOWARDS EACH OF ITS FOUR COMPONENTS (SUPERVISION, PRESERVATION, RECORD KEEPING AND SECRETARIAL SERVICES) FOR THE PURPOSE OF MONTHLY BILLING BY CONTRACTOR.

4.2.19.6.2 PRICE AND STAGE PAYMENT

CONTRACTOR SHALL INCLUDE THE PRICE FOR RENDERING COMPLETE MATERIALS MANAGEMENT SERVICES (GENERALLY DESCRIBED AS IN THE PRECEDING CLAUSES, INCLUDING PROVIDING ALL NECESSARY RESOURCES EXCEPTING THOSE INDICATED SPECIFICALLY AS BHEL SCOPE) IN THE VARIOUS ITEM RATES OF MATERIAL HANDLING ACTIVITIES AS APPEARING IN THE RATE SCHEDULE OF PRICE BID. **CONTRACTOR SHALL NOT QUOTE ANY SEPARATE ITEM RATE/PRICE FOR MM SERVICES IN THE RATE SCHEDULE**.

FOR FURTHER DETAILS OF PROGRESSIVE PAYMENT AND FINAL PAYABLE AMOUNTS, PLEASE REFER SECTION-12 (SCC).

4.2.19.6.3 DEFICIENT/UNSATISFACTORY MM SERVICES & NOT RENDERING MM SERVICES

CONTRACTOR SHALL RENDER THE MM SERVICES AS PER THE JOINTLY AGREED PLAN AND PARAMETERS THEREOF AS DESCRIBED IN "PARAMETERS AND QUANTIFICATION OF MM SERVICES". IN CASE THE CONTRACTOR FAILS IN DELIVERING/RENDERING THESE SERVICES PARTLY OR TOTALLY, EITHER QUALITATIVELY OR QUANTITATIVELY IN THE CONCERNED PLAN PERIOD, BHEL WILL TAKE THE FOLLOWING RECOURSE.

- DEFICIENT/UNSATISFACTORY SERVICES:

  IN CASE THE LEVEL/QUALITY OF MM SERVICES IS FOUND NOT IN COMPLIANCE WITH THE PLAN (EITHER IN TERMS OF DEFICIENCY IN QUALITY OR QUANTITY OR BOTH, WITH REGARD TO THE MUTUALLY AGREED/IDENTIFIED RESOURCES), BHEL WILL COMMUNICATE THE SAME TO THE CONTRACTOR ON RECORD. CONTRACTOR SHALL IMMEDIATELY TAKE CORRECTIVE ACTION TO ERADICATE THE COMPLAINT. BHEL WILL NOT MAKE ANY PAYMENTS FOR SUCH PERIOD / NUMBER OF DAYS WHEN SERVICES ARE FOUND DEFICIENT/ UNSATISFACTORY. PAYMENT WILL BE MADE FOR THE PERIOD /NUMBER OF DAYS OF SATISFACTORY SERVICES ON PRO-RATA BASIS AS PER THE FOLLOWING FORMULA.

  $P = P_A \times D_S / D_M$, WHERE

  P = AMOUNT PAYABLE FOR RENDERING A PARTICULAR SERVICE SATISFACTORILY IN A BILLING MONTH.

  $\mathbf{P_A}$ = AMOUNT **ASSIGNED** TOWARDS THE PARTICULAR SERVICE FOR THE CONCERNED MONTH AS PER AGREED PLAN.

  $\mathbf{D_S}$ = NUMBER OF EQUIVALENT DAYS INCLUDING SUNDAYS AND BHEL HOLIDAYS OF **SATISFACTORY** SERVICES IN THE PARTICULAR BILLING MONTH.

  $\mathbf{D_M}$ = TOTAL NUMBER OF DAYS INCLUDING SUNDAYS AND BHEL HOLIDAYS IN THE PARTICULAR **BILLING MONTH**.

  IN ADDITION TO 'NO PAYMENT' FOR THE UNSATISFACTORY/DEFICIENT SERVICES PERIOD, A PENALTY @ 5% APPLIED ON THE PRO-RATA AMOUNT OF THE DEFICIENT PERIOD I.E. 5% OF (P_A – P) WILL BE LEVIED ON THE CONTRACTOR. THIS PENALTY WILL BE RECOVERED FROM THE RUNNING ACCOUNT BILL OF THE SAME MONTH.

4.2.19.6.4 NOT RENDERING THE SERVICES AT ALL

IN THE EVENT, THE CONTRACTOR FAILS TO RENDER A PARTICULAR SERVICE DURING THE MONTH (EITHER PART OF THE MONTH OR FULL) BHEL WILL NOT MAKE ANY PAYMENT TOWARDS THAT SERVICE FOR SUCH PERIOD. ADDITIONALLY, A PENALTY @ 15% WILL BE LEVIED AS UNDER.

FOR NO SERVICES IN THE ENTIRE MONTH: 15% OF THE TOTAL MONTHLY ASSIGNED AMOUNT.

FOR NO SERVICES DURING PART OF THE MONTH: 15% OF THE PRO-RATA AMOUNT FOR THE DEFAULTING PERIOD AS PER FORMULA GIVEN EARLIER HERE.

4.2.19.6.5 IRREVOCABLE PENALTY AND DISALLOWED AMOUNT

IT SHALL BE SPECIFICALLY NOTED THAT THE PAYMENT DISALLOWED FOR DEFICIENT OR NIL SERVICE IN A PARTICULAR MONTH AND/OR PENALTIES LEVIED ON SIMILAR GROUND, SHALL NOT BE CONSIDERED FOR RELEASE IN ANY SUBSEQUENT MONTH EVEN IF THE CONTRACTOR TAKES CORRECTIVE ACTION IN THE LATER STAGE.

4.2.19.6.6 EXPLANATION ABOUT THE SCOPE OF MM SERVICES

1. **General**

THE RESOURCES DEPLOYED FOR MM SERVICES BY THE CONTRACTOR SHALL BE AT THE EXCLUSIVE DISPOSAL OF BHEL ON A FULL TIME BASIS. THESE SHALL NOT BE USED FOR ANY ACTIVITIES ASSOCIATED WITH THE REGULAR MATERIAL HANDLING ACTIVITIES (LIKE RECEIPT, UNLOADING, VERIFICATION, STACKING AND REGULAR STOCK VERIFICATION OF PROJECT MATERIALS).

2. **Supervision services**

WORKING LEVEL SUPERVISION OF EACH WORK SPOT SHALL BE IN THE SCOPE OF CONTRACTOR UNDER REGULAR MATERIAL HANDLING WORK. ON THE OTHER HAND, SUPERVISORY SERVICES UNDER MM SERVICES SHALL BE AT ONE LEVEL HIGHER THAN WORKING LEVEL SUPERVISION BEING DONE AS CONTRACTOR'S RESPONSIBILITY TOWARDS MATERIAL HANDLING WORK. BHEL REQUIRES THAT THESE SERVICES SHALL BE TO OVERSEE AND MONITOR THE VARIOUS OPERATIONS/ACTIVITIES OF MATERIAL HANDLING PROCESS. MM SUPERVISORY SERVICES SHALL ENSURE SETTING BROAD GUIDELINES TO THE WORKING LEVEL SUPERVISORS, MONITORING PROGRESS OF OVERALL PLAN VIS-À-VIS IMPLEMENTATION, PROPER AND PROMPT TRACEABILITY OF STOCK IN THE STORES, IDENTIFICATION OF CORRECTIVE & PREVENTIVE ACTIONS IN MATERIAL HANDLING & STORAGE WORK AND IMPLEMENTATION OF A SYSTEMATIC PROCESS TO FINALLY ENSURE ACHIEVEMENT OF THE PROJECT SCHEDULE.

3. **Preservation of components**

CONTRACTOR'S SCOPE UNDER THIS MM SERVICES WORK INCLUDES HANDLING OF THE MATERIALS THAT REQUIRES PRESERVATION, AS WELL AS HANDLING OF OTHER MATERIALS AROUND THE FORMER IN ORDER TO MAKE PROPER ACCESS/APPROACH FOR WORK. CONTRACTOR SHALL DEPLOY NECESSARY SUPERVISORS, LABOURERS AND T&P FOR ALL SUCH ACTIVITIES.

4. **Record keeping**

CREATION AND MAINTENANCE OF PROPER RECORDS OF DISPATCH, RECEIPT, STOCK, ISSUE, RETURN, DAMAGE, INSURANCE CLAIMS, PRESERVATION, RESTACKING, RECEIPT INSPECTION, STOCK VERIFICATION ETC. OF PROJECT MATERIALS ARE VITAL IN NATURE. CONTRACTOR SHALL ENSURE THAT ALL SUCH RECORDS ARE CREATED AND UPDATED PROMPTLY TO FACILITATE LATEST POSSIBLE INFORMATION TO BHEL AND CONCERNED ERECTION AGENCIES OF BHEL. RECORDS SHALL BE CRATED AND MAINTAINED IN BHEL'S COMPUTERIZED DATA BASE PROGRAMME (NAMED 'SOMS') AS

WELL AS IN HARD COPY (REGISTERS, FILE, FOLDER ETC.) AS A BACK-UP. THE CONTRACTOR SHALL DEPLOY ADEQUATE NUMBER OF PERSONNEL WITH PROFICIENCY IN COMPUTERIZED DATA BASE OPERATIONS FOR OPERATING SOMS. CONTRACTOR SHALL ALSO DEPLOY ADEQUATE PERSONNEL FOR CREATION & MAINTENANCE OF MANUAL RECORDS WITH EXPERIENCE IN MATERIALS MANAGEMENT WORK.

5. Secretarial & other miscellaneous services

THESE SHALL INCLUDE SERVICES OF PERSONAL ASSISTANCE IN THE OFFICIAL WORK OF BHEL'S CONSTRUCTION MANAGER, CLERICAL SERVICES FOR CORRESPONDENCES AND RECORD KEEPING TO VARIOUS DEPARTMENTS OF BHEL SITE (ERECTION, COMMISSIONING, FINANCE & ACCOUNTS, STORES/MATERIAL MANAGEMENT ETC).

SCOPE SHALL ALSO INCLUDE SERVICES OF OFFICE BOY AT BHEL OFFICE AND STORES, MESSENGER/ PEON FOR RECEIPT AND LOCAL DISTRIBUTION OF CORRESPONDENCES (DAK), COLLECTION/DELIVERY OF CORRESPONDENCES FROM/TO POST OFFICE OR COURIER OFFICE AND SIMILAR NATURE OF SERVICES.

SERVICES OF CARPENTER WITH HELPER SHALL BE EXCLUSIVELY USED FOR UNPACKING AND PACKING THE BOXES AFTER VERIFICATION OF MATERIALS WHEREVER DIRECTED BY BHEL ENGINEER. SIMILARLY THE SERVICES OF ELECTRICIAN WITH HELPER SHALL BE USED FOR MAINTENANCE OF THE ELECTRIFICATION WORK IN STORES, STORAGE YARD, OFFICE BUILDING ETC.

4.2.20
THE DISTANCES INDICATED IN THESE SPECIFICATIONS ARE ONLY APPROXIMATE. HOWEVER, THE TENDERERS SHOULD ASSESS THE VARIOUS DISTANCES AND SITE CONDITIONS BY VISITING SITE BEFORE SUBMITTING THEIR OFFER. NO ADDITIONAL/EXTRA CLAIMS FOR ANY VARIATION IN THIS REGARD WILL BE ENTERTAINED.

4.2.21
ALL THE MATERIALS SHALL BE STORED WELL ABOVE GROUND LEVEL AS NECESSARY TO AVOID WATER INGRESS ETC, BY USE OF WOODEN/ CONCRETE SLEEPERS. NO MATERIAL SHALL BE STORED DIRECTLY ON THE GROUND AT ANY TIME. SLEEPERS HAVE TO BE PROVIDED BY THE CONTRACTOR.

4.2.22
THE PERSONNEL DEPLOYED FOR MATERIALS MANAGEMENT SERVICES SHALL BE EXCLUSIVELY AVAILABLE TO BHEL. THEY SHOULD POSSESS QUALIFICATION AND EXPERIENCE AS PER BHEL'S REQUIREMENT.

4.2.23
SCOPE OF SERVICES SHALL INCLUDE MAINTENANCE OF STORES RECORDS, SUPERVISION OF ISSUE AND RETURN OF MATERIALS IN RESPECT OF BHEL'S ERECTION AGENCIES.

4.2.24
CONTRACTOR SHALL GENERATE PERIODIC STATUS REPORTS AS REQUIRED BY BHEL (REPORTS REGARDING MATERIAL DISPATCHES, RECEIPTS, SHORTAGE, DAMAGE, LOSS, ISSUE, RETURN, PENDING AND CRITICAL MATERIALS ETC.

4.3.0 BROAD SCOPE OF WORK FOR ERECTION, TESTING AND COMMISSIONING:

THE SCOPE OF WORK FOR RECEIPT / COLLECTION / LOADING / UNLOADING/ TRANSPORTATION OF MATERIALS FROM BHEL / CLIENT'S STORES / STORAGE YARDS TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING, FINAL PAINTING AND HANDING OVER OF 1X62 TPH HEAT RECOVERY STEAM GENERATOR WITH AUXILIARIES, STACK/ STEEL CHIMNEY WITH ASSOCIATED AUX, 1 XFR6 GAS TURBINE-GENERATOR SET WITH THEIR AUXILIARIES, BALANCE OF PLANT EQUIPMENTS / SYSTEMS WITH RELATED AUXILIARIES, INTEGRAL PIPING, FIELD / POWER CYCLE PIPING AND APPLICATION OF THERMAL INSULATION OF EQUIPMENTS / PIPING/VESSELS & TANKS ETC. FOR 1X33.3 MW COGENERATION POWER AND STEAM PLANT UNIT AT 1X33.3 MW COGENERATION POWER AND STEAM UNIT GUJARAT NARMADA VALLEY FERTILIZERS COMPANY LIMITED, DIST. BHARUCH (GUJARAT) BROADLY IS AS UNDER:

1. RECEIPT/COLLECTION/LOADING/ UNLOADING/ TRANSPORTATION OF MATERIALS FROM BHEL/CLIENT'S STORES /STORAGE YARDS, TRANSPORTATION TO SITE OF WORK /ERECTION SITE INCLUDING THE HEAVY CONSIGNMENT LIKE BOILER DRUMS, MODULES, STEEL CHIMNEY / STACK SECTIONS, GAS TURBINE, GAS TURBINE GENERATOR, GT ACCESSORY BASE, DEAERATOR, BYPASS STACK AND DAMPERS AND ALL OTHER RELATED ERECTION MATERIALS ETC. THE TENTATIVE DISTANCE OF STORAGE YARD FROM ERECTION SITE IS ABOUT 1.5 KM.

2. PRE-ASSEMBLY, ASSEMBLY AND PRE-ASSEMBLY CHECKS AS APPLICABLE.

3. LIFTING, PLACEMENT, ERECTION, FIT-UP, ALIGNMENT ETC. OF EQUIPMENTS OF HRSG, STEEL CHIMNEY / STACK, GAS TURBINE, GAS TURBINE GENERATOR, BYPASS STACK, DEAERATOR, PUMPS, BALANCE OF PLANT EQUIPMENTS WITH RESPECTIVE AUX., SYSTEMS, PIPING INCLUDING INTEGRAL PIPING OF HRSG, GTG / BALANCE OF PLANT EQUIPMENTS ETC. AS THE SCOPE OF THESE SPECIFICATIONS.

4. ERECTION, ALIGNMENT, FIT-UP AND WELDING/BOLTING/FASTENING, PRE-HEAT TREATMENT/POST HEAT TREATMENT ETC. OF EQUIPMENTS WITH AUX., SYSTEMS, FIELD PIPING INCLUDING INTEGRAL PIPING OF HSRG, INTEGRAL PIPING OF GTG / BALANCE OF PLANT EQUIPMENTS, FIELD / EXTERNAL / POWER CYCLE PIPING WITH SUPPORTS ETC. INCLUDING PRIMER PAINTING OF SITE WELD JOINTS WITH CHLORINATED BASED ZINC PHOSPHATE PRIMER.

5. ASSEMBLY, FIXING, WELDING OF HRSGS CASINGS (COMPRISING OF STAINLESS STEEL SHEET, INSULATION, OUTER SHEET WITH STAINLESS STEEL FIXING COMPONENTS/ RETAINERS/HOOKS ETC.), WELDING ETC. AT SITE AND ERECTION.

6. NON DESTRUCTIVE EXAMINATION, RADIOGRAPHY ETC.

7. CHIPPING, PREPARATION OF EQUIPMENTS & STRUCTURES FOUNDATIONS.

8. SECONDARY GROUTING OF EQUIPMENTS & STRUCTURES WITH RELATED AUX., ROTATING MACHINES ETC. INCLUDING THE ASSOCIATED FORM WORKS LIKE SHUTTERING AND RELATED FACILITIES & PROCESS FOR GROUT MIXING.

9. TESTING, PRE-COMMISSIONING, COMMISSIONING, HYDRAULIC TESTING, CHEMICAL CLEANING/ AIR BLOWING/ FLUSHING, ALKALI BOIL OUT, STEAM BLOWING, SAFETY VALVE ETC.

10. ASSEMBLY OF CHIMNEY SHELLS, FIT-UP, WELDING WITH NDE/RADIOGRAPHY ETC. OF CHIMNEY.

11. APPLICATION OF REFRACTORY/LINING & THERMAL INSULATION WITH RETAINERS, FIXING COMPONENTS, CLADDING SHEET ETC. OF HRSGS WITH AUX., EQUIPMENTS, DUCTS, PIPING, TANKS, VESSELS, CHIMNEY, INTEGRAL PIPINS OF HRSG & GTG, GTG SYSTEM EQUIPMENTS, DEAERATOR, AND OTHER RELATED BALANCE OF PLANT EQUIPMENTS WITH ASSOCIATED AUX./ EQUIPMENTS AS PER SCOPE UNDER THESE SPECIFICATIONS.

12. HANDLING, LIFTING, ERECTION AND PLACEMENT OF HEAVY EQUIPMENTS LIKE HRSG MODULES, HRSG DRUMS, STEEL CHIMNEY SECTIONS/SHELLS, GAS TURBINE, GAS TURBINE GENERATOR, DEAERATOR WITH HEATER, BYPASS STACK ETC.

13. ERECTION, LAYING, WELDING, NDE/RADIOGRAPHY OF TEMPORARY PIPING, VALVES, TANKS, SUPPORTS ETC. FOR AIR BLOWING, STEAM BLOWING, CHEMICAL CLEANING/ FLUSHING ETC. AND THEIR SUBSEQUENT DISMANTLING AFTER COMPLETION OF WORK.

14. HANDLING AND FILLING OF CHEMICALS, LUBRICANTS/GAS/ PRESERVATIVES DURING, ERECTION, PRESERVATION, CHEMICAL CLEANING / FLUSHING / BLOWING, PRE-COMMISSIONING, COMMISSIONING AND SUBSEQUENT TOPPING UP TILL TRIAL OPERATION COMPLETION.

15. PRE-COMMISSIONING CHECKS, TRIAL RUNS, TESTING AND COMMISSIONING.

16. SURFACE PREPARATION AND FINAL PAINTING OF EQUIPMENTS, RELATED AUX., SYSTEMS, STRUCTURES, PIPING WITH VALVES, FITTINGS, SUPPORTS ETC.

17. SAFETY VALVE FLOATING, TRIAL OPERATION.
18. TOUCH UP PAINTING, SURFACE PREPARATION AND FINAL PAINTING / FINISH PAINTING.
19. COMPLETION OF FACILITY POINTS (AS APPLICABLE)

SCOPE OF WORK IS FURTHER DETAILED IN VARIOUS CLAUSES HEREAFTER:

4.3.1
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.

4.3.2
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.

4.3.3
THE WORK SHALL BE EXECUTED UNDER THE USUAL CONDITIONS AND SPACE CONSTRAINTS AFFECTING MAJOR POWER PLANT CONSTRUCTION AND IN CONJUNCTION WITH NUMEROUS OTHER OPERATIONS AT SITE. THE CONTRACTOR AND HIS PERSONNEL SHALL COOPERATE WITH PERSONNEL OF BHEL, BHEL'S CUSTOMER, CUSTOMER'S CONSULTANTS AND OTHER CONTRACTORS, COORDINATING HIS WORK WITH OTHERS AND PROCEED IN A MANNER THAT SHALL NOT DELAY OR HINDER THE PROGRESS OF WORK OF THE PROJECT AS A WHOLE.

4.3.4
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.

4.3.5
CONTRACTOR SHALL ERECT AND COMMISSION ALL THE EQUIPMENTS AND AUXILIARIES AS PER THE SEQUENCE & METHODOLOGY PRESCRIBED BY BHEL/GNFC/DCPL 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.

4.3.6
ALL NECESSARY CERTIFICATES AND LICENSES, PERMITS & CLEARANCES WHEREVER REQUIRED TO CARRY OUT THIS WORK FROM THE RESPECTIVE STATUTORY AUTHORITIES ARE TO BE ARRANGED BY THE CONTRACTOR EXPEDITIOUSLY AT HIS COST IN TIME TO ENSURE SMOOTH PROGRESS OF WORK.

4.3.7
THE HRSG AND PIPING WILL BE ERECTED AS PER RELEVANT PROVISIONS OF INDIAN BOILER REGULATIONS & LATEST AMENDMENTS/REVISIONS THEREOF. SIMILARLY GAS TURBINE GENERATOR ERECTION AND INSTALLATION SHALL BE REQUIRED TO BE APPROVED BY ELECTRICAL INSPECTORATE / STATUTORY AUTHORITY OF RELEVANT STATE. ALL THESE SHALL BE ARRANGED BY CONTRACTOR WITH ALL EXPENSES TO CONTRACTOR'S ACCOUNT.

4.3.8
THE WORK SHALL CONFORM TO DIMENSIONS AND TOLERANCES SPECIFIED IN THE VARIOUS DRAWINGS / DOCUMENTS THAT WILL BE PROVIDED DURING VARIOUS STAGES OF ERECTION. IF ANY PORTION OF WORK IS FOUND TO BE DEFECTIVE IN WORKMANSHIP, NOT CONFORMING TO DRAWINGS OR OTHER STIPULATIONS DUE TO

CONTRACTOR'S FAULT, THE CONTRACTOR SHALL DISMANTLE AND RE-DO THE WORK DULY REPLACING THE DEFECTIVE MATERIALS AT HIS COST, FAILING WHICH THE WORK WILL BE GOT DONE BY BHEL AND RECOVERIES WILL BE EFFECTED FROM THE CONTRACTOR'S BILLS TOWARDS EXPENDITURE INCURRED INCLUDING COST OF MATERIALS AND DEPARTMENTAL OVERHEADS OF BHEL.

4.3.9
THE CONTRACTOR SHALL PERFORM ANY SERVICES, TESTS ETC. WHICH MAY NOT BE SPECIFIED BUT NEVERTHELESS REQUIRED FOR THE COMPLETION OF WORK WITHIN QUOTED RATES.

4.3.10
THE CONTRACTOR SHALL EXECUTE THE WORK IN THE MOST SUBSTANTIAL AND WORKMANLIKE MANNER.

4.3.11
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.

4.3.12
ALL CRANES, TRANSPORT EQUIPMENT, HANDLING EQUIPMENT, TOOLS, TACKLES, FIXTURES, EQUIPMENT, MATERIALS, MANPOWER, SUPERVISORS/ ENGINEERS, CONSUMABLES ETC., EXCEPT OTHERWISE SPECIFIED AS BHEL SCOPE OF FREE ISSUE, REQUIRED FOR THIS SCOPE OF WORK SHALL BE PROVIDED BY THE CONTRACTOR. ALL EXPENDITURE INCLUDING TAXES AND INCIDENTALS IN THIS CONNECTION WILL HAVE TO BE BORNE BY HIM UNLESS OTHERWISE SPECIFIED IN THE RELEVANT CLAUSES. THE CONTRACTOR'S QUOTED RATES SHOULD BE INCLUSIVE OF ALL SUCH CONTINGENCIES.

4.3.13
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 13.1 TO 13.8.

4.3.14
ALL WORKS SUCH AS CLEANING, LEVELING, ALIGNING, TRIAL ASSEMBLY, DISMANTLING OF CERTAIN EQUIPMENTS / COMPONENTS FOR CHECKING AND CLEANING, SURFACE PREPARATION, FABRICATION OF SHEETS, TUBES AND PIPES AS PER GENERAL ENGINEERING PRACTICE AND AS PER BHEL ENGINEER'S INSTRUCTIONS AT SITE, CUTTING, GOUGING, WELD DEPOSITING, GRINDING, STRAIGHTENING, CHAMFERING, FILING, CHIPPING, DRILLING, REAMING, SCRAPPING, LAPPING, FITTING UP ETC., AS MAY BE APPLICABLE IN SUCH ERECTION WORKS AND WHICH ARE TREATED INCIDENTAL TO THE ERECTION WORKS AND NECESSARY TO COMPLETE THE WORK SATISFACTORILY, SHALL BE CARRIED OUT BY THE CONTRACTOR AS PART OF THE WORK WITHIN THE QUOTED RATES.

4.3.15
THE CONTRACTOR SHALL MAKE ALL FIXTURES, TEMPORARY SUPPORTS, STEEL STRUCTURES REQUIRED FOR JIGS & FIXTURES, ANCHORS FOR LOAD AND GUIDE PULLEYS REQUIRED FOR THE WORK. BHEL WILL NOT PROVIDE ANY STEEL FOR THIS.

4.3.16
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.

4.3.17
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.

4.3.18
PLANT MATERIALS SHOULD NOT BE USED FOR ANY TEMPORARY SUPPORTS / SCAFFOLDING / PREPARING PRE-ASSEMBLY BED ETC.

4.3.19
THE DETAILS OF EQUIPMENTS TO BE ERECTED UNDER THIS CONTRACT IS GENERALLY AS PER THE DETAILS OF QUANTITY GIVEN IN RELEVANT APPENDIX. THESE DETAILS ARE APPROXIMATE AND MEANT ONLY TO GIVE A GENERAL IDEA TO THE TENDERER ABOUT THE MAGNITUDE OF THE WORK INVOLVED. ACTUAL QUANTUM AND TYPE OF EQUIPMENTS WILL BE BASED ON THE 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.

4.3.20
ALL WELDED JOINTS SHOULD BE PAINTED WITH ANTICORROSIVE PAINT IMMEDIATELY AFTER COMPLETION OF RADIOGRAPHY AND STRESS RELIEVING WORKS. NECESSARY PAINTS AND OTHER CONSUMABLES FOR THE ABOVE WORK ARE IN THE SCOPE OF THE CONTRACTOR.

4.3.21
HANGERS & SUSPENSIONS, SUPPORTS AND SUPPORTING STRUCTURES ETC FOR TUBES, PIPING, & DUCTS ETC., WILL BE SUPPLIED IN RUNNING / RANDOM LENGTHS / SIZES WHICH SHALL BE CUT TO SUITABLE SIZES AND ADJUSTED AS REQUIRED.

4.3.22
SPRING SUSPENSION/CONSTANT LOAD HANGERS MAY HAVE TO BE PRE-ASSEMBLED FOR REQUIRED LOAD AND ERECTION CARRIED OUT AS PER INSTRUCTIONS OF BHEL. ADJUSTMENTS, REMOVAL OF TEMPORARY ARRESTS/LOCKS, CUTTING OF EXCESS THREAD LENGTH OF HANGER TIE-ROD ETC., HAVE TO BE CARRIED OUT AS AND WHEN

REQUIRED. LOAD SETTING OF SPRING HANGERS, AS PER BHEL'S DOCUMENTS/ INSTRUCTIONS, DURING VARIOUS STAGES OF ERECTION & TESTING AND AFTER FLOATING OF PIPING/DUCTING DURING COLD AND HOT CONDITION WILL HAVE TO BE DONE. THIS EXERCISE MAY HAVE TO BE REPEATED TILL SATISFACTORY RESULTS ARE ACHIEVED.

4.3.23
LAYOUT OF FIELD ROUTED/ SMALL BORE PIPING SHALL BE DONE AS PER SITE REQUIREMENT. NECESSARY SKETCH FOR ROUTING THESE LINES SHOULD BE GOT APPROVED FROM BHEL BY THE CONTRACTOR. THERE IS A POSSIBILITY OF SLIGHT CHANGE IN ROUTING THE ABOVE PIPE LINES EVEN AFTER COMPLETION OF ERECTION. SUCH CHANGES WILL BE INCIDENTAL TO WORK HENCE NO SEPARATE/ ADDITIONAL PAYMENT WILL BE MADE.

4.3.24
Welding of necessary instrumentation tapping points, thermocouple pads, root valves, condensing vessels, flow metering & measurement devices, and control valves to be provided on HRSG, GTG, BOP and their respective auxiliaries, integral & external pipe lines covered within the scope of this specification, will also be the responsibility of the contractor and shall be done as per the instructions of BHEL site engineer. The installation of all the above items will be contractor's responsibility even if:

A) Items are not specifically indicated under the respective product groups as given in the technical specifications.

B) items are supplied by an agency other than BHEL.

4.3.25
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, where instructed so, such instruments for calibration and storage/re-erection. Calibration will be done by C&I erection agency.

4.3.26
Fixing and seal welding of thermo wells & 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 thermo wells after hydro test/steam blowing of lines as part of work.

4.3.27
Actuators/drives of valves, dampers, gates, powered vanes etc. may have to be serviced, lubricated, before erection, during pre-commissioning & commissioning, including carrying out minor adjustments required as incidental to the work.

4.3.28
All electrical motors have to be tested for IR & PI values prior to the trial run. Where required, dry out may have to be carried out by using external heating source. Contractor shall make all arrangements in this regard and complete the work as instructed. BHEL will provide the motorized insulation testers.

4.3.29
Receipt , Loading, handling, verification of materials at BHEL / Client's stores / storage yard, Transportation to erection site, unloading, stack of erection materials at site shall be

treated as part of scope of erection & commissioning work and no any separate payment for such will be paid by BHEL. The tentative distance of storage yard from erection site is about 1.5 KM.

4.4 GENERAL REQUIREMENTS – COMMON TO ALL PACKAGES

4.4.1
The intent of specification is to provide erection, testing and commissioning 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.

4.4.2
The terminal points decided by BHEL shall be final and binding on the contractor for deciding the scope of work and effecting payment for the work done.

4.4.3
The work shall be executed under the usual conditions affecting major power plant construction and in conjunction with numerous other operations at site. The contractor and his personnel shall cooperate with personnel of BHEL, BHEL's customer, customer's consultants and other contractors, coordinating his work with others and proceed in a manner that shall not delay or hinder the progress of work of the project as a whole.

4.4.4
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.

4.4.5
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.

4.4.6
All necessary certificates and licenses, permits & clearances required to carry out this work from the respective statutory authorities are to be arranged by the contractor at his cost in time to ensure smooth progress of work.

4.4.7
The HRSG and piping will be erected as per relevant provisions of Indian Boiler Regulations & latest amendments/revisions thereof.

4.4.8

The work shall conform to dimensions and tolerances specified in the various drawings / documents that will be provided during various stages of erection. If any portion of work is found to be defective in workmanship, not conforming to drawings or other stipulations due to contractor's fault, the contractor shall dismantle and re-do the work duly replacing the defective materials at his cost, failing which the work will be got done by BHEL and recoveries will be effected from the contractor's bills towards expenditure incurred including cost of materials and departmental overheads of BHEL.

4.4.9
The contractor shall perform any services, tests etc. which may not be specified but nevertheless required for the completion of work within quoted rates.

4.4.10
The contractor shall execute the work in the most substantial and workmanlike manner.

4.4.11
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.

4.4.12
All cranes, transport equipment, handling equipment, tools, tackles, fixtures, equipment, materials, manpower, supervisors/ engineers, consumables etc., except otherwise specified as BHEL scope of free issue, required for this scope of work shall be provided by the contractor. All expenditure including taxes and incidentals in this connection will have to be borne by him unless otherwise specified in the relevant clauses. The contractor's quoted rates should be inclusive of all such contingencies.

4.4.13
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 13.1 to 13.8.

4.4.14
All works such as cleaning, leveling, aligning, trial assembly, dismantling of certain equipments / components for checking and cleaning, surface preparation, fabrication of sheets, tubes and pipes as per general engineering practice and as per BHEL engineer's instructions at site, cutting, gouging, weld depositing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scrapping, lapping, fitting up etc., as may be applicable in such erection works and which are treated incidental to the erection works and necessary to complete the work satisfactorily, shall be carried out by the contractor as part of the work within the quoted rates.

4.4.15
The contractor shall make all fixtures, temporary supports, steel structures required for jigs & fixtures, anchors for load and guide pulleys required for the work. BHEL will not provide any steel for this.

4.4.16
The contractor shall take delivery of the components, equipments, chemicals, lubricants etc from the BHEL stores/ storage area after getting the approval of BHEL engineer on standard indent forms of BHEL. Complete and detailed account of the materials and equipments after usage shall be submitted to the BHEL and reconciled periodically.

4.4.17
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.

4.4.18
Plant materials should not be used for any temporary supports / scaffolding / preparing pre-assembly bed etc.

4.4.19
The details of equipments to be erected under this contract is generally as per the details of quantity given in relevant Appendix These details are approximate and meant only to give a general idea to the tenderer about the magnitude of the work involved. Actual quantum and type of equipments will be based on the 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.

4.4.20
All welded joints should be painted with anticorrosive paint immediately after completion of radiography and stress relieving works. Necessary paints and other consumables for the above work are in the scope of the contractor.

4.4.21
Hangers & suspensions, supports and supporting structures etc for tubes, piping, & ducts etc., will be supplied in running / random lengths / sizes which shall be cut to suitable sizes and adjusted as required.

4.4.22
Spring suspension/constant load hangers may have to be pre-assembled for required load and erection carried out as per instructions of BHEL. Adjustments, removal of temporary arrests/locks, cutting of excess thread length of hanger tie-rod etc., have to be carried out as and when required. Load setting of spring hangers,

as per BHEL's documents/ instructions, during various stages of erection & testing and after floating of piping/ducting during cold and hot condition will have to be done. This exercise may have to be repeated till satisfactory results are achieved.

4.4.23
Layout of field routed/ small bore piping shall be done as per site requirement. Necessary sketch for routing these lines should be got approved from BHEL by the contractor. There is a possibility of slight change in routing the above pipe lines even after completion of erection. Such changes will be incidental to work hence no separate/ additional payment will be made.

4.4.24
Welding of necessary instrumentation tapping points, thermocouple pads, root valves, condensing vessels, flow metering & measurement devices, and control valves to be provided on HRSG, GT, GTG & their respective auxiliaries, integral & Field / Power Cycle piping, Balance of Plant Equipments covered within the scope of this specification, will also be the responsibility of the contractor and shall be done as per the instructions of BHEL site engineer. The installation of all the above items will be contractor's responsibility even if:

A) Items are not specifically indicated under the respective product groups as given in the technical specifications.
B) Items are supplied by an agency other than BHEL.
NDE/NDT and post weld heat treatment for above shall be done as per the specifications as part of work.

4.4.25
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, where instructed so, such instruments for calibration and storage/re-erection.

4.4.26
Fixing and seal welding of thermo wells & plugs before hydro test/ steam blowing of equipment or other piping system are within the scope of work. Contractor shall also remove the seal welded plugs by process of grinding and fix and seal weld thermo wells after hydro test/steam blowing of lines as part of work.

4.4.27
Actuators/drives of valves, dampers, gates, powered vanes etc. may have to be serviced, lubricated, before erection, during pre-commissioning & commissioning, including carrying out minor adjustments required as incidental to the work.

4.4.28
All electrical motors have to be tested for IR & PI values prior to the trial run. Where required, dry out may have to be carried out by using external heating source. Contractor shall make all arrangements in this regard and complete the work as instructed. BHEL will provide the motorized insulation testers.

4.4.29

Contractor will have to collect the materials from BHEL /customer stores/ storage yard, verify the materials, loading of materials including heavy equipments at stores/storage yard by arranging the cranes and all other T&P etc arrange transpiration to transport to site of work/erection site and unload/handle and preserve them as scope of work.

4.4.30
Any discrepancy/shortage/damage found in the consignment after taking clean delivery of materials from the stores/storage yard shall be the responsibility of contractor.

4.4.31
Unloading at work site, stacking and restacking if necessity arises including of heavy/sophisticated equipments like heavy motors, heavy bearing pedestals, Dampers, Gas Turbine, Gas Turbine Generator, Pumps, Deaerator with FST, Motors, Duct items and other GT & associated Auxiliaries and Balance of Plant Equipments, HSRG Drums, Heat Transfer Modules, Chimney Shells, Generator Transformer, Station Transformer, LT Aux. Transformer etc. as covered under these tender specifications shall be done as per storage and preservation manual of BHEL and/or as per directions of BHEL engineer.

4.4.32
If the contractor or his workmen or employees break, deface, injure or destroy any part of a building, road, Krebs, fence, enclosures, water pipes, cables, drains, electric or telephone posts or wires, trees or any other property or to any part of erected equipments, stored components etc. Within the project premises or outside the contractor shall make the same good at his own expenses.

4.4.33
All the materials during pre-assembly, storing shall be stored well above ground level as necessary to avoid water ingress etc, by use of wooden/concrete sleepers/ blocks as per instruction of BHEL Engineer at site. No material shall be stored directly on the ground at any time. Concrete blocks/ Sleepers have to be provided by the contractor.

4.5
PREPARATION OF FOUNDATIONS, AND GROUTING OF EQUIPMENTS

4.5.1
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 up to 25mm for achieving proper levels will be within the scope of work/specification.

4.5.2
All minor foundations and anchor points required for installing erection equipments like winches, anchors etc. are to be cast by the contractor.

4.5.3

The complete work of secondary grouting of equipments is included in the scope of work/specification. Contractor shall arrange all manpower, T&P, form work and shuttering materials, all grouting materials such as ordinary portland cement, sand, stone chips etc & quick-setting-non-shrink-free-flow special grout mix of required specification (like conbextra-GP-1 & GP-2 or equivalent).

4.5.3.1
The quick-setting-non-shrink-free-flow special grout mix shall be purchased only from the following BHEL approved vendors:

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

In order to ensure the quality, the major grouting of equipments using any of above grout mixes shall essentially be done as per the recommendations of supplier with regard to grout preparation and use of machinery etc under the supervision of the respective supplier. BHEL has arrangement with above suppliers for supervision services and the supervision charges for the same will be borne by BHEL. However, the contractor shall ensure readiness of equipment for grouting in all respect before such a service is requisitioned and the duration is not prolonged unduly. Any overstay required due to contractor shall be charged to the contractor with BHEL's departmental charges. Contract shall consult BHEL engineer before deciding upon the vendor for the above.

4.5.3.2
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.

4.5.4
BHEL will provide only shims and packer plates (either machined or plain), which are received from BHEL's manufacturing plants and go as permanent part of the equipment. Additional packer plates and shims if required will have to be prepared by the contractor out of steel plates, steel sheets to meet site requirements. Necessary steel plates for this purpose will be provided by BHEL free of cost.

4.5.5
The contractor shall carry out scrapping and matching of embedded plates, permanent spacers and all the matching parts of turbine, generator, pumps and other equipments wherever required. The support and sole plates matching and concrete surface bedding is also covered in the scope of work. The fine dressing of concrete shall be with Prussian blue-match checks.

4.5.6
Packer plates shall not only be blue matched with foundations but also inter-packer contact surfaces, contact surfaces between packer and pedestals, contact surface between packer and foundation frame etc. Shall also be blue matched and required

percentage contact shall be achieved by chipping and scrapping as per engineer's instructions.

4.6
WELDING, HEAT-TREATMENT, RADIOGRAPHY AND OTHER NON-DESTRUCTIVE EXAMINATION:

4.6.1 WELDING:

4.6.1.1
The HRSG and piping shall be erected in conformity with the provision of Indian boiler regulations and as may be directed as per other standard / specifications / codes in practice. Method of welding (viz) arc, TIG or other methods as indicated in the erection welding schedule shall be followed; BHEL engineer will have the option to change the method to suit site conditions.

4.6.1.2
Welding and tacking of high pressure joints shall be done by certified high pressure welders who possess valid certificate of chief inspector of boilers of the state in which boiler is being erected. Welder shall also appear in advance, before chief inspector of boilers of the state for re-qualification tests before expiry of the validity of the certificate, as per the provisions of Indian boiler regulations and keep the certificate valid till the completion of the work. The services of such welders whose validity of certificate is expired should not be engaged on the works.

4.6.1.3
In the case of P-91 pipe welding, contractor shall deploy welders having experience in welding of P-91 material. BHEL, at its discretion, may extend help in training of contractor’s welders, not qualified for P-91 welding, at BHEL welding research institute (WRI) Trichy. Such welders would be allowed to work only after passing the required qualifying test and acceptance by all concerned. All expenditures towards such qualification including cost of training, traveling expenses, stay etc shall be borne by the contractor.

4.6.1.4
All welders shall be tested and approved by BHEL engineer/customer before they are actually engaged on work though they may possess the requisite experience certificate. BHEL reserves the right to reject any welder without assigning any reasons.

4.6.1.5
All expenses for welder’s qualification testing of contractor’s welders including destructive and non-destructive tests conducted by BHEL at site shall have to be borne by the contractor. BHEL will provide the raw pipes and plates for preparation of test coupons free of charges.

4.6.1.6
BHEL engineer is entitled to stop any welder from his work if his work is unsatisfactory for any technical reason or if there is a high percentage of rejection of joints welded by him, which in the opinion of BHEL engineers will adversely affect the quality of welding though the welder has earlier passed the tests prescribed. The facts that the welders have passed the test, does not relieve the contractor

from his contractual obligations to check the performance of the welders. Contractor shall submit a monthly performance record of all welders.

4.6.1.7
All welded joints shall be subject to acceptance by BHEL engineer whose decision will be final and binding.

4.6.1.8
The high pressure welders who possess necessary certificate shall appear well in advance before expiry of the validity of his certificate for re-qualification test as per relevant provision of IBR and keep the certificate valid till the completion of work. the services of such welders, the validity of whose certificates have expired shall have to be terminated forthwith.

4.6.1.9
For protection of all pipe joints against rusting between the fit up and actual time of welding, supply and application of special de-oxidized weldable aluminium painting as approved by site engineer shall be done as part of work. Providing such preservative is contractor's responsibility.

4.6.1.10
Welding electrodes have to be stored in enclosures having temperature and humidity control arrangement. This enclosure shall meet BHEL specifications.

4.6.1.11
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 during shifting from backing and holding oven. Contractor has to make sufficient number of backing ovens to meet the requirement.

4.6.2 Heat Treatment:

4.6.2.1
Pre-heating, post heating and stress relieving are part of erection work and shall be performed by the contractor in accordance with instructions of BHEL engineer. During preheat and stress relieving operations the temperature shall be measured as per the instructions of BHEL engineers by thermocouples and recorded graphs for the heat treatment works carried out shall be the property of BHEL. The contractor has to provide thermo-chalks for checking preheat temperature for welding or for monitoring temperature of metal for hot correction as per BHEL engineer's instructions.

4.6.2.2
For the purpose of stress relieving, 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 and not by manual arc welding. Contractor shall arrange sufficient number of thermocouple attachment units.

4.6.2.3

Wherever necessary, contractor should provide temperature indicator / temperature recorder as required by BHEL engineer for measuring heat treatment temperature for welding or for controlling temperature of metal for hot correction etc. the temperature recorders should be preferable of solid state type. Decision of BHEL engineer on method and checking of preheat temperature of controlling temperature for hot correction and welding shall be final and binding on contractor.

4.6.2.4
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.

4.6.2.5
Wherever heat treatment / stress relieving is not mentioned, but pre-heating is required on joints, the same shall be carried out as part of the work.

4.6.2.6
For weld joints of heavy structural sections, if heat treatment is required, the same shall be carried out as part of the work.

4.6.2.7
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.

4.6.2.8
Preheating, inter-pass heating, post weld heating and stress relieving after welding are part of erection work and shall be performed by the contractor in accordance with BHEL engineer's instructions. where the electric resistance heating method is adopted contractor shall make all arrangement including heating equipment with automatic recording devices, all heating elements, thermocouples and attachment units, graph sheets, thermal chalks, & insulating materials like mineral wool, asbestos cloth, ceramic beads, asbestos ropes etc, required for all heating and stress relieving works.

4.6.2.8
All the recorded graphs for heat treatment shall be handed over to BHEL / IBR authorities and due clearances obtained.

4.6.2.9
During welding & post weld heat treatment of main steam piping (p-91 material), the induction heating process shall continue un-interrupted. Therefore, contactor shall arrange DG set for the same to take care of power failures.

4.6.2.10
Results of these processes shall be verified/ validated as per requirements of BHEL/client.

4.6.3 Non Destructive Examination:

4.6.3.1
Radiographic inspection of welds shall be arranged by the contractor including all consumables like isotope camera, film, chemicals etc. scaffolding and approaches

for taking radiographs. The necessary skilled technician and labourers for taking the radiographs shall be provided by the contractor. While taking radiographs, the contractor has to use proper penetrameter / image quality indicators as instructed by the BHEL engineer. all the processed and accepted films will be the property of BHEL. In this regard, the contractor has to adhere to the safety rules / regulations laid by BARC authorities from time to time. it may please be noted that invariably the radiographic work will be carried after the normal working hours.

4.6.3.2
Tenderer shall note that 100% radiography shall be taken on all high pressure welding till such time the welders' performance is found by BHEL engineers to be satisfactory. Subsequently, subject to consistency in welder's performance, the percentage of radiography will be based on BHEL's standard practice/code requirement. The defects shall be rectified immediately and to the satisfaction of BHEL engineer. The decision of BHEL engineer regarding acceptance / rejecting the joints will be final and binding on the contractor.

4.6.3.3
Wherever radiographs are not accepted, on account of bad shot, joints shall be re-radiographed and re-shots submitted for evaluation. Radiographs shall be taken on joints after carrying out repairs. However, if defect persists after first repair, as per radiograph, carrying out repairs and radiography shall be repeated till joint is made acceptable. in case, the joint is not repairable, the same shall have to be cut and repaired at contractor's cost. Decision of BHEL engineer in all these matters is final and binding on the contractor. Payment is considered only for radiography after clearing all defects.

4.6.3.4
100% radiograph of certain sizes in piping have to be taken as per bhel standards/ drawings.

4.6.3.5
All field-welded joints shall be subjected to dye-penetrant examination as specified in respective drawings and shall have to be accepted by BHEL engineer. Any rectification required shall have to be done by the contractor at his cost.

4.6.3.6
For carrying out ultrasonic testing of welding joints, large size tubes and pipes, it will be necessary to prepare surface by grinding and buffing a smooth finish and contour as necessary. The contractor's scope of work includes such preparation and no extra charge is payable for this.

4.6.3.7
It may also become necessary to adopt inter layer radiography/MPT/UT and final NDE combining radiography/ MPT/ UT depending upon the site/technical requirement necessitating interruptions in continuity of the work and making necessary arrangements for carrying out the above work. The contractor shall take all this into account.

4.6.3.8

Contractor may have to undertake radiography with cobalt-60 isotope camera. in case due to unavoidable circumstances cobalt-60 is not possible to be used, those joints shall be checked by 'ultrasonic test'. after completion of suitable part of the thickness, radiography with ir–192/cobalt 60 or other suitable source as acceptable to BARC to be done in case cobalt-60 source cannot be used, subsequently after completing the joint UT to be done. Contractor shall deploy level–ii operator certified by BARC for this purpose.

4.6.3.9
In the case of p-91 piping NDT requirement, where ever radiography is not possible, alternatively ultrasonic test has to be carried out apart from other NDE.

4.6.3.10
For piping of thickness less than 25 mm no radiography plugs will be provided. Radiography shots to be taken by double wall technique or any other method to be adopted in consultation with BHEL engineer at site.

4.6.3.11
No separate payment for any NDE activities is envisaged. The quoted price shall include all the NDE activities.

4.6.3.12 **SOCKET WELDING:**

In execution of this work, considerable number of socket weld joints is involved. The exact quantity of such socket welds or probable variation in the quantum cannot be furnished. The tenderer shall take notice of this while quoting as no extra claim on this account will be entertained at a later date. 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.

4.6.13
Welding electrodes have to be stored in enclosures having temperature and humidity control arrangement. This enclosure shall meet BHEL specifications.

4.6.14
Welding electrodes, prior to their use, call for baking for specified period and will have to be held at specified temperature for specified period. Also, during execution, the welding electrodes have to be carried in portable ovens.

4.7 ERECTION OF HRSG, ITS AUXILIARIES

4.7.1 HRSG RECEIPT, UNLOADING, STACKING AND ERECTION OF MODULES:

4.7.1.1 **ERECTION OF HEAT TRANSFER MODULES:**
The heat transfer modules will be sent loose, 2-3 Nos. with intermediate wooden packing, in light crating-cum-arrestor arrangement welded to the trailer bed. The crate-arrestor has to be cut at site for unloading the modules one-by-one. For unloading the modules special unloading frames have to be used as the modules being flexible have propensity to bending. Utmost care is, therefore, essential while

unloading the modules and a special frame will have to be used for unloading supplied by BHEL, manufacturing unit.

These modules will be unloaded directly at site and only 2-3 modules, with wooden packing between them at appropriate locations, shall be kept in each stack.

For erection of these modules yet another frame, for making the module vertical, will be required. Frame will have to be fabricated at site by the contractor.

Required materials for fabrication of special frames for unloading as-well-as vertical frame shall be issued in random sizes by BHEL on free-returnable basis. No separate payment is envisaged for this fabrication.

In all these handling of modules polyester flat webbing sling shall be used. These slings will be provided by BHEL free of charge on returnable basis.

There are 51 modules, dimension of each module is 3715mm x 140mm x 11500mm, and each module weighs 5MT approx.

4.7.1.2 **ERECTION OF HRSG DRUM:**
The tentative weight and dimensions respectively are as under:

HP drum : 1 no- weight – 51.5 MT, length- 8900mm, ID 1524mm & dist. Above CL is 1100mm & below CL is 1500mm. The elevation of Centre Line of HP Drum is 19950 mm

LP drum : 1 no - weight – 10 MT, length 8200mm, ID 1372MM & dist. Above CL is 950 mm & below CL is 1250mm. The elevation of center line of LP Drum is 19800 mm.

These have to be erected with the help of adequate capacity crane from the side of HRSG after the erection of casing and heat transfer modules of respective circuits.

4.7.1.3
It shall be the responsibility of the contractor to provide temporary ladders on columns, chimney etc in a manner prescribed by BHEL using their own material till such time as permanent stairways are completed.

4.7.1.4
Pressure Parts components like Headers, Modules, loose tubes / links etc. have to be checked for dimensional accuracy and configuration and minor rectifications, if necessary will have to be done before erection. This will involve making appropriate bed of steel structures over the concrete blocks. Steel, in random sizes, for this purpose will be provided by BHEL from the packing materials / scraps etc., where as necessary concrete blocks shall be arranged by the contractor. Bed shall be fabricated as per requirement. These shall be dismantled & returned to BHEL at appropriate stage. No separate payment for making / dismantling such bed is envisaged.

4.7.1.5
Normally the high pressure valves will have prepared edges for welding. But, if it becomes necessary, the contractor shall prepare new edges or recondition the edges by grinding or chamfering to match the corresponding tubes and pipes. All

fittings like “T” pieces, weld neck flanges, reducers, etc., shall be suitably matched with pipes for welding (this is applicable to piping work also).

4.7.1.6
Tubes or pipes wherever deemed convenient, will be sent in random lengths. Tubes / pipes sent in standard/ random length shall be cut and edge prepared to suit the site conditions and the layouts. Bends of tubes up to OD 65 mm will have to be formed at site as incidental to the work. This is applicable to piping work also.

4.7.1.7
Welding of all attachments, including those of stainless steel hooks/ pins on casing & inlet duct, non-pressure parts, pressure parts/ piping including those required for insulation work of HRSG with aux, steel stack and equipments, tanks / vessels, heaters, deaerator etc. of Gas Turbine set, piping’s is in the scope of work.

4.7.1.8
Furnace area and Heat recovery area of flue gas passage has to be made leak proof by seal welding. Air leak test by pressurization has to be conducted to prove effectiveness of the seal weld and bubble / soap test will have to be carried out for the entire seal welds to ascertain the effective sealing is achieved. The tests may have to be repeated till satisfactory result achieved.

4.7.1.9
If required, the pressure parts, after initial erection and tests, will have to be preserved by either dry or wet preservation procedure. Contractor shall render all assistance for this and erect temporary piping with valves wherever necessary. Required material will be provided by BHEL.

4.7.1.10
Any fixtures, concrete block supports, steel structures, required for temporary supporting for pre-assembly or checking and welding for lifting and handling during pre-assembly and erection shall be arranged by the contractor.

4.7.2
Field piping, integral piping of GT, Balance of plant equipments/systems /packages and Power cycle piping:

4.7.2.1
The work on piping systems (air, water, fuel, oil/lube oil, steam, gas etc.) Will include cutting to required length, laying, edge preparation, fixing & welding of the pipes / elbows / fittings/ valves etc. In the pipeline, fixing & adjustment of supports / anchors / shock absorbers and carrying out all other activities / work to complete the erection and also carrying out all pre-commissioning / commissioning operations mentioned in the specification as per BHEL engineers instructions and / or as per approved drawings / documents.

4.7.2.2
Fittings like bends tees, elbows, miter bends, reducers, flanges etc., will be supplied as loose items. However, bends of tube size up to OD 65mm will have to be formed as part of work.

4.7.2.3

All drains / vents / relief/ escape / safety valve piping to various tanks / sewage / drain canal / flash box / sump / atmosphere etc. From the stubs on the piping and equipments erected by the contractor/ battery limit points as specified in drawings/ instructions of BHEL site in charge is completely covered in the scope of work. The matched flanges including at battery limit points will be provided by BHEL. This is applicable to trim piping of HRSG also.

4.7.2.4
Connection (flanged, bolted, welded) of piping to the terminal points/equipments etc. Is in the scope of work even though such terminal point/equipment may not form part of this work. All NDE including radiography of joints so made, post-weld-heat-treatment if any is also within the scope of work/specification. Terminal points works of various piping schemes with customer lines and other contractor's lines. The terminal points work is inclusive of cutting of existing lines, edge preparation, welding/blanking and hook up work.

4.7.2.5
It should be ensured that all the terminal point connections are done without transferring any undue load or strain to the other equipments. Necessary protocols have to be prepared for such fit-up along with BHEL /customer representative before connecting. All NDE including radiography of joints so made, post weld heat treatment if any, are also within the scope of work / specification.

4.7.2.6
The non-IBR piping will be sent as plain pipes. The attachments for tapping points and / or supports will be sent as loose items. Site work will involve fabrication, drilling, fitting, pre-heating, welding, NDE & PWHT as per applicable BHEL documents. Rate quoted shall take account of all these work as no separate payment is envisaged for such work.

4.7.2.7
For integral piping of GT package all attachments etc will be supplied as loose items and are to be welded to the main pipes at site as per instructions. Necessary drilling of holes on main pipe for welding stub shall also be done at site by the contractor.

4.7.2.8
GT OFF-BASE ENCLOSUREs weighing about 75 MT will be supplied in loose sections / items. Contractor shall carry out assembly & fixing of these assemblies / components at site as scope of work. For setting right of deformed components / mismatched components, items / assemblies is the part of scope of work and same shall be carried out by contractor as per instruction of BHEL Engineer at site.

4.7.3
SERVICE & INSTRUMENT AIR PIPES

4.7.3.1
Laying of S.S./G.I. Pipes with fittings and supports of instrument air lines/process air shall include air blowing, hacksaw / cutting from running length to the size, threading, welding, installation of isolation valves, headers, root valves, moisture

traps, check valves, supports and clamps etc by providing the required consumables shall be carried out by contractor.

4.7.3.2
Line shall be provided with proper slope as per drawing / standards and shall be supported at recommended pitching.

4.7.3.3
Hydraulic / pressure testing of pipelines, wherever called for, shall be conducted as part of work till satisfactory results are obtained.

4.7.4 Other products and systems

4.7.4.1
Ducts / expansion bellows are normally supplied in loose wall plates / segments and these are to be assembled and welded at site before erection. All joints connecting ducts, expansion pieces and dampers shall be seal welded. These welds have to be tested by LPI and made leak proof as per technical instruction / requirement.

4.7.4.2
Certain structural items like silencer supports, roof cladding structure, platform etc., will be supplied in running lengths which shall be cut to required suitable sizes and adjusted/trimmed as part of work.

4.7.4.3
Additional platforms of permanent nature for approaching different equipments like actuators, valves, instruments etc. As per site / BHEL client's requirements, which may not be indicated in drawings, but essential for safe access, shall be made by the contractor from structural steel / materials supplied in random lengths / sizes. The contractor will be paid for this work on accepted erection tonnage rate for structures.

4.7.5 INSULATION

4.7.5.1
Inlet and outlet ducts have to be fully insulated with ceramic wool and SS cladding from inside i.e. on gas flow path side, at site. Similarly, the site joints of pre-fabricated & insulated casings shall be packed with insulation and cladding be provided at site.

4.7.5.2
Application of wool insulation, sheet metal cladding, welding of hooks/supports to hold insulation covered under this contract, shall include, but are not limited to, the following :-

A) Where indicated, removable type of insulation to be provided for valves, expansion joints, etc. As per the drawings or as directed by BHEL engineer.

B) Wool insulations are received at site as bonded and unbounded mattresses in standard sizes. These are to be dressed / cut to suit work by the contractor.

C) Application of insulation and refractory works and sheet metal covering as given in various drawings/ specifications of BHEL, supplied to the contractor.

D) Outer sheet cladding by fabrication of aluminum/ GI sheets to the sizes and shapes specified in drawings, beading, swaging, beveling of sheets, crowning the sheets, if necessary, fixing the same to supports, over wool insulation with screws/retainers as specified in BHEL drawings or as instructed by BHEL engineer.

E) Welding of hooks/supports on equipment including on Pressure Parts and piping to support wool insulation, as per the drawings or as instructed by BHEL engineers.

F) Painting the inner side of aluminum/GI/steel cladding, with anti- corrosive paint as specified. The required paint and thinner is in the contractor's scope. Also, all other accessories for painting, cleaning the surfaces etc. Shall be arranged by the contractor.

G) 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 cut open during commissioning to fix gauges, fittings, and instruments. These gaps will have to be finished as per drawings at a later date by the contractor at no extra cost to BHEL.

H) The skin casing plates scalloped bars and other materials that are to be matched with the erected components have to be cut and re-welded from the fabricated pieces as incidental to work.

I) Wastage allowance for the materials issued shall be as under:-

i)	Refractory	2%
ii)	Wool Insulation	2%
iii)	Cladding sheets	2%

4.7.5.3
Application of thermal insulation including cladding / sheeting of all the applicable equipments of HRSG with casing & Aux., duct, steel stack/chimney, Gas Turbine ducts, Bypass Stack and Aux, Deaerator with heater, piping including the integral piping of HRSG & all other equipments, field / external / power cycle piping, tanks and vessels as applicable & covered under these tender specifications shall be carried by contractor.

4.7.6 CHIMNEY ERECTION

1. Steel chimney for HRSG – 45.0 Meter tall with varying shell thickness has to be erected.

2. Chimney is being dispatched in 18 full round sections, Thickness of individual shell is max. 25 mm & min.8 mm. The Maximum and Minimum weight of Chimney shells is 7 MT & 2 MT.

3. Providing all platforms, ladders & tapping for sampling, aviation lamps, earthing strip and earth-pit and openings for connection of the duct, access, measurement tap offs etc. shall be within the scope of work

4. Welding of chimney joints shall be carried out by certified welder. Wherever necessary, radiography has to be taken to meet the BHEL/statutory requirements.

5. As such insulation & cladding of Chimney is envisaged to around 25 Meters height, however entire work of Insulation & Cladding shall be carried out as per drawings requirements within the accepted / applicable item rate of rate schedule.

6. Helical strokes as indicated in the erection drawing are to be welded onto the chimney.

7. Chimney base will be supplied in two pieces, which will have to be assembled at site.

8. Painters trolley will be supplied in parts and will have to be assembled.

4.7.7

ERECTION OF GAS TURBINE WITH AUX, GAS TURBINE GENERATOR, DIVERTED DAMPERS, GUILLOTINE DAMPERS, STACK, DEAERATOR WITH FST & HEATER AND APPROACH PLATFORM, PUMPS WITH AUX. AND BALANCE OF PLANT WITH OTHER RELATED EQUIPMENTS & AUXILIARIES.

4.7.7.1

No any EOT crane or any other BHEL's crane will be available under this tender specification for erection of Gas Turbine, Gas Turbine Generator, Bypass Stack, Feed Storage Tanks or any other equipments. Contractor shall take specific note of this aspect and shall arrange all necessary T&P and lifting/handling/transportation arrangements for placement on required foundation/elevation, erection of equipment including the heavier consignments/equipment like gas turbine, gas turbo-generator, GT inlet ducts, GT off base enclosure, Filter unit of GT, Feed Storage Tanks & Heater of Deaerator etc.. Gas Turbines and Gas Turbine Generators weighing respectively about 68 MT & 87 MT shall be required to be lifted by Suitable capacity Crane/ jacks & support structure etc. to take minimum possible time in lifting and placement then on respective foundations. The contractor shall specific note of same and shall arrange required arrangements as per site requirement.

BHEL shall not provide any crane or transportation arrangement for this work. Contractor shall make all arrangements including cranes and other suitable arrangements as indicated in relevant Appendix- and required for completion of work in contractor's scope including the handling, lifting, placement, erection of heavy equipments like Gas Turbines, Gas Turbine Generators, Feed Storage Tank and Heater of Deaerator, Bypass Stack items, HRSG Drums, Accessory Base, Diverter Dampers, Guillotine Dampers etc..

As an additional information, the tentative Elevation of operating Centre line of Feed Storage Tank (FST) and Heater of Deaerator is 16.6 Meter & 19.25 meters respectively and foundation elevation is about 15.5 Meters.

4.7.7.2
The Height of assembled Bypass Stack is about 32 meters and Internal Dia. Is 3.56 meters. These Bypass Stacks will be supplied in loose ducts / sections and have to assembled / erection at site involving welding, bolting, tack welding work and erection of Aviation Light and lightening arrestor. The Bypass Stack have to insulated upto full height followed by cladding/sheeting work. All these works are covered under the scope of work of contractor under these specifications.

4.7.7.3
Piping weight indicated in relevant Appendix- with valves/fittings, supports and all other piping schemes like fuel, gas, HSD, HP & LP feed water, HP & MP steam, LP Steam, Deaerator Steam & Feed Water, instrument air & service air, cooling water, LP Dosing (Hydrazine & Ammonia), DM water, CW make up, Drinking Water, service water piping, MUD Condensate piping and other Condensate System piping, Process air/n2 piping, GT off base Gas system for GT & HRSG etc. (excluding GTG sets integral piping) for GTG, HRSGs, Common system equipments and balance of plant equipments / systems & related auxiliaries. Contractor shall carry out the erection and complete the piping works of respective system as per sequence, schedule and programme decided by BHEL engineer/customer at site in order to achieve the commissioning schedule of respective equipments/ systems and over all commissioning schedule of project as whole.

4.7.7.4
For the skid mounted equipment, the checking and realignment required at site is in the scope of work.

4.7.7.5
Components like generator auxiliary compartment, load gear and enclosures etc received loose are to be erected in position by contractor.

4.7.7.6
Air filter, inlet ducting, exhaust ducting will be supplied in individual assembled sections with inside insulation. Site job involves complete assembly and erection.

4.7.7.7
Water wash skid shall involve welding of stainless steel pipe from skid to the GT. The piping shall be site routed. The contractor shall complete the job within quoted rate.

4.7.7.8
Overhauling, cleaning, revisioning, servicing of pumps, governing system, equipments, valves etc. During erection and commissioning stages, are in the scope of work. Gaskets/packing for replacement will be provided by BHEL free of cost. All equipments shall be preserved and protected periodically before and after erection as per the advice of BHEL engineer at no extra cost. All HT motors should be, if necessary, serviced and reassembled before erection as per the advice of BHEL engineer.

4.7.7.9
Certain instrumentation like pressure switches, air sets, filter regulators, pressure gauges, and junction boxes, power Cylinders, dial thermometers, flow meters, valve actuators, flow indicators etc. are received in assembled condition as integral part of equipments. Contractor shall dismount such instruments for calibration. Mounting of such instruments will be done by the erection agency.

4.7.7.10
Contractor shall provide the following for GTG set and balance of plant equipments and other related equipments with auxiliaries' erection:

1) Temporary bolts of required size for honing of generator coupling
2) Spanner & torque wrench/bolt stretching device for stretching / tightening of load and accessories coupling bolts.

4.7.7.11
Rain hood protection shall be provided for the equipments e.g. Fuel/HSD, naphtha forwarding skid located outside/ in open space.

4.7.7.12
The FRP Cooling tower will be erected by Original Equipment Manufacturer, However the connected system / piping / Pumps / Fans/ Cooling water treatment system etc. of these tender specification have to be hooked up with above FRP Cooling tower. Contractor under these tender specifications shall extend all the necessary help / assistance to OEM vendor to complete the work and shall carry out the all interface /terminal point works of connecting the piping, welding of flange joints etc. as per instructions of BHEL Engineer at site.

4.7.7.13
The supply, fabrication and erection of DM water tanks carried out by Original Equipment Manufacturer, However the connected system / piping / Pumps etc. of these tender specification have to be connected up with above DM water tank. Contractor under these tender specifications shall extend all the necessary help / assistance to OEM vendor to complete the work and shall carry out the all interface /terminal point works of connecting the piping, welding of flange joints etc. as per instructions of BHEL Engineer at site

4.8.0 TESTING, PRE-COMMISSIONING, COMMISSIONING AND POST COMMISSIONING

4.8.1
Testing, pre-commissioning, & commissioning will involve, though not limited to these, various testing, trial runs of various equipments erected and systems installed; flushing of the lines by air, water, oil/lube oil, gas, steam as the case may be; chemical cleaning of various systems & piping; steam blowing of the pipe lines; floating of safety valves, cranking of GT, FSNL run of GT, synchronization of GT set, open cycle operation, combined trial operation and reliability run etc., are some of these activities. All the activities for commissioning of the set, as informed by BHEL from time to time shall be completed.

4.8.2
All the above tests should be repeated till all the equipments satisfy the requirement / obligations of BHEL to their client and also the relevant statutory authority.

4.8.3

Contractor shall lay / install necessary temporary piping, tanks, pumps, valves, blanks, gauges, cables, switches etc., for conduct of hydraulic / pressure test, chemical cleaning, steam / air blowing etc. This may involve cutting of some portion of existing piping / valves, placing of rubber wedges / blanks in the valves and other openings. Where required, bends have to be fabricated / formed at site from random length / size of pipes / structural steel. Temporary installation itself has to be tested, tried, and subject to non-destructive examinations as per the instructions of BHEL as part of work.

4.8.4 (a)
For the installation of temporary system as above BHEL will provide only the piping, structural items for supports and access platforms, tanks/ plates for fabrication of tank, valves, gauges and their fittings, Thermal insulation and Chemical Circulation Pumps for Alkali Boil out / Chemical cleaning of Major / Bigger size of piping. These will be supplied in random sizes / lengths. However, fabrication, erection, installation, alignment, dismantling of the same after completion of the process, and handing over back to BHEL stores will be the responsibility of the contractor. All above works shall be carried out by contractor. All other pumps like Hydraulic Test Pumps, Water fill pumps and Chemical cleaning pumps etc. which have to be used in temporary installation for the respective purpose will be arranged by the contractor along with starters, foundation / frames cables, switches, etc.. BHEL will not provide any pumps / arrangements other than specified above.

4.8.4 (b)
For payment of temporary system for chemical cleaning and steam blowing of boiler and piping the measurement for the piping, fitting, valves etc and equipments like tanks, structures provided by BHEL & not figuring in shipping list will be based on jointly measured quantity and corresponding standard weights. Payment will be made at the rate applicable for **non-pressure parts** for items. No payment will be made for the equipments brought by the contractor such as pumps etc and foundations made by the contractor for temporary systems. Similarly, no payment will be made for temporary system installed for conducting hydraulic test of various piping systems and HRSG.

4.8.5
Fabrication, fit-up, pre-heating, welding, and post-weld-heat treatment if any, of requisite blanks for conduct of hydraulic test / leakage test is part of work. Similarly, removal of blanks, restoration and normalization of the concerned system / line is to be done as part of work. BHEL will provide the material for blanks free of charge. No separate payment is envisaged for these activities.

4.8.6
Cleaning, servicing of tanks, valves, pumps, equipments, turning gear, governing system during various stages of erection and commissioning are in the scope of work. Gaskets, packing & spares for replacement will be provided free of charges by BHEL.

4.8.7
For various pre-commissioning / commissioning activities / processes mentioned in various clauses, transport of chemicals from BHEL/ customer's stores, charging of chemicals into the system and returning of remaining chemicals and the empty

containers of the chemicals to customer / BHEL stores is the responsibility of the contractor.

4.8.8
During trials/ tests, pre-commissioning / commissioning, replacing / changing mechanical / other seals of equipments like pumps, removal and cleaning / replacing of filters etc is within the scope of work.

4.8.9
In case any defect is noticed during tests, trial runs of all equipments and their auxiliaries, such as interferences, rubbing, loose components, abnormal noise or vibration, strain on connected equipment etc., the contractor shall immediately attend to these defects and take necessary corrective measures. If any readjustment and realignment are necessary, the same shall be done as per BHEL engineer's instructions. Claim, if any, for these works from the contractor shall be governed by clauses 13.1 to 13.8.

4.8.10
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.

Similarly, during the course of erection, if certain portion of equipments erected by the contractor has to be undone for enabling other contractors / agencies of BHEL / customer to carry out their work, contractor shall carry out such jobs expeditiously and promptly and make good the job after completion of work by other contractors / agencies of BHEL / customer as per BHEL engineer's / agencies of BHEL / customers instructions. Claims, if any, in this regard shall be governed as per clauses 13.1 to 13.8.

4.8.11
During this period, though BHEL/ client's staff will also be associated in the work, the contractor's responsibility will be to arrange for complete requirement of men and required tools and plants, consumables, scaffolding and approaches etc., till such time the unit is taken over.

4.8.12
Commissioning activities will continue till the completion of trial operation. During this period contractor shall make available the services of separate dedicated workforce comprising of suitable skilled and semi-skilled / un-skilled workmen and supervisory staff along with necessary tools and plants, consumables etc as part of work.

4.8.13
It shall be specifically noted that the contractor may have to work round the clock during the pre-commissioning and commissioning period along with BHEL engineers and hence considerable overtime payment is involved. The contractor's quoted rates shall be inclusive of all these factors.

4.8.14
The contractor shall carry out any other tests as desired by BHEL engineer on erected equipment covered under the scope of this contract during testing, pre-

commissioning and commissioning, to demonstrate the completion of any part or whole of work performed by the contractor.

4.8.15
After chemical cleaning/pickling of lubricating system (including oil piping, oil tank and other fittings) of rotating machines, oil flushing for lubricating systems as per instructions of BHEL engineer shall be carried out. Cleaning of oil tank of lubricating oil system of GTG set, rotating machinery and other system as per scope of tender specification before and after oil flushing is in the scope of work.

4.8.16
Transportation of oil drums from customer's/BHEL's stores, filling of oil for flushing, first fill of lubricants and subsequent topping up during commissioning and post commissioning is included in the scope of this contract. The contractor shall have to return all the empty drums to the customer/BHEL stores. Similarly, for various pre-commissioning/ commissioning activities/ processes mentioned in various clauses, transport of chemicals from BHEL/customer's stores, charging of chemicals into the system and returning of remaining and/or the empty containers of the chemicals to customer/BHEL stores is the responsibility of the contractor.

4.8.17
BHEL's crane will not be available under this tender specification. Contractor shall take specific note of this aspect and shall arrange all necessary T&P and lifting/handling/transportation arrangements for placement on required foundation/elevation, erection of equipment including the heavier consignments/equipment like Gas Turbine, Gas Turbine - Generator, GT inlet ducts, GT off base enclosure, filter unit of GT, Deaerator, unloading/handling of electrical items like transformers etc.

4.8.18
Piping weight indicated in relevant Appendix- (pipings, valves, fittings & supports for all piping schemes like fuel, oil/lube oil-GT integral piping, gas, HP & MP steam/aux. steam, HSD, HP & LP feed water, Chemical Dosing, Service water, Instrument & Service air, Process air / N2, DM water, Cooling water, Condensate etc. for GT system, and other balance of plant equipment) includes the all type piping for all equipments, auxiliaries, packages/systems of HRSG, GT and balance of plant equipments with auxiliaries etc. Including the equipments integral piping like lube oil/control oil, fuel / gas / water / air etc. Contractor shall carry out the erection and complete the piping works of respective system as per sequence, schedule and programme decided by BHEL engineer/customer at site in order to achieve the commissioning schedule of respective equipments/ systems and over all commissioning schedule of project as whole.

4.8.19
Apart from some portion of lube oil piping, the piping of DM water system, fuel, gas and instrument/process air system are of stainless steel materials. Where as piping of steam system is of alloy steel material

4.8.20
For the purpose of payment, the weight of Field inter connection / integral piping (such as Lube oil / Control oil piping, individual Equipments drains & Vents etc.) of

GT, GTG and BOP with Aux. shall be considered as scope of work under lumpsum rate of GT, GTG & Balance of Plant equipments with Aux. system Erection, Testing & Commissioning work.

4.8.21
For HRSG with Aux & integral piping and Power Cycle piping like HP & MP steam/aux. steam, HSD, HP & LP feed water, Chemical Dosing, Service water, Instrument & Service air, Process air / N2, DM water, Cooling water, Condensate, Gas piping etc. for GT system & Balance of Plant Equipments with Aux, the payment will be made as per accepted rate of rate schedule for piping erection, testing, NDT/NDE test and commissioning works.

4.9 SECURITY, HOUSE KEEPING & OTHER RESPONSIBILITIES OF THE CONTRACTOR

4.9.1
The contractor shall have total responsibility for all equipment and materials in his custody at contractor's stores, loose, semi-assembled, assembled or erected by him at site. He shall effectively protect the finished works from action of weather and from damages or defacement and shall also cover the finished parts immediately on completion of work as per BHEL engineer's instructions. The machine surfaces/finished surfaces should be greased and covered.

4.9.2 Preservation & Protection of components

At all stages of work, equipments/materials in the custody of contractor, including those erected, will have to be preserved as per the instructions of BHEL. Necessary preservation agents, excepting the primer & paint, for the above work shall be provided by BHEL.

4.9.3
The contractor shall make suitable security arrangements including employment of security personnel and ensure protection of all materials/ equipment in their custody and installed equipments from theft/fire/pilferage and any other damages and losses.

4.9.4
Contractor shall collect all scrap materials periodically from various area of work site, deposit the same at one place earmarked at site or shift the same to a place earmarked in BHEL/ client's stores. In case of failure of contractor in compliance of this requirement, BHEL will make suitable arrangement at contractor's risk and cost.

4.9.5
The entire surplus, damaged, unused materials, packaging materials / containers, special transporting frames, gunny bags, etc., shall be returned to BHEL stores by the contractor.

4.9.6
The contractor shall not waste any materials issued to him. In case it is observed at any stage that the wastage/excess utilization of materials is not within the permissible limits, recovery for the excess quantity used or wasted will be effected

with departmental charges from the contractor. Decision of BHEL on this will be final and binding on the contractor.

4.10 FINAL PAINTING

4.10.1
BHEL will provide the primer, thinner & paints for final painting. All other consumables like brush, cleaning agents etc. All T&P, manpower, supervision is contractor's scope.

4.10.2
All exposed metal parts of the equipment including piping, supports, structures, railing, tanks/vessels, HRSG parts / items, Chimney, GT set equipments, Balance of Plant Equipments etc., as applicable shall be painted after thoroughly cleaning the surface from dust, rust, greases, oils, scales, etc, by wire brush, scrapping etc; as specified in relevant erection documents.

The above parts shall then be painted with specified no. of coats of specified paint over the shop primer/paint. Also, where the shop primer/paint has peeled off, the affected area shall be cleaned thoroughly by the specified method and then primer coat applied. Similarly, certain components may be supplied without any primer/paint coat from shop. The surface of such items shall be cleaned as per specifications, coated with suitable primer and then coated with final paint coats. The surface preparation and number of coats & dry film thickness of each coats and the final coat shall be as per customer specification and prior approval under instructions of BHEL engineer at site.

4.10.3
In addition, colour banding, legend and identification marking, direction of flow/rotation marking etc. is part of work.

4.11
For any class of work for which no specifications have been laid down in these specifications, work shall be executed as per the instructions of BHEL.

4.11
The terminal points of machine under this tender specification will be hooked with terminal points of existing system in project premises. Customer has tentatively planned shutdown of their existing system in the month of April'2009. Contractor under these tender specification shall mobilize his manpower and T&P resources to undertake the work and hook up the terminal points of this machine with existing terminal points of HP/IP/LP/Aux. Steam, Gas, Instrument Air/ Service Air, Cooling Water, Feed Water, Condensate System, HSD, Fire water, Drinking Water, Chemical dosing, Drains, etc prior to actual commencement of erection work of machine under these tender specifications. The work involved is cutting, grinding/ making tapping points in existing system, welding the pipes with valves / Blanks/TEEs with fittings/supports in respective system/terminal points, carrying out radiography & NDE test including the IBR welding work etc. including providing all required consumables by contractor. Contractor shall carry out all above works as per schedule & instructions of BHEL Engineer.

4.12 EXCLUSIONS

The following works are specific exclusions from the scope of work / specification: -

I) some sub-delivery items and electrical components such as push buttons, junction boxes etc.

II) E&C work of cable trays, cables and earthing except specifically mentioned.

III) Erection of control panels, MCC etc., calibration of instruments.
IV)
V) All electrical and control & instrumentation items except those specified herein.
VI) Civil works except to the extent specifically indicated elsewhere in this tender.
VII) Pneumatic copper tubing and fittings thereof.

VIII) Design, procurement, supply, and application of spray insulation.

SECTION-5

SPECIAL CONDITIONS OF CONTRACT

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

5.1 Accommodation, drinking water & local transportation for the labour other employees

BHEL/client is not providing any land / space for labour / workmen colony. Contractor shall make his own arrangements for accommodation of his labour and staff out side the project premise with necessary facilities including drinking water, Sanitation, Transport, Electricity, FIRST AID & Emergency transport facilities with all other Hygienic requirements etc at his own expenditure. BHEL/client shall not provide any facility in this regard.

5.2 **TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES**:

5.2.1
The contractor shall provide all (excepting those indicated in BHEL scope) required tools and plants, monitoring and measuring devices (MMD) and handling & transportation equipments for the scope of work covered under these specifications. Contractor has to provide suitable cranes for material handling at BHEL/client's stores/storage yard. BHEL's crane will not be available for this purpose. Please refer relevant Appendix- for the list of T&P being provided by BHEL free of charges on sharing basis. Contractor shall take the specific note this aspect and shall arrange all necessary required T&P and unloading/lifting/handling/transportation arrangements for placement on required foundation/elevation, erection of equipments including for heavier consignments like Gas Turbine Generator, GT inlet ducts , Bypass Stack, GT off base enclosure, filter unit of GT, Deaerator, HRSG Drums, Steel Chimney / Stack, HRSG Modules, including unloading/handling of Electrical Equipments, Panels and Control & Instrumentation items including the Generator Transformer, Station Transformers, LT Aux. Transformers etc.

5.2.2
All tools and tackles to be deployed by the contractor for the work shall have the prior approval of BHEL engineer with regard to brand, quality and specification. Indicative list of major T&P to be arranged by the contractor has been furnished in relevant Appendix-. Contractor shall also mobilize all other T&P necessary for timely and satisfactory completion of the work in scope.

5.2.3
As regards the hydraulic test pumps, water fill pumps and chemical cleaning pumps etc which have to be used in temporary installations for the respective purpose have to be arranged by the contractor. BHEL will not provide these T & P.

5.2.4

Timely deployment of adequate quantity of T&P is the responsibility of the contractor. The contractor shall be prepared to augment the T&P at short notice to match the planned programme and to achieve the milestones.

5.2.5
Contractor shall maintain and operate his tools and plants in such a way that major breakdowns are avoided. In the event of major breakdown, contractor shall make alternative arrangements expeditiously so that the progress of work is not hampered.

5.2.6
In the event of contractor failing to arrange the required tools, plants, machinery, equipment, material or non-availability of the same owing to breakdown, BHEL will make the alternative arrangement at the risk and cost of the contractor.

5.2.7
The T&P to be arranged by the contractor shall be in proper working condition and their operation shall not lead to unsafe condition. The movements of cranes, and other equipment should be such that no damage / breakage occurs to foundations, other equipments, material, property and men. All arrangements for the movement of the T&P etc shall be the contractor's responsibility. The necessary test certificates for equipments to be submitted.

5.2.8
Use of welding generators/ rectifiers for welding only shall be permitted. Use of welding transformers will be subject to specific approval of BHEL engineer.

5.2.9
The contractor at his cost shall carry out periodical testing of his construction equipments and calibration of measuring & monitoring devices (MMD). Test/ calibration certificates shall be furnished to BHEL. MMD shall be calibrated only at accredited laboratory as per the list available with BHEL or any other laboratory approved by BHEL.

5.2.10
Contractor shall transport BHEL's T&P to & fro between BHEL stores and site. Additional loose components / sub-assemblies / attachments as and when necessary, will be issued by BHEL, to & fro between BHEL stores and site of such items shall also be done by the contractor. Assembly of such additional loose components/sub-assemblies/ attachments is in contractor's scope. Contractor shall provide all enabling services with tools and tackles for assembly/dismantling as above.

5.3 CONSUMABLES

5.3.1
The contractor shall provide all consumables including HRSG & Aux., GT set special consumables like Molykote, Hylomar, Bricosit, Stag-B, Shellac etc. required for carrying out the work covered under these specifications excepting those specifically indicated as BHEL scope.

5.3.2

All consumables to be used for the work shall have prior approval of BHEL engineer with regard to brand and quality specifications. Test reports / certificates in respect of these consumables, wherever applicable, shall be submitted to BHEL engineer.

5.3.3 PRIMERS & PAINTS

All preservation primers with paints for entire works is in the contractor's scope. BHEL will provide preservation paints & Finish Paints with primer for preservation of BHEL supplied equipments / materials and Final / Finish Painting of BHEL equipments under these specifications.

5.3.4 Consumables for BHEL supplied equipments (cranes, T&P etc)

Refer relevant clause of section-7 special conditions of contract in this regard.

5.4 WELDING ELECTRODES, FILLER WIRES FOR TIG WELDING AND GASES

5.4.1
All the required welding electrodes, as approved by BHEL shall be arranged by contractor at his cost. It shall be the responsibility of the contractor to obtain prior approval of BHEL, before procurement, regarding manufacturer, type of electrodes etc. On receipt of the electrodes at site, it shall be subject to inspection and approval by BHEL regarding type of electrodes, batch number, date of expiry etc. Batch test certificates shall be made available for verification & record before the actual use of the welding consumables.

BHEL reserves the right to reject the use of any electrodes, if found non-acceptable because of bad quality, deterioration in quality due to improper storage, shelf life expiry, unapproved type / brand etc.

5.4.2

Filler wires, for TIG welding of pressure parts & piping, to the extent supplied by the manufacturing units of BHEL alongwith the components / equipments only shall be provided by BHEL as free issue. All the filler wires for TIG welding for all other purposes & additional requirement (if any) beyond the above free supply of BHEL, contractor at his cost shall provide & meet requirements of TIG filler wires**.**

5.4.3
Gases like argon, oxygen, acetylene etc that are required for erection related activities shall be arranged by the contractor at his cost.

5.4.4
Nitrogen gas, if required, for preservation of boiler and nitrogen capping during chemical cleaning process and preservation of Generator Transformers, Station Transformers, Unit Aux. transformers etc., will be provided by BHEL free of charge. Contractor shall arrange necessary connector, nipple, regulator, header and piping for usage of such gas from Cylinders.

5.5 FIELD OFFICE

5.5.1
The contractor shall make his own arrangements for field office and stores for accommodating necessary equipments, tools room for execution of the work. Only open space will be provided by BHEL / customer, free of charges as per the availability of space. The contractor shall make his own arrangements for Construction of field office, store shed/stores. GNFC, Bharuch project having space constraints and Safety as prime Concern & lots of work permit procedures/formalities for excavation, Fabrication, grinding, welding works etc., contractor may decide his portable Type office/stores etc. arrangements. Contractor may have to arrange his own arrangement outside the project premise for accommodation of his T&P and cranes etc. and shall be arranegd by contractor at his own expenditure

5.5.2
On completion of work, all the temporary buildings, structures, pipelines, cables, etc shall be dismantled and leveled and debris shall be removed as per instruction of BHEL by the contractor at his cost. In the event of his failure to do so, the same will be arranged to be removed and expenditure thereof will be recovered from the contractor. The decision of BHEL engineer in this regard shall be final. However, the scope of dismantling and leveling the area is limited only to the contractor's site office, yard and other spaces occupied by the contractor.

5.6 AREA LIGHTING

5.6.1
Contractor shall arrange adequate floodlights, hand lamps and area lighting. Contractor shall use his own materials like cables, fuses, switch-boards etc. BHEL/client will not provide anything in this regard.

5.7 CONSTRUCTION POWER & WATER

5.7.1
Construction power (415 V, 3 Ph., and 4 Wire) will be provided at available single point at a distance of about 100 Meters from project work site in project premise by customer (GNFC). The construction power for construction purpose will be free of charges; however any taxes, duties, levy etc. as charged by customer, shall be paid by contractor. The contractor shall provide all necessary cables, glands, fuses, switches, switchboards, ELCB, energy meters, capacitor banks etc. for power factor improvement & loss avoiding measures etc. and any other installations as specified by statutory authority in this regard for further drawl of power. Obtaining approvals, payment of necessary fees, duties etc towards the clearance of such installations, prior to their being put to use or as may be specified, shall be the responsibility of the contractor.

5.7.2
It shall be the responsibility of the contractor to provide, maintain the complete installation on the load side of the supply with due regard to the safety requirements at site. All cabling and installations shall comply in all respects with the appropriate statutory requirements. The installation and maintenance of this shall be done by licensed and experienced electrician.

5.7.3
The contractor shall install necessary capacitor bank etc. with appropriate control mechanism to maintain the power factor as per the guidelines in vogue from time to time in this regard. Any levy imposed by the customer / authority for any deviation in power factor shall be passed on to the contractor.

5.7.4
Contractor shall be well equipped with back-up power supply arrangement like dg set and diesel operated welding machine etc. To tackle situations arising due to failure of customer supplied power, so as to ensure continuity and completion of critical processes that are underway at the time of power failure or important activities planned in immediate future.

5.7.5
BHEL shall not be responsible for any loss or damage to the contractor's equipment as a result of variations in voltage or frequency or interruptions in power supply.

5.7.6 **Construction Water:**

Water for construction purpose will be provided by customer free of charges at available single point inside the plant area. Contractor has to arrange his own distribution system/pumping arrangements etc. for further distribution of construction water. The necessary taxes, duties and levies as imposed by M/s GNFC have to be borne by contractor and the coated rates deemed to have included all this things.

5.7.7
Contrcator shall make his own arrangement of drinking water.

5.7.8
Wherever required & as insisted by Customer, Contractor shall provide and install the meters for usages & metering of construction power & construction water. These meters shall have necessary test certificate from relevant approving authority and shall be used only on clearance from client/BHEL.

5.8 RESPONSIBILITIES WITH REGARD TO LABOUR EMPLOYMENT ETC.

Refer clause 2.8 of general conditions of contract also in this regard.

5.8.1
Contractor shall also comply with the requirements of local authorities / project authorities calling for police verification of antecedents of the workmen, staff etc.

5.8.2
BHEL / customer may insist for witnessing the regular payment to the labour. They may also like to verify the relevant records for compliance with statutory requirements. Contractor shall enable such facilities to BHEL / customer.

5.8.3
It is the responsibility of the contractor to arrange gate pass for all his employees, T&P etc for entering the project premises. Necessary coordination with customer officials is the responsibility of the contractor. Contractor to follow all the

procedures laid down by the customer for making gate passes. Where permitted, by customer / BHEL, to work beyond normal working hours, the contractor shall arrange necessary work permits for working beyond normal working hours.

5.8.4.
Contractor shall provide at different elevation suitable arrangement for urinal and drinking water facility with necessary plumbing & disposal arrangement including construction of septic tank. These installations shall be maintained in hygienic condition at all times.

5.8.5
If at any time during the execution of work, it is noticed that the work is suffering on account of non-availability/shortfall in provision of resources from the contractor's side, BHEL will make suitable alternate arrangements at the risk and cost of contractor. The expenditure incurred with overheads thereon shall be recovered from the contractor.

5.8.6
The contractor in the event of engaging 10 or more workmen will obtain Independent licence under the contract labour (regulation and abolition) act 1970 from the concerned authorities based on the certificate (form-V) issued by the principal employer/customer. In order to issue the certificate (form-V) by customer, contractor shall fulfill all statutory requirements like Insurance Policy, PF code/PF account number etc. as per requirement of BHEL/Customer.

5.8.7
Contractor will deduct the necessary amount from his employees towards provident fund and contribute the equal amount as per government of india labour laws. This amount will be deposited regularly to the provident fund commissioner and get the account code. Contractor shall submit the above account code duly certified by pf commissioner to BHEL Project In-charge.

5.8.8
It is the responsibility of the contractor to arrange gate pass for all his employees, T&P etc. Necessary coordination with Customer/BHEL officials is the responsibility of the contractor. Contractor to follow all the procedures laid down by Customer/BHEL for making gate passes.

5.8.9
BHEL/Customer may insist upon witnessing the regular payment to the labour. They may also like to verify the relevent records for compliance with statutory requirements. Contractor shall enable such facilities to BHEL/Customer.

5.8.10
Contractor shall also comply with the provisions of ESI act in vogue and submit evidence thereof to BHEL site incharge. Also all other employees benefits to be borne by the contractor as per the labour laws. Contractor shall produce necessary certificates towards their compliance with such statutes and payment of all statutory dues.

5.8.11

Contractor shall also comply with the requirements of local authorities / project authorities calling for police verification of antecedents of the workmen, staff etc.

5.8.12
Where permitted, by BHEL/Customer, to work beyond normal working hours, the contractor shall arrange necessary gate passes.

5.8.13
GNFC project premise being in operation and Industrial project, Contractor under these tender specifications shall strictly abide, enforce and follow the basic requirement of safety & Fire requirements, Environmental requirements and Statutory requirements as per their ISO-14001 before the execution of work, during execution of work and after execution of work as per GNFC requirement and instructions of BHEL Engineer at site.

5.9.0 TAXES, DUTIES, LEVIES

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

5.9.1

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

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

5.9.2 Service Tax & Cess on Service Tax

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

Contractor shall submit to BHEL documentary evidence of Service Tax registration certificate specifying name of services covered under this contract.. **Contractor has to mention in their RA Bill service tax registration number and remittance record of such tax immediately after depositing the tax with concerned authorities.** Contractor shall obtain prior written consent from BHEL before billing the amount towards such taxes.

With introduction of Cenvat Credit Rules 2004, which came into force w.e.f. 10.09.2004, Excise Duty paid on Input Goods including Capital Goods and Service Tax paid on Input Services that are used for providing the output services can be taken credit of against the Service Tax payable on output services. However BHEL may opt for availing the abatement provision in which case cenvat credit may not be available on input duty.

5.9.3 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.

5.10.0 SUBMISSION OF PERIODICAL REPORTS

Contractor shall submit periodical reports in respect of following aspects of operation:

- Consumption of welding electrodes and gases
- Consumption of construction power
- Availability and utilization of BHEL's cranes
- Manpower reports
- Progress reports - periodically
- Field calibration reports

BHEL at site will inform formats for these reports.

It is the responsibility of the contractor to arrange gate pass for all his employees, T&P etc. 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 permit for working beyond normal working hours.

SECTION-6

SPECIAL CONDITIONS OF CONTRACT

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

6.1 SUPERVISORS AND LABOUR

Contractor shall deploy in adequate strength Labour, Technicians, Supervisors and Engineers for these works.

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- 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 and Workmen for this job. They shall have professional approach in executing the work having adequate knowledge / experience in over all knowledge of G T Equipments/ systems/components, Quality Assurance procedures, Planning, Safety etc. and conversant / exposure to such refinery atmosphere / environment that are required to be undertaken for the type of work as per these specifications.

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
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 another contractors or agencies. Cost of damage, if any, to life and property arising out of such violation of statutory regulations shall be borne by the contractor.

6.9 WATCH AND WARD
Contractor shall arrange and provide watch & ward round the clock for the materials/equipments issued to him.

6.10
Contractor shall implement local labour laws and Safety & Insuranace requirements, maintain necessary records and co-ordinate with the local labour authorities on all matters of labour and industrial relations.

6.11
The contractor shall comply with the applicable law, rules and regulation etc; with regard to employment of labour. He shall obtain labour license.

The scope includes getting the licenses and approvals from the statutory authorities, arranging for inspection of electrical inspector periodically as per BHEL engineer's instructions, submitting documents etc. and following up the matter with them as and when necessary for the work involved in this scope. All expenses, fees, levies etc have to be borne by the contractor.

6.12 **SITE ORGANIZATION**
The contractor shall provide adequate staffing in the following areas in addition to the staffing requirements of execution as instructed/informed by BHEL from time to time:

- Overall planning, monitoring & control
- Quality control and quality assurance
- Materials Management
- Safety, Fire & Security
- Industrial relations and fulfillment of labour laws and other statutory obligations.

SECTION-7

SPECIAL CONDITIONS OF CONTRACT

7.0 OBLIGATIONS OF BHEL

Facilities to be provided by BHEL
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 WELDER'S TEST MATERIALS (ONLY TUBES & PIPES)

BHEL will only provide the tube & pipe pieces in random sizes free of charges for preparation of test coupons for conducting the site qualification test of hp/ IBR welders. Contractor shall arrange on his own arrange other materials such as plates, tubes, pipes etc for qualification of other welders. Contractor shall prepare the required test coupons.

7.2 FILLER WIRE FOR TIG WELDING

Refer section-5 in this regard.

7.3 EQUIPMENTS – TOOLS & PLANTS

BHEL will provide the T&P listed in relevant Appendix- free of charge. Contractor shall ensure these are maintained in working condition during their deployment for the work and while retuning the same. BHEL reserves the right to take penal action as deemed fit in the event of damages to these on account of contractor. Further details are as under:

7.3.1 CRANES TO BE PROVIDED BY BHEL

7.3.1.1

BHEL shall not provide any crane or transportation / handling arrangements and lifting slings / fixtures for the works under these tender specifications. Contractor shall make all arrangements for the cranes and other suitable arrangements as indicated in relevant Appendix- and required for completion of work in contractor's scope including the handling, lifting, placement, erection of heavy equipments like HP Drum, LP Drum, HRSG Modules, Steel Chimney / Stack, Gas Turbine, Gas Turbine Generator, Feed Storage Tank and Heater of Deaerator, Bypass Stack items, Accessory Base, Diverter Dampers, Guillotine Dampers, Generator Transformer, Station Transformers, LT Aux. Tranformer etc.

7.3.1.2

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.

7.3.1.3
Any boom reduction/ extension shall be the contractor's responsibility.

7.3.1.4
The day-to-day upkeep and running maintenance like filling / topping up of lubricants, etc, of BHEL T&P shall be the responsibility of the contractor. Spares if any, required in normal course will be provided by BHEL. Major breakdowns will be attended to by BHEL.

7.4 OTHER T&P

7.4.1
Special tools which are supplied by BHEL as part of maintenance tools to be handed over to customer under regular DU / DESS numbers in various product groups may be issued to the contractor free of charges for specific activities, at the discretion of BHEL. Contractor shall return them after the completion of the specific activity, for which the tools were spared, in good working order.

7.4.3
Lubricants like hydraulic oil, gear oil and grease for BHEL's T&P will be provided by BHEL free of charge. All other consumables like cotton waste etc shall be in the contractor's scope.

7.4.6
The contractor must not use these equipments for any purpose other than what they are intended for.

7.4.7
If the above items issued to contractor are found not utilised / not maintained to the satisfaction of BHEL engineer or misused, these will be withdrawn and no replacement will be done for such items.

7.4.8
Required temporary structural steel, pipes & fittings, valves for drum lifting, conductance of hydraulic test, chemical cleaning / steam blowing / oil flushing / acid cleaning etc. shall be provided by BHEL.

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

7.5.1
All lubricants and chemicals required for testing, preservation, chemical cleaning / acid cleaning, oil flushing, and the lubricants for trial runs of the equipments will be supplied by BHEL as free issue. BHEL will provide paints with primer & thinner for Final / Finish painting.

8.0 Inspection/Quality Assurance/Quality Control/ Statutory Inspection

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

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

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

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

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

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

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

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

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

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

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

8.8

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

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

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

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

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

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

8.14 Stage Inspection By FES/QA Engineers

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

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

Statutory Inspection of Work

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

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

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

The scope includes getting the approvals from the statutory authorities, which includes arranging for inspection visits of statutory authority periodically as per BHELl Engineer's

instructions, arranging materials for ground inspection, taking rub outs for the pressure parts to be offered for inspection, submitting co-related inspection reports, documents, radiographs etc and following up the matter with them. Contractor shall also make all arrangements for offering the Products / Systems for inspection at location, as applicable, to the concerned authority.

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

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

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

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

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

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

Field Quality Assurance

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

SECTION-9

SPECIAL CONDITIONS OF CONTRACT

Safety, Occupational Health and Environmental Management

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
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 it's 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 administers should be prominently displayed.

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

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

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

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

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

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

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

Sl no	**Equipment**	**Scope of inspection**	**Inspection by**	**Schedule**
1	Hand tools	To identify unsafe/defective tool	User	Daily
2	Power tools	To identify unsafe/defective tool	User	Daily
3	Fire Extinguishers	To check pressure and any defect	User / Safety Coordinator	Daily Every month
4	Lifting equipment/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 Slinging property	200/-
07.	Using Damaged Sling	200/-

Sl. No	Instance of Violation	Fine (in Rs)
08.	Lifting Cylinders Without Cage	500/-
09.	Not Using Proper Welding Cable With Lot of Joints And Not Insulated Property.	200/-
10.	Not Removing Small Scrap From Platforms	200/-
11.	Gas Cutting Without Taking Proper Precaution or Not Using Sheet Below Gas Cutting	200/-
12.	Not Maintaining Electric Winches Which are Operated Dangerously	500/-
13.	Improper Earthing Of Electrical T&P	500/-
	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

WR 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
IS 10658	1983		HIGHER CAPACITY DRY POWDER FIRE EXTINGUISHERS (TROLLEY MOUNTED)
IS 10662	1992		COLOUR TELEVISION
IS 10667	1983		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR PROTECTION OF FOOT AND LEG
IS 11037	1984		ELECTRONIC FAN REGULATORS
IS 11057	1984		INDUSTRIAL SAFETY NETS
IS 11451	1998		RECOMMENDATION FOR SAFETY AND HEALTH REQUIREMENT RELATING TO OCCUPATION EXPOSURE TO ASBESTOS
IS 1169	1967		PEDESTAL FANS
IS 1179	1967		SPECIFICATION FOR EQUIPMENT FOR EYE AND FACE PROTECTION DURING WELDING
IS 11833	1986		DRY POWDER FIRE EXTINGUISHERS FOR METAL FIRES
IS 11972	1987		CODE OF PRACTICE FOR SAFETY PRECAUTION TO BE TAKEN WHEN ENTERING A SEWARAGE SYSTEM
IS 1287	1986		ELECTRIC TOASTER
IS 13063	1991		STRUCTURAL SAFETY OF BUILDINGS ON SHALLOW FOUNDATIONS ON ROCKS
IS 13385	1992		SPECIFICATIONS FOR FIRE EXTINGUISHERS 50 LITRE WHEEL MOUNTED WATER TYPE (GAS CARTRIDGES)
IS 13386	1992		SPECIFICATIONS FOR FIRE EXTINGUISHERS 50 LITRE MECHANICAL FOAM TYPE
IS 13415	1992		CODE OF SAFETY FOR PROTECTIVE BARRIERS IN AND AROUND BUILDINGS
IS 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 No	YEAR	Amd upto	DESCRIPTION
IS 1904	1986		CODE OF PRACTICE FOR DESIGN AND CONSTRUCTION OF FOUNDATIONS IN SOIL
IS 1905	1987		STRUCTURAL SAFETY OF BUILDINGS MASONARY WALLS
IS 2082	1985		ELECTRICAL GEYSERS
IS 2171	1985		PORTABLE FIRE EXTINGUISHERS DRY POWDER TYPE (CARTRIDGE)
IS 2309	1989		PRACTICE FOR THE PROTECTION OF BUILDINGS AND ALLIED BUILDINGS AGAINST LIGHTENING
IS 2312	1967		EXHAUST FANS
IS 2361	1994		SPECIFICATION FOR BUILDING GRIPS - FIRST REVISION
IS 2418	1977		TUBULAR FLUORSCENT LAMPS IS 2418 (FT-1)
IS 2750	1964		STEEL SCAFFOLDINGS
IS 2762	1964		SAFE WORKING LOADS IN KGS FOR WIRE ROPE SLINGS
IS 2878	1986		FIRE EXTINGUISHERS CARBON DIOXIDE TYPE (PORTABLE AND TROLLEY MOUNTED)
IS 2925	1984		SPECIFICATION FOR INDUSTRIAL SAFETY HELMETS
IS 3016	1982		CODE OF PRACTICE FOR FIRE PRECAUTIONS IN WELDING AND CUTTING OPERATIONS- FIRST REVISION
IS 3315	1974		DESERT COOLERS
IS 3521	1989		INDUSTRIAL SAFETY BELTS AND HARNESS
IS 368	1983		IMMERSION WATER HEATERS
IS 3696	1991		SAFETY CODE OF SCAFFOLDS AND LADDERS PART 1 TO 2
IS 3737	1996		LEATHER SAFETY BOOTS FOR WORKERS IN HEAVY METAL INDUSTRIES
IS 374	1979		CEILING FANS INCLUDING REGULATORS
IS 3764	1992		EXCAVATION WORK - CODE OF SAFETY
IS 3786	1983		METHOD FOR COMPUTATION OF FREQUENCY AND SEVERITY RATES FOR INDUSTRIAL INJURIES AND CLASSIFICATION OF INDUSTRIAL ACCIDENTS
IS 3935	1966		CODE OF PRACTICE FOR COMPOSITE CONSTRUCTION
IS 4014	1967		CODE OF PRACTICE FOR STEEL TUBULAR SCAFFOLDING
IS 4081	1986		SAFETY CODE FOR BLASTING AND RELATED DRILLING OPERATIONS
IS 4082	1977	1996	STACKING AND STORAGE OF CONSTRUCTION MATERIALS AND COMPONENTS AT SITE
IS 4130	1991		DEMOLITION OF BUILDINGS - CODE OF SAFETY PART 1 TO 2
IS 4138	1977		SAFETY CODE FOR WORKING IN COMPRESSED AIR (FIRST REVISION)
IS 4155	1966		GLOSSARY OF TERMS RELATING TO CHEMICAL AND RADIATION HAZARDS AND HAZARDOUS CHEMICALS
IS 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 No	YEAR	Amd upto	DESCRIPTION
IS 5184	1969		CODE OF SAFETY FOR HYDROFLUORIC ACID
IS 5216	1982	2000	RECOMMENDATIONS ON SAFETY PROCEDURES AND PRACTICE IN ELECTRICAL WORK PART I AND II
IS 555	1979		TABLE FANS
IS 5557	1995		INDUSTRIAL AND SAFETY LINED RUBBER BOOTS (SECOND REVISION)
IS 5916	1970		SAFETY CODE FOR CONSTRUCTION INVOLVING USE OF HOR BITUMINOUS MATERIALS
IS 5983	1980		SPECIFICATION FOR EYE PROTECTORS - FIRST REVISION
IS 6234	1986		PORTABLE FIRE EXTINGUISHERS WATER TYPE (STORED PRESSURE)
IS 692	1994		CRITERIA FOR SAFETY AND DESIGN OF STRUCTURES SUBJECTED TO UNDERGROUND BLASTS
IS 6994	1973		SPECIFICATION FOR SAFETY GLOVES
IS 7155	1986		CODE OF RECOMMENDED PRACTICE FOR CONVEYOR SAFETY (PART 1 TO 8)
IS 7205	1974		SAFETY CODE FOR ERECTION OF STRUCTURAL STEEL WORK
IS 7293	1974		SAFETY CODE FOR WORKING WITH CONSTRUCTION MACHINERY
IS 7323	1994		GUIDELINES FOR OPERATIONS OF RESERVOIRS
IS 7812	1975		CODE OF SAFETY FOR MERCURY
IS 7969	1975		SAFETY CODE FOR HANDLING AND STORAGE OF BUILDING MATERIALS
IS 8089	1976		CODE OF SAFE PRACTICE FOR LAYOUT OF OUTSIDE FACILITIES IN AN INDUSTRIAL PLANT
IS 8091	1976		CODE OF PRACTICE FOR INDUSTRIAL PLANT LAYOUT
IS 8095	1976		ACCIDENTS PREVENTION TAGS
IS 818	1968	1997	CODE OF PRACTICE FOR SAFETY AND HEALTH REQUIREMENTS IN ELECTRIC AND GAS WELDING, AND CUTTING OPERATIONS
IS 8448	1989		AUTOMATIC LINE VOLTAGE CORRECTOR (STABILISER)
IS 8519	1977		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR BODY PROTECTION
IS 8520	1977		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR EYE, FACE AND EAR PROTECTION
IS 875	1987		STRUCTURAL SAFETY OF BUILDING: LOADING STANDARD PART 1 TO 5
IS 8807	1978		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR PROTECTION OF ARMS AND HANDS
IS 8978	1985		INSTANTANEOUS WATER HEATERS
IS 8989	1978		SAFETY CODE FOR ERECTION OF CONCRETE FRAMED STRUCTURES
IS 940	1989		PORTABLE FIRE EXTINGUISHERS WATER TYPE (GAS CARTRIDGE)
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 No	YEAR	Amd upto	DESCRIPTION
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 sections 1 & 2 respectively and special conditions of contract contained in sections 4 to 15 and appendices, provisions contained in special conditions of con t in sections 4 to 15 and appendices shall prevail.

10.7
In case of discrepancy between quoted item rate and corresponding amount in the rate schedule, the **quoted item rates shall be reckoned as correct and amount recalculated**. Quoted item rates shall also prevail for arriving at the total price quoted for offer evaluation. Offers will evaluated on the total amount for the entire Rate Schedule and the work will be awarded without splitting the scope.

10.8
Bank Guarantees to be furnished by the contractor towards Security Deposit and Performance Guarantee (last 5% payment against workmanship warranty/defect liability) shall have a claim period of six months over and above the validity period required for the respective cases. BG for advance payment shall be kept valid for a period of two more months beyond the recovery period of the advance with interest thereof.

SECTION-11

SPECIAL CONDITIONS

11.0 TIME SCHEDULE, MOBILISATION, PROGRESS MONITORING, COMPLETION, OVERRUN, PRICE VARIATION ETC.

11.1 TIME SCHEDULE AND MOBILIZATION

11.1.1

The contractor shall mobilize at site to start the contractual work within **TWO Weeks** from issue of fax letter of intent by BHEL. Contractor shall mobilize the resources and shall augment & increase additional resources further in such a manner that the entire works envisaged under the Tender Specification is completed to achieve the following schedule from date of start of work at site:

(A) FOR HRSG AND AUX:

SN	MILESTONE	COMPLETION SCHEDULE FROM START OF HRSG ERN.
01	HRSG DRUM LIFTING (HP + LP)	6TH MONTH
02	HYDRAULIC TEST	8TH MONTH
03	GAS IN	9TH MONTH
04	ALKALI BOIL OUT	10TH MONTH
05	SVF & STEAM BLOWING	11TH MONTH
06	CO-GEN COMMISSIONING	12TH MONTH
07	GT BOX UP	6TH MONTH
08	OIL FLUSHING OF GT SYSTEM	7TH MONTH
09	GT CRANKING	8TH MONTH
10	FSNL OF GT	8TH MONTH
11	GT SYNCHRNIZATION (OPEN CYCLE)	8TH MONTH
12	RELIABILITY RUN COMPLETION	12TH MONTH
13	COMPLETION OF ALL FACILITIES	13TH MONTH

11.1.2

The work of materials unloading / materials handling & material management services etc. will start much earlier than actiual start of Erection work. Contractor shall mobilize the resources within two weeks time after issue Fax Letter of Intent to undertake the works of Material Unloading, Verification, Stacking and Material Management services work with watch & ward and other miscellaneous services under the scope of this contract accordingly and will mobilize resources to commence the Erection, Testing and commissioning work progressively as per direction of BHEL Engineer at site. Mutually agreed programme shall be drawn by the contractor primarily to achieve the schedule as aforesaid, taking into account available and anticipated materials inflow and other inputs. These may have to be further fine tuned with shorter duration programmes as per requirement to suit the project schedule and commitments to Customer.

11.1.3

The terminal points of machine under this tender specification will have to be hooked up with terminal points of existing system of project premise. Customer has tentatively planned shutdown of their existing system in the month of April'2009. Contractor under these tender specification shall mobilize his manpower and T&P

resources to hook up the terminal points of this machine with existing terminal points of HP/IP/LP/Aux. Steam, Gas, Instrument Air/ Service Air, Cooling Water, Feed Water, Condensate System, HSD, Fire water, Drinking Water, Chemical dosing, Drains, etc prior to actual commencement of erection work of machine under these tender specifications. The work involved is cutting/grinding/ making tapping points in existing system, welding the pipes / TEEs with valves / Blanks, root valves with fittings/supports in respective system/terminal points, carrying out radiography & NDE test including the IBR welding work etc. with providing all consumables by contractor. Contractor shall carry out all above works as per schedule & instructions of BHEL Engineer. These works of terminal hook ups shall be carried out much earlier to the actual commencement of erection works of HRSG & Aux. etc. The payment for such work will be payable as per accepted applicable item rate of piping for erection & commissioning of rate schedule (Item under Sl.A-6.1, A-6.2 & A-6.3 of Section-A of rate schedule). **The dates of commencement of these terminal hookup works shall not be considered for the purpose of commencement of contract period.**

11.1.4
The HRSG with Aux. work is tentatively scheduled to start by September-October'2009. The date of Start of Contract Period shall be reckoned from the date of erection/placement of HRSG's first major equipment / major assembly / major sub-assembly on its designated foundation/location by the contractor and so certified by BHEL engineer. The placement of packers, inserts, foundation bolts and shims, or chipping of foundations for packers etc. will not be considered for this purpose.

11.1.5
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.

11.1.4 **CONTRACT PERIOD**

The total contract period shall be **13 months** from the start of erection work as defined in clause 11.1.1 & 11.1.4 herein earlier.

11.1.5 **GRACE PERIOD**

Contractor shall complete all the works in scope of these specifications within the Contract Period. A Grace period of **3 months** beyond Contract period will be allowed at the discretion of BHEL without any additional financial implications on either side.

11.2 Progress monitoring, contract extension and overrun

11.2.1 Progress monitoring

11.2.1.1
Progress will be reviewed periodically (daily / weekly / monthly) including month end review vis-à-vis the plans drawn as above. The contractor shall submit periodical

progress reports, and other reports / information including manpower, consumables etc., as desired by BHEL.

11.2.1.2 Ascertaining and establishing the reasons for shortfall

The onus-probandi that the causes leading to extension of the contract period is not due to any reasons attributable to the contractor is on him (the contractor). Review of the performance as stated vide cl. 11.2.1 above will be made considering the availability of components to be erected and other inputs / constraints over which the contractor has no control. The programme will be reviewed area-wise and the following facts will be recorded in case of shortfall at the end of every month:

A) Erection / commissioning programme not achieved owing to non-availability of fronts.

B) Erection / commissioning programme not achieved owing to non-availability of materials.

C) Erection/commissioning programme not achieved owing to non-availability of tools and plants, manpower and consumables by the contractor or any other reason attributable to the contractor.

D) Erection / commissioning programme not achieved due to any other reasons not attributable to the contractor.

11.2.2 **CONTRACT EXTENSION**

12.2.2.1
If the completion of work as detailed in these specifications gets delayed beyond the end of contract period and grace period contractor shall request for an extension of the contract. Depending on the balance work left out then, BHEL at its discretion may extend the contract.

11.2.2.2
A joint programme shall be drawn for the work to be completed during the extended contract period. Review of the program and record of shortfall as describe vide clause no. 11.2.1.2 shall be done during the extended period. The overrun charges will be paid in proportion to the achievement of the respective month vis-à-vis the plan for the month (for assessing the performance, the agreed plan shall be reduced by shortfall attributable to the BHEL). BHEL may disallow contractor's claim for over run charges if the monthly programme as mentioned here not made by him.

11.2.2.3
The part of extension attributable to the contractor, if any, in total contract extension shall be exhausted first i.e., immediately after end of grace period. This shall be followed by the extension on account of force majeure conditions, if any, and lastly on account of BHEL.

11.2.3 OVERRUN COMPENSATION

11.2.3.1
If the contract is extended beyond the contract (including grace) period for any reason other than those attributable to the contractor or force majeure conditions, the contractor will be compensated by payment of over run charges at the rate of **Rs.50,000/- per month (Rupees Fifty Thousand only**). Over run compensation will be paid for the extension attributable to BHEL only. No over run compensation will be payable for the extension on account of reasons attributable to contractor and / or force majeure conditions. Pro-rata payment will be made for part of a month considering daily ORC=Monthly ORC rate divided by 30 .

11.2.3.2
Contractor shall complete all the works and fulfill all the obligations of Material Handling and Material Management services from initial mobilization at site & within the completion of Erection & commissioning contract period and its subsequent extended period (if any) without any additional/extra claim Or ORC compensation. However if required, BHEL at its discretion may decide to avail the services of any member and category of Material Management group (Secretarial & Other misc. services AND/OR Record keeping AND/ OR Preservation of components AND/OR Supervisory Services) beyond the completion of Erection & Commissioning Contract Period & extended period. Contractor shall provide the services of such member(s) & category on manmonth basis as per requirement of BHEL Engineer Incharge at site. Contractor shall be paid at an average rate of Rs.7,000.00 per manmonth (Rupees Seven Thousand per manmonth) for such services on certification of BHEL engineer. Pro-rata payment will be made for part of a month considering the per day payment= Rs.6000.00 multiplied by manmonth availed and divided by 30. This per manmonth payment rate shall remain firm/unchanged for the period of 6 months (Six months) beyond the completion of E&C contract period and extended period (if any).

For Material Handling work (if any) beyond the E&C contract period & its extended period (if any), the payment shall be paid as per applicable Material Handling item rate of rate schedule in addition to the payment of manmonth of Material Management services availed during the relevant month beyond the E&C contract period and its extended period.

11.3 PRICE VARIATION

11.3 PRICE VARIATION

In order to take care of variation in cost of execution of work on either side, due to variation in the index of LABOUR, DIESEL and ELECTRODE, Price Variation Formula as described herein shall be applicable

11.3.1
85% component of Contract Value shall be permitted to be adjusted for variation in various relevant indices during execution of work. The remaining 15% shall be treated as fixed component.

11.3.2
The basis for calculation of price variation in each category, their component, Base Index, Base Date of accounting shall be as under:

.SL NO.	CATEGORY	COMPONENT ('K')	BASE INDEX	BASE DATE

A)	LABOUR (ALL CATEGORIES)	40%	CONSUMER PRICE INDEX FOR INDUSTRIAL WORKERS (GENERAL), APPLICABLE TO 'ALL INDIA' AS PUBLISHED BY LABOUR BUREAU, SHIMLA	Base date shall be calendar month of last date of submission of Tender (including extended date of submission if any)
B)	H.S. DIESEL OIL	5%	WHOLE SALE PRICE INDEX (FOR COMMODITY :HIGH SPEED DIESEL) PUBLISHED BY MINISTRY OF COMMERCE AND INDUSTRY (www.eaindustry.nic.in)	…DO…
C)	WELDING ELECTRODE	40%	WHOLE SALE PRICE INDEX (FOR COMMODITY:ELECTRODES) PUBLISHED BY MINISTRY OF COMMERCE AND INDUSTRY (www.eaindustry.nic.in)	…DO…

11.3.3

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

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

Where

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

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

R = Value of work done for the billing month

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

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

11.3.4

The above Price Variation formula is applicable for the entire Contract period, Grace period, and the extended contract period if any. However for the period extended on account of reasons attributable to the contractor and/or Force Majeure conditions, the price variation will be applied based on the respective indices/prices frozen at the calendar month preceeding the start of such extended period.

11.3.5

The price Variation is not applicable to Over Run Charges, Manday rates for extra works etc.

Similarly Price Variation shall not be applicable for the respective % assigned to milestone activities viz Oil Flushing, Barring Gear, Commissioning of Condensate System, Commissioning of Feed Water System and Synchronisation

11.3.6

The contractor shall furnish necessary monthly bulletins for WHOLE SALE PRICE INDEX (for Commodity :ELECTRODES and HS DIESEL) Published by Ministry of Commerce and Industry (www.eaindustry.nic.in) and CONSUMER PRICE INDEX for INDUSTRIAL WORKERS (GENERAL), applicable to 'All India' as published by Labour Bureau, Shimla.

11.3.7

The contractor will be required to raise the bills for price variation payments on a monthly basis along with the running bills irrespective of the fact whether any increase/decrease in the consumer price index for Labour, HS Diesel and Electrode has taken place or not. In case there is delay in publication of bulletins (final figure), the provisional values as published can be considered for payments and arrears shall be paid/recovered on getting the final values.

11.3.8

The Total Quantum of Price Variation shall not exceed fifteen percentage (15%) of executed Contract Value. Executed Contract value for this 15% cap shall not include Overrun charges, Extra works.

11.3.9

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

11.4 CONTRACT VARIATIONS

11.4.1 VARIATION IN QUANTITIES

Weight of various equipments, quantities of various items of work, etc. Covered under these specifications, & indicated in relevant appendices are likely to vary. For any upward or downward variation in the quantities the rates accepted shall be applicable without any variation, wherever unit rate is applicable. Payment will be made by BHEL for the actual executed quantities in such cases. However for lump sum rate of equipments/auxiliaries of rate schedule, no additional payment/ recovery shall be made towards any variation in weights and quantities.

~~11.5 INTEREST BEARING ADVANCE~~

~~Interest bearing (@ 12% per annum interest with monthly rest basis) advance limited to 5% of the award value may be paid by BHEL at its discretion against receipt & acceptance of bank guarantee from the contractor for the amount sought. This bank guarantee shall be valid for sufficient period till the entire loan amount is recovered. Recovery will be made minimum @ 10% of the admitted running bill amount from the first applicable running bill onwards till entire due is recovered. Rate of recovery shall be higher in case the period for recovery available is lesser.~~

11.6 DEFINITION OF WORK COMPLETION

The contractor's scope of work under these specifications will deem to have been completed in all respect, only when all the activities are completed satisfactorily and so certified by BHEL site in charge. The decision of BHEL in this regard shall be final and binding on the contractor.

11.7 INTEREST BEARING ADVANCE

Interest bearing (rate of interest shall be prime leading rate of SBI plus 2% per annum, on monthly reducing balance basis) recoverable advance limited to 5% of the contract value may be paid by BHEL at its discretion depending on the merit of the case against receipt & acceptance of bank guarantee from the contractor for the amount sought. This bank guarantee (BG) shall be valid at least for one year or the recovery duration. In case recovery of dues does not get completed within the aforesaid BG validity period, the contractor must renew the validity of BG or submit fresh BG for the outstanding amount and remaining recovery period. BHEL is entitled to make recovery of the entire outstanding amount in case the contractor fails to comply with the BG requirement as above.

Recovery of dues will be made minimum @ 10% of the admitted gross running bill amount from the first applicable running bill onwards till entire due (principal plus interest) is recovered. In the event sufficient time duration is not left for recovery @10%, the rate of recovery shall be suitably enhanced so that entire due is recovered by the time contractor reaches 90% billing of total value of work executed & within the contract period (including extensions granted or foreclosure if any).

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

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

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

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

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

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

8. MICR Code of the Bank Branch

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

12.1 STAGES OF PROGRESSIVE PRO-RATA PAYMENTS:

12.1.1 MATERIAL HANDLING AND MATERIALS MANAGEMENT (SL. NO.B-1 & B-2 OF RATE SCHEDULE : SECTION – B OF PART-II PRICE BID)

12.1.1.1
The 4% of total amount of rate schedule will be released on following events of contractor's T&P mobilization:

(i) 2.0% of the total amount on deployment of & making operational the 25 T Crawler/ Tyre mount crane at site for material handling.
(ii) 1.0% of the total amount on deployment of & making operational the first 10-12 T Hydra crane at site for material handling.
(iii) 0.40% of the total amount on deployment of 100 Nos. of wooden/ concrete sleepers at site
(iv) 0.60% of the total amount on deployment of balance 200 Nos. of wooden/concrete sleepers at site

12.1.1.2
70% of the agreed item rates shall stand assigned for progressive pro-rata release towards material handling work of the rate schedule.

Payments in respect of material handling activities (listed in section-B of rate schedule) will be made for the actual quantities executed.

12.1.1.3
The remaining 26% of the agreed item rates shall be assigned for progressive pro-rata release towards various Material Management services as described in detail in these specifications.

Payment towards MM services will be made after availing such services as per agreed plan. This is irrespective of any materials handled or not in that month.

12.1.1.2.1
Detailed break up for release on progressive pro-rata payment towards Material Handling will be as following.

12.1.1.2.1.1
Break up of assigned % of rate towards Material Handling activities for progressive payment of incoming materials **(Unloading & preliminary verification of materials, item Nos. B-1 of rate schedule)**

(i) 35 % of agreed rates shall be paid after the materials are received and unloaded at project site and verified (verification of physical quantities and externally detectable damages) with reference to RR/LWB/PWB subject to furnishing following information and record along with the bill.

(a) Shortage report/open delivery taken W.R.T. RR/LWB, if any, and acceptance thereof by railway authorities/transporters.
(b) Proof of the claim lodged with railways/transporters in respect of above shortage/open delivery.
(c) Material management forms duly filled in by contractor and certified by BHEL engineer.

(II) **Detailed verification & stacking**

35 % of the agreed rates shall be paid after the materials are duly stacked and verified as per packing slip/loading advice slip by repacking, stacking etc wherever necessary. Payment will be released on submission of information as per materials management forms by the contractor immediately after verification of materials and certified by BHEL engineers. Site engineer will provide the requisite proforma. Normally the verification of material shall be done within the time frame specified by BHEL.

12.1.1.2.1.2

The progressive pro-rata payment towards Shifting/re-arranging/ re-stacking of materials (item Sl.. No. B.2 of rate schedule) shall be released as per following:

70% of the accepted item rate on prorata basis for respective work completed and corresponding records prepared in the month.

Above progressive payment will also be followed for items "**INCOMING AND OUTGOING SMALLS** " whenever services utilized with certification of BHEL Engineer at site.

12.1.1.3.1 Break up of assigned % towards Materials Management services for pro-rata progressive payment

The break up of assigned 26% towards various mm services shall be as under:

A. Supervision:	06%
B. Preservation:	03%
C. Record keeping:	07%
D. Secretarial & other misc. Services	10%

12.1.2 HRSG AND IT'S AUXILIARIES (RATE SCHEDULE: SECTION – A)

12.1.2.1
97% of item rate for various items of HRSG and its auxiliaries and piping will be released, based on certified quantity by BHEL engineer, as pro-rata progressive payment as per the stage break up given hereunder:

Sl. No.	Part of the activity completed	Percentage of accepted item rates (ref respective Sl. No. A-1, A-2, A-3, A-4 of Rate schedule : Section – A)			
		Non-pressure parts and Chimney	Structures	Pressure parts, Heat Trans. Mod	Insulation & cladding
A	TRANSPORT, & ERECTION / PLACEMENT	38%	43%	38%	---
B	ALIGNMENT / WELDING / BOLTING WITH PERMANENT SUPPORTS	40%	45%	35%	---
C	GAS TIGHTNESS TEST / KEROSENE LEAK TEST / LPI TEST AS APPLICABLE	10%	---	---	---
D	RADIOGRAPHY, HEAT TREATMENT AND OTHER NDE TEST COMPLETION	---	---	10%	---
E	APPLICATIONOF THERMAL INSULATION	---	---	---	88%
F	ON COMPLETION OF HYDRAULIC TEST OF HRSG	-	-	5%	0
G	ON COMPLETION OF SAFETY VALVE FLOATING	2%	2%	2%	2%
H	ON COMPLETION OF TRIAL OPERATION	3%	3%	3%	3%
I	ON COMPLETION OF FINAL PAINTING	2%	2%	2%	2%
J	ON COMPLETION OF ALL FACILITIES OF HRSG	2%	2%	2%	2%
	TOTAL	97%	97%	97%	97%

12.1.2.2

03% of total amount of rate schedule for various items of HRSG (Items under Sl. A-1, A-2, A-3, A-4, A-5 of Section-A) & items of GTG (Items under Sl. No. C-1 of Section-C) of Rate Schedule) will be released on following events of contractor's T&P mobilization:

(i) 2.5% of the total amount on deployment of & making operational the 120-150T capacity at site to suit the site requirement for erection of Chimney & HRSG and GTG.

(ii) 0.50% of the total amount on deployment of & making operational of separate 10-12T Hydra crane at site for erection work.

12.1.3
PROGRESSIVE PAYMENT FOR PIPING (RATE SCHEDULE SECTION – A- items under Sl. No. A.5)

Sl.	Part of activity completed	Percentage of accepted item rates
		piping (C.S., A.S. and S.S.)
A	Transport to work site & erection / placement in position	25%
B	Alignment, fit-up	24%
C	Welding	20
D	NDT	5%
E	Pre-heat treatment / Post weld heat treatment (as applicable)	5%
F	Hydraulic test of pipeline	5%
G	Chemical cleaning of pipeline	2%
H	Steam blowing of pipeline	3%
I	Final painting	3 %
J	Synchronization	2%
K	Trial operation completion	2%
L	Completion of all facilities of GT & combined cycle set	1%
	Total	**97%**

12.1.4
For payment of temporary system for chemical cleaning and steam blowing of boiler and piping the measurement for the piping, fitting, valves etc and equipments like tanks, structures provided by BHEL & not figuring in shipping list will be based on jointly measured quantity and corresponding standard weights. Payment will be made at the rate applicable for **non-pressure parts** for items. No payment will be made for the equipments brought by the contractor such as pumps etc and foundations made by the contractor for temporary systems. Similarly, no payment will be made for temporary system installed for conducting hydraulic test of various piping systems and HRSG.

12.1.5 STAGES OF PROGRESSIVE PRO-RATA PAYMENTS FOR GTG WITH AUX. & BALANCE OF PLANT EQUIPMENTS

STAGE BREAK UP FOR PAYMENT OF GAS TURBINE-GENERATOR SETS WITH AUX., INTEGRAL PIPING AND BALANCE OF PLANT (MECHANICAL) AND OTHER RELATED EQUIPNMENTS & AUXILIARIES (REFER SL. NO. C-1 SECTION-C OF RATE SCHEDULE) SHALL BE AS PER FOLLOWING ON PROGRESSIVE PRORATE BASIS:

1.0	**GAS TURBINE, DUCTING AND AUXILIARIES (32 %)**	**%**
1.1	Preparation and chipping of foundation & Packer grouting	1.0
1.2	Placement of Gas Turbine on foundation	2.0
1.3	Alignment of GT with load gear box	1.0
1.4	Erection of GT off base enclosure	3.0
1.5	Erection of Gas valve modules, Lube Oil centrifuge, Lube Oil Mist eliminator,	2.0
1.6	Erection of GT vent fans with enclosure & Exhaust frame Blowers etc.	1.0
1.7	Erection of Air Processing skid and APU Cooler	1.0
1.8	Erection of Gas Turbine Accessory base with associated items /equipments/ auxiliaries	2.0
1.9	Erection of GT co_2 fire protection systems	2.0
1.10	Erection of Compressors Water Wash Skid	1.0
1.11	Erection of Main Filter House	3.0
1.12	Erection of GT inlet ducting with silencers, expansion joints	2.0
1.13	Erection of exhaust ducting system with silencers, Ducts and Structure of By pass stack.	2.0
1.14	Erection of Guillotine Dampers, Diverter Dampers, GD & GFD seal air fans	2.0
1.15	Erection, welding & NDE/NDT of integral / inter connecting piping	3.0
1.16	Erection of Stack support structures, GT Walkway, Ladders & platforms	2.0
1.17	Grouting of Gas Turbine	1.0
1.18	Erection of miscellaneous items of GT	1.0
	SUB TOTAL OF 1.0	**32.0**
2.0	**GAS TURBINE GENERATOR & AUX (9 %)**	%
2.1	Preparation of foundation & base plate / packers grouting etc.	1.0
2.2	Placement Of Generator on foundation	2.0
2.3	Centering & leveling of Generator on foundation	1.0
2.4	Alignment of GTG with load gear box	1.0
2.5	Erection of exciter and alignment	1.0
2.6	Erection of air filter , air cooler duct with air cooling elements	1.0
2.7	Grouting of Generator	1.0
2.8	Erection of Miscellaneous items	1.0
	SUB TOTAL OF 2.0	**9.0**
3.0	**BALANCE OF PLANT EQUIPMENTS, PUMPS AND OTHER RELATED EQUIPMENTS & AUX. (33%)**	%
3.1	Erection Natural Gas system for GT: Gas conditioning skid, knockout drum, filter, separator skid, scrubber, fuel gas condensate drain tank with submersible drain pump etc. with accessories/aux.	4.0
3.2	Erection of HP Boiler Feed Pumps (Barrel Type) with Motor drives & Aux./ Accessories	4.0

3.3	Erection of LP Feed Pumps with Motor drives (Ring section Type) & Accessories /Aux.	2.0
3.4	Erection of DM water transfer pumps with Motor drives (Stainless Steel) & Aux / Accessories including the pump which to be installed near existing DM plant.	2.0
3.5	Erection of Cooling Water Pumps with Motor drives & Aux./Accessories	3.0
3.6	Erection of Oily Water effluent disposal pumps with motor drives with Aux./Accessories	2.0
3.7	Erection of Water effluent disposal pumps with motor drives & Dewatering Pumps with Motor drives with Aux./Accessories	2.0
3.8	**Erection of Heat Exchangers :**	
3.8.1	Deaerator with FST, Heater, Approach Platform and fittings / loose items	3.0
3.8.2	Gas Turbine oil Coolers with fittings / accessories	2.0
3.8.3	Generator Air Coolers with Frames, Ducts & Accessories	2.0
3.9	Erection of LP dosing skids (Hydrazine & Ammonia)	2.0
3.10	Grouting of Equipments	2.0
3.11	Erection of Hoists of BFPs	1.5
3.12	Erection of Misc. items	1.5
	SUB-TOTAL OF 3	**33.0%**
4.0	**FINAL PAINTING (5%)**	**%**
4.1	Progressive final painting of equipments of GTG, BOP with associated Aux. & Accessories under scope	5 .0
5.0	**Commissioning 18%**	%
5.1	Cranking of GT	2.0
5.2	Full speed no load sum of GT	2.0
5.3	Synchronisation of GT set	2.0
5.4	Trail operation of GT set	1.0
5.5	Oil flushing completion of GT system	2.0
5.6	Commissioning of feed water system	2.0
5.7	Commissioning of Make water system	1.0
5.8	Commissioning of Cooling Water System	2.0
5.9	Commissioning of Natural Gas system	1.0
5.10	Commissioning of Effluent system	1.0
5.11	Completion of Co-Generation	1.0
5.12	Completion of all facilities of GT & Co-gen system related with PG test	1.0
	SUB TOTAL OF 5.0	**18.0**
	GRAND TOTAL OF 1.0,2.0,3.0,4. and 0,5	**97.0**

12.3 **GENERAL**

12.3.1
Weight of packers and shims which become permanent part of equipment, both figuring in shipping list and those fabricated at site will be paid for on shipping list based actual weight.

12.3.2
Certain optimized assemblies / or modules may be made, assembling products from two or more different product group main assembly and dispatched. Payment for erection of these optimized assemblies / or modules will be regulated as per the weight of individual product group main assemblies contributing to the total weight of the module or optimized

assembly at the quoted rate for the respective product group main assemblies, in the rate schedule.

12.3.3
TO START WITH CONTRACT VALUE WILL BE CONSIDERED AS THE AWARD VALUE. CONTRACT VALUE WILL BE PERIODICALLY REVIEWED DEPENDING ON THE QUANTITY OF MATERIALS TO BE HANDLED/ERECTED BY THE CONTRACTOR FOR COMPLETION OF THE CONTRACTUAL WORK IN TOTALITY. FINALLY, THE CONTRACT VALUE SHALL BE ARRIVED AT BY MULTIPLYING THE AGREED ITEM RATES OF THE RATE SCHEDULE APPLIED ON ACTUALLY EXECUTED FINAL QUANTITY OF ALL THE ACTIVITIES AND THE TOTAL PAYMENT TOWARDS BREAK UP ENVISAGED IN RELEVENT CLAUSE HEREIN ABOVE SHALL BE ADJUSTED ACCORDINGLY.

12.4 MEASUREMENT OF THE WORK COMPLETED

A) Where payment is to be made on the basis of weight, the weight per unit given in the BHEL document only shall be taken in to consideration. In case such an information is not available in BHEL documents, then the latest relevant Indian standards in this regard may be applied.

B) Spares, surplus quantity, erection contingency materials will not be paid for unless the same has been consumed in place of regular item of measurable work as per the rate schedule.

C) Where the payment is made on the basis of item rate, actual executed quantity measured jointly shall only be paid for.

D) It is clarified that as far as weight constituted by welding consumables and other consumables supplied by BHEL as well as by the contractor, shall 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) Wastage allowance provided elsewhere on application of refractory & insulation will be applied on the net issued quantity. The net issued quantity is gross issue less the quantity returned. The wastage allowance will be applied at the final reconciliation stage. The payable amount will then be restricted to the net quantity after wastage allowance.

G) No separate payment shall be made for grouting of equipments, structures etc specified elsewhere in these specifications.

SECTION-13

SPECIAL CONDITIONS OF CONTRACT

13.1
If extra works (requiring up to 100 man-hours) for modification, rework, revamping, in brief, any work done to change the state existing to a stage desired and also fabrication, all or any, needed due to any change in or deviation from the drawings and design of equipment, operation / maintenance requirements, mismatching, transit damages and other allied works which are not very specifically indicated in the drawings, but are found essential for satisfactory completion of the work, are done, no extra charges will be paid. The tenderers are requested to take this aspect into account and the quoted rate should include all such contingencies.

13.2
However, BHEL may consider for payment as extra on man-day basis, for such of those activities detailed in clause 13.1 which require more than 100 man-hours and such payment will be regulated by the terms, conditions and stipulations contained in the clauses contained hereinafter. It may be specifically noted that the decision of BHEL as to whether such payment is due shall be final and binding on the contractor.

13.3
Extra works should be done by a separately identifiable gang, without affecting routine activities. Daily log sheets in the proforma prescribed by BHEL should be maintained and shall be signed by the contractor's representative and BHEL engineer. No claim for extra work will be considered / entertained in the absence of the said supporting documents i.e. Daily man-hour log sheets. It may, however, be noted that signing of log sheets by BHEL engineer does not mean the acceptance of such works as payable extra works.

13.4
Such extra works arising out of transit, storage and erection damages, payment, if found due, will be regulated as per section-14.

13.5
BHEL retains the right to award or not to award any of the major repair / rework / modification / rectification / fabrication works as defined above to the contractor, at their discretion without assigning any reason for the same.

13.6
It shall be noted that all extra works that arise on account of the contractor's fault, will have to be carried out by the contractor free of cost. Under such circumstances, any material and consumable required for this purpose will also have to be arranged by the contractor at his cost.

13.7
After eligibility of extra works is established and finally accepted by BHEL engineer / designer, payment will be released on competent authority's approval at the following rate.

Manday rate for eligible extra works

Single average manday rate for 8 working hours, including overtime if any, and other site expenses and incidentals, including suprevision, consumables, tools and tackles, will be **Rs. 320/-** (Rupees three hundred twenty only).
No payment will be made if an item of work lasts less than 100 manhouRs.

SECTION-14 (rev:01 dated 02/02/2009)

SPECIAL CONDITIONS OF CONTRACT

INSURANCE

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

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

14.2

The contractor has to arrange on his own, insurance cover for all the T&P and other construction equipments deployed at site. Such assets are not covered in insurance policy taken by BHEL.

14.3

It shall also be the responsibility of the contractor to arrange for accident risk policy/workmen compensation policy for the staff and workmen.

14.4

The contractor has to provide assistance in lodging and realizing the insurance claims covered by the MCE insurance policy that is taken by BHEL. Scope shall include receipt inspection (shortage/damage/loss reporting) immediately on arrival of consignment, recording such damage/loss/shortage intimation on the LR/RR/LWB duly countersigned by the driver/transporter's representative while acknowledging receipt of consignment to the concerned transporter, intimating the loss/damage/shortage to BHEL, providing assistance for inspection of the reported consignment at the time of insurance survey, liasioning with the transporter and insurance company etc.

14.5

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

14.6

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

15.0 EARNEST MONEY DEPOSIT, SECURITY DEPOSIT & BANK GUARANTEE

15.1 Earnest Money Deposit:

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

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

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

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

15.1.2 EMD shall not carry any interest.

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

15.2 Security Deposit

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

SN	Contract Value	Security Deposit Amount
1	Up to Rs. 10 lakhs	10% of Contract Value
2	Above Rs. 10 lakhs upto Rs.50 lakhs	1 lakh + 7.5% of the Contract Value exceeding Rs. 10 lakhs.
3	Above Rs. 50 lakhs	Rs 4 lakhs + 5% of the Contract Value exceeding Rs. 50 lakhs.

The security Deposit should be furnished before start of the work by the contractor.

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

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

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

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

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

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

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

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

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

ix. The Security Deposit shall not carry any interest.

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

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

15.3 BANK GUARANTEE

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

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

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

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

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

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

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 Hydrabad
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.

APPENDIX-I

TENTATIVE SCOPE OF EQUIPMENTS/SYSTEMS COVERED UNDER THIS TENDER SPECIFICATION.

(AA) Heat Recovery Steam Generator with associated Equipments & Aux. including Steel Stack / Chimney, Integral Piping as per below mentioned scope comprising of following broad system.

a) HP and LP Steam drums with internals.
b) Spiral finned HP Super-heater and LP Super-heaters.
c) Spiral finned HP and LP Evaporators.
d) Spiral finned HP Economizers.
e) Spiral finned Condensate Pre-Heater (CPH).
f) Complete gas duct work with necessary expansion joints as per drawings.
g) Boiler Integral piping, fittings, valves, drains and vents as per drawing. And site requirement.
h) HP Steam attemperator with Control Valves
i) Safety valves and Safety relief valves with silencers as per drawing requirement.
j) Direct water level gauges as per drawing requirement.
k) Complete Boiler support Structures with foundation fasteners and anchors.
l) Platforms and ladders as per drawing and site requirement.
m) Complete insulation (Pourable, refractory, Mineral wool etc. with fixing components, hooks, Sheeting) work
n) Tanks & Vessels
o) HP Dosing
p) Self supporting Steel Chimney with Electrical-aviation lights & Earthing and platforms, stares & ladders, Floor Grills, associated insulation & claddings

q) Field / External system / Power Cycle Piping Schemes related with GTG system, Balance of Plant Equipments with valves, fittings, hangers & supports etc. from BHEL Hyderabad & their vendors :

- HP & MP Steam Piping
- LP & Deaerator Steam Piping
- MUH Condensate, DM water Transfer and Condensate Return System, & Deaerator Steam Piping
- HP & LP Feed Water System Piping
- Cooling Water System Piping
- Off Base Gas System for GT & HRSG
- LP Dosing (Hydrazine)
- LP Dosing (Ammonia)
- Instrument Air, Service Air, N2 piping
- DM water piping, drinking water piping.
- Service water piping

(BB) Material Handling and Material Management for materials of HRSG, Gas Turbine with Aux., Gas Turbine Generator with Aux., Heat exchangers, Balance of plant equipments/Systems with related auxiliaries and related piping, Complete Electrical and C&I equipments/items like Control & Electrical Panels, Cables, Cable Trays, Structural materials Instruments, Busduct, Switchgear Panels, Tanks & Vessels, Pumps, Piping, Insulation materials, T&P items, Chemical & Lubricants and all other project related materials including heavy & voluminous consignments / equipments like Gas Turbine, Gas Turbine Generator, HP&LP

HRSG drums, HRSG Modules, Deaerator, Accessory base, Generator Transformer, Station Transformers, LT Aux. Transformer, Pumps etc.

(CC) Gas Turbine with Generator & Aux., Bypass Stack, Heat Exchangers, Pumps, Deaerator with heater & approach platform, and Balance of Plant Equipments with integral piping, Field / External/Power Cycle Piping, LP Dosing / Chemical dosing system etc.

(A) Gas Turbine and Aux.:

One number frame-6B [PG6581B] Gas Turbine (Indoor installation) each of which is characterized by the following equipment and accessories:

1. Base mounted, single-shaft Frame-6B Split base, Gas Turbine and accessory compartment consisting of:

- **<u>Accessory compartment consisting of:</u>**
  - Diesel Engine starting system.
  - Hydraulically operated, solenoid-valve controlled jaw clutch with automatic disengagement at turbine self-sustaining speed.
  - Hydraulic torque converter
  - Heavy duty, multi-shaft accessory gear box
  - Diaphragm type accessory coupling.
  - DC motor driven hydraulic ratchet rotor turning device

- **<u>Natural Gas Fuel System consisting of :</u>**

  - Stop/speed ratio valve & Control valve located in Gas Module (mounted off-base)
  - Piping, valves filters & necessary instrumentation etc.
  - 400 micron Gas strainer (mounted off-base)
  - Interconnection wiring in rigid metal conduits.
  - Base mounted terminal boxes.
  - Closed, forced fed lubricating oil system including :
  - Shaft driven main oil pump
  - Full flow AC motor driven auxiliary lube oil pump
  - Partial flow DC motor driven emergency oil pump
  - Dual LO coolers (oil to water)
  - Dual filters with transfer valve for Lube Oil & Hydraulic oil systems
  - Dual filters with transfer valve for Trip oil system
  - Full flow AC motor driven auxiliary Hydraulic pump
  - Necessary piping, controls and instrumentation etc.
  - Off-base Enclosure thermal & acoustic for Accessory compartment limiting near field noise level to 85 dBA @ 1.0 m laterally from GT enclosure at 1.5-m elevation from ground level.
  - Negative ventilation system
  - Fire Detection & monitoring system with CO_2 protection
  - Necessary on-base piping
  - Necessary on-base cables(power, control & signal), electrical equipment & instrumentation – suitable for Class-1, Division-2, Group-D
  - Lighting in accessory compartment

- **<u>Turbine compartments consisting of:</u>**

- Seventeen stage, axial flow, corrosion protected compressor
- Ten-chamber, reverse flow type, standard diffusion combustor with steam injection for Nox control.
- .3-stage turbine with PLASMA GUARD coated first stage buckets
- Dual ignition system
- Vibration sensors (seismic type) with monitoring by GT Mark-V panel
- Non-contacting Displacement probes (radial & axial), Key phaser , etc with monitor
- Thermocouples for measuring critical turbine temperature (exhaust)
- Thermocouples for measuring bearing drain temperatures
- Boroscope openings
- Inlet and exhaust plenums
- On-base Enclosure thermal & acoustic for Accessory compartment limiting near field noise level to 85 dBA @ 1.0 m laterally & 1.5 m elevation from GT enclosure
- Negative ventilation system
- Fire & Gas detection cum & monitoring system with CO_2 protection
- Interconnection wiring in rigid metal conduits.
- Base mounted terminal boxes.
- Necessary on-base piping
- Necessary on-base cables (power, control & signal), electrical equipment & instrumentation – suitable for Class-1, Division-2, Group D
- Lighting in turbine compartment

2. Inlet Air Systems consisting of:

- Filter compartment with:
- Self cleaning filter cartridges
- Lighting and instrumentation
- Air processing unit
- Inlet ducting with silencer
- Transition piece from inlet ducting to inlet plenum
- Necessary structural supports

3. Internally insulated Exhaust Gas system (side Exhaust) consisting of:

- Exhaust ducting
- Electrically operated Diverter damper with 2 X 100 % seal air fans.
- Electrically operated Guillotine damper with 2 X 100 % seal air fan.
- 30m high bypass stack (height from machine base-line) including Transition piece & silencer
- Necessary structural supports

4. Walkways
5. Foundation hardware
6. Special tools & tackles
7. Off-base compressor cleaning and washing skid for off-line/on-line cleaning
8. Boroscope kit
9. Mobile Lube oil centrifuge - 1000 LPH
10. Lube oil drain pump (2 m3)
11. Steam injection facility for Nox control
12. Diaphragm type load coupling.
13. Load gear box between GT & Generator
14. GT Off base Enclosures

(B) 1 x Fr6B GAS TURBINE GENERATOR & ITS AUXILIARIES

1. Closed circuit air cooled Generator (VPI) suitable for in-door installation, consisting of:

- Stator with output leads at the top (3 ph + 3 N)
- Rotor suitable for Overhang BLE
- Bearings, base frame, built in RTDs, space heaters
- Side mounted air to water coolers with elements, mounting frames / ducts
- Liquid leakage detector
- Enclosure to limit noise level to 90dBA at 1m distance
- Walkway
- Generator shaft current and voltage measurement unit.

2. Overhang Brushless Exciter and PMG along with portable stroboscope.

(C): GTG system Integral Piping :

C.1: GTG Integral piping like: Lube oil, Control oil / Governing Oil / Jacking Oil , Individual Equipment / systems drains & vents etc.

(D) BALANCE OF PLANT EQUIPMENTS, PUMPS WITH AUX. AND OTHER RELATED EQUIPMENT & AUX.:

1) Natural Gas System for GT & HRSG:

i) ESD valves, pressure reducing station,
ii) Gas conditioning skid consisting of Knock drum, duplex type filter separator skid etc.
iii) Condensate drain tank with submersible pumps

2) LP Dosing Skid (Hydrazine) with associated Aux., fittings & foundation parts.

3) LP Dosing Skid (Morpholine) with associated Aux., fittings & foundation parts.

5) Stainless Steel DM system with associated accessories & fittings
6) Cooling Water treatment system with associated accessories, fittings & foundation parts.
7) Hoists with BFPs

8) Pumps with Motors and associated Aux., Accessories:

a) HP Boiler Feed Pumps with Motor drives (Barrel Type)
b) LP Feed Pumps with Motor drives (Ring section Type)
c) DM water transfer pumps with Motor drives (Stainless Steel)
d) DM Water Transfer Pumps with motor drives (Stainless Steel near existing DM plant)
e) Cooling Water Pumps with Motor drives
f) Oily Water effluent disposal pumps with motor drives
g) Water effluent disposal pumps with motor drives
h) Dewatering Pumps with Motor drives

8) Deaerator with Accessories:

- Feed Storage Tank
- Deaerator Heater

- Deaerator approach Platform
- Loose Items like level gauge, stand, root valves, foundation plates / bolts

9) Gas Turbine Oil Coolers
10) Generator Air Coolers with mounting frames / ducts

APPENDIX – II
DETAILS OF QUANTITIES

(AA) ESTIMATED WEIGHT OF VARIOUS PRODUCT GROUPS OF HEAT RECOVERY STEAM GENERATOR FOR 1X33.3 MW COGENERATION POWER AND STEAM PLANT AT GNFC, BHARUCH (GUJARAT)

S.N.	PGMA	DESCRIPTION	Tentative Wt.(Kg)
a) STRUCTURES:			
1	24225	SILENCER SUPPORTS - LP	3,500.00
2	24425	SILENCER SUPPORTS - HP	3,500.00
3	35010	FOUNDATION MATERIALS-BOILER	8,000.00
4	35110	MAIN COLUMNS LEFT	25,000.00
5	35120	MAIN COLUMNS RIGHT	25,000.00
6	35131	INLET DUCT SUPPORT STRUCTURE FOR HRSG	8,000.00
7	35140	AUXILIARY COLUMNS	8,000.00
8	35220	BOILER CEILING STRUCTURE-ROLLED BEAMS	13,000.00
9	35391	MODULE TRANSPORTING STRUCTURE	12,000.00
10	35392	SINGLE MODULE LIFTING FRAME	1,500.00
11	35393	MODULE UPRIGHTING FRAME	3,500.00
12	35520	AUXILIARYCOLUMN BRACING	6,000.00
13	35591	BOTTOM BRACING BEAM	4,500.00
14	35592	TOP BRACING BEAM	6,500.00
15	35593	BASE BEAMS OR MODULE BOTTOM SUPPORT	3,500.00
16	35594	DUCT STIFFENER BEAMS	9,000.00
17	35595	LATERAL SUPPORT BEAM FRONT	5,000.00
18	35596	LATERAL SUPPORT BEAM REAR	5,000.00
19	35597	PRESSURE PART SUPPORT	5,500.00
20	35610	BOILER ROOF STRUCTURE	10,000.00
21	35611	BOILER ROOF SHEETING	4,000.00
22	36210	MAIN FLOOR 1ST LEVEL	4,000.00
23	36220	MAIN FLOOR 2ND LEVEL	4,000.00
24	36230	MAIN FLOOR 3RD LEVEL	4,500.00
25	36240	MAIN FLOOR 4TH LEVEL	7,000.00
26	36390	MISCELLANEOUS PLATFORMS	4,000.00
27	36810	FLOOR GRILLS AND GUARD PLATE	12,000.00
28	36820	STAIRS AND LADDERS	5,000.00
29	36850	HANDRAILS AND HAND RAIL POST	8,500.00
		SUB-TOTAL OF a)	**219,000.00**
b) PRESSURE PARTS INCLUDING HEAT TRANSFER MODULES:			
1	04116	BOILER DRUM WITH INTERNALS-HP	51,500.00
2	04156	DRUM SLIDE BEARING PLATES	100.00
3	04158	FASTENERS FOR DRUM SADDLE	50.00
4	04176	BOILER DRUM WITH INTERNALS-LP	10,000.00
5	07206	RISER PIPES-HP	2,000.00
6	07208	RISER PIPES-LP	1,500.00

7	07210	RISER LINKS-HP	2100
8	07211	RISER LINKS-LP	2000
9	07504	DISC SPRINGS FOR EVAP. MODULES	300.00
10	07505	EVAPORATOR MODULE SUPPORTS - HP FRONT	500.00
11	07506	EVAPORATOR MODULE SUPPORTS - HP REAR	1,500.00
12	07507	EVAPORATOR MODULE SUPPORTS - LP FRONT	500.00
13	07508	EVAPORATOR MODULE SUPPORTS - LP REAR	1,000.00
14	08910	EXPANSION MOVEMENT MEASURING COMPONENT	100
15	12850	SAT. STEAM CONNECTING LINKS(HP)	1,000.00
16	12851	MAIN STEAM LINE (HP)	3,000.00
17	12852	DE SUPERHEATER CONNECTING LINKS	3,500.00
18	12853	MAIN STEAM LINE (LP)	2,500.00
19	12900	DE SUPERHEATER	600.00
20	12901	SH. SUPPORTS & SUSPENSIONS (SAT LINK & DESH)	500.00
21	12902	SH. SUPPORTS & SUSPENSIONS (MSLINE)	500.00
22	12904	SH. SUPPORTS & SUSPENSIONS (LP SAT LINK & LP MS LINE)	300.00
23	12912	SH MODULE SUPPORTS	2,000.00
24	19101	WPH INLET LINE	500.00
25	19102	WPH OUTLET LINE	500.00
26	19850	ECONOMISER FEED PIPE (HP)	600.00
27	19851	ECONOMISER LINK TO DRUM	1,000.00
28	19852	ECO INTER CONNECTING LINKS (FRONT & MIDDLE)	400.00
29	19853	ECO INTER CONNECTING LINKS (MIDDLE & REAR)	400.00
30	19854	ECONOMISER FEED PIPE (LP)	200.00
31	19901	ECONOMISER SUPPORTS & SUSPENSIONS (HP FEED PIPE)	200.00
32	19902	ECONOMISER SUPPORTS & SUSPENSIONS (ECO LINK)	200.00
33	19904	ECONOMISER SUPPORTS & SUSPENSIONS (LP FEED PIPE)	100.00
34	19908	SUPPORTS FOR WPH LINKS	300.00
35	19911	WPH MODULE SUPPORTS	750.00
36	19912	ECO MODULE SUPPORTS(FRONT)	1,000.00
37	19913	ECO MODULE SUPPORTS(MIDDLE)	500.00
38	19914	ECO.MODULE SUPPORTS(REAR)	500.00
39	19992	IMPORTED ELECTRODES	10.00
40	19993	ERECTION MATERIALS	200.00
41	24200	TRIM PIPE & FITTING-LP	7,500.00
42	24201	TRIM PIPE SUPPORT-LP	1,200.00
43	24260	VALVES - LP	4,000.00
44	24273	DIRECT WL GAUGE-LP	300.00
45	24275	HDRS FOR TRIM PPG-LP	500.00

46	24280	SAFETY VALVES-LP	500.00
47	24400	TRIM PIPE & FITTING-HP	9,000.00
48	24401	TRIM PIPE SUPPORT-HP	2,000.00
49	24460	VALVES - HP	6,000.00
50	24465	VALVES,BELLOWS - SD	3,000.00
51	24473	DIRECT WL GAUGE-HP	300.00
52	24475	HDRS FOR TRIM PPG-HP	600.00
53	24480	SAFETY VALVES-HP	500.00
54	24994	NAME PLATES	100.00
55	80145	BDT EXHAUSTS & VENTS	3,000.00
56	80219	HP CHEMICAL DOSING	4,000.00
57	80273	BDT VALVES	100.00
58	80274	CBD TANK SAF.VALVE	100.00
59	81005	IBD TANK	1,300.00
60	81011	CBD TANK	1,300.00
61	81411	TUBULAR WL GAUGES	50.00
62	81413	VALVES & FITTINGS(SD)	150.00
63	HL101	EVAPORATOR MODULE ASSY.-HP FRONT	12,000.00
64	HL102	EVAPORATOR MODULE ASSY.-HP REAR	48,000.00
65	HL121	EVAPORATOR MODULE ASSY.-LP FRONT	8,000.00
66	HL122	EVAPORATOR MODULE ASSY.-LP REAR	24,000.00
67	HL131	SH-II MODULE ASSY	8,000.00
68	HL132	SH-I MODULE ASSY	16,000.00
69	HL151	ECO MODULE ASSY(FRONT)	34,200.00
70	HL152	ECO MODULE ASSY (MIDDLE)	15,200.00
71	HL153	ECO. MODULE ASSY(REAR)	15,200.00
72	HL171	WPH MODULE ASSY.	20,000.00
73	HL201	LINKS FOR EVAPORATOR - HP FRONT	1,000.00
74	HL202	LINKS FOR EVAPORATOR - HP REAR	3,500.00
75	HL221	LINKS FOR EVAPORATOR - LP FRONT	600.00
76	HL222	LINKS FOR EVAPORATOR - LP REAR	2,000.00
77	HL231	SH-II MODULE LINKS	1,000.00
78	HL232	SH-I MODULE LINKS	1,000.00
79	HL251	ECO MODULE LINKS (FRONT)	500.00
80	HL252	ECO MODULE LINKS (MIDDLE)	400.00
81	HL253	ECO.MODULE LINKS(REAR)	400.00
82	HL271	LINKS FOR WPH MODULES	500.00
83	HL301	MODULE COMP. FOR EVAPORATOR-HP REAR	2,000.00
84	HL321	MODULE COMP. FOR EVAPORATOR-LP REAR	1,500.00
85	HL331	SH MODULE COMPONENTS	800.00
86	HL351	ECO MODULE COMPONENTS(FRONT)	600.00
87	HL352	ECO. MODULE COMPONENTS(MIDDLE)	600.00
88	HL371	MODULE COMP. FOR WPH	1,000.00
		SUB-TOTAL OF b)	**357,910.00**
c) NON-PRESSURE PARTS:			
1	24220	SV ESCAPE PIPING-LP	5,500.00
2	24285	SV SILENCERS - LP	3,000.00
3	24290	SILENCER STARTUP - LP	1,000.00

4	24420	SV ESCAPE PIPING-HP	5,000.00
5	24485	SILENCER SAF.VALVES - HP	3,500.00
6	24490	SILENCER-START UP-HP	1,500.00
7	28700	CLADDING SHEET FIXING PINS, NUTS& WASHERS	9,500.00
8	41130	DUCT BURNER ASSY	9,000.00
9	41450	PIPE TYPE IGNITOR	75.00
10	43002	SCANNER COOLING AIR SYSTEM	750.00
11	43008	PURGE & SEAL / AUG AIR SYSTEM	400.00
12	43202	SD, SCANNER COOLING AIR SYSTEM	1,000.00
13	43208	SD, PURGE & SEAL / AUG AIR SYSTEM	100.00
14	43302	BHEL VALVES, SCANNER COOLING AIR SYSTEM	100.00
15	43308	BHEL VALVES, PURGE & SEAL / AUG AIR SYSTEM	50.00
16	48200	INSTRUMENT TAPPINGS	500.00
17	48422	HRSG INLET DUCT	26,000.00
18	48424	EXP. JOINT - INLET	500.00
19	48452	DUCT BOILER OUTLET	10,000.00
20	48454	EXP.PIECES - OUTLET	500.00
21	48482	DISTRIBUTION GRID	2,000.00
22	48700	BULKED BPS COMPONENTS	1,000.00
23	HL098	LOOSE COMPONENTS- DUCT	10,000.00
24	HL501	SIDE CASING S1 - S2	4,500.00
25	HL502	SIDE CASING S2-S3	4,500.00
26	HL503	SIDE CASING S3 - S4	4,500.00
27	HL504	SIDE CASING S4 - S5	4,500.00
28	HL505	SIDE CASING S5 – S6	4,500.00
29	HL506	SIDE CASING S6 – S7	4,500.00
30	HL601	TOP & BOTTOM CASING S1 - S2	4,500.00
31	HL602	TOP & BOTTOM CASING S2- S3	4,500.00
32	HL603	TOP & BOTTOM CASING S3 - S4	4,500.00
33	HL604	TOP & BOTTOM CASING S4 - S5	4,500.00
34	HL605	TOP & BOTTOM CASING S5 – S6	4,500.00
35	HL606	TOP & BOTTOM CASING S6 – S7	4,500.00
		SUB-TOTAL OF c)	**144,975.00**
d) INSULATION:			
1	32010	CLADDING SHEET INLET DUCT	3,500.00
2	32055	EXTERNAL INSULATION -PIPING	7,000.00
3	32110	CLADDING SHEET - S1 TO S2	2,000.00
4	32120	CLADDING SHEET - S2 TO S3	2,000.00
5	32210	CLADDING SHEET - S3 TO S4	2,000.00
6	32310	CLADDING SHEET - S4 TO S5	2,000.00
7	32410	CLADDING SHEET - S5 TO S6	2,000.00
8	32510	CLADDING SHEET - S6 TO S7	2,000.00
9	32810	CLADDING SHEET - OUTLET DUCT	2,000.00
10	32993	ERECTION MATERIALS	2,000.00
11	33021	CERAMIC WOOL	60,000.00

12	33621	MINERAL WOOL FOR PIPING	16,500.00
13	33970	WIRE MESH	5,000.00
14	33975	SEALING COMPONENTS	100.00
15	37810	OUTER CASING SHEET-PIPING	6,000.00
16	87950	CHIMNEY INSULATION	3,400.00
17	87960	CHIMNEY INSULATION - FIXING COMPONENTS	2,000.00
18	--------	INSULATION & CLADDING FROM BHEL HYD	5,500.00
		SUB-TOTAL OF d)	**125,000.00**
e) CHIMNEY:			
1	87010	FOUNDATION MATERIAL	6,000.00
2	87100	CHIMENY SHELL	81,500.00
3	87150	CHIMNEY STRAKES	170,000.00
4	87200	PAINTER'S TROLLEY (STAINLESS STEEL)	1,100.00
5	87300	PALTFORMS & LADDERS	8,000.00
6	87930	AVIATION LAMPS & LIGHTNING ARRESTOR	1,000.00
		SUB-TOTAL OF e)	**267,600.00**
f) PIPING:			
f.1	**INTEGRAL PIPING BHEL TRICHY SCOPE OF SUPPLY**		
1	41988	COMMISSIONING SPARES, BURNER	50.00
2	42070	BURNER FLOOR SKIDS	2,750.00
3	42155	PIPING, OPRG FLOOR - IGNITOR GAS	1,000.00
4	42156	PIPING, OPRG FLOOR - FUEL GAS	4,000.00
5	42255	SD, OPRG FLOOR PIPING - IGNITOR GAS	300.00
6	42256	SD, OPRG FLOOR PIPING - FUEL GAS	1,000.00
7	42270	SD, BURNER FLOOR SKIDS	750.00
8	42355	BHEL VALVES, OPRG FLOOR PIPING - IGNITOR GAS	50.00
9	42356	BHEL VALVES, OPRG FLOOR PIPING - FUEL GAS	100.00
10	80600	HP DOSING PIPING	2,000.00
		SUB-TOTAL OF f.1	**12,000.00**
f.2	**PIPING (FIELD PIPING / EXTERNAL PIPING / POWER CYCLE PIPING BHEL HYDERABAD SCOPE OF SUPPLY**		
a.	CARBON STEEL PIPING WITH VALVES, FITTINGS, SUPPORTS		20,000.00
b.	ALLOY STEEL PIPING WITH VALVES, FITTINGS, SUPPORTS		40,000.00
c.	STAINLESS STEEL PIPING WITH VALVES, FITTINGS, SUPPORTS		20,000.00
		SUB-TOTAL OF f.2	**80,000.00**
TOTAL OF INTEGRAL PIPING BHEL TRICHY AND BHEL HYDERABAD SCOPE OF SUPPLY (f.1+f.2)			**92,000.00**
		Grand Total of (a+b+c+d+e+f)	**1,206,485.00**

(BB) **TENTATIVE TOTAL WEIGHT OF HRSG WITH AUX., STEEL STACK WITH AUX., GT WITH AUX., BYPASS STACK, GAS TURBINE GENERATOR WITH AUX., BALANCE OF PLANT EQUIPMENTS WITH AUX., PUMPS, MOTORS, DEAEARTOR, TANKS, VESSELS, PIPING WITH FITTINGS, SUPPORTS, THERMAL INSULATION & CLADDING, CONSUMABLES, ELECTRICAL EQUIPMENETS WITH ACCESSORIES, SWITCHGEARS, BUSDUCT, CONTROL & INSTRUMENTATION ITEMS, PANELS, CABLE, CABLE TRAYS, STRUCTURAL MATERIALS AND OTHER PLANT MATERIALS AND ALL OTHER T&P MATERIALS INCLUDING THE HEAVY & VOLUMINOUS EQUIPMENTS LIKE HRSG DRUMS, GAS TURBINE, GAS TURBINE GENERATOR,**

GENERATOR TRANSFORMER, STATION TRANSFORMERS, LT AUX. TRANSFORMERS MATERIALS ETC. FOR RECEIPT / COLLECTION, UNLOADING, HANDLING, STACKING, VERIFICATION AND MATERIAL MANAGEMENT SERVICES ETC. OF 1X33.3NMW COGENERATION POWER AND STEAM PLANT AT GNFC BHARUCH : 2800 MT

(CC) TENTATIVE WEIGHT SCHEDULE AND DIMENSION OF VARIOUS EQUIPMENTS / ITEMS OF GAS TURBINE WITH AUX., GAS TURBINE GENERATOR WITH AUX., BALANCE OF PLANT (MECHANICAL) AND OTHER RELATED EQUIPMENTS & AUX., INTTEGRAL PIPING WITH VALVES / FITTINGS / SUPPORTS FOR ERECTION & COMMNG. OF 1X33.3NMW COGENERATION POWER AND STEAM PLANT AT GNFC BHARUCH

a)
SHIPPING WEIGHTS AND DIMENSION FOR 1XFr 6 GAS TURBINE, DUCTING AUXILIARIES AND INTEGRAL PIPING:

S.N.	DESCRIPTION	DIMENSIONS (LXBXH) (m)	WT (MT)	WT (Kg)
1	GAS TURBINE PACKAGE (FLANGE TO FLANGE)	7.38x3.6x3.93	68.00	68,000.00
2	LOAD COUPLING	2.1x0.6x0.75	0.30	300.00
3	ACCESSORY BASE	6.0x3.0x5.0	31.00	31,000.00
4	LOAD COUPLING GUARD	2.2x1.5x1.0	0.22	220.00
5	ACCESSORY COUPLING	1.5x0.5x0.5	0.10	100.00
6	ACCESSORY COUPLING GUARD	1.5x0.6x0.6	0.05	50.00
7	GT WALKWAY+LADDERS (WALKWAY IS SPLIT INTO PIECES)	3.0X1.0X1.5	1.50	1,500.00
8	CO2 BOTTLE RACKS-1	2.0X1.0X1.0	5.00	5,000.00
9	CO2 BOTTLE RACKS-2	2.0X1.0X1.0	2.00	2,000.00
10	MAIN FILTER HOUSE (WILL BE SHIPPED IN LOOSE)	6.0X3.0X3.5	60.00	60,000.00
11	TURBINE VENT FANS (8NOS. BEING SUPPLIED IN LOOSE APPROX. 16 BOXES)	2.5X2.5X2.0	4.50	4,500.00
12	AIR PROCESSING SKID	3.0X1.0X2.5	1.00	1,000.00
13	APU COOLER	3.0X0.5X2.0	0.50	500.00
14	COMPRESSOR WATER WASHING SKID	6.5X3.0X3.2	5.00	5,000.00
15	LUBE OIL CENTRIFUGE	3.0X1.5X1.8	1.50	1,500.00
16	FIELD INTER CONNECTION PIPING	6.0X3.5X3.0	10.00	10,000.00
17	FOUNDATION BOLTS & MISC. HARDWARE		5.00	5,000.00
18	GT-OFF BASE ENCLOSURES (WILL BE SHIPPED IN LOOSE)	7.0X3.0X3.0	75.00	75,000.00
19	GAS VALVE MODULE	6.0X3.6X5.0	8.00	8,000.00
20	EXHAUST FRAME BLOWERS (2 Nos.)	3.0X3.0X1.5	2.00	2,000.00
21	**INLET DUCTING:**			

a.	INLET DUCT TRANSITION PIECES	4.0X4.0X3.0	25.00	25,000.00
b.	INLET DUCT EXPANSION PIECES	4.0X0.5X4.0		
c.	INLET DUCT ELBOW NO. 1	4.0X4.0X4.0		
d.	INLET DUCT ELBOW NO. 2	4.0X4.0X4.0		
e.	SILENCER	4.0X2.0X3.0		
f.	STRAIGHT DUCT NO. 1	4.0X3.0X3.0		
g.	STRAIGHT DUCT NO. 2	4.0X3.0X3.0		
h.	SUPPORT STRUCTURE	6.0X3.0X3.0		
22	**EXHAUST DUCTING :**			
a.	EXPANSION JOINT (TOTAL 4)	4.4X4.0X3.0	1.20	1,100.00
b.	SILENCER DUCT SL1	4.7X5.1X3.2	10.17	10,173.00
c.	SILENCER DUCT SL2	4.3X4.7X1.6	5.12	5,118.00
d.	DIVERTER DAMPER	4.4X4.0X4.0	18.00	18,000.00
e.	GUILLOTINE DAMPER	6.0X4.0X4.0	10.00	10,000.00
f.	HORIZONTAL DUCT D1	4.5X4.1X3.85	9.73	9,732.00
g.	HORIZONTAL DUCT H1	4.1X2.5X2.8	4.65	4,653.00
h.	HORIZONTAL DUCT D5	3.9X3.9X0.6	1.83	1,827.00
i.	HORIZONTAL DUCT D6	4.1X4.1X1.1	2.92	2,918.00
j.	TRANSIT DUCT D2	4.7X4.3X2.6	5.14	5,139.00
k.	TRANSIT DUCT D3	4.5X4.3X2.1	4.10	4,102.00
l.	VERTICAL DUCT VD8 (4 NOS.)	4.3X4.3X3.35	18.64	18,640.00
m.	VERTICAL DUCT VD9	4.5X4.5X3.4	5.01	5,009.00
23	STACK SUPPORT STRUCTURE (COLUMNS BEAM, ANGLES)		15.00	15,000.00
24	GD & GFD SEAL AIR FAN ASSY	3.0X2.0X2.0	1.00	1,000.00
25	MISC. ITEM (LADDERS, PLATFORM, BOLTS)		4.00	4,000.00
26	LUBE OIL MIST ELIMINATOR	1.5X1.5X1.0	1.00	1,000.00
		TOTAL WT	**423.20**	**423,201.00**

b) GAS TURBINE GENERATOR & AUX:

S.N.	DESCRIPTION	DIMENSION L X B X H (IN MM)	APPROX. WT (MT)	APPROX. WT (KG)
1	GENERATOR PACKAGE COMPRISING OF STATOR,ROTOR, BRGS (2 Nos.), EXCITER (OH)	7400x3150x2850	87.00	87,000.00

2	AIR COOLER DUCT	6000X1700X2400	5.00	5,000.00
3	GENERATOR ENCLOSURE	AS PANELS	7.00	7,000.00
4	FOUNDATION ITEMS	LOOSE ITEMS	6.00	6,000.00
5	STAIRCASE	1000 X 1125 X 600 – 4 Nos.	4.00	4,000.00
6	EXCITER	1845 X 1500 X 1160	2.00	2,000.00
		TOTAL WT.	**120.00**	**120,000.00**

C) BALANCE OF PLANT EQUIPMENTS, PUMPS WITH AUX. AND OTHER RELATED EQUIPMENT & AUX.:

S.N.	ITEM DESCRIPTION	QTY	DIM. (LXBXH) IN METERS	WEIGHT OF EACH (MT)	TOTAL WEIGHT
1	**Natural Gas System for GT :**				
i)	Gas Conditioning skid consisting of knock-out drum, duplex type filter separator skid etc.	1	7.0x3.5x4.0	8.000	8.00
ii)	Scrubber skid for HRSG	1	3.5x3.5x4.0	3.000	3.00
iii)	Fuel Gas Condensate drain tank with submersible drain pumps	1	Dia 2.0x4.0	2.000	2.00
2	**Feed Water System :**				
i)	HP Boiler Feed Pumps with motor drive (Barrel type)	2	6.0x2.2x2.0	10.000	20.00
ii)	LP Dosing skid (Hydrazine)	1	4.75x1.75x1.5	5.000	5.00
iii)	LP Dosing skid (Ammonia)	1	4.75x1.75x1.5	5.000	5.00
iv)	LP Feed Water Pumps	2	2.5x1.75x1.25	2.000	4.00
3)	**Make-Up Water System :**				
i)	DM water transfer Pumps (Stainless steel)	2	2.2x1.0x1.0	1.200	2.40
ii)	DM water transfer Pumps (Stainless steel) near existing DM Plant	2	2.0x1.0x0.75	1.000	2.00
4	**Cooling Water System :**				
i)	Cooling water Pumps with motor drive	2	1.85x1.016x0.75	2.950	5.90
ii)	Cooling water treatment system	1	10x5x5	2.000	2.00
5	**Heat Exchanger Details :**				
a)	**Deaerator :**				
i)	Feed Storage Tank			17.000	17.000
ii)	Deaerator Heater			8.500	8.500
iii)	Deaerator Platform (Structural Steel)			3.500	3.500
iv)	Loose Items			2.000	2.000
b)	**Gas Turbine Oil Coolers :**				
i)	Gas Turbine Oil Coolers	2	3x0.8x0.8	1.500	3.00

c)	**Generator Air Coolers :**				
i)	Generator Air Coolers	6	3x0.67x0.63	1.500	9.00
ii)	Loose Items			0.500	0.500
6	**Maintenance Equipment :**				
i)	Hoists for BFPs	2		2.000	4.00
7	**Effluent System :**				
i)	Oily water effluent disposal Pumps	2	0.75x0.75x05	2.000	4.00
ii)	Water effluent disposal Pumps	2	0.75x0.75x05	2.000	4.00
8	**Miscellaneous Equipment**				
i)	Dewatering Pumps	2	0.5x0.5x0.6	0.025	0.05
			Total Weight		**94.45**

NOTE:

1. WEIGHT AND DIMENSIONS ARE APPROXIMATE.

2. WEIGHT OF VALVES, FITTINGS, SUPPORTS ETC. ARE INCLUDING IN WEIGHT OF PIPING (FOR ALL C.S. A.S. AND S.S.) OF RESPECTIVE SCHEME / SYSTEMS OF PIPING OF. THE SITE WELDING OF SITE WELD JOINTS AND NDT/PRE-POST HEAT TREATEMNT REQUIREMENTS BOTH FOR IBR & NON-IBR, CS, AS & SS PIPINGS/SYSTEM SHALL BE AS PER BHEL DRAWINGS/DOCUMENTS AND SITE REQUIREMENT
3. DM WATER PIPING, CHEMICAL DOSING PIPING AND SOME FUEL/OIL PIPING ARE OF STAINLESS STEEL
4. BESIDES PRODUCT GROUPS INDICATED ABOVE, THERE IS LIKELIHOOD OF ADDITION OF NEW PRODUCT GROUPS BY BHEL's UNIT FOR RELEASE OF SOME ITEMS, INTEGRAL TO THIS WORK. TENDERERS' QUOTED UNIT RATES SHALL BE APPLICABLE FOR SUCH PRODUCT GROUPS ALSO.
5. BHEL's DECISION WITH REGARD TO CLASSIFICATION OF A PARTICULAR PRODUCT GROUP IS BINDING ON THE CONTRACTOR.
6. BESIDES THE ABOVE, WEIGHT & OF ALL TEMPORARY PIPING, VALVES, PUMPS, TANKS AND OTHER MISCELLANEOUS EQUIPMENTS ETC. FOR CARRYING OUT HYDRAULIC TEST, CHEMICAL CLEANING, STEAM BLOWING AND OTHER TESTS, AS STATED ELSEWHERE WILL GET ADDED.

APPENDIX-III

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

SL.NO.	DESCRIPTION & CAPACITY OF T&P	QUANTITY	REMARKS
01	STEAM BLOWING VALVE SET WITH ACTUATOR	1 SET	
02	PIPING, VALVES & FITTINGS, SUPPORTING STRUCTURES, PLATES/ TANKS FOR TEMPORARY SYSTEMS FOR HYD TEST, CHEMICAL CLEANING, STEAM BLOWING ETC.	1 SET	TO SUIT SITE REQUIREMENT.
03	CHEMICAL CIRCULATING PUMPS FOR CHEMICAL CLEANING OF MAJOR / BIGGER SIZE OF PIPING	2 SETS OR (AS SUITABLE)	AS PER SITE REQUIREMENT

APPENDIX-IV

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

A: TOOL & PLANTS

SL. NO.	DESCRIPTION OF EQUIPMENTS	CAPACITY	MINIMUM QUANTITY
01	CRAWLER CRANE WITH SUITABLE BOOM LENGTH AND JIB TO FACILITATE ERECTION OF HRSG MODULES, DRUMS, STEEL STACK / CHIMNEY. AND GT BYPASS STACK AND OTHER GTG & BOP EQUIPEMENTS ERECTION & HANDLING OF HEAVY EQUIPMENTS AT SITE	120-150 T or Higher Capacity as per requirement	1 NO.
02	TYRE MOUNT / CRAWLER CRANE FOR MATERIAL HANDLING	25 T	1 NO.
03	HYDRA (MOBILE PICK AND CARRY) CRANE FOR MATERIAL HANDLING AND ERECTION WORK	10-12 T	2 NOS.
04	JACKS WITH SLEEPERS / OTHER SUITABLE ARRANGEMENTS FOR UNLOADING AND HANDLING OF GAS TURBINES, GAS TURBINE GENERATORS, TRANSFORMERS	AS PER REQUIREMENT	AS REQUIRED
05	CONCRETE /WOODEN SLEEPERS FOR MATERIAL HANDLING (ASSORTED SIZE 6 FEET LENGTH) FOR MAREIAL HANDLING	300 Nos.	100Nos. WITHIN 1ST MONTH AND BALANCE BY 6TH MONTH FROM DATE OF REPORTING AT SITE
06	TRAILER WITH HORSE	15 TON / 20 TON	01
07	AIR COMPRESSOR (ELECTRIC)	140 CFM	01
08	TIG WELDING SET	-	4 SETS, AS PER REQUIREMENT
09	3 ph DISTRIBUTION BOARD WITH COMPLETE SET UP FOR DRAWL OF CONSTRUCTION POWER & FITTED WITH ENERGY METER	200 Amps-2 Sets, 400 Amp-2 Sets	4 SETSM AS PER REQUIREMENT
10	PRE HEATING / STRESS RELIEVING SET (HEATING CONTROL PANEL, CABLES, HEATING ELEMENTS ETC.)	AS PER REQUIREMENT	3 SETS, AS PER REQUIREMENT
11	RADIOGRAPHY ARRANGEMENT INCLUDING THE SOURCE	IR 192	2 SETS, AS PER REQUIREMENT
12	ELECTRO-HYDRAULIC PIPE BENDING MACHINE	FOR UP TO 100 mm Nb PIPES	AS PER SITE REQUIREMENT
13	WELDING GENERATOR (ELECTRIC & DIESEL)	300 AMPS	AS REQUIRED
14	RADIOGRAPHY FILM VIEWER	AS PER REQMT	1 NO.
15	ELECTRIC WINCH	3 TON / 2 TON	AS PER REQMNT
16	HAND WINCH	1 TON	-DO-

17	ELECTRIC CABLE FOR DRAWAL & DISTRIBUTION OF CONSTRUCTION POWER	AS PER SITE REQUIREMENT	AS PER SITE REQUIREMENT
18	PIPE BENDING MACHINE – HAND OPERATED	UP TO 50 mm Nb PIPES	AS PER SITE REQUIEREMENT
19	BAKING OVEN AND HOLDING OVEN WITH THERMOSTAT AND TEMPERATURE GAUGE FOR BAKING COATED WELDING ELECTRODES	AS PER REQUIREMENT	01 EACH
20	PORTABLE OVEN FOR COATED WELDING ELECTRODES	AS PER REQUIREMENT	15
21	ELECTRIC MOTOR DRIVEN HYDRAULIC TEST PUMP WITH DRIVE AND STARTER ETC.	250 Kg/Cm^2	1 NO.
22	MIXER FOR GROUTING OF EQUIPMENT FOUNDATIONS	AS PER REQUIREMENT	AS PER REQUIREMENT
23	VACUUM CLEANER (INDUSTRIAL)	AS PER REQUIREMENT	AS PER REQUIREMENT
24	24V TRANSFORMERS	24 V OUTPUT	4 NOS.
25	JACKING BOLTS / PRESSOUT BOLTS OF ALL SIZES	AS PER REQUIREMENT	AS PER REQUIREMENT
26	GANG OPERATED AND HAND OPERATED HYDRAULIC JACKS WITH SUFFICIENT LONG HOSES OF VARIOUS CAPACITIES FOR GT, AND GTG, GENERATOR TRANSFORMER ETC.	50 MT, 100 MT ADEQUATE NOS.	AS PER REQUIREMENT
27	TORQUE WRENCH 0 TO 200 N-M CAP	AS PER REQUIREMENT	AS PER REQUIREMENT
28	SLINGS OF VAROIUS CAPACITY AND QUANTITIES FOR HANDLING OF EQUIPMENTS	AS PER REQUIREMENT	AS PER REQUIREMENT
29	BOLT STRETCHING DEVICE	AS PER REQUIREMENT	AS PER REQUIREMENT
30	FEELER GAUGE S OF VARIUOS SIZES	AS PER REQUIREMENT	AS PER REQUIREMENT
31	SPANNERS / EYE BOLTS (OF ALL SIZES)	AS PER REQUIREMENT	AS PER REQUIREMENT
32	ANY OTHER MAJOR T&P REQUIRED FOR SATISFACTORY COMPLETION OF THE WORKS.	AS PER REQUIREMENT	AS PER REQUIREMENT

B: MEASURING AND MONITORING DEVISES (MMD):

AS PER REQUIREMENT TO BE FINALIZED AT SITE.

NOTE :

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

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

SN	CATEGORY	MONTHS											
		1	2	3	4	5	6	7	8	9	10	11	12
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												

SIGNATURE OF TENDERER

DATE:

APPENDIX–VI

FORMAT FOR DEPLOYMENT PLAN FOR MAJOR TOOLS AND PLANTS

SL. NO.	DESCRIPTION & CAPACITY OF T&P	MONTHS											
		1	2	3	4	5	6	7	8	9	10	11	12
01													
02													
03													
04													
05													
06													
07													
08													
09													
10													

SIGNATURE OF THE TENDERER

DATE:

APPENDIX-VII
CONCURRENT COMMITMENTS

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

SIGNATURE OF THE TENDERER

DATE:

APPENDIX-VIII

ANALYSIS OF UNIT RATE QUOTED

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

SIGNATURE OF THE TENDERER

DATE:

APPENDIX–IX

DETAILS OF SIMILAR WORK DONE DURING THE LAST SEVEN YEARS

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

SIGNATURE OF TENDERER WITH SEAL

- PLEASE USE ADDITIONAL SHEET IF NEEDED **IN THE SAME FORMAT.**
- PLEASE ENCLOSE COPIES OF WORK ORDERS INCLUDING DETAILED BILL OF QUANTITIES, COMPLETION CERTIFICATES IN SUPPORT OF THIS STATEMENT.

APPENDIX-X

FORMAT FOR MONTH-WISE DEPLOYMENT PLAN **FOR MATERIALS MANAGEMENT SERVICES**
(CATEGORY-WISE NUMBERS PROPOSED TO BE DEPLOYED TO BE INDICATED FOR EACH MONTH)
***USE ADDITIONAL SHEETS TO COVER THE TOTAL CONTRACT PERIOD**

Sl. No.	Service Category	Months												
		1	2	3	4	5	6	7	8	9	10	11	12	SO ON*
01	Supervision													
02	Record Keeping													
03	Preservation													
04	Secretarial & Other Misc Services													
	Month Wise Total													

DATE **SIGNATURE & SEAL OF BIDDER**