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

NO. BHE/PW/PUR/IOC-MM&HRSG/530

FOR

RECEIPT / COLLECTION, UNLOADING, HANDLING, STACKING, VERIFICATION OF ENTIRE PROJECT MATERIALS OF GT & HRSG, ELECTRICAL AND C&I EQUIPMENTS, CIVIL REINFORCEMENT & STRUCTURAL STEEL AND OTHER MATERIALS RELATED TO PLANT IN BHEL / CUSTOMER'S STORES/STORAGE YARD AS RECEIVED BY ROAD FROM MANUFACTURING UNITS / TRANSPORTERS GODOWN UNDER MATERIALS MANAGEMENT, RECEIPT / COLLECTION / LOADING/ UNLOADING / TRANSPORATION OF MATERIALS FROM BHEL / CLIENT'S STORES/STORAGE YARDS TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING, APPLICATION OF THERMAL INSULATION, FINAL PAINTING, CO-GENERATION OPERATION AND HANDING OVER OF 2X100 TPH SUPPLIMENTARY FIRED HEAT RECOVERY STEAM GENERATOR WITH INTEGRAL PIPING AND THEIR AUXILIARIES, INLUDING CHIMNEY WITH INSULATION ETC. FOR 2x30 MW, EPCC PACKAGE-7(GTG & HRSG), RESIDUE UPGRADATION AND MS/HSD QUALITY IMPROVEMENT (IRUP), IOCL, GUJARAT REFINERY, JAWAHAR NAGAR, VADODARA

AT

INDIAN OIL CORPORATION LIMITED
GUJARAT REFINERY, JAWAHAR NAGAR
VADODARA (GUJARAT)

PART I

TECHNICAL BID SPECIFICATIONS
&
NOTICE INVITING TENDER, REVERSE AUCTION PROCEDURE, GCC

BOOK NO.

BHARAT HEAVY ELECTRICALS LIMITED
(*A GOVERNMENT OF INDIA UNDERTAKING*)
POWER SECTOR - WESTERN REGION
BHEL-PSWR-NAGPUR
Tender Specification BHE/PW/PUR/IOC-MM&HRSG530

C O N T E N T S

SN	DESCRIPTION	SECTION/ APPENDIX NO.	NO. OF PAGES
21.	INSURANCE	SECTION-14	2
22.	EMD AND SECURITY DEPOSIT	SECTION-15	2
23.	LIST OF TENTATIVE SCOPE OF EQUIPMENTS / SSYTEM COVERED UNDER THE TENDER SPECIFICATION	APPENDIX-I	7
24.	DETAILS OF QUANTITIES FOR ERECTION AND COMMISSIONING SCOPE WORK	APPENDIX-II	15
25.	LIST OF T&P TO BE PROVIDED BY BHEL FREE OF CHARGE ON SHARING BASIS	APPENDIX-III	1
26.	MAJOR TOOL & PLANTS & MMD TO BE DEPLOYED BY THE CONTRACTOR	APPENDIX-IV	2
27.	FORMAT FOR MONTHWISE MANPOWER DEPLOYMENT PLAN	APPENDIX-V	1
28.	FORMAT FOR DEPLOYMENT PLAN FOR MAJOR TOOL & PLANTS OF CONTRACTOR	APPENDIX-VI	1
29.	CONCURRENT COMMITMENTS	APPENDIX-VII	1
30.	ANALYSIS OF UNIT RATE	APPENDIX-VIII	1
31.	DETAILS OF SIMILAR WORK DONE IN LAST SEVEN YEARS	APPENDIX-IX	1
32.	**CUSTOMER REFERNCE DOCUMENTS REGARDING SITE SAFETY AND STAUTORY REQUIREMENTS WITH GENERAL RULES & REGULATION, GROUTING, PAINTING, CHEMICAL CLEANING**	APPENDIX-X, X1,XII,XIII, AND XIV	**#**
33.	**RATE SCHEDULE** (PART-II: PRICE BID)		**@**

$: ATTACHED AT THE END OF HARD COPY OF TENDER SPECIFICATION. HOSTED IN WEB PAGE AS FILE TITLED “NIT+RA+GCC-530”

: APPENDICES X, XI, XII, XIII, AND XIV ARE IN SERIAL ORDER IN HARD COPY OF TENDER SPECIFICATION. HOSTED IN WEB PAGE AS SEPARATE FILES

@: ISSUED AS A SEPARATE BOOKLET AS HARD COPY. HOSTED IN WEB PAGE AS FILE TITLED “PRICE BID-530”.

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

TENDER SPECIFICATION NO. **NO. BHE/PW/PUR/IOC-MM&HRSG/530**

NAME OF THE WORK : RECEIPT / COLLECTION, UNLOADING, HANDLING, STACKING, VERIFICATION OF ENTIRE PROJECT MATERIALS OF GT & HRSG, ELECTRICAL AND C&I EQUIPMENTS, CIVIL REINFORCEMENT & STRUCTURAL STEEL AND OTHER MATERIALS RELATED TO PLANT IN BHEL / CUSTOMER'S STORES/STORAGE YARD AS RECEIVED BY ROAD FROM MANUFACTURING UNITS / TRANSPORTERS GODOWN UNDER MATERIALS MANAGEMENT, RECEIPT / COLLECTION / LOADING/ UNLOADING / TRANSPORATION OF MATERIALS FROM BHEL / CLIENT'S STORES/STORAGE YARDS TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING, APPLICATION OF THERMAL INSULATION, FINAL PAINTING, CO-GENERATION OPERATION AND HANDING OVER OF 2X100 TPH SUPPLIMENTARY FIRED HEAT RECOVERY STEAM GENERATOR WITH INTEGRAL PIPING AND THEIR AUXILIARIES, INLUDING CHIMNEY WITH INSULATION ETC. FOR 2x30 MW, EPCC PACKAGE-7(GTG & HRSG), RESIDUE UPGRADATION AND MS/HSD QUALITY IMPROVEMENT (IRUP), IOCL, GUJARAT REFINERY, JAWAHAR NAGAR, VADODARA (GUJARAT)

EARNEST MONEY DEPOSIT RS.2, 00,000.00 (RS.TWO LAKHS ONLY)

LAST DATE AND TIME FOR
RECEIPT OF OFFERS

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

M/s. ……
……

……...

(THESE TENDER DOCUMENTS ARE NOT TRANSFERABLE)

FOR BHARAT HEAVY ELECTRICALS LIMITED

Dy. GEN. MANAGER (PURCHASE)

PLACE: NAGPUR
DATE :

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

PROCEDURE FOR SUBMISSION OF SEALED TENDERS

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

Part-I (Technical Bid) cover-I:

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

EARNEST MONEY DEPOSIT (EMD)

EMD shall be included in the Technical Bid. **EMD shall be paid by bidders only in the form of account payee Demand Draft payable at Nagpur in favour of Bharat Heavy Electricals Limited.** No other mode of payment of EMD shall be acceptable.

Bidder may opt to deposit "One Time EMD" of Rs. 2.0 lacs with this office (BHEL:PSWR:Nagpur) which will enable them to participate in all the future tender enquiries in respect of Erection and Commissioning services issued from this office. Interested bidders may clearly send their consent for converting the present EMD into an "One Time EMD" in their offer.

Bidders who have already submitted such "One Time EMD" will be exempted from submission of any EMD for this tender. However bidder shall furnish details of the "One Time EMD" in his offer including the Check List furnished herein.

Part-II (Price Bid) cover-II:

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

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

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

TENDERER ARE REQUESTED TO MAKE SPECIFIC NOTE OF THE FOLLOWING

CONDITIONS:

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

2. CONTRACTOR SHOULD HAVE SOUND FINANCIAL STABILITY.

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

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

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

1 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.

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

PROJECT INFORMATION

1.0.0 INTRODUCTION, *LOCATION & FEATURES OF SITE*

Bharat Heavy Electricals Ltd. has received a turnkey contract to set up a 2 X 30 MW, GTG based Co-generation Plant from Customer (M/s. Indian Oil Corporation Limited) who is setting up " RESIDUE UPGRADATION AND MS & HSD QUALITY IMPROVEMENT FACILITIES **(IRUP)** PROJECT at their existing IOCL, Gujarat Refinery, Jawahar Nagar, Vadodara (Gujarat, Pin Code-391320) premise. The project being installed under these specification is in their existing project premise and M/s Indian Oil Corporation Ltd. has appointed M/s. Toyo Engineering India Ltd. as their Project Management Consultant (PMC)

The project name as " EPCC-7 Package comprises of the GT & HRSG Units.

The proposed project site is located at a distance 10 KM from Vadodara City. The nearest railway station is Vadodara (Gujarat). The nearest airport is at Vadodara, which is approx. 15 KM away from the site.

Site ambient condition informations:

1.Barometric Pressure:

(i)Normal :1008.2 mbar
(ii)Minimum :1000.7mbar
(iii)Maximum:1013.2mbar

2. Site elevation:37.7meters above the sea level

3.Ambient Temperature:

(i) Minimum Temperature (winter dry bulb):4.4Degree Centigrade
(ii) Maximum Temperature (Summer dry bulb):46.7DegreeCentigrade

(iii) Relative humidity:21%
(iv) Relative humidity:89%

4.Rain Fall:Maximumrainfall:77mm (rainy season is from July to September)

5. Wind Speed experienced during a cyclone in November 1982:
125Km/Hr. for 2 Hours, 90 Km/Hr.; average N-W (320 degree N)

Wind Velocity (gust wind):
Max.61 Km/Hr.

(i) 20-61 Km/Hr.-4 days annually
(ii) 1-19 Km/Hr.-289 days annually

(iii) Under 1 Km/Hr.-72 days annually

Above information furnished are for general guidance of Contractor. Contractor is advised to visit the site and appraise himself about the conditions of site and infrastructure available in the area for fulfilling their commitments under the contract.

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 30 DAYS FROM FAX LOI)		
6	WHETHER NO DEVIATION CERTIFICATE FURNISHED	YES	NO
7	TENDERER HAS VISITED THE PROJECT SITE AND ACQUAINTED WITH THE SITE CONDITIONS	YES	NO
8	DETAILS OF CONCURRENT JOBS ARE FURNISHED (AS PER APPENDIX-VII)	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 (APPENDIX–V) IS FURNISHED	YES	NO
16	MONTHWISE DEPLOYMENT PLAN FOR MAJOR T&P (APPENDIX-VI) IS FURNISHED	YES	NO
17	ANALYSIS OF UNIT RATES QUOTED (APPENDIX –VIII) IS FURNISHED	YES	NO

18	POWER OF ATTORNEY ENCLOSED IN FAVOUR OF PERSON MAKING OFFER.	YES	NO
19	DETAILS OF SIMILAR WORK DONE IN LAST SEVEN YEARS AS PER APPENDIX – IX 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

NOTE : STRIKE OFF YES OR NO, AS APPLICABLE

DATE : SIGNATURE OF TENDERER

DECLARATION SHEET

I, HEREBY CERTIFY THAT ALL THE INFORMATION AND DATA FURNISHED BY ME WITH REGARD TO THIS TENDER SPECIFICATION NO.BHE/PW/PUR/IOC-MM&HRSG/530 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/IOC-MM&HRSG/530**

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
Shree Mohini 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/IOC-MM&HRSG/530** for 2x30MW, EPCC Package-7(GTG&HRSG), Residue Upgradation and MS/HSD quality improvement (IRUP), IOCL, Gujarat Refinery, Jawahar Nagar, Vadodara (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 under these specification for Material Handling & Materials Management services and Erection, Welding, Alignment, Testing, Commissioning, Chemical Cleaning/Flushing, Final Painting and Handing over of 2x30 MW GTG Based Co-gen, IOCL (IRUP), Gujarat Refinery, Vadodara Project shall broadly be as under:

A) 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 2x100 TPH Supplementary Fired Heat Recovery Steam Generator and their auxiliaries, Insulation, Chimney and field & Power Cycle Piping, 2x30MW Fr-6 Gas Turbines, Gas Turbine-Generators with their Auxiliaries including Bypass Stack, Gas Turbine Filter, Deaerators with FST, LP Dosing system, Naphta Filter Skids, HSD Filter Skids, Hitech Additive Skids, Naphta Tanks, HSD Tanks, HSD Fuel forwarding Skids, Drain Tanks, Gas Conditioning Skids, Gas Filter Skids, SWAS system, Naphta Colesecnt Skids, Water Injection Skids, IBD & CBD Tanks, Heat Exchangers, DM Water Circulating Pump Skids, HSD Centrifuge, Compressor water wash Skids, Diverter Dampers, Electrical and Control & Instrumentation Equipments & items likes, Station Transformers, Generator Transformers, Unit Aux. Transformers, 6.6 KV & 11KV & 33 KV Switchgear Systems/Panels and other related system Panels/cubicles/control panels, other related items like Cable, Cable Trays, Electrical Fittings etc. and Reinforcement & Structural Steel materials supplied by BHEL units, their sub-vendors, bought-out items, any other material like BHEL's T&P, furniture etc.

B) Receipt/collection/loading/ unloading/ transportation of materials from BHEL/client's stores /storage yards to site of work, erection, testing, commissioning, Chemical cleaning/Flushing, Alkali Boil out, Steam Blowing, Safety Valve Floating and Final painting of 2x100TPH Supplementary Fired HRSGs with their auxiliaries including Chimney, application of insulation, including assembly, fit up, welding, NDT/ radiography/ pre-heat treatment/post-heat treatment requirement, supporting of field piping, Integral piping and associated Aux. piping etc.

4.1.1 Broad Scope of work for Material Handling and Material Management Services:

The scope of work under Material Handling and Materials Management services for 2x30 MW GTG Based Co-gen, IOCL (IRUP), Gujarat Refinery, Vadodara Project shall broadly be as under:

1 Receipt, Unlading, Stacking, Verification of HRSGs & all related auxiliaries, Packages, Piping, Tanks, Insulation, Ducts, Dampers, HRSG modules, including Chimney items, Electrical and C&I items etc..

2 Receipt, unloading, Stacking, Verification of Gas Turbines, Gas Turbine generators, Bypass Stacks, Various Skids, Feed Storage Tank with Deaerator Header, Tanks etc. with their auxiliaries/items, integral piping, Insulation Materials, Balance Of Plant Equipments with related Aux., Electrical and C&I items, Panels etc. of all total related packages/systems.

3 Receipt, Unloading Stacking, Verification of Other items supplied by BHEL units, their sub-vendors, bought-out items including Paints, Lubricants etc.

4 Receipt, Unloading Stacking, Verification of any other material like BHEL's T&P (except heavy duty cranes), Furniture, Erection materials etc.

5 Receipt, Unloading Stacking, Verification of Electrical equipments like Transformers, Switchgear Systems, Control and instrumentation packages including Station C&I and Control Room Equipments/items/Panels etc., Motors, Cable trays, Cables, Structural Steel, Earting materials, Plant Illumination/Lighting materials.

6 Receipt, Unloading, Stacking, Verification of Insulation and refractory/Lining materials for HRSGs, Chimney, Bypass Stack, Ducts, Piping and Equipments, Tanks, Vessels and related Equipments of GT & GTG, Skids and all other Packages etc.

7 Receipt, Unloading, Stacking, Verification of Reinforcement Steel, Structural Steel and other Civil works related Items.

8 Receipt of materials dispatched by road transport on door delivery basis at the BHEL/IOCL stores inside the project premises and unloading thereof.

9 Preliminary verification of materials at the time of unloading from road transport vehicle, reporting discrepancies like damages and shortages noticed immediately.

10 Detailed verification of materials with reference to packing list and loading advice slip after unpacking of boxes & crates; repacking after detailed verification; preparation of receipt inspection reports.

11 Stacking and Storing at BHEL/IOCL storage yard or covered stores or semi-closed sheds, submission of stacking/storing records.

12 Preservation of the materials received inside the project premises in accordance with BHEL/IOCL's preservation manual or as per BHEL/IOCL's instructions.

13 General cleaning, grass cutting and upkeep of storage yard, covered and semi-closed stores sheds within the quoted rates of unloading, verification and stacking.

14 Providing services for Materials Management Services (operation of computerized materials management system – feeding data, updation, generation of status reports etc.) **(Refer Clause No.4.12).**

15 Re-handling and restacking of materials as and when called for by BHEL. This also includes excess/redundant materials returned to stores by BHEL's erection contractors.

16 Handling and loading of outgoing materials that are to be sent to other destinations.

17 Collection/receipt of materials, verification, Transportation of materials from Transporter's Godown which are supplied on Godown delivery basis from units/vendors/sub-vendors etc.

18 Providing services of secretarial assistance for office & stores and office up-keeping/messengers at BHEL Site Office and Stores.

19 To provide one set of computer with printer and all required accessories at BHEL store office for Material entry/ report generation and updation of material records etc. its subsequent maintenance to keep it in fully working condition and operational.

20 To provide required quantity and size of concrete / wooden sleepers for material storing and handling work as per requirement as scope of work.

21 Receipt, Unlading, Stacking at Stores/Store Yard of Heavy Consignments and /Or OD consignments/Equipments such as Boiler Drums, Chimney Shells/ Sections, Gas Turbines, Gas Turbine Generators, Brushless Exciters, Accessory System Skid, Main filter house, GT MCC, Diverter Damper, Guillotine Damper, Cylindrical Stack, Water Injection Skid, Naptha Storage Tank, HSD storage Tank, Feed Storage Tank with Deaerator headers, Generator Transformers, Station Transformers, Unit Aux. Transformers, Load Gear Box, Switchgear MCC, Boiler Feed Pump Motors etc.

4.1.2 Major Packages to be Handled are as under:

The scope of work of this tender specification of material handling and materials management of entire 2x30MW GTG Based (GTG & HRSG with related Aux. &

Equipments, piping, Tanks, Vessels, Skids, Electrical and C&I equipments/items/Panels, Reinforcement & Structural Steel Materials etc.), IOCL-IRUP, Gujarat Refinery, Vadodara, Gujarat Project shall broadly be as under:

1. HRSGs and their auxiliaries, Modules, Coils/Tubes, CBD & IBD & Tanks, Valves, Structures & Supports, Ducts, Silencers and Chimney sections including Boiler Drums.

2. Gas turbines, Gas turbine-generators and their auxiliaries including Bypass Stacks.

3. Thermal insulation, Refractory and lining

4. HRSGs Electrical and Controls & instrumentation and accessories.

5. GT & TG Electrical and Controls & Instrumentation, Protection and accessories.

6. Balance of Plants (Mechanical equipments & Skids, such as Naphtha Filter Skids, HSD Filter Skids, Hitech Additive Skids, Naphtha day Tanks, HSD day Tanks, Naphtha Fuel Forwarding skid, HSD Fuel forwarding Skids, Drain Tanks, Gas Conditioning Skids, Gas Filter Skids, Naphtha Calescent Skids, Water Injection Skids, Water to Water Heat Exchangers, DM Water Circulating Pump Skids, HSD Centrifuge, Compressor water wash Skids, Diverter Dampers, Guillotine Dampers, BFP Motors, Accessory bases, Gas Valve Modules) Equipments, Skids and Packages etc..

7. Generator transformers, Station Transformers & Unit auxiliary transformer packages and other related Transformers.

8. 6.6KV, 11KV & 33KV Switchgear System, LT Switchgears with associated items/accessories.

9. Electrical motors, Panels, Switchgears, Junction Boxes, and bus ducts etc

10. HT, LT, Control & Signal Cables and Cable trays with support materials etc.

11. Power cycle and field piping, Feed Storage Tanks with Deaerators, Tanks, Vessels and Balance of plant equipments & related items/packages etc.

12. Plant illumination / Electrification items like Poles, Electrical fittings, Cable Trays, Plant Earthing materials, Switch Boards, Junction Boxes, Breakers, Cables etc..

13. Other BHEL supplied (manufactured/bought out items) packages

14. Other items sent by BHEL sites/regions etc.

15. Civil & Structural work items like Reinforcement Steel (TMT Bars) and Structural Steel items (like ISMB beams, Channels, Angles, Plates etc.)

SOME OF THE MAJOR HEAVY CONSIGNMENTS ARE:

Sl. No.	Description of the equipment	Approx. Equipment dimension LX BXH (in mm)	Approx. Weight (MT) per item
01	HRSG Drums (2 Nos.)	Dia.1.524XL-7 Meters	22
02	Chimney Sections (22 Nos. per unit i.e total 44 Nos. for two units,)	Dia.3.5x2.5 Meters	wt. of heaviest section-7
03	Gas Turbine Skids (2Nos)	7.38x3.6x3.93 Meters	64
04	Accessory Base (2 Nos.)	6x3x5 Meters	30
05	GT Generators assembled with rotor etc. (2 Nos.)	7.4x3.15x2.85 Meters	81
06	GT Gas valve Module (2Nos.)	6X3.6X5 Meters	8
07	Gas Conditioning Skids(2 Nos.)	5x5x4 Meters	5
08	Gas Filter Skids (2 Nos.)	3x3x3 Meters	3
09	HSD Centrifuge (2 Nos.)	5x5x3 Meters	3
10	Compressor water wash Skids (2Nos.)	6.5x3x3.2 Meters	5
11	Boiler Feed Pumps (6 Nos.)	4x2x3 Meters	5
12	Diverter Dampers (2 Nos.)	4x4x4 Meters	15
13	Guillotine Dampers (2 Nos.)	6x0.4x4 Meters	10
14	Silencer Duct SL1 (2 Nos.)	4.7x5.1x3.2Meters	11
15	Silencer Duct SL2 (2 Nos.)	4.3x4.7x1.6Meters	5.2
16	Horizontal Duct D-1 (2 Nos.)	4.5x4.1x3.85 Meters	10
17	Horizontal Duct H-1 (2 Nos.)	4.1x2.5x2.8 Meters	4.7
18	Transit Duct D-2 (2 Nos.)	4.7x4.3x2.6 Meters	5.2
19	Transit Duct D-3 (2 Nos.)	4.5x4.3x2.1 Meters	4.2
20	Vertical Duct VD8 (8Nos.)	4.3X4.3X3.35 Meters	4.7
21	Vertical Duct VD9 (2Nos.)	4.5X4.5X3.4 Meters	5
22	GT Motor Control Center (2 Nos.)	8.86X0.9X2.43 Meters	7.5
23	Load Gearboxes (2 Nos.)	---	12
24	Cylindrical Stacks (8 Nos.)	Dia 3.8x6 Meters	17
25	Generator Transfor (2 Nos.)	8.8x10.2x6.1 Meters	68
26	Station Transformers (4 Nos.)	8.8x10.2x6.1 Meters	60
27	33/11KV, 30MVA, OLTC, ITC Transformers (4 Nos.)	8.8x10.2x6.1 Meters	68

28	6.6/0.433KV, 2.5MVA Auto Transformers (4Nos.)-1/2	3.5X3X3 mETERS	7
29	6.6/0.433KV, 1.6MVA Auto Transformers (4Nos.)-3/4	3.5X3X3 mETERS	7
30	415V PMCC-1 LT Swtgr. (2Nos.)	19x1.5x2.45 Meters	15.5
31	415V PMCC-2 LT Swtgr. (2Nos.)	12x1.5x2.45 Meters	10
32	415V BOP MCC (2 Nos.)	9.15x1.5x2.45 Meters	6.6
33	415VDSTG MCCLT Swtgrs(2Nos.)	13x1.5x2.45 Meters	10
34	415VAC/VENT MCC (2 Nos.)	7x1.5x2.45 Meters	5.1
35	415V CW MCC (2 Nos.)	10x1.5x2.45 Meters	7.1
36	415V CLW MCC (2 Nos.)	7.65x1.5x2.45 Meters	5.6
37	415V. ASB-1 (2Nos.)	7.75X1X2.45 Meters	2.5
38	415V MLDB (2 Nos.)	4.5x1x2.45 Meters	3
39	415V ACELDB (2 Nos.)	3x1x2.45 Meters	2
40	240V UPS DB (2 Nos.)	4.5x1x2.45 Meters	3
41	220V DCDB-1 (2 Nos.)	5.25x1x2.45 Meters	3.5
42	Aux. Control Panels (2 Nos.)	6x1x2.3 Meters	4
43	415V CLW MCC (2 Nos.)	7.65x1.5x2.45 Meters	5.6
44	Feed Storage Tanks (2 Nos.)	10.65x4.1x3.55 Meters	17
45	FST Headers (2 Nos.)	5.55x2.6x2.05 Meters	8
46	Bypass Stack Materials		
a.	Trans.duct assly.FR6B-D2(2 Nos.)		5.4
b.	Silencer Assly. Fr6-SL1 (2 Nos.)		10.4
C.	Trans.duct assly.FR6-D3 (2 Nos.)		4.3
d.	Vert. duct assly.FR6-D8L (2 Nos.)		4.7
e.	Vert. duct assly.FR6-D8M (2 Nos.)		4.7
f.	Vert.duct assly.FR6-D8M (2 Nos.)		4.7
g.	Vert. duct assly.FR6-D9 (2 Nos.)		5.1
h.	Silencer Assy FR6-SL2(2 Nos.)		5.3
i.	Hor. Duct assly. FR6B-D1(2 Nos.)		9.2
j.	Vert. duct Assly. FR6-D81		4.7

 # As an additional information:

(1) The elevation of center line of Steam Generator Drum is about 19 Meters.

(2) The thickness of Chimney shells form Zero meter height (i.e from bottom) to 60 meter height (i.e top) is as per following:

(i) From 0 meter to 15 meters- 25 mm thick.

(ii) From 15 meter to 25 meters- 20 mm thick.

(iii) From 25 meter to 35 meters- 16 mm thick.

(iv) From 35 meter to 45 meters- 12 mm thick.

(v) From 45 meter to 50 meters- 10 mm thick.

(vi) From 50 meter to 60 meters- 8 mm thick.

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. Work shall be carried out for all the Equipments received from various manufacturing units and their vendors for the project under this specifications and drawings.

4.1.3
The intent of specification is to provide material handling and materials management services according to the most modern and proven techniques and codes. The omission of specific reference to any method, equipment or materials necessary for proper and efficient unloading, transportation, verification, stacking & preservation etc shall not relieve the contractor of the responsibility of providing such facilities to complete the work without any extra compensation.

4.1.10 Responsibilities of contractor and scope of work receipt, unloading and Stacking etc.

4.1.10.1
It will be responsibility of the contractor to keep in touch with officials of BHEL/IOCL/TEIL regarding advance information about arrival of consignments. The contractor shall collect lorry way bills or other such dispatch documents.

4.1.10.2
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.

4.1.10.3
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.

4.1.10.4
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.

4.1.11. In Coming and Outgoing smalls

4.1.11.1
Contractor shall arrange collection, from Transporter's Godowns, of materials (Smalls) dispatched by Road transport on Godown delivery basis, loading at transporters Godown, local transport up to BHEL/IOCL's stores/site and unloading. The payment for such collection of materials, 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-3 of rate schedule and terms of payment as per Section-12. 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 transports' Godown(s). These Godowns are expected to be located within a radius of 5 KM approx from the project site.

Similarly, for any smalls to be sent to different locations/sites from and which need 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.

4.1.11.2
For all such consignments, observations regarding loss/damage/shortage/ discrepancy is 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 for taking open deliveries. All expenses connected therewith shall be to the account of contractor. Any loss that accrue

to BHEL on account of such failures shall be debited to the contractor and recovery effected from his running bills.

4.1.11.3
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.

4.1.11.4
Consignments are expected to arrive during any time of the day, and count down for demurrage /wharfage 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. Consignments arriving on weekly off days and holidays shall be similarly unloaded by the contractor.

4.1.11.5
Unloading at storage area/work site, stacking and restacking if necessity arises, of Heavy/sophisticated equipments like Modules/ Tubes/ Coils panels of HRSG, Heavy Motors, Heavy Bearings pedestals, Pumps, Servomotors, Electrical Panels and GT & GTG equipments like heavy GT components, Skids, Panels, Switchgears, Panels etc. shall be done as per storage and preservation manuals of BHEL/IOCL and Or as per instruction of BHEL Engineer.

4.1.11.6
The contractor shall verify the consignments in detail within the shortest possible time from receipt at site, usually within ten days. 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.

4.1.11.7
The material shall be so stacked that it should facilitate easy identification, retrieval and handling for issue as and when need arises.

4.1.11.8
Pre-defined identification system of the locations of open storage yard, semi-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 display boards shall be made with structural steel & M.S.. Plates and shall be painted with synthetic enamel paint. Contractor shall have to periodically repeat such exercise as the original displays may get lost/damaged/ deteriorate with time. All materials and consumables for this

purpose shall be arranged by the contractor. **The structural steel/slotted angle racks (as it may be) for covered storage shed/ semi covered storage shed will be provided by BHEL. Contractor shall carry out fabrication of racks / assembly of slotted angle racks as part of scope of work of material handling. For all other purposes, contractor shall have to make his own arrangements including supply of materials for displaying the proper identification Tags, Boards, Marking, Inscription etc. as scope of work.**

4.1.11.9
The contractor shall execute the work in a professional manner. The stores shall be handled with due care and diligence. Any loss to BHEL/IOCL due to contractor's lapse shall be made good by the contractor at his risk and cost.

4.1.11.10
Loading on to the transporter's trailer/truck for onward transmittal to other destinations is also scope of work of contractor. Payment for these shall be made as per relevant items of rate schedule.

4.1.12 SHIFTING/RE-STACKING/RE-ARRANGING

Over a period of time, Re-stacking/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.

Restacking and rearranging shall be applicable for materials returned by BHEL's erection contractors also.

Separate item rate shall be quoted for restacking/re-handling/shifting of stacked materials as asked in the rate schedule.

4.1.13
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.

4.1.14
The distance indicated in these specifications are only approximate. However, the contractors should assess the various distance and the site conditions by

visiting site before submitting their offer. No additional / Extra claims for any variation in this regard will be entertained.

4.1.15

SCOPE OF WORK FOR PROVIDING MATERIALS MANAGEMENT SERVICES

THE PROJECT IS BEING EXECUTED ON ERECTION & COMMISSIONING BASIS WHERE THE UNIT IS SCHEDULED FOR COMMISSIONING BY FEB' 2009 AND FACILITIES COMPLETION BY MAY' 2009.

4.1.15.1 THE MAJOR AREAS OF MATERIAL FLOW (IN & OUT) WILL BE:

MAIN PLANT MECHANICAL AND ELECTRICAL EQPTS

MAIN PLANT EQUIPMENT OF HRSGs, GT & GTG, BALANCE OF PLANT EQUIPMENTS WITH THEIR AUXILIARIES AND PIPING, ELECTRICAL AND CONTROL & INSTRUMENTATION ETC. THE SUPPLIES WILL START WITH THAT OF HRSGs FROM JAN'08. THE MAJOR SUPPLIES OF BTG PACKAGE ARE LIKELY TO CONTINUE TILL NOV- DEC'08. APPROX QUANTUM OF **MATERIAL IS 5690 MT.**

CIVIL STRUCTURAL AND RE-INFORCEMENT STEEL

MAJOR SUPPLIES WILL INCLUDE REINFORCEMNT BARS, STRUCTURAL SECTIONS SUCH AS PLATES, ROLLED SECTIONS ETC, THE SUPPLIES ARE LIKELY TO START FROM NOV-DEC'07 AND MAJOR SUPPLIES ARE EXPECTED TO COMPLETE BY JUNE-JULY'08. **THE APPROXIMATE QUANTUM IS 3350 MT.**

IN ADDITION TO ABOVE, NON-TURNKEY BOUGHT OUT ITEMS WILL BE RECEIVED DURING THE PROJECT EXECUTION PERIOD.

AS IS NORMAL TO ANY PROJECT EXECUTION, THE FLOW OF MATERIAL MAY NOT FOLLOW LINEAR PATTERN. THUS THE REQUIREMENT OF MM SERVICES WILL VARY FROM MONTH TO MONTH. SIMILARLY ISSUE OF MATERIALS TO ERECTION AGENCIES MAY VARY FROM MONTH TO MONTH DEPENDING UPON THE STAGE OF COMPLETION. AFTER MAJOR RECEIPTS AND ISSUES, THE THRUST WILL SHIFT TOWARDS FINAL RECONCILIATION WITH ERECTION AGENCIES. FROM TIME TO TIME, THE CONTRACTOR SHALL MODULATE HIS RESOURCE DEPLOYMENT IN CONSULTATION WITH BHEL FOR EFFECTIVE & SATISFACTORY DELIVERY OF REQUIRED MM SERVICES IN ALL RESPECT.

4.1.15.2 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.

SEE EXPLANATION CLAUSE NO. 4.1.16 HEREIN BELOW.

(A) SUPERVISION SERVICES - Progressively - 1 Service Points [SEE EXPLANATION]

(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 - 1 Crew of adequate strength as per site requirement [SEE EXPLANATION]

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

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 TRANSFORMERS; BHEL WILL PROVIDE THE NITROGEN GAS FOR THE SAME. HOWEVER

CONTRACTOR SHALL HANDLE THE CYLINDERS AT STORES, TRANSPORT TO POINT OF USE, 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, OPERATE AND MAINTAIN THE SAME.

BHEL WILL PROVIDE FREE OF COST ALL PRESERVATIVES LIKE PRESERVATIVE OIL, LUBRICANTS, CHEMICALS, INHIBITORS, CAPS ETC EXCEPT PRIMERS & PAINTS. **CONTRACTOR SHALL PROVIDE CHLORINATED BASED ZINC PHOSPHATE PRIMER OF REPUTED MANUFACTURES (E.G. ASIAN PAINTS, BERGER, JENSON & NICHOLSON, BOMBAY PAINTS, SHALIMAR AND ANY OTHER IOCL/TEIL APPROVED MANUFACTURER) REQUIRED FOR PRESERVATION SHALL BE PROVIDED BY THE CONTRACTOR AND USED FOR THIS PURPOSE.**

IN THE PROCESS THE IDENTIFICATION MARKS, COMPONENT/MATERIAL CODES, MATCH MARKS MAY HAVE TO BE REPAINTED. 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) <u>RECORD KEEPING</u> - Progressively - 2 Service Points [SEE EXPLANATION]

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.

i) MANUAL LEDGERS & RECORDS.

ii) 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.

D. <u>SECRETARIAL & OTHER MISC. SERVICES</u> - Progressively (2+4) Service Points [<u>SEE EXPLANATION</u>]

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

4.1.15.3 PARAMETERS AND QUANTIFICATION OF MM SERVICES, PERIODIC MONITORING

FOR THE PURPOSE OF DELIVERY OF THE AFORESAID MM SERVICES & 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.

4.1.15.4 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 SECTIOON-12 (SCC).

4.1.15.5 DEFICIENT/UNSATISFACTORY MM SERVICES & NOT RENDERING MM SERVICES

4.1.15.5.1
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.

P_A = AMOUNT **ASSIGNED** TOWARDS THE PARTICULAR SERVICE FOR THE CONCERNED MONTH AS PER AGREED PLAN.

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

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.

4.1.15.5.2 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.

4.1.15.5.3 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.

4.1.16 <u>EXPLANATION ABOUT THE SCOPE OF MM SERVICES</u> **<u>[BACK]</u>**

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 [BACK]

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 [BACK]

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 [BACK]

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 [BACK]

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.

4.1.17 Other Points for Material Handling and Material Management:

i) Contractor shall unload/transport/shift/drag (wherever required) the of Gas Turbine Skids (2 Nos.), GT Generators (2 Nos.),Generator Transformers (2 Nos.), Station Aux. Transformers (4 Nos.), 33/11KV OLTC-ICT Transformers (4 Nos.) heavy equipments from Material storage yard to bring/unload them near to their respective foundation within the distance of 5 Meters as the scope of work. This shall also include the loading, shifting, and transportation, unloading/dragging of these equipments from BHEL/IOCL Storage yard to site of work/near to the respective equipment foundations. All these works shall be carried out as scope of work of material handling/material management within the agreed rates. No separate payment for these works shall be payable. The tentative distance of Material Storage Yard from erection site is about 6 KM.

ii) The unloading / transporting / shifting/dragging(wherever required) of Boiler Drums from Material Storage Yard to bring/unload them near to their respective foundation and their further lifting, shifting/dragging/placement/erection to their respective required foundation/elevation shall be carried out by contractor as part of scope of normal Erection & Commissioning work.

iii) RECORD KEEPING AND REPORT GENERATION

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.

iv) Contractor shall carry out the followings as per instructions /specifications of BHEL/IOCL/TEIL engineer at site:

- **Storing/stacking the materials on sleepers sufficiently above the Ground level/ Floor Level.**
- **Coating with preservative paints/ lubricants/ inhibitors as per instruction of BHEL engineer.**

- **Covering with tarpaulins wherever required of items/packages including electrical panels, Skids, Motors, which are stored in open storage yard.**
- **Capping/wrapping/covering of components/coils/tubes etc.**
- **Filling/immersion in oil/chemicals etc.**
- **Periodic checks/maintaining required nitrogen pressure in tanks of all transformers.**
- **Deployment of required personnel having proficiency in computer operation, Report generation, information management and print out.**
- **Deployment of required personnel having proficiency in computer operation, Report generation, information management and print out.**
- **All the necessary skilled/unskilled manpower to carry out the above works shall be arranged by contractor.**
- 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 updation of "SOMS". The persons shall also be fluent in basic computer operations like "Primavera" & 'MS office' etc.

- Scope of services shall include maintenance of stores records, supervision of issue and return of materials in respect of BHEL's erection agencies.

- 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.

- Contractor shall arrange for preservation of components as per BHEL's storage and preservation manual or as per instructions of BHEL engineer in case such information is not available in the manual.

- One or more of following methods shall be adopted for preservation:

  Contractor's cranes have to be used for handling of materials wherever required in preservation of materials. 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 for perusal in the prescribed formats.

- The essence of the contract is material handling, preservation, accounting and providing assistance for BHEL site office upkeeping.

- All the necessary skilled/unskilled manpower to carryout the above work shall be arranged by the contractor. The persons so employed shall be fully trained and experienced in the nature of work.

- Before quoting for this tender, the contractor shall visit the site and assess the local conditions, entry and traffic restrictions and get acquainted with general procedures by customer related to BHEL/its agencies' interface activities. Claims for not having proper knowledge on site condition shall not be entertained.

- All the materials shall be handled with care and diligence. Any loss or damage to BHEL due to contractor's lapses shall have to be made good by the contractor at his cost.

- BHEL engineer's decision shall be final regarding the type and nature of painting to be done on the components as also for arranging the components sequentially to suit erection requirements.

- 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.

- 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 metric tonne applicable to all consignments, including heavy/ODC such as gas-turbine-generator, boiler drum, steam turbine modules, turbine-generator, 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.

- 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, varification and stacking will be made as per unit rate vide item Sl.No. B.2 of rate schedule (refer clause 4.1.11.1).

- 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.

- The personnel deployed for materials management services shall be exclusively available to BHEL. They should possess qualification and experience as per BHEL's requirement.

- Scope of services shall include maintenance of stores records, supervision of issue and return of materials in respect of BHEL's erection agencies.

- 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.

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

The scope of work for Erection, Welding, Alignment, Testing, Commissioning, Chemical Cleaning/Flushing, Final Painting and Handing over of 2x100 TPH Supplementary fired HRSGs with Aux., Equipments, Systems, Piping, Insulation, Final Painting of 2x30 MW GTG Based Co-gen, IOCL (IRUP), Gujarat Refinery, Vadodara Project shall broadly be 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 etc.

2. Pre-assembly, Assembly and pre-assembly checks as applicable.

3. Lifting, Placement, Erection, Fit-up, Alignment etc. of Equipments with Aux., Systems, Piping 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 & Integral 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 including Chimney and other associated equipments as per scope under these specifications.

12. 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.

13. 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.

14. Pre-commissioning checks, Trial runs, testing and commissioning.

15. Surface preparation and Final painting of equipments, related Aux., Systems, Structures, Piping with valves, fittings, supports etc.

16. Safety Valve Floating, Trial operation.

17. Completion of facility points (as applicable)

Scope of work is further detailed in various clauses hereafter:

4.2.1
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.

4.2.2
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.

4.2.3
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.

4.2.4
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.

4.2.5
Contractor shall erect and commission all the equipments and auxiliaries as per the sequence & methodology prescribed by BHEL/IOCL/TEIL 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.

4.2.6
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.

4.2.7
The HRSG and piping will be erected as per relevant provisions of Indian Boiler Regulations & latest amendments/revisions thereof.

4.2.8
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.

4.2.9
The contractor shall perform any services, tests etc. Which may not be specified but nevertheless required for the completion of work within quoted rates.

4.2.10
The contractor shall execute the work in the most substantial and workmanlike manner.

4.2.11
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.

4.2.12
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.

4.2.13
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.

4.2.14
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.

4.2.15
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.

4.2.16
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.

4.2.17
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.

4.2.18
Plant materials should not be used for any temporary supports / scaffolding / preparing pre-assembly bed etc.

4.2.19
The details of equipments to be erected under this contract is generally as per the details of quantity given in Appendix-II. 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.

4.2.20
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.

4.2.21
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.

4.2.22
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.

4.2.23
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.

4.2.24
Welding of necessary instrumentation tapping points, thermocouple pads, root valves, condensing vessels, flow metering & measurement devices, and control valves to be provided on HRSG 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.

4.2.25
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.

4.2.26
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.

4.2.27
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.

4.2.28
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 PREPARATION OF FOUNDATIONS, AND GROUTING OF EQUIPMENTS

4.3.1
Buildings, foundations and other necessary civil works for supporting structures, equipments etc, will be provided by the BHEL/customer. The checking of dimensional accuracy, axes, elevation, levels etc, with reference to bench marks of foundations and anchor bolt pits and also adjustments of foundation level, dressing and chipping of foundation surfaces of all equipments contractor/BHEL shall prepare protocols before taking over the foundations. Dressing and chipping of foundations upto 25mm for achieving proper levels will be within the scope of work/specification.

4.3.2
All minor foundations and anchor points required for installing erection equipments like winches, anchors etc. Are to be cast by the contractor.

4.3.3
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).

4.3.3.1
The quick-setting-non-shrink-free-flow special grout mix shall be purchased only from the following BHEL approved vendors:

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

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

4.3.3.2
Cleaning of the foundation surfaces, pocket holes, anchor bolt pits and de-watering and making them free of oil, grease, sand and other foreign materials by soda washing, water washing, compressed air and other approved methods will be within the scope of this work.

4.3.4
BHEL will provide only shims and packer plates (either machined or plain), which are received from BHEL's manufacturing plants and go as permanent part of the equipment. Additional packer plates and shims if required will have to be prepared by the contractor out of steel plates, steel sheets to meet site requirements. Necessary steel plates for this purpose will be provided by BHEL free of cost.

4.3.5
The contractor shall carry out scrapping and matching of embedded plates, permanent spacers and all the matching parts of turbine, generator, pumps and other equipments wherever required. The support and sole plates matching and concrete surface bedding is also covered in the scope of work. The fine dressing of concrete shall be with Prussian blue-match checks.

4.3.6
Packer plates shall not only be blue matched with foundations but also inter-packer contact surfaces, contact surfaces between packer and pedestals, contact surface between packer and foundation frame etc. Shall also be blue matched and required percentage contact shall be achieved by chipping and scrapping as per engineer's instructions.

4.3.7
Further, the surface preparation, cleaning, curing, procedure and mixing of grout mix etc. for secondary grouting shall be carried out as per TEIL/IOCL specification "GROUTING WORK-DOC.No.:G-304" which is attached separately.

4.4 WELDING, HEAT-TREATMENT, RADIOGRAPHY AND OTHER NON-DESTRUCTIVE TESTING

4.4.1

Installation of equipment involves good quality welding, NDE checks, post weld heat treatment etc. Contractor's personnel engaged should have adequate qualification on the above works.

4.4.2
The method of welding (viz) arc, TIG or other method will be indicated in the detailed drawing/documents. BHEL engineer will have the option of changing the method of welding as per site requirement.

4.4.3
Welding of high pressure joints shall be done by IBR certified high pressure welders who have been permitted by CIB of state concerned for deployment at the site of work.

4.4.4
Welding of all attachments to pressure parts, piping shall be done only by the qualified and approved welders.

4.4.5
All the welders (structural and high pressure) shall be tested and approved by BHEL engineer before they are actually engaged on work though they may possess the IBR/other certificate. BHEL reserves the right to reject any welder without assigning any reason.

4.4.6
Unsatisfactory and continuous poor performance may result in discontinuation of concerned welder.

4.4.7
The welded surface shall be cleaned of slag and painted with Chlorinated based Zinc Phosphate primer paint to prevent rusting, corrosion. For this consumables like paint etc will be in the contractor's scope.

4.4.8
HP joint fit-ups, should be protected, where required, by use of tapes/protective paint as may be prescribed by BHEL. The contractor shall supply consumables like protective paints/tapes etc.

4.4.9
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. Normally the electric resistance heating method will be adopted. Contractor shall arrange to supply heating equipment with automatic recording devices. Also the contractor shall have to arrange for labour, 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.

4.4.10
All the recorded graphs for heat treatment works shall be the property of BHEL and shall be handed over to BHEL engineer when demanded.

4.4.11
The contractor shall maintain welding records in the form as prescribed by BHEL containing all necessary details, and submit the same to the BHEL engineer as

required. Interpretation of the BHEL engineer regarding acceptability of the welds shall be final.

4.4.12
Heat treatment may be required to be carried out at any time (day and night) to ensure the continuity of the process. The contractor shall make all arrangements including labour required for the work as per direction of BHEL.

4.4.13
Radiography work of welds connected with this contract shall be arranged by the contractor including provision of services of technician and necessary equipment and consumables like isotope camera, x-ray/gamma ray films, chemicals etc., and necessary labour required such as riggers, helpers, etc., to assist the technician for carrying out the radiography work and making other arrangements such as providing scaffolding, approaches, platform lighting arrangements, etc., at their cost and the work has to be arranged as per the instruction of BHEL. It may please be noted that invariably the radiography work will be carried out after the normal working hours and close of other site activities only.

4.4.14
Radiography inspection of welds shall be performed in accordance with requirements and recommendation of BHEL engineer. The quantum of radiographic inspection shall be as per provision of IBR/BHEL's erection documents. They may, however be increased depending upon the performance of the individual welder at the discretion of BHEL engineer/boiler inspecting authority.

4.4.15
All x-ray / gamma ray films of joints shall be preserved properly and be handed over to BHEL. These shall become the property of BHEL.

4.4.16
The field welded joints shall be subject to dye-penetrant/ other non-destructive examination as specified in the respective engineering documents/ as instructed by BHEL.

4.4.17
Where required, surface preparation, like smooth grinding of welded area, prior to radiography shall be done as specified. It may also become necessary to adopt inter-layer radiography/MPT/UT depending upon the site/technical requirement necessitating interruptions in continuity of the work and making necessary arrangements for carrying out the above work. The contractor shall take all this into account in his offer.

4.4.18 **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.

4.4.19
Welding electrodes have to be stored in enclosures having temperature and humidity control arrangement. This enclosure shall meet BHEL specifications.

4.4.20
Welding electrodes, prior to their use, call for baking for specified period and will have to be held at specified temperature for specified period. Also, during execution, the welding electrodes have to be carried in portable ovens.

4.4.21
Welding of all IBR & Non-IBR joints for all materials (Carbon steel, Alloy Steel and Stainless Steel) including seal welding works shall be as per specification, drawing requirement and scope of work. No separate payment for welding work is envisaged and no any claim on such welding account shall be entertained.

4.5..0 **ERECTION OF HRSG, ITS AUXILIARIES & PIPING**

4.5..1 **HRSG**

4.5.1.1 **RECEIPT, UNLOADING, STACKING AND ERECTION OF MODULES**:

4.5.1.1.a
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 & handling the modules and a special frame will have to be used for unloading which shall be fabricated at site .

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 as per instruction of BHEL Engineer.

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 these fabrication.

In all these handling of modules polyester flat webbing sling shall be used and same shall be provided by contractor.

There are total about 45 modules. The SUPER Heater Modules (released under PGMA HL-131 & HL-132) are of Alloy Steel and other remaining modules are of Carbon Steel. The dimension of each module is about 4M (width) x10M (height)x150mm(Thick). The weight of each module is approx. 3.5 MT.

4.5.1.1.b
The modules, their links & components have been released under PGMA “HL-XXX” and the supports & other components have been released under PG-07,PG-12 etc. Insulation has been released in relevant PG of insulation group.

4.5.1.2

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

4.5.1.3
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.

4.5.1.4
Pressure parts components like headers, modules, loose tubes 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.

4.5.1.5
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).

4.5.1.6
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 upto OD 65 mm will have to be formed at site as incidental to the work. This is applicable to piping work also.

4.5.1.7
Welding of all attachments on casing, non-pressure parts, pressure parts/ piping including those required for insulation work is in the scope of work.

4.5.1.8
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.

4.5.1.9
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 & fittings wherever necessary. Required material will be provided by BHEL.

4.5.1.10
The drum internals, if already installed, may have to be removed to facilitate tube expansion, inspection by statutory authorities and chemical cleaning. The drum internals are to be preserved properly and refitted afterwards as part of work.

4.5.1.11
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.

4.5.1.12
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.

4.5.1.13
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.

4.5.1.14
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.

4.5.1.15
It should be ensured that all the terminal point connections are done without transferring any undue load or strain to the other equipments. Necessary protocols have to be prepared for such fit-up alongwith BHEL /customer representative before connecting. All NDE including radiography of joints so made, post weld heat treatment if any, are also within the scope of work / specification.

4.5.1.16
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.

4.5.1.17
For integral piping 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.

4.5.2 **SERVICE & INSTRUMENT AIR PIPES**

4.5.2.1
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.

4.5.2.2
Line shall be provided with proper slope as per drawing / standards and shall be supported at recommended pitching.

4.5.2.3
Hydraulic / pressure testing of pipelines, wherever called for, shall be conducted as part of work till satisfactory results are obtained.

4.5.3 Other products and systems

4.5.3.1
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.

4.5.3.2
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.

4.5.3.3
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.

4.5.4 **INSULATION**

4.5.4.1
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. HRSG casing(Ducts) will be fabricated at site from Stainless Steel Sheets & Carbon sheet, Stainless Steel Hooks/Retainers and outer cladding sheet including packing/fixing of insulation in HRSG casing (Ducts).

The Stainless Steel Sheets will be used for cladding the insulation on HRSG casing (Ducts) inside surface at high temperature region upto Evaporator Section. The weight of such Stainless Steel sheets is about 8MT and has been released under PGMA 32-310 and thickness of Stainless Steel is 1 to1.5mm.

The Carbon Steel Sheets will be used for cladding the insulation on HRSG casing (Ducts) inside surface at low temperature region after Evaporator Section. The weight of such Carbon Steel sheets is about 4 MT and has been released under PGMA 32-310.

The GI / Aluminium Sheet work is involved to clad (outer sheeting) the external insulation of Steam Generator Drum, Piping with valves & fittings, Chimney, Tanks, Vessels, Ducts and all other associated Aux./systems/components as per drawings/documents. These cladding sheets are released under PGMA 37-810 & tentative weight is 4.7MT.

4.5.4.2
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) Insulation material would be ceramic wool/ mineral wool mattress of density as per design requirement. HRSG to be insulated from inside. Steam drums and all external piping to be insulated externally with mineral wool with outer pain GI/aluminium cladding. All insulation including HRSG internal insulation shall be carried out at site. Insulation material supplied to site will be loose.

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

C) 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.

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

E) 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.

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

G) 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.

H) 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 etc. These gaps will have to be finished as per drawings at a later date by the contractor at no extra cost to BHEL.

I) 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.

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

- Refractory 2%
- Wool Insulation 2%
- Cladding sheets 2%

4.5.5 **CHIMNEY ERECTION**

1. Steel chimney of each HRSG having 60 Meters tall, Self-supported, Straight Cylindrical, Internal Diameter 3.5 Meters and of varying shell thickness has to be erected. The material of Chimney shells is Carbon Steel (IS 2062)

2. Chimney is being dispatched in 24 full round sections. The length of each shell section is 2.5 meters and thickness of these shell sections vary from 8mm to 24mm.

3. The heaviest shell section as dispatched from works weighs about 7MT and minimum weight shell section weighs about 2.5 MT.

4. The Joints between Chimney shells are Butt Weld joints with flanges for fit up.

5. 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.

6. Welding of chimney joints shall be carried out by certified welder. Wherever necessary, radiography have to be taken to meet the BHEL/Statutory requirements/IOCL/TEIL requirements.

7. Chimney has to be insulated upto full height with outer cladding work of Plain Aluminium sheet of thickness 0.71 mm. The insulation is lightly resin bonded mineral wool to be covered with plain aluminium cladding sheet.

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

9. The Base Ring (Base Plate and Stool Plate) of Chimney will be dispatched in 2 pieces and to be assembled & welded at site.

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

11. Lighting arrestor and associated Aviation lamps, cabling, Junction boxes etc.. the complete erection and commissioning is in the scope of contractor under these specifications.

4.5.6
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.

4.5.7
Providing necessary engineer/supervisors/technicians/electricians as required by BHEL engineer for drying out the LT/HT motors is within the scope of the work. Job includes testing the motor for finding out PI & IR values and making necessary cabling connection for heating for dry out from the nearest source of supply and maintaining and controlling the temperature till the IR and PI values are achieved as per standards. However, BHEL will provide necessary motorized insulation testers for this purpose. The contractor shall provide necessary power cables and other tools and consumables

for the above works free of charges. Before undertaking dry out/trial run of HT motors, the end shields and covers shall be opened on both the ends of the motor for inspection, cleaning and greasing of bearings.

4.6.0 Testing, pre-commissioning, commissioning and post commissioning:

4.6.1
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 /Alkali boil out of various systems & piping; steam blowing of the pipe lines; floating of safety valves till the trial operation in combined cycle operation, Reliability run/Performance Guarantee test 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.

4.6.2
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.

4.6.3
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.

4.6.4
For the installation of temporary system as above BHEL will provide the piping, structural items for supports and access platforms, tanks/ plates for fabrication of tank, valves, gauges and their fittings, thermal insulation and Circulation Pumps with Motors. These will be supplied in random sizes / lengths. However, fabrication, erection, dismantling of the same after completion of the process, and handing over back to BHEL stores will be the responsibility of the contractor. All above works shall be carried out by contractor as part of scope of work including the making of foundations/Frames for pumps with motors and their subsequent installation/erection, alignment, cabling, providing switches/starters and commissioning etc.. The temporary lines for chemical cleaning/ Flushing/ Steam Blowing shall be required to be laid to suitable & safe locations/ neutralizing pits (the location as decided by IOCL/TEIL and instruction of BHEL Engineer at site. Contractor shall collect all these materials form BHEL/TOCL/TEIL stores/Storage yard etc. All these works shall be the part of scope of work of contractor. No separate payment is envisaged for these works. **The Chemical Cleaning shall be carried out as per TEIL/IOCL Specification "CHEMICAL CLEANING-DOC.No.:H-322 and instruction of BHEL engineer at site. TEIL/IOCL specification "DOC.No.:H-322" attached separately.**

4.6.5
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.

4.6.6
Cleaning, servicing of tanks, valves, pumps, equipments, 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.

4.6.7
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.

4.6.8
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.

4.6.9
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.

4.6.10
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.

4.6.11
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.

4.6.12
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.

4.6.13
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.

4.6.14
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.

4.6.15
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, rotating machinery and other system as per scope of tender specification before and after oil flushing is in the scope of work.

4.6.16
Transportation of Chemicals/Lubricants/lube oils etc. from customer's/BHEL's stores/storage yard, filling for flushing/cleaning, 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.

4.6.17
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&Ps and lifting/handling/transportation arrangements for lifting/placement to required foundation/elevation, erection of equipments like HRSG Drums, HRSG modules, Chimney shells/Sections etc. including unloading & handling of heavier consignments/equipment like Gas Turbines, Gas Turbo-generators, GT inlet ducts, GT off base enclosure, Horizontal Ducts, Silencers, Load Gear Box, Cylindrical Stacks, Accessory Bases, Filters unit of GT, Skids, Feed Storage Tanks & Deaerator, Generator Transformers, Station Transformers, Unit Aux. Transformers, Switchgears etc. shall be required to be lifted with suitable capacity cranes/Jacks & Sleepers or any other suitable alternate methods. The contractor shall arrange all above suitable arrangements to suit the site requirement and erection schedule.

4.7 SECURITY, HOUSE KEEPING & OTHER RESPONSIBILITIES OF THE CONTRACTOR

4.7.1
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.

4.7.2 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.

4.7.3
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.

4.7.4
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.

4.7.5
The entire surplus, damaged, unused materials, packaging materials / containers, special transporting frames, gunny bags, etc., shall be returned to BHEL/IOCL stores by the contractor as per instruction of BHEL Engineer at site.

4.7.6
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.

4.8 FINAL PAINTING

4.8.1
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.

4.8.2
All exposed metal parts of the Equipments including piping, supports, structures, railing, tanks/vessels, Chimney and related Auxiliaries/items/components/fittings 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 dry film thickness after final coat should be as per specification.

4.8.3
In addition, colour banding, legend and identification marking, direction of flow/rotation marking etc. is part of work.

4.8.4

The surface preparation/cleaning, treatment, Identification marking Colour Codes and Final/Finish painting works shall be carried out by contractor as per TEIL/IOCL Specification "PAINTING WORKS -DOC. No.: O-301-A" with Addendums (the Specifications O-301-A is attached separately). For any non-confirmation/dispute between BHEL & TEIL/IOCL specification, the procedure/instructions as laid down in customer & their consultant's specification shall supercede BHEL specification and shall be binding on contractor.

4.9.0 Other Points:

4.9.1

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 to Customer & suit the site requirement.

4.9.2

The work shall be executed under highly restricted, Space Constraints & Safety Concerned /constrained conditions affecting major Refinery projects in an existing power plant and in conjunction with numerous other operations at site. The contractor and his personnel shall cooperate with personnel of customer's, Consultant's, contractors, coordinating his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole without compromising the Safety aspects/laws/Rules/Regulations.

4.9.3

All the work shall be carried out as per the instructions of BHEL engineer. BHEL engineer's decision regarding correctness of the work and method of working shall be final and binding on the contractor.

4.9.4

The contractor shall perform all required services which may not be specified herein but nevertheless required for the completion of work within quoted rates.

4.9.5

All necessary certificates and licenses required to carry out this work are to be arranged by the contractor expeditiously from Respective Statutory Authorities/ Customer/Consultant/ Factory Inspector/ Labour & Welfare Officers/ Labour Commissioner/ Electrical Inspectorate etc. as required.

4.9.6

All cranes, transport equipments, handling equipment, tools, tackles, fixtures, equipment, manpower, supervisors/engineers, consumables (excluding those indicated as BHEL scope), etc required for this scope of work shall be provided by the contractor and shall conform to Safety Requirements/ Load Testing etc. as per IOCL/TEIL rules & Regulations at site.

4.9.7

All expenditure including taxes and incidentals in this connection will have to be borne by the contractor unless otherwise specified in the relevant clauses elsewhere here. The contractor's quoted rates shall include of all such contingencies. In this connection refer relevant clause of general conditions of contract.

4.9.8
If the contractor or his workmen or employees break, deface, injure or destroy any part of a building, road, Kerbs, 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.

4.9.9
The contractor shall take due precaution during Materials Handling and Erection, testing & commissioning of equipments/works under these specifications to avoid deface, injure, damages, destruction by contractor or his workmen or servants to any pipelines, railway lines, roads, canals, cables, culverts, drains, sewer, telephone &telegraph lines, water mains, dykes, poles, pillars, fences, wires, supports and embedments and other under ground or over ground works, Structural or constructions whatsoever and shall at his own cost and initiative forthwith restore and repair any damage thereto the entire satisfaction of customer/BHEL at his own expense or in default, the customer/ BHEL site engineer may cause the same to be made good by other agency or by other means and deduct the expense with BHEL overhead (of which the site engineer's decision is final) from any sums that may be then or at any time thereafter become due to the contractor or from his security deposit or any other money due.

4.9.10
As such, the marine cover and erection all risk cover insurance for the project for permanent incorporation of materials and services at site lies with customer. The contractor shall have to take necessary all risk insurance policy (motor vehicles act, worker's compensation act, fatal accidents act, personal injuries insurance act, emergency risk insurance act and/or other industrial legislation from time to time India with insurance company(ies) approved by owner) **for his manpower and his employees deployed at site under work compensation act including but not limited to third party insurance at IOCL, Gujarat refinery project along with his T&Ps before starting of the work and shall submit the necessary document/policy in support of above to BHEL/customer at site. This will be also essential for taking the gate pass/entry pass etc. From customer & their related departments/TEIL/CISF at site. The insurance policy taken shall be kept inforce till completion of contract. The workmen's compensation insurance and third party insurance liability limits shall be as customer specification. Contractor shall indemnify the customer (IOCL)/ BHEL harmless against such losses, which are on account of contractor.**

4.9.11

Recoveries will be made from contractor's bills for any liability accrued to BHEL/IOCL/TEIL for the accidents and refund of the same shall be considered later, after the claim is fully settled by insurance authorities.

4.9.12
Customer has taken the marine cover and erection all risk cover insurance for the project for permanent incorporation of materials and services at site. However contractor shall take all due precautions, arrange & follow the safety & security requirements/regulations for materials issued to him & works under his execution and shall be responsible for safety & security of these materials & works for any loss or damages. For any damage / loss to the material during inland transportation, storage, erection, final testing, commissioning stage etc., contractor shall intimate promptly to BHEL/customer and shall prepare & submit the necessary detailed report / documents / information, facilitating inspection / discussions by the officials / surveyors deputed by insurer with all expenditure on contractor's account. Contractor shall take care for timely information for conducting survey, submission of monetary estimate & furnish the requisite documents to surveyors/insurer, taking necessary precautions so that the loss/damage is not aggravated further, protecting damaged goods etc. As part of scope of work.

Contractor shall promptly make repair / rectify/replace and make good any damage or loss to customer/BHEL materials and works on above account as per instructions of BHEL engineer incharge at site without any delay & waiting for settlement of insurance claim from insurer. Contractor's claim (if any) for such works will be settled as per applicable item rate of contract after settlement of claim from insurer / customer & after ascertaining / establishing that contractor is not responsible for such loss or damages. The contractor's claim for such repair / replacement shall not be more than the payment settled by insurer / customer and in such case the contractor's payment will be limited to seventy percent of settled amount by insurer/customer against claim amount.

4.9.13
The contractor shall submit survey report/performance report of the tools and plants deployed by him and being utilized on the work under the scope. These survey reports/performance reports are to be obtained by contractor from the customer of BHEL/insurance authorities and submitted to BHEL at no extra cost.

4.9.14
In case, any additional expenditure is to be incurred in work during execution arising out of the faulty execution of such work by the contractor, the same shall be borne by the contractor.

4.9.15
Contractor shall deploy & maintain, the separate exclusive workforce / manpower arrangements and T&Ps resources including the Cranes & heavy lift equipments /arrangements for Material Handling and Erection & Commissioning scope of works.

4.9.16
All the Material Handling and Erection & Commissioning scope T&Ps and tools & tackles, Measuring equipments/devices/ Tools, Safety devices, Transport Vehicles, Welding Generators/diesel Generators etc. shall have due calibration, Test & Load Test certificates from approved agencies / statutory authority as per requirement of IOCL/TEIL. All vehicles/ electrical motors, devices shall have to be provision of fire extinguisher/muffler facilities etc.

4.9.17
Contractor shall abide by all Safety Rules, Laws & regulations and statutory requirements as per requirement of TEIL/IOCL/CISF at project premise and same shall be binding on contractor.

4.9.18
Contractor shall provide FIRST AID / emergency medical facilities & Emergency Vehicle facilities at project premise/work site to meet any exigency / emergency requirement and shall maintain these facilities through out the contract period & extension period (if any) as scope of work.

4.9.19
The equipments/systems/piping/components under these specification shall require to connect / hookup with other systems / equipments / piping / components / terminal points etc. of Customer / other erection vendors. Contractor shall carry out the termination of these systems / equipments / piping with customer/other vendor's terminal points and shall involve welding, bolting/flange joints, cutting, edge preparation, radiography, NDE etc. of terminal point systems (which may not be included in these specifications and may have been erected by other vendor) shall be carried out by contractor as per instruction of BHEL engineer at site including welding / bolting of counter/matching flange joints as scope of work. Decision of BHEL engineer shall be final and binding on contractor.

4.9.20
As such the external barricading of project plot area will be carried out by civil agency as scope of civil works. Contractor under these specification shall carry out his internal barricading/ cordoning off (as applicable) of area of HIS operations, providing safety nets, safety tapes, passenger trolley for high height working etc. as per safety requirements/safety concern and regulations enforced by IOCL/TEIL at site before under taking the day-to-day works. All such works/arrangements shall be carried out by contractor as scope of work.

4.9.21
For structures, supports, stairways, platforms, galleries, hand rails, grills, etc. the structural materials may be supplied in random length which may have to be cut to required profile in order to suit the requirement a incidental to the work. Also it may sometimes be necessary to remove some of the erected members to facilitate erection of bigger / pre-assembled equipments. In such cases, the

removal and re-rection of such works as agreed by BHEL Engineer will have to be done by contractor as incidental to work.

4.9.22
All the handrails and toe guards shall be provided as per drawing and safety requirements. After cutting the floor grills to suit the site condition, the cut edges shall be painted with two coats of cold galvanizing paints conforming to Indian Standard.

4.9.23
HRSG casing supplied will be of carbon steel casing externally reinforced with structural steel. All structural steel will be seal welded at site to the casing (ducting). The ducting (casing) will have to be internally lined with blanket/mineral/ceramic wool insulation covered by suitable thickness and material of internal liner.

4.10 **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) All electrical Equipments and control & instrumentation items except those specified herein.

V) Civil works except to the extent specifically indicated elsewhere in this tender.

VI) Pneumatic copper tubing and fittings thereof.

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 of Material Handling and Erection & Commissioning etc. as covered under these specifications. Contractor has to provide suitable cranes for Material handling works at BHEL/client's stores/storage yard and for erection & commissioning works separately. Contractor shall submit proposed T&P deployment plan alongwith offer.

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&Ps and lifting/handling/transportation arrangements for lifting/placement to required foundation/elevation, erection of equipments like HRSG Drums, HRSG modules, Chimney shells/Sections etc. including unloading & handling of heavier consignments/equipment like Gas Turbines, Gas Turbo-generators, GT inlet ducts, GT off base enclosure, Horizontal Ducts, Silencers, Load Gear Box, Cylindrical Stacks, Accessory Bases, Filters unit of GT, Skids, Feed Storage Tanks & Deaerator, Generator Transformers, Station Transformers, Unit Aux. Transformers, Switchgears etc. shall be required to be lifted with suitable capacity cranes/Jacks & Sleepers or any other suitable alternate methods. The contractor shall arrange all above suitable arrangements to suit the site requirement and erection schedule.

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 flushing/ 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 any Pumps/arrangements. BHEL**

will provide only Chemical Circulation Pumps for Alkali Boil out operation free of hire charges. .

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 as per IOCL/TEIL Rules, Laws, Regulations requirement at site shall be required to be submitted by contractor at site.

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.

5.2.11
Contractor shall provide necessary Concrete / Wooden Sleepers for unloading, Handling, Storage of Materials as per requirement and specified schedule in relevant appendix in addition to the sleepers/concrete blocks for his regular pre-assembly/fabrication work etc. as part of scope of Erection & Commissioning work.

5.3 **CONSUMABLES**

5.3.1
The contractor shall provide all consumables required for carrying out the works 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 TEIL/IOCL & 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 preservation of site weld joints are in the contractor's scope. BHEL will provide preservation paints with primers for preservation of BHEL supplied equipments / materials and Final Painting/ Finish Painting of BHEL equipments under these specifications.

5.3.4 Consumables for BHEL supplied equipments (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. Contractor shall at his cost meet requirements of TIG filler wires, if any, beyond these free issue by BHEL.

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

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. IOCL Gujarat Refinery 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:

Construction power (3ph., 415v/440v) will be provided at available single point in project premise by customer (IOCL). 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 etc. And any other installation 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 laws & regulations and requirements at site as per specifications of iocl/teil. 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 equipped with back-up power supply arrangement like Diesel Generator 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 process 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 iocl 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
The meters to be used for metering of construction power as well as construction water shall have necessary test certificate from relevant approving authority and these meters 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 IOCL/TEIL.

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 incharge.

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

5.8.9
BHEL/IOCL/TEIL 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/IOCL/TEIL

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 IOCL/TEIL /BHEL, to work beyond normal working hours, the contractor shall arrange necessary gate passes.

5.9 TAXES, DUTIES, LEVIES

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

5.9.1

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

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

5.9.2 Service Tax & Cess on Service Tax

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

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 relevant 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 employ only qualified Engineers/Supervisors and Workmen for this job. They shall have professional approach in executing the work having adequate knowledge / experience in the field of Material Handling & Material Management, Over all knowledge of HRSG/Boiler 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 and ward round the clock for the materials/equipments issued to him.

6.10

Contractor shall implement local labour laws, 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:

6.12.1 Overall planning, monitoring & control

6.12.2 Quality control and quality assurance

6.12.3 Materials management

6.12.4 Safety, Fire & security

6.12.5 Industrial relations and fulfillment of labour laws and other statutory obligations.

SECTION-7

SPECIAL CONDITIONS OF CONTRACT

7.0 OBLIGATIONS OF BHEL

7.1 Facilities to be provided by BHEL

7.1.1 Space for site office / stores
Refer section-5 in this regard.

7.1.2 **CONSTRUCTION POWER & WATER**
Refer section-5 in this regard.

21.1.3 **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.

7.2 EQUIPMENTS – TOOLS & PLANTS

BHEL will make available T&P / materials listed vide Appendix-III 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 arrangement for this work. Contractor shall make all arrangements for the crane and other suitable arrangements as indicated in relevant appendix and required for completion of work in contractor's scope.

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

SECTION-8
SPECIAL CONDITIONS OF CONTRACT

INSPECTION / QUALITY ASSURANCE / STATUTORY INSPECTION

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

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

8.3
A daily logbook of all measurements and testing/calibration should be maintained by contractor on the job for detailing inspection details of various equipments.

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

8.5
All the welders including hp welders shall carry identity cards as per the proforma prescribed by BHEL only welders duly authorized by BHEL/boiler inspector/customer/consultant shall be engaged on the work.

8.6
Contractor shall provide all the measuring and monitoring devices (MMD) required for completion of the work satisfactorily. These MMD shall conform to job requirement in respect of measurement range, accuracy level & any other specification.

8.7
The MMD deployed by the contractor shall, at all stages of work, have valid and current calibration certificate. The calibration of these MMD shall be got done from the agencies accredited/ approved by BHEL. Copy of calibration certificates in respect of these MMD has to be submitted to BHEL. Periodical status report regarding validity of calibration has to be submitted to BHEL. Re-calibration/ re-validation shall be done for the continuity of usage , as per BHEL specifications. Contractor shall conform to the specifications of BHEL regarding storage of the MMD.

8.8
Re-work necessitated on account of use of invalid MMD shall be entirely to the contractor's account. He shall be responsible to take all corrective actions, including resource augmentation if any, as specified by BHEL to make-up for the loss of time.

8.9
In the course of work BHEL may counter/ finally check the measurements with their own MMD. Contractor shall render all assistance in conduct of such counter check / final measurements.

8.10
Vibration indicators/vibration recorders/vibration analyzers will be provided by BHEL for checking and analyzing vibration levels of rotating equipments with qualified operatoRs. Contractor shall provide necessary manpower for carrying out such tests. Similarly, BHEL will provide the oscilloscope for any specific requirement.

8.11
Total quality is the watchword of the work and contractor shall strive to achieve the quality standards, procedures laid down by BHEL. He shall follow all the instructions as per BHEL drawings and quality standards. Contractor should engage well-qualified and experienced engineer for quality assurance and NDE services.

8.12 Stage inspection by FES / QA engineers

8.12.1
Apart from day-to-day inspection by BHEL engineers stationed at site and also by customer's engineers, stage inspection of equipments under erection and commissioning at various stages of erection and commissioning by teams of engineers from field engineering services of BHEL's manufacturing units and quality assurance teams from field quality assurance, factory quality assurance and commissioning engineers from technical services of BHEL / consultant will also be conducted. Contractor shall arrange all labour, tools and tackles etc for such stage inspections as part of work.

STATUTORY INSPECTION OF WORK

8.13.1
The work to be executed under these specifications has to be offered for inspection, at appropriate stages of work to statutory authorities to comply with applicable regulations.

8.13.2
The work related statutory inspections, though not limited to, are as under:
Inspectorate of steam boilers and smoke nuisance
Factory inspector, labour commissioner, electrical inspector pf commissioner and other authority connected to this project work

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

8.13.3
The contractors shall pay all fees connected with testing of his welders / workers and testing, inspection & calibration of his MMD and T&P.

8.13.4
It shall be contractor's responsibility to obtain approval of statutory authorities, whenever applicable, for the conducting of any work which comes under the purview of these authorities. Any cost arising from this shall be contractor's account.

8.13.5
Contractor shall pay fees for visits, inspection fees etc of IBR authorities in addition to all other expenses in this regard.

8.13.6
Contractor should be qualified to execute pressure parts & piping work coming under the purview of IBR, for which he should register himself with CIB of state concerned. Contractor also should be aware of the latest IBR regulations and electricity act, including the amendments thereof.

8.14.0

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 MMD (measuring and monitoring devices). The mmd shall have test / calibration certificates from authorized / government approved/ accredited agencies traceable to national / international standards. Retesting / recalibration 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 MMD so that work does not suffer when the particular equipment/ instrument is sent for recalibration. Also if any mmd is 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 i.e. repeat the readings taken by that instrument, failing which bhel may deploy MMDs and retake the readings at contractor's cost.

8.15
Contractor to note that in addition to above BHEL requirements of inspection /quality assurance / quality control / statutory inspection, contractor shall follow & abide the requirements of iocl/teil and in the event of any deviation/ dispute, the requirements of IOCL/TEIL in above regard shall supersede the BHEL requirements.

Section-9

Special Conditions

Safety, Occupational Health and Environmental Management

Introduction:-

BHEL PSWR has been certified for Environmental Management under ISO 14001:1996 standard and Occupational Health & Safety under OHSAS 18001 by DNV. In order to comply with the above standards, it shall be the endeavor 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

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

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

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

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

9.2 SPECIAL CONDITIONS

9.2.1 Safety

9.2.1.1 Safety Plan

Before commencing the work, contractor shall submit a "safety plan" to the 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 guard rails, 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 eg 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 Cylinder Rules and relevant safe working practices

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

9.2.1.18

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

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

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

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

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

9.2.1.22
In case of a fatal or disabling injury/accident to any person at construction sites due to lapses by the contractor, the contractor as per statutory requirements shall compensate the victim and/or his/her dependents. 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 neighboring
- Protect environment
- Resumption of normal operations as soon as the emergency condition is called off

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

At least 5% Contractors supervisors and workmen shall undergo training in administering 'First Aid'. The trained persons should represent for all categories of work and for all areas of work. Adequate number of trained persons should be available for each shift. These first aiders 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 PPEs are adequate/maintained and worn by all staff involved in operations that are potentially hazardous to their health
- Ensure that the personnel deployed are physically fit for the operation/work concerned
- Provide hygienic and sanitary working conditions

9.2.2.5
Contractor workers employees engaged in noise risk areas shall be issued with hearing protection aids and the use of the same will be enforced. Further, these workers will be educated on the hazards of noise

9.2.2.6
Contractor workers engaged in dust environment shall be issued with necessary dust protection aids and the use of the same shall be enforced

9.2.2.7
Workers engaged in exposure to bright light/rays as in welding or radiation shall be issued with eye protection devices and the use of the same shall be enforced

9.2.2.8 Adequate arrangements shall be made to provide safe drinking water

9.2.2.9
Health monitoring records on at least sample basis for contractor employees & workmen shall be maintained for persons engaged in specified categories of work. These shall include

- Noise induced hearing loss
- Lung Function test

- Ergonomic Test
- Eye Test for Welders, Grinders, Drivers etc

9.2.3.0 HYGIENE and HOUSEKEEPING

9.2.3.1
Good house keeping and proper hygiene is one of the key requirements of Occupational Health Safety and Environment management. Towards this the contractor shall encourage his workers and supervisors to maintain cleanliness in their area of work.

9.2.3.2
The Contractor shall arrange to place waste bins/chutes at convenient locations for the collection of scrap and other wastes. The bins shall be clearly marked and segregated for metal, non-metal, hazardous and non hazardous wastes.

9.2.3.3
BHEL may take up appropriate remedial measures at the cost of the contractors if the contractors fail good house keeping and if there is an imminent risk of pollution

9.2.4ENVIRONMENT 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 advise

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

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

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

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

9.3 SUPERVISION

9.3.1
Contractor must provide at least one full time on site safety coordinator when the manpower engaged is in excess of 50 for the contract activities in the premises. If the manpower is less than 50, the on site safety coordination responsibilities shall be assumed by any one of the contractor's other supervisory staff; however in both the cases, the contractor must specify in writing the name of such persons to the BHEL Engineer in Charge .

9.3.2
Contractor's safety coordinator or his supervisor responsible for safety as the case may be shall conduct at his work site, and document formal safety inspection and audits at least once in a week. Such documents are to be submitted to BHEL Engineer in Charge for his review and record. Contractor, supervisor must attend all schedule safety meetings as would be intimated to him by the BHEL Engineer in Charge.

9.3.3
Before starting work under any contract, the contractor must ensure that a job specific safety procedures/field practices as required over and above the safety permit conditions are prepared and followed .He should also ensure that all supervisors and workers involved understand and follow this procedures /field practices.

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

9.4.0 TRAINING & AWARENESS

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

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

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

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

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

9.5.0 REPORTING

9.5.1

The contractor shall submit report of all accidents, fires and property damage, dangerous occurrences to the authorised BHEL official immediately after such occurrence but in any case not later than twelve

hours of the occurrence. Such report shall be furnished in the manner prescribed by BHEL and also to meet statutory requirement.

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

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

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

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

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

9.6 AUDIT REVIEW AND INSPECTION

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

9.6.2

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

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

The Safety Co-ordinator shall visit and inspect work sites daily. All unsafe acts, unsafe conditions that have imminent potential for causing harm/injury/damage will be immediately corrected. He shall maintain a daily logbook giving details of unsafe acts or conditions observed and the corrective action taken and recommendations for preventing recurrence. Adequacy of corrective actions will be verified

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

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.	Safety	Fine (in Rs)
01	Not Wearing Safety Helmet	50/-
02.	Not wearing Safety Belt	100/-
03.	Grinding Without Goggles	50/-
04.	Not using 24 V Supply For Internal Work	500/-
05.	Electrical Plugs Not used for hand Machine	100/-
06.	Not Slinging property	200/-
07.	Using Damaged Sling	200/-
08.	Lifting Cylinders Without Cage	500/-
09.	Not Using Proper Welding Cable With Lot of Joints And Not Insulated Property.	200/-
10.	Not Removing Small Scrap From Platforms	200/-
11.	Gas Cutting Without Taking Proper Precaution or Not Using Sheet Below Gas Cutting	200/-
12.	Not Maintaining Electric Winches Which are Operated Dangerously	500/-
13.	Improper Earthing Of Electrical T&Ps	500/-

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

9.8

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

9.9 Memorandum of Understanding

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

Memorandum of Understanding

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

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

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

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

Signed by 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	1983		HIGHER CAPACITY DRY POWDER FIRE

10658			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 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 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 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

9.11

CONTRACTOR TO NOTE THAT IN ADDITION TO ABOVE BHEL REQUIREMENTS OF Safety, Occupational Health and Environmental Management, CONTRACTOR SHALL STRICTLY FOLLOW & ABIDE THE SAFETY LAWS/RULES & REGULATION REQUIREMENTS OF IOCL/TEIL AT SITE AND IN THE EVENT OF ANY DEVIATION/ DISPUTE, THE REQUIREMENTS OF IOCL/TEIL IN ABOVE REGARD SHALL SUPERSEDE THE BHEL REQUIREMENTS. CONTRACTOR SHALL ARRANGE THE REQUIRED SAFETY FACILITIES SUCH AS FIRST AID, EMERGENCY TRANSPORT, FIRE PROTECTION/FIRE EXTINGUISHERS/SAND BUCKETS/WATER BUCKETS, BARRICADING OF AREA, DISPLAY OF SAFETY RULES/POSTER/ DANGER MARKS, PUTTING OF DANGER BOARDS/ CORDONING OF UNSAFE AREAS, PUTTING THE SAFETY TAPS/ SAFETY FENCING SAFETY TAG ETC. AS PART OF SCOPE OF WORK AS PER REQUIREMENT OF IOCL/BHEL.

FOR NON-COMPLIANACE/VIOLATION OF SAFETY RULES AND FINE/PANELY IMPOSED BY IOCL/TEIL AS THEIR RULES & REGULATIONS SHALL BE TO THE ACCOUNT OF CONTRACTOR & SAME SHALL BE PAID BY CONTRACTOR. IN EVEN OF ANY RECOVERY FROM BHEL BILLS BY CUSTOMER ON ACCOUNT OF CONTRACTOR AGAINST SUCH FINE/PANELTY, BHEL SHALL RECOVER SUCH AMOUNT/PAYMENT IN ADDITION TO 30% DEPARTMENTAL OVERHEADS FROM ANY AVIALBLE BILLS/PAYMENTS OF CONTRACTOR WHICH IS DUE FOR PAYMENT FROM BHEL.

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 contract in sections 4 to 15 and appendices shall prevail.

10.7 In case of discrepancy between quoted item rate and corresponding amount in the rate schedule, the **quoted item rates shall be reckoned as correct and amount recalculated**. Quoted item rates shall also prevail for arriving at the total price quoted for offer evaluation.

10.8 Bank guarantees to be furnished by the contractor towards security deposit and performance guarantee (last 5% payment against workmanship warranty/defect liability) shall have a claim period of six months over and above the validity period required for the case.

SECTION-11

SPECIAL CONDITIONS

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 of HRSG with related Aux. including Chimney with insulation and Final Painting is completed to achieve the following schedule:

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SN	MILESTONE	COMPLETION SCHEDULE OF UNIT-1 FROM START OF ERECTION WORK
01	HYDRAULIC TEST	6TH MONTHS
02	GAS IN	8 TH MONTH
03	SAFETY VALVE FLOATING & STEAM BLOWING	8 TH MONTH
04	COMBINED CYCLE TRIAL OPERATION AND COMPLETION OF ALL FACILITIES INCLUDING FINAL PANTING	11 TH MONTH

 # Unit-2 Time Schedule will be within one month difference of Unit-1.

11.1.2
The contractor shall mobilize his resources within two weeks time after issue Fax Letter of Intent for Material Unloading, Verification, Stacking and Material Management services work with watch & ward and will mobilize to commence the Erection, Testing and commissioning work 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.

11.1.2
The date of Start of Contract Period shall be reckoned from the date of erection/placement of 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. Contractor prior to start of start of erection/placement work (i.e. start of contract period), contractor shall mobilize resources to undertake the other services like those at stores, Material Management, Watch & Ward and other miscellaneous services under the scope of this contract.

11.1.3
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 **12 months** from the start of erection work as defined in clause 11.1.1 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 **2 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 Clause No. 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.6,000.00 per manmonth (Rupees Six 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 schedule in addition to the payment of manmonth basis Material Management services during the period of availing the Material Management services beyond the E&C contract period and its extended period.

11.3 PRICE VARIATION

Rates offered shall remain firm through out the contract period and grace period as also during extended period, if any. No rate revision, price variation is applicable under this contract. Accordingly, the clause no. 2.15 of general conditions of contract is also 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 (rate of interest will be 1% per annum more than bank interest rate, on monthly reducing balance basis) recoverable advance limited to 5% of the contract value may be paid by BHEL at its discretion depending on the merit of the case against receipt & acceptance of bank guarantee from the contractor for the amount sought. This bank guarantee (BG) shall be valid at least for one year or the recovery duration. In case recovery of dues does not get completed within the aforesaid BG validity period, the contractor must renew the validity of BG or submit fresh BG for the outstanding amount and remaining recovery period. BHEL is entitled to make recovery of the entire outstanding amount in case the contractor fails to comply with the BG requirement as above.

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

11.6 DEFINITION OF WORK COMPLETION

The contractor's scope of work under these specifications will 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.

SECTION-12

SPECIAL CONDITIONS OF CONTRACT

12.0 TERMS OF PAYMENT

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

12.0.2
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 at any point of time one month after start of work and upto completion of guarantee period, subject to receipt and acceptance of bank guarantee of equal amount in BHEL's prescribed format and 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

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

12.1 STAGES OF PROGRESSIVE PRO-RATA PAYMENTS

12.1.1 MATERIAL HANDLING AND MATERIALS MANAGEMENT (SL. NO.B-1, B-2 & B-3 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 25T crane at site

(ii) 1.0% of the total amount on deployment of & making operational the 10-12 T Hydra crane and one set of computer with printer & related accessories at site.
(iii) 0.50% of the total amount on deployment of 350 Nos. of wooden/ concrete sleepers at site
(iv) 0.5% of the total amount on deployment of balance 250 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-a 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.

12.1.1.2.1.3
The progressive pro-rata payment towards for outgoing materials (item No. A.3 of rate schedule) shall be released as per following:

70% of accepted rate will be paid after proper packing/bundling of materials as and where necessary, loading on the outgoing vehicle, preparation of packing list and material outgoing gate pass, getting the consignment inspected and endorsed by the security personnel of BHEL as well as that of customer, getting the out-going gate pass registered at the 'out gate' of the project.

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 (ITEMS A-1, A-2, A-3, A-4 & A-5 of RATE SCHEDULE: SECTION – A)

12.1.2.1

96% 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. Rate schedule : Section – A)**			
		Non-pressure parts and Chimney	Structures	Pressure parts,Heat Hran. Mod	Insulation
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	2%	2%	2%	2%
I	ON COMPLETION OF FINAL PAINTING	3%	3%	3%	3%
J	ON COMPLETION OF ALL FACILITIES OF HRSG	1%	1%	1%	1%
	TOTAL	96%	96%	96%	96%

12.1.2.2
04% of total amount of rate schedule for various items of HRSG and its auxiliaries and piping 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 150T capacity at site to suit the site requirement for erection of Chimney & HRSG.

(ii) 1.50% of the total amount on deployment of & making operational of 10-12T Hydra crane at site for erection work.

12.2 GENERAL

12.2.1
For the purpose of release of progressive payments, month-wise break up for each of the above services will be jointly worked out by BHEL and the contractor at site at the time of start of work. This will be dynamically and regularly reviewed every month or mutually agreed periodicity and shall be re-set based on expected requirement of various services keeping in view relevant aspects. On all the issues as above, BHEL engineer's decision shall be final & binding.

12.2.2
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 and Erection & Commissioning of materials to be done 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 material handling and Erection & Commissioning activities and the total payment towards break up envisaged in clause 12.1.1 and 12.1.2 herein above shall be adjusted accordingly.

12.2.3
Weight of packers and shims which become permanent part of equipment, both figuring in shipping list and those fabricated at site will be paid for on shipping list based actual weight.

12.2.4
Certain optimized assemblies / or modules may be made, assembling products from two or more different product group main assembly and dispatched. Payment for erection of these optimized assemblies / or modules will be regulated as per the weight of individual product group main assemblies contributing to the total weight of the module or optimized assembly at the quoted rate for the respective product group main assemblies, in the rate schedule.

12.2.5 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 manhours) 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 manday basis, for such of those activities detailed in clause 13.1 which require more than 100 manhours 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 supervision, 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
SPECIAL CONDITIONS OF CONTRACT

14.0 INSURANCE

14.1 MARINE, STORAGE CUM ERECTION (MCE) INSURANCE AND REPAIRING DAMAGES

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

14.2 REPORTING DAMAGES AND CARRYING OUT REPAIRS

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

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

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

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

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

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

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

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

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

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

14.2.11 In case of theft / damage / loss of materials due to negligence or 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 shall be recovered from the contractor. Recovery will be limited to Normal Deductible Franchise (DF) / Excess as per applicable Insurance (TAC) tariff guidelines. However, in case such insurance claim is summarily rejected by the underwriters due to willful damage/loss on the part of the contractor, the total cost of repair/ replacement shall be recovered from the contractor.

14.3 INSURANCE BY THE CONTRACTOR AND INDEMNIFICATION OF BHEL

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

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

NOTE:
CONTRACTOR SHALL TAKE THE REFERENCE OF CLAUSE 4.9.10 AND INDEMNIFY BHEL AND CUSTOMER (IOCL) ACCORDINGLY.

SECTION-15

Special Condition of Contract

15.0 EARNEST MONEY DEPOSIT & SECURITY DEPOSIT

15.1 EARNEST MONEY DEPOSIT:

EMD for this tender is Rs. 2,00,000/- (Rupees two lakhs only). Bidders who have already deposited One Time EMD of Rs. 2.00 lakh will be exempted from submission of any EMD now for this tender.

EMD is to be paid in **cash** (as permissible under Income Tax Act), Pay order or **Demand Draft** only in favour of Bharat Heavy Electricals Limited and payable at Nagpur. **No other form of EMD is acceptable**.

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

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

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

15.1.2 EMD shall not carry any interest.

15.2 SECURITY DEPOSIT

15.2.1 Security Deposit shall be furnished by the successful tendered. 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 based on award value shall be furnished before start of the work by the Contractor. Amount of Security Deposit shall be aligned with the actual executed value at appropriate stages of the contract period if there is variation from the award value.

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

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

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

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

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

v) Bank Guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act subject to a maximum of 50% of the total security deposit value. The balance 50% has to be remitted either by cash or in the other form of security. The Bank Guarantee format should have the approval of BHEL.

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

vii) Security deposit can also be recovered at the rate of 10% from the running bills. However in such cases at least 50% of the Security Deposit should be furnished in the form of BG or DD by the Contractor before start of the work and the balance 50% may be recovered from the running bills.

viii) EMD of the successful tendered shall be converted as Security Deposit, excepting those bidders who have 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.

15.2.2.1.1 Security Deposit shall not be refunded to the Contractor except in accordance with the terms of the contract.

APPENDIX-I

TENTATIVE SCOPE OF EQUIPMENTS/SYSTEMS COVERED UNDER THIS TENDER SPECIFICATION FOR 2X30 MW GTG BASED CO-GEN IOCL, GUJARAT REFINERY, VADODARA PROJECT

A) Receipt/collection/loading/ unloading/ transportation of materials from BHEL/client's stores /storage yards to site of work, erection, testing, commissioning, Chemical cleaning/Flushing, Alkali Boil out, Steam Blowing, Safety Valve Floating and Final painting of 2x100TPH Supplementary Fired HRSGs with their auxiliaries including Chimney, application of insulation, including assembly, fit up, welding, NDT/ radiography/ pre-heat treatment/post-heat treatment requirement, supporting of field piping, Integral piping and associated Aux. piping etc.

Heat Recovery Steam Generator with associated Equipments & Aux. as per below mentioned scope and weight details and items listed in "A-Appendix-II".

a) Boiler Drums with internals.
b) Spiral finned Front, Middle and Rear Riser pipe systems with respective links.
c) Spiral finned Screen, Front, Middle, Rear Evaporator module with supports.
d) Spiral finned Saturated Steam connecting system with connecting links.
e) Main Steam piping.
f) Spiral finned De-superheater system with supports & suspensions.
g) Spiral finned Super-heater Tubes, Headers system with supports.
h) Spiral finned Economizer system with links & supports & suspensions.
i) Soot Blower and Soot Blower system with piping.
j) Seal Air System, Scanner Airs system etc.
k) Boiler trim piping and boiler integral piping with valves, fittings, drains, vents etc.
l) Silencer system with supports, Safety Valves, related metallic expansion bellows.
m) Sample coolers/SUPP
n) Manholes and Access doors
o) Complete Ducts, Dampers and Expansion joints as per drawings.
p) Direct water level gauges as per drawing requirement.
q) Complete insulation (Pourable, refractory, Mineral wool etc. with fixing components, hooks, cladding/Sheeting-Al/SS) of HRSG/casing/modules, Ducting system, Chimney, Piping, Valves, Equipments, Tanks etc.
r) Complete Support Structures with foundation fasteners and anchors.
s) Safety valves, Safety relief valves with silencers as per drawing requirement.
t) Galleries, Stair ways, Platforms and ladders as per drawing and site requirement.
u) Tanks & Vessels
v) Dosing System

w) Self supporting Steel Chimney with ladder/ painter trolley

(B) 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 2x100 TPH Supplementary Fired Heat Recovery Steam Generator and their auxiliaries, Insulation, Chimney and field & Power Cycle Piping, 2x30MW Fr-6 Gas Turbines, Gas Turbine-Generators with their Auxiliaries including Bypass Stack, Gas Turbine Filter, Deaerators with FST, LP Dosing system, Naphta Filter Skids, HSD Filter Skids, Hitech Additive Skids, Naphta Tanks, HSD Tanks, HSD Fuel forwarding Skids, Drain Tanks, Gas Conditioning Skids, Gas Filter Skids, SWAS system, Naphta Colesecnt Skids, Water Injection Skids, IBD & CBD Tanks, Heat Exchangers, DM Water Circulating Pump Skids, HSD Centrifuge, Compressor water wash Skids, Diverter Dampers, Electrical and Control & Instrumentation Equipments & items likes, Station Transformers, Generator Transformers, Unit Aux. Transformers, 6.6 KV & 11KV & 33 KV Switchgear Systems/Panels and other related system Panels/cubicles/control panels, other related items like Cable, Cable Trays, Electrical Fittings etc. and Reinforcement & Structural Steel materials supplied by BHEL units, their sub-vendors, bought-out items, any other material like BHEL's T&P, furniture etc.

The dimensions of major equipments (Mechanical & Electrical items for unloading and handling:

Sl. No.	Description of the equipment	Approx. Equipment dimension LX BXH (in mm)	Approx. Weight (MT) per item
01	HRSG Drums (2 Nos.)	Dia.1.524XL-7 Meters	22
02	Chimney Sections (22 Nos. per unit i.e total 44 Nos. for two units,)	Dia.3.5x2.5 Meters	wt. of heaviest section-7
03	Gas Turbine Skids (2Nos)	7.38x3.6x3.93 Meters	64
04	Accessory Base (2 Nos.)	6x3x5 Meters	30
05	GT Generators assembled with rotor etc. (2 Nos.)	7.4x3.15x2.85 Meters	81
06	GT Gas valve Module (2Nos.)	6X3.6X5 Meters	8
07	Gas Conditioning Skids(2 Nos.)	5x5x4 Meters	5
08	Gas Filter Skids (2 Nos.)	3x3x3 Meters	3

09	HSD Centrifuge (2 Nos.)	5x5x3 Meters	3
10	Compressor water wash Skids (2Nos.)	6.5x3x3.2 Meters	5
11	Boiler Feed Pumps (6 Nos.)	4x2x3 Meters	5
12	Diverter Dampers (2 Nos.)	4x4x4 Meters	15
13	Guillotine Dampers (2 Nos.)	6x0.4x4 Meters	10
14	Silencer Duct SL1 (2 Nos.)	4.7x5.1x3.2Meters	11
15	Silencer Duct SL2 (2 Nos.)	4.3x4.7x1.6Meters	5.2
16	Horizontal Duct D-1 (2 Nos.)	4.5x4.1x3.85 Meters	10
17	Horizontal Duct H-1 (2 Nos.)	4.1x2.5x2.8 Meters	4.7
18	Transit Duct D-2 (2 Nos.)	4.7x4.3x2.6 Meters	5.2
19	Transit Duct D-3 (2 Nos.)	4.5x4.3x2.1 Meters	4.2
20	Vertical Duct VD8 (8Nos.)	4.3X4.3X3.35 Meters	4.7
21	Vertical Duct VD9 (2Nos.)	4.5X4.5X3.4 Meters	5
22	GT Motor Control Center (2 Nos.)	8.86X0.9X2.43 Meters	7.5
23	Load Gearboxes (2 Nos.)	---	12
24	Cylindrical Stacks (8 Nos.)	Dia 3.8x6 Meters	17
25	Generator Transfor (2 Nos.)	8.8x10.2x6.1 Meters	68
26	Station Transformers (4 Nos.)	8.8x10.2x6.1 Meters	60
27	33/11KV, 30MVA, OLTC, Inter connecting Transformers (ICTs 4 Nos.)	8.8x10.2x6.1 Meters	68
28	6.6/0.433KV, 2.5MVA Auto Transformers (4Nos.)-1/2	3.5X3X3 mETERS	7
29	6.6/0.433KV, 1.6MVA Auto Transformers (4Nos.)-3/4	3.5X3X3 mETERS	7
30	415V PMCC-1 LT Swtgr. (2Nos.)	19x1.5x2.45 Meters	15.5
31	415V PMCC-2 LT Swtgr. (2Nos.)	12x1.5x2.45 Meters	10
32	415V BOP MCC (2 Nos.)	9.15x1.5x2.45 Meters	6.6
33	415VDSTG MCCLT Swtgrs(2Nos.)	13x1.5x2.45 Meters	10
34	415VAC/VENT MCC (2 Nos.)	7x1.5x2.45 Meters	5.1
35	415V CW MCC (2 Nos.)	10x1.5x2.45 Meters	7.1
36	415V CLW MCC (2 Nos.)	7.65x1.5x2.45 Meters	5.6
37	415V. ASB-1 (2Nos.)	7.75X1X2.45 Meters	2.5

38	415V MLDB (2 Nos.)	4.5x1x2.45 Meters	3
39	415V ACELDB (2 Nos.)	3x1x2.45 Meters	2
40	240V UPS DB (2 Nos.)	4.5x1x2.45 Meters	3
41	220V DCDB-1 (2 Nos.)	5.25x1x2.45 Meters	3.5
42	Aux. Control Panels (2 Nos.)	6x1x2.3 Meters	4
43	415V CLW MCC (2 Nos.)	7.65x1.5x2.45 Meters	5.6
44	Feed Storage Tanks (2 Nos.)	10.65x4.1x3.55 Meters	17
45	FST Headers (2 Nos.)	5.55x2.6x2.05 Meters	8
46	Bypass Stack Materials		
a.	Trans.duct assly.FR6B-D2(2 Nos.)		5.4
b.	Silencer Assly. Fr6-SL1 (2 Nos.)		10.4
C.	Trans.duct assly.FR6-D3 (2 Nos.)		4.3
d.	Vert. duct assly.FR6-D8L (2 Nos.)		4.7
e.	Vert. duct assly.FR6-D8M (2 Nos.)		4.7
f.	Vert.duct assly.FR6-D8M (2 Nos.)		4.7
g.	Vert. duct assly.FR6-D9 (2 Nos.)		5.1
h.	Silencer Assy FR6-SL2(2 Nos.)		5.3
i.	Hor. Duct assly. FR6B-D1(2 Nos.)		9.2
j.	Vert. duct Assly. FR6-D81		4.7

C) SUMMARY OF TOTAL WEIGHT FOR MATERIAL HANDLING:

SL. No.	Description	Approx. Wt.(MT)
1.	HRSG AND AUXILIARIES	1820
2.	GTG AND AUXILIARIES	1270
3.	BOP EQUIPMENTS (MECH.) WITH PIPING	1575
4.	ELECTRICAL AND C&I (INCLUDING TARNSFORMERS, CABLES, TRAYS ,NGR, STATIC FREQUENCY CONVERTER, CONTROL PANELS, BUS DUCTS, SWTICH GEARS, INSTRUMENTS ETC.)	1025
5.	REINFORCEMENT STEEL	2030
6.	STRUCTURAL STEEL	1320

7.	MISC LOOSE ITEMS LIKE OIL, T&P AND ITEMS OTHERS	60
	TOTAL	**9100**

Note: The scope under E&C and weights for material handling indicated above is tentative. The work of E&C and material handling shall be carried out by contractor as per drawing requirement for all the equipments with Aux. and associated components and material supplied form BHEL/customer and respective vendors for the entire project.

APPENDIX – II

DETAILS OF QUANTITIES FOR ERECTION AND COMMISSIONING SCOPE PER UNIT

(A) ESTIMATED WEIGHT OF VARIOUS PRODUCT GROUPS PER UNIT OF 2X100 TPH HEAT RECOVERY STEAM GENERATORS FOR 2X30 MW GTG BASED CO-GEN. IOCL, GUJARAT REFINERY, VADODARA FOR ERECTION, TESTING AND COMMISSIONING ETC.

1. STRUCTURES:

Sl.No.	PG	MA	DESCRIPTION	WT IN KG
1.	24	425	SILERNCER SUPPORTS	4500
2	35	010 & 011	FOUNDN MATERIALS	7700
3	35	110	MAIN COLUMNS LEFT	27000
4	35	120	MAIN COLUMNS RIGHT	27000
5	35	131	MAIN COLUMN MIDDLE	8000
6	35	140	AUX.COLUMNS LEFT END	8000
7	35	220	BOILER CEILING STRUCT	6000
8	35	390	UPRIGHTING FRAME	3400
9	35	391	MODULE TRANSPORT STRUCT	15000
10	35	392	SINGLE MOD. LIFT FRAM	1500
11	35	520	COLUMN BRACING-SIDE	1800
12	35	591	BOTTOM BRACING BEAM	4500
13	35	592	TOP BRACING BEAM	6500
14	35	593	BASE BEAMS	3500
15	35	594	STIFFNER BEAM	10000
16	35	595	STACKING BEAM ARRGT	6500
17	35	596	PACKING BEAM ARRGT	4500
18	35	597	PR.PART SUPPORT	6000
19	35	610	BLR ROOF STRUCTURE	7000
20	35	611	BLR ROOF SHEETING	2000
21	36	210	MAIN FLOOR 1 LEVEL	6000
22	36	220	MAIN FLOOR 2 LEVEL	10000
23	36	230	MAIN FLOOR 3 LEVEL	6000
24	36	240	MAIN FLOOR 4 LEVEL	3000
25	36	390	MISC PLATFORMS	1000
26	36	810	FLOORGRILLS&GUARD PL	17000
27	36	820	STAIRS & LADDERS	7000
28	36	850	HAND RAILS & POSTS	7000
			SUB-TOTAL	**217,400**

2. PRESSURE PARTS INCLUDING HEAT TRANSFER MODULES:

Sl.No.	PG	MA	DESCRIPTION	WT IN KG
1.	04	116	BOILER DRUM WITH INTERNALS	22000
2	04	156	DRUM SLIDE BEARING PLATES	130
3	04	158	FAST.FOR DRUM SADDLE	20

4	07	206	RISER PIPES-FRONT	1000
5	07	207	RISER PIPES-MIDDLE	500
6	07	208	RISER PIPES-REAR	1000
7	07	210	RISER LINKS-FRONT	500
8	07	211	RISER LINKS-MIDDLE	500
9	07	211	RISER LINKS-REAR	1000
10	07	504	DISC SPRING FOR EVAP. MODULES	300
11	07	505	EVAPORATAR MODULE SUPPORTS-SCREEN	750
12	07	506	EVAPORATOR MODULE SUPPORTS-FRONT	750
13	07	507	EVAPORATOR MODULE SUPPORTS-MIDDLE	1000
14	07	508	EVAPORATOR MODULE SUPPORTS-REAR	1000
15	07	992	IMPORTED ELECTRODES	10
16	07	993	ERECTION MATERIALSS	200
17	12	850	SAT-STEAM CONNECTING LINKS	3000
18	12	851	MAIN STEAM LINE	4000
19	12	852	DE SUPERHEATER CONNECTING LINKS	5600
20	12	900	DE SUPERHEATER	600
21	12	901	SH. SUPPORTS & SUSPENSIONS (SAT LINK & DESH)	600
22	12	902	SH. SUPPORTS & SUSPENSIONS (MS LINE)	400
23	12	911	SH-II MODULE SUPPORTS	400
24	12	912	SH-I MODULE SUPPORTS	600
25	12	992	IMPORTED ELECTRODES	20
26	12	993	ERECTION MATERIALS	500
27	19	850	ECONOMISER FEED PIPE	400
28	19	851	ECONOMISER LINK TO DRUM	500
29	19	852	ECO-I TO ECO-II LINKS	250
30	19	901	ECONOMISER SUPPORTS & SUSPENSIONS (FEED PIPE)	200
31	19	902	ECONOMISER SUPPORTS & SUSPENSIONS (ECO LINK)	200
32	19	912	ECO-II MODULE SUPPORTS	300
33	19	913	ECO-I MODULE SUPPORTS	900
34	21	600	SOOT BLOWER PIPING	4000
35	21	601	SOOT BLOWER PIPING SUPPORTS	1500
36	21	725	SOOT BLOWER SUPPORT BEARINGS	1000
37	21	825	SB PRESSURE REDUCING VALVE	100
38	21	850	SOOT BLOWER SAFETY VALVE	100
39	21	992	IMPORTED ELECTRODES	10
40	24	400	TRIM PIPES&FITTINGS	11000
41	24	401	BOILER TRIM PPG SUPPORTS	3000
42	24	420	SV ESCAPE PIPING	6700
43	24	440	SAMPLE COOLER/SUPP	800
44	24	460	BHEL VALVES	5000

45	24	465	1) METALLIC EXPANSION BELLOWS	5000
46	24	465	2) SPRAY CONTROL VALVE	150
47	24	465	3) BLOCK VALVE	100
48	24	465	4) N2 FILLING SYSTEM	100
49	24	473	DIRECT WATER LEVEL GAUGE	350
50	24	475	DRAIN HEADERS	750
51	24	480	SAFETY VALVES	350
52	24	495	PR VESEL FOR EWL I	500
53	24	992	IMPORTED ELECTRODES	25
54	24	994	NAME PLATES	100
55	42	152	PIPING OPERATING FLOOR LFO	1500
56	42	156	PIPING OPERATING FLOOR GAS	3300
57	42	157	PIPING OPERATING FLOOR AIR	900
58	42	252	SUB DELIVERY OP.FLOOR LFO	300
59	42	256	SUB DELY.OP.FLOOR GAS	200
60	42	257	SUB DELY.OP.FLOOR AIR	200
61	42	258	SUB DELIVERY OP FLOOR STEAM	500
62	42	352	B.VALVE OP FLOOR LFO	200
63	42	357	B.VALVE OP FLOOR AIR	500
64	42	700	BULKED BPS COMPONENTS	100
65	80	145	EXHAUSTS AND VENTS	1900
66	80	219	DOZING SYSTEM	4500
67	80	273	BLOW DOWN TANK VALVES	35
68	80	274	BLOW DOWN TANK SAFETY VALVE	75
69	**80**	**600**	**DOSING PIPING (COMMON FOR BOTH BOILERS)**	**600**
70	81	005	IBD TANK	2500
71	81	011	CBD TANK	2000
72	81	411	BD TANK TUBULAR LEVEL GAUGE	80
73	81	413	BD TANK CONTROL VALVE	100
74	HL	098	LOOSE COMPONENTS- DUCT	2000
75	HL	101	EVAPORATOR MODULE ASSY.-SCREEN	14400
76	HL	102	EVAPORATOR MODULE ASSY.-FRONT	7200
77	HL	103	EVAPORATOR MODULE ASSY.-MIDDLE	43200
78	HL	104	EVAPORATOR MODULE ASSY.-REAR	32400
79	HL	131	SH-II MODULE ASSY	6000
80	HL	132	SH-I MODULE ASSY	12500
81	HL	151	ECO-II MODULE ASSY	11000
82	HL	152	ECO-I MODULE ASSY	32000
83	HL	201	LINKS FOR EVAPORATOR - SCREEN	1000
84	HL	202	LINKS FOR EVAPORATOR - FRONT	500
85	HL	203	LINKS FOR EVAPORATOR - MIDDLE	1000
86	HL	204	LINKS FOR EVAPORATOR - REAR	1000
87	HL	231	SH-II MODULE LINKS	2000
88	HL	232	SH-I MODULE LINKS	2500
89	HL	251	ECO-II MODULE LINKS	400
90	HL	252	ECO-I MODULE LINKS	800

91	HL	301	MODULE COMP. FOR EVAPORATOR-FRONT	750
92	HL	302	MODULE COMP. FOR EVAPORATOR-MIDDLE	1000
93	HL	303	MODULE COMP. FOR EVAPORATOR-REAR	1000
94	HL	331	SH MODULE COMPONENTS	800
95	HL	351	ECO-II MODULE COMPONENTS	400
96	HL	352	ECO-I MODULE COMPONENTS	600
97	HL	501	SIDE CASING S1 - S2	7000
98	HL	502	SIDE CASING S2-S3	6500
99	HL	503	SIDE CASING S3 - S4	4500
100	HL	504	SIDE CASING S4-S5	4500
101	HL	601	TOP & BOTTOM CASING S1 - S2	4000
102	HL	602	TOP & BOTTOM CASING S2- S3	4000
103	HL	603	TOP & BOTTOM CASING S3 - S4	5000
104	HL	604	TOP & BOTTOM CASING S4 - S5	4000
			SUB TOTAL	**323,695**

3. INSULATION:

Sl.No.	PG	MA	DESCRIPTION	WT IN KG
1	32	010	FIXING COMP. INLET DUCT SIDE	1400
2	32	110	FIXING COMP. INLET DUCT TOP	800
3	32	210	FIXING COMP. INLET DUCT BOTTOM	500
4	32	310	FIXING COMP. CASING	12700
5	32	610	FIXING COMP. PIPING INSULATION	4000
6	32	810	FIXING COMP. OUTLET DUCT	1400
7	32	993	ERECTION MATERIALS	200
8	33	021	ID CERAMIC WOOL	55300
9	33	621	MINERAL WOOL FOR PIPING	18000
10	33	970	MISC EQPTS EXP METAL	800
11	33	975	SEALING COMPONETS	100
12	37	810	OUTER CASING SHEET	4700
			SUB TOTAL	**99,900**

4. CHIMNEY:

Sl.No.	PG	MA	DESCRIPTION	WT IN KG
1	87	010	FOUNDN MATLS FOR CHIMNEY	4000
2	87	100	CHIMNEY SHELL-BOTTOM	80000
3	87	101	CHIMNEY SHELL-TOP	94000
4	87	200	CHIMNEY PAINTER'S TROLLEY	1500
5	87	830	CHIMNEY LADDER	1000
			SUB TOTAL	**180500**

5. NON-PRESSURE PARTS

Sl.No.	PG	MA	DESCRIPTION	WT IN KG
1	08	910	EXPANSION MOVEMENT MEASURING	3000

			COMPONENT	
2	24	485	SAFETY VALVE SILENCERS	3500
3	24	490	START UP VENT SILENCER	1600
4	28	700	PINS AND B P S COMPONENTS	7500
5	41	130	DUCT BURNER ASSY.	8500
6	41	390	OIL GUN VICE & RACK	200
7	41	450	GAS IGNITOR	600
8	41	997	BURNER MANDATORY SPARE	100
9	43	002	ASSY.SCANNER AIR SYSTEM	1200
10	43	003	ASSY.AUG. AIR SYSTEM	6000
11	43	008	ASSY.SEAL AIR SYSTEM	3000
12	43	202	SUB DELY.SCANNER AIR SYSTEM	800
13	43	203	SUB DELY. AUG.AIR SYSTEM	1500
14	43	208	SUB DELY.SEAL AIR SYSTEM	800
15	43	308	B,VL. SEAL AIR SYSTEM	200
16	48	200	INSTRUMENT TAPPINGS	200
17	48	422	HRSG INLET DUCT	14000
18	48	424	EXPANSION JOINT HRSG INLET DUCT	300
19	48	452	DUCT BOILER OUTLET	6200
20	48	454	EXPN. PIECES BOILER OUTLET	300
21	48	482	DISTRIBUTION GRID	1500
22	48	700	BULKED BPS COMPONENTS	70
23	48	993	ERECTON-MATERIALS	1000
			SUB TOTAL	**62,070**
			TOTAL OF HRSG WEIGHT FOR UNIT-1	**884000**

GRAND TOTAL OF HRSG WEIGHT FOR BOTH THE UNITS=1768 MT

NOTE:

1. Weight and dimensions are approximate.

2. 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.

3. BHEL's decision with regard to classification of a particular product group is binding on the contractor.

4. Besides the above, weight & of all temporary piping, valves, pumps, tanks and other miscellaneous equipments etc. For carrying out hydraulic test, chemical cleaning, steam blowing and other tests, as stated elsewhere will get added. The work such temporary piping, tanks, pumps etc. For chemical cleaning/flushing/blowing etc. Will be carried out as scope of work and no separate extra / additional payment will be paid for these temporary works.

APPENDIX-III

LIST OF T&P AND MATERIALS 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	As per requirement
02	Piping, valves & fittings, supporting structures, plates/ tanks for temporary systems for Hyd test, chemical cleaning, steam blowing etc.	1 set	As per site requirement
03	Chemical Circulating pumps (150TPH)	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	TYRE MOUNT/ CRAWLER CRANE WITH SUITABLE BOOM LENGTH AND JIB TO FACILITATE ERECTION OF CHIMNEY AND HRSG	150 T CAPCITY FOR ERECTION OF CHIMNEY & HRSG	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 HRSG 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	600 Nos.	350Nos. WITHIN 1ST MONTH AND BALANCE BY 6TH MONTH FROM DATE OF REPORTING AT SITE
06	TRAILER WITH HORSE SUITABLE CAPACITY	AS PER REQUIREMENT	AS REQUIRED
07	AIR COMPRESSOR (ELECTRIC)	140 CFM	01
08	TIG WELDING SET	-	4 SETS/AS REQUIRED
09	3 ph DISTRIBUTION BOARD WITH COMPLETE SET UP FOR DRAWL OF CONSTRUCTION POWER & FITTED WITH ENERGY METER	600 Amp	4 SETS/ AS REQUIRED
10	PRE HEATING / STRESS RELIEVING SET (HEATING CONTROL PANEL, CABLES, HEATING ELEMENTS ETC.)	AS PER REQUIREMENT	4 SETS,AS PER REQUIREMENT
11	RADIOGRAPHY ARRANGEMENT INCLUDING THE SOURCE	IR 192	3 SETS/AS REQUIRED
12	ELECTRO-HYDRAULIC PIPE BENDING MACHINE	FOR UP TO 100 mm Nb PIPES	AS PER SITE REQUIREMENT
13	WELDING GENERATOR (ELECTRIC &	300 AMPS	APPROX.20 Nos. & OR

	DIESEL)		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.	150 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	JACKING BOLTS / PRESSOUT BOLTS OF ALL SIZES	AS PER REQUIREMENT	AS PER REQUIREMENT
25	GANG OPERATED AND HAND OPERATED HYDRAULIC JACKS WITH SUFFICIENT LONG HOSES OF VARIOUS CAPACITIES	ADEQUATE NOS.	AS PER REQUIREMENT
26	TORQUE WRENCH 0 TO 200 N-M CAP	AS PER REQUIREMENT	AS PER REQUIREMENT
27	SLINGS OF VAROIUS CAPACITY AND QUANTITIES FOR HANDLING OF EQUIPMENTS	AS PER REQUIREMENT	AS PER REQUIREMENT
28	SPANNERS / EYE BOLTS (OF ALL SIZES)	AS PER REQUIREMENT	AS PER REQUIREMENT
29	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	COMMEN C-EMENT DATE	SCHEDU -LED COMPLE -TION	% COMPL- TD. AS ON DATE	ANTICIP A-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 CONTRAC T	DATE OF AWARD OF WORK	DATE OF COMMENC EMENT OF WORK	TIME SCHEDULE (MONTHS)	DATE OF ACTUAL COMPLETI ON 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.