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

No. - BHE/PW/PUR/MAUDT-BLR Vertical Pkg/649

FOR

COLLECTION OF MATERIALS FROM BHELL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE; PRE-ASSEMBLY IF NECESSARY ,ERECTION, TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION , ASSISTANCE FOR PERFORMANCE GUARANTEE TEST AND HANDING OVER OF BOILER AND ITS AUXILIARIES, START UP BOILER,AIR PREHEATERS, DUCTS AND DAMPERS, FUEL PIPING, BOILER INTEGRAL PIPING, ELECTROSTATIC PRECIPITATOR, FANS, POWER CYCLE PIPING, TG CYCLE PIPING ,ROTATING MACHINES INCLUDIG COAL MILLS AND COAL FEEDERS, CHEMICAL DOZING SYSTEM, INSULATION, FINAL PAINTING ETC OF 500 MW UNIT NO. 1 OF 2X500 MW MAUDA SUPER THERMAL POWER PROJECT.

AT

MAUDA SUPER THERMAL POWER STATION
NTPC LIMITED
TEHSIL-MAUDA, DIST-NAGPUR
MAHARASHTRA

PART I

(TECHNICAL BID SPECIFICATION, NOTICE INVITING TENDER & GCC)

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

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$: Included in Tender Specifications Part-I. Hosted in BHEL web page (www.bhel.com) as file titled **"NIT+GCC-649".**

@: Issued as separate hard copy booklet 'Tender Specifications Part-II (Price Bid-649)'. Hosted in BHEL web page (www.bhel.com) as file titled **"PRICE BID-649"**

Note:

Rest of the tender documents are included in Tender Specifications Part-I. Hosted in BHEL web page (www.bhel.com) as file titled "**TECH BID-649"**

BHARAT HEAVY ELECTRICALS LIMITED

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

TENDER SPECIFICATION DOCUMENT ISSUE DETAILS

TENDER SPECIFICATION No. BHE/PW/PUR/MAUDT-BLR Vertical Pkg/649

NAME OF THE WORK: COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE; PRE-ASSEMBLY IF NECESSARY ,ERECTION, TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION , ASSISTANCE FOR PERFORMANCE GUARANTEE TEST AND HANDING OVER OF BOILER AND ITS AUXILIARIES,START UP BOILER , AIR PREHEATERS, DUCTS AND DAMPERS, FUEL PIPING, BOILER INTEGRAL PIPING, ELECTROSTATIC PRECIPITATOR, FANS, POWER CYCLE PIPING, TG CYCLE PIPING ,ROTATING MACHINES INCLUDIG COAL MILLS AND COAL FEEDERS, CHEMICAL DOZING SYSTEM, INSULATION, FINAL PAINTING ETC OF 500 MW UNIT NO. 1 OF 2X500 MW MAUDA SUPER THERMAL POWER PROJECT.

AT

MAUDA SUPER THERMAL POWER STATION
NTPC LIMITED
TEHSIL-MAUDA, DIST-NAGPUR
MAHARASHTRA

EARNEST MONEY DEPOSIT: Please see Special Conditions of Contract.

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

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

M/s. ……

…….

PLEASE NOTE:
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

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

BHARAT HEAVY ELECTRICALS LIMITED

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

PROCEDURE FOR SUBMISSION OF SEALED TENDERS

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

PART-I (TECHNICAL BID) COVER-I

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

PART-II (PRICE BID) COVER-II

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

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

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

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

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

PROJECT INFORMATION

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

LOCATION & APPROACH

1) Project Name: Mauda Super thermal Power Station Units # 01 & 02 (500 MW each).

2) Project Location: Tehsil- Mauda, Dist: Nagpur, Maharashtra.

3) Transport facilities:

A) Nearest Railway: Chacher Railway Station is on Nagpur-Kolkata Broad Gauge (BG) section of south eastern Railway (Main line) is 8 kms away.

B) Road: Mauda STPS is connected to Mauda town by 04 Kms long all-weather road.
Mauda town is 40 Kms from Nagpur on NH-6.

C) Nearest Airport: Nagpur / 50 Kms, from Mauda town.

CLIMATIC CONDITIONS:

General:

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

GEOGRAPHICAL CONDITIONS:

1) Latitude – 21^{o}-10'-50'' N
2) Longitude – 79^{o} -23'-52'' E

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 TENDER OPENING DATE)		
5	MOBILIZATION TIME (NOT EXCEEDING 04 WEEKS FROM FAX LOI)		
6	WHETHER NO DEVIATION CERTIFICATE FURNISHED	YES	NO
7	TENDERER HAS VISITED THE PROJECT SITE AND ACQUAINTED WITH THE SITE CONDITIONS	YES	NO
8	DETAILS OF CONCURRENT JOBS ARE FURNISHED (AS PER RELEVANT APPENDIX)	YES	NO
9	HEAD QUARTER'S ORGANISATION IS FURNISHED	YES	NO
10	PROPOSED SITE ORGANISATION IS FURNISHED	YES	NO
11	FINANCIAL STATUS OF THE COMPANY (ANNEXURE 'A' OF GCC) IS FURNISHED	YES	NO
12	PROFIT & LOSS ACCOUNT FOR PRECEDING THREE YEARS IS FURNISHED	YES	NO
13	LATEST SOLVENCY CERTIFICATE FROM THE BANKER IS FURNISHED	YES	NO
14	LATEST INCOME TAX CLEARANCE CERTIFICATE OR COPY OF PAN CARD ACCOMPANIED BY 'IT RETURN' COPY IS FURNISHED	YES	NO
15	MANPOWER DEPLOYMENT PLAN (AS PER RELEVANT APPENDIX) IS FURNISHED	YES	NO
16	MONTHWISE DEPLOYMENT PLAN FOR MAJOR T&P (AS PER RELEVANT APPENDIX) IS FURNISHED	YES	NO
17	ANALYSIS OF UNIT RATES QUOTED (AS PER RELEVANT APPENDIX) IS FURNISHED	YES	NO
18	POWER OF ATTORNEY ENCLOSED IN FAVOUR OF PERSON MAKING OFFER.	YES	NO

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

NOTE : STRIKE OFF YES OR NO, AS APPLICABLE

DATE : SIGNATURE OF TENDERER

DECLARATION BY BIDDER'S AUTHORIZED SIGNATORY

TENDER SPECIFICATION No. BHE/PW/PUR/MAUDT-BLR Vertical Pkg/649

I, HEREBY CERTIFY THAT ALL THE INFORMATION AND DATA FURNISHED BY ME WITH REGARD TO THIS TENDER SPECIFICATION ARE TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE. I HAVE GONE THROUGH THE SPECIFICATIONS, CONDITIONS AND STIPULATIONS IN DETAIL AND AGREE TO COMPLY WITH THE REQUIREMENTS AND INTENT OF THE SPECIFICATION. I FURTHER CERTIFY **THAT I AM DULY AUTHORISED REPRESENTATIVE OF THE UNDERMENTIONED BIDDER AND A VALID POWER OF ATTORNEY TO THIS EFFECT IS ALSO ENCLOSED**.

DATE: SIGNATURE OF AUTHORIZED SIGNATORY WITH SEAL

CERTIFICATE OF NO-DEVIATION

TENDER SPECIFICATION No. BHE//PW/PUR/MAUDT-BLR Vertical Pkg/649

I/WE, M/s ……

HEREBY CERTIFY THAT NOTWITHSTANDING ANY CONTRARY INDICATIONS/ CONDITIONS ELSEWHERE IN OUR OFFER DOCUMENTS, I/WE HAVE NEITHER SET ANY TERMS AND CONDITIONS NOR THERE IS ANY DEVIATION TAKEN FROM THE CONDITIONS OF BHEL'S TENDER SPECIFICATIONS, EITHER TECHNICAL OR COMMERCIAL, AND I/WE AGREE TO ALL THE TERMS AND CONDITIONS MENTIONED IN BHEL'S TENDER SPECIFICATION WITH ASSOCIATED AMENDMENTS AND CLARIFICATIONS.

Signature of the Bidder

Date:

CERTIFICATE CONFIRMING BIDDER'S KNOWLEDGE ABOUT SITE CONDITIONS

TENDER SPECIFICATION No. BHE//PW/PUR/MAUDT-BLR Vertical Pkg/649

We, M/s ……

hereby declare and confirm that we have visited the project site as referred in BHEL's Tender Specification under reference above and acquired full knowledge and information about the site conditions. We further confirm that the above information is true and correct and we shall not be eligible for any additional payment of any nature due to lack of knowledge or non-familiarization of site conditions.

BIDDER'S NAME AND ADDRESS: ……..

SIGNATURE & OFFICIAL SEAL OF BIDDER'S
AUTHORISED SIGNATORY

PLACE:

DATE:

SECTION-3
OFFER OF THE CONTRACTOR

To,
The Dy. General Manager (Purchase)
Bharat Heavy Electricals Limited
Power Sector - Western Region
Shreemohini Complex
345, Kingsway
Nagpur 440 001

Dear Sir,
Sub: Offer against Tender Specification No. BHE/ PW/PUR/MAUDT-BLR Vertical Pkg/649

I/we hereby offer to carry out the work detailed in the tender specification issued by Bharat Heavy Electricals Limited, Power Sector-Western Region, Nagpur, in accordance with the terms and conditions thereof.

I/we have carefully perused the following listed documents connected with the above work and agree to abide by the same.

1. Instructions to 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 requisite Earnest Money Deposit (EMD) 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

SCOPE OF WORK

4.0 The work under the scope of these specifications is broadly as follows.

1) Collection of materials from BHEL/client's stores/storage yard; transportation to site; pre-assembly if necessary ,erection, testing & assistance for commissioning, trial operation , assistance for performance guarantee test and handing over of boiler and its auxiliaries,start up boiler, air preheaters, ducts and dampers, fuel piping, boiler integral piping, electrostatic precipitator, fans, power cycle piping, TG cycle piping ,rotating machines includig coal mills and coal feeders, chemical dozing system, insulation, final painting etc of 500 MW unit no. 1 of 2x500 MW Mauda super thermal power project.

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2) Erection, alignment and welding, bolting, fastening, grouting as applicable of:

   a) Boiler supporting structures.
   b) Start up boiler and its auxiliaries.
   c) Boiler pressure parts.
   d) Boiler trim & integral piping and mountings
   e) Fuel oil piping
   f) Non-pressure parts
   g) Rotating machines with their drives & lube oil system etc.
   h) Pulverised fuel pipeline.
   i) External structures (e.g. Duct supporting, pipe rack structures, elevator structure etc).
   j) Handling arrangements for rotating machines & other equipment.
   k) Power Cycle Pipeline (Main Steam, Hot Reheat, Cold Reheat, Feed Water etc).
   l) HP by-pass system.
   m) De-aerating Heater & Feed Water Storage Tank
   n) Electrostatic precipitator with stairways & galleries.
   o) Chemical dozing system.
   p) Fabrication of pipe/cable rack structures and embedment.

3) Pre-assembly, if any, pre-erection checks as applicable

4) Transportation / dragging of boiler drum from unloading bay to inside boiler structures and positioning on ground, erection using strand jack method including final alignment.

5) Non-destructive examination & post weld heat treatment

6) Insulation of the required equipment and pipelines followed by sheet cladding.

7) Pre-commissioning checks/tests, trial runs/testing and assistance for commissioning

8) Final painting of exposed (non-insulated) surfaces.

9) Trial operation and associated tests

10) Completion of facilities/systems

11) Handing over of the unit

12) Assistance for conducting performance guarantee test

4.1 Scope of work is further detailed in various clauses hereinafter.

4.1.1 General requirements – common to all work

4.1.1.1
The intent of specification is to provide services according to the most modern and proven techniques and codes. The omission of specific reference to any method, equipment or material necessary for proper and efficient execution of this work shall not relieve the contractor of the responsibility of providing such facilities to complete the work without any extra compensation.

4.1.1.2
The terminal points decided by BHEL should be final and binding on the contractor for deciding the scope of work and effecting payment for the work done.

4.1.1.3
The work shall be executed under the usual conditions affecting major power plant construction and in conjunction with numerous other operations at site. The contractor and his personnel shall cooperate with personnel of BHEL, BHEL's customer, customer's consultants and other contractors, coordinating his work with others and proceed in a manner that shall not delay or hinder the progress of work of the project as a whole.

4.1.1.4
The work covered under this specification is of highly sophisticated nature, requiring the best quality workmanship, supervision, engineering and construction management. The contractor should ensure proper planning and successful & timely completion of the work to meet the overall project schedule. The contractor must deploy adequate quantity of tools & plants, modern / latest construction aids etc. He must also deploy adequate trained, qualified and experienced supervisory staff and skilled personnel.

4.1.1.5
Contractor shall erect and commission all the equipments and auxiliaries as per the sequence & methodology prescribed by BHEL depending upon the technical requirements. Availability of materials and fronts will decide this. BHEL engineer's decision regarding correctness of the work and method of working shall be final and binding on the contractor. No claims for extra payment from the contractor will be entertained on the ground of deviation from the methods / sequence adopted in erection of similar sets elsewhere.

4.1.1.6

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

4.1.1.7
The boiler shall be erected as per relevant provisions of latest Indian Boiler Regulations (IBR) and amendments/addendums thereof, if any.
4.1.1.8
The work shall conform to dimensions and tolerances specified in the various drawings / documents that will be provided during various stages of erection. If any portion of work is found to be defective in workmanship, not conforming to drawings or other stipulations due to contractor's fault, the contractor shall dismantle and re-do the work duly replacing the defective materials at his cost, failing which the work will be got done by BHEL and recoveries will be effected from the contractor's bills towards expenditure incurred including cost of materials and departmental overheads of BHEL.

4.1.1.9
The contractor shall perform any services, tests etc, which may not be specified but nevertheless, required for the completion of work within quoted rates.

4.1.1.10
All necessary certificates and licenses required for carrying out this work are to be arranged by the contractor expeditiously

4.1.1.11
The contractor shall execute the work in the most substantial and workmanlike manner. The stores shall be handled with care and diligence.

4.1.1.12
BHEL reserves right to recover from the contractor any loss which arises out of undue delay / discrepancy / shortage / damage or any other causes due to contractor's lapse during any stage of work. Any loss to BHEL due to contractor's lapse shall have to be made good by the contractor.

4.1.1.13
During the course of erection, testing and commissioning certain rework/ modification / rectification / repair / fabrication etc may become necessary on account of feedback / revision of drawing etc. This will also include modifications/ re-works suggested by BHEL / customer / other inspection group. Contractor shall carry out such rework / modification / rectification / fabrication / repair etc promptly and expeditiously. Daily log sheets signed by BHEL engineer and indicating the details of work carried out, man-hours etc shall be maintained by the contractor for such reworks. Claim of contractor if any, for such works will be governed by relevant clauses of Section-13 of SCC.

4.1.1.14
All works such as cleaning, levelling, aligning, trial assembly, dismantling of certain equipments / components for checking and cleaning, surface preparation, fabrication of structures, tubes and pipes as per general engineering practice and as per BHEL engineer's instructions at site, cutting, gouging, weld depositing, grinding,

straightening, chamfering, filing, chipping, drilling, reaming, scrapping, lapping, fitting up etc as may be applicable in such erection works and which are treated incidental to the erection works and necessary to complete the work satisfactorily, shall be carried out by the contractor as part of the work within the quoted rates.

4.1.1.15
The contractor shall make temporary supports, jigs & fixtures, anchors for load and guide pulleys as required for the work. Contractor shall arrange necessary steel for such usage.

4.1.1.16
The contractor shall take delivery of the components, equipments, chemicals, and lubricants etc from the BHEL stores/ storage area after getting the approval of BHEL engineer on standard indent forms of BHEL. Contractor shall return the left over materials periodically and reconcile the detailed issue vis-à-vis consumption quantities of all such materials at regular intervals.

4.1.1.17
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. Contractor shall stack the materials neatly, preserve and store in the contractor's shed and at work areas in an orderly manner. In case it is necessary to shift and re-stack the materials kept at work areas/site to enable other agencies to carry out their work or for any other reason, same shall be done by contractor most expeditiously as incidental to work.

4.1.1.18
Plant materials should not be used for any temporary supports/scaffolding/ preparing pre-assembly bed etc.

4.1.1.19
The details of equipments to be erected under this contract are generally as per the schedule given in relevant appendices. These details are approximate and meant only to give a general idea to the bidder about the magnitude of the work involved. Actual quantum and type of equipments will be based on the relevant erection documents which will be furnished to the contractor in due course of erection and the weight and quantity as per the relevant engineering documents will only be admissible for the billing purpose.

4.1.1.20
Hangers & suspensions, supports etc for tubes, piping, & ducts etc will be supplied in running / random lengths / sizes which shall be cut to suitable sizes and adjusted as required.

4.1.1.21
Spring suspension / constant load hangers may have to be pre-assembled for required load and erection carried out as per instructions of BHEL. Adjustments, removal of temporary arrests/locks, cutting of excess thread length of hanger tie-rod etc have to be carried out as and when required. Load setting of spring hangers, as per BHEL's documents/instructions, during various stages of erection & testing and

after floating of piping/ducting during cold and hot condition will have to be done as part of work. This exercise may have to be repeated till satisfactory results are achieved.

4.1.1.22
Contractor shall lay/install the field-routed/small-bore pipelines to suit site condition/ requirement. Before laying/installing such pipelines, the contractor shall prepare necessary sketch for routing these pipe lines and get the same approved by BHEL. Contractor must take care of the location/layout of other systems and equipment before preparing such sketch to avoid interference. There is a possibility of minor change in routing such pipelines even after completion of erection; contractor shall carry out the same without any extra cost to BHEL.

4.1.1.23
Welding of necessary instrumentation tapping points, thermo-well, thermocouple pad, metal temperature measurement (MTM) pad and clamps, root valve, condensing vessel, flow metering & measurement devices, and control valves to be provided on boiler & its auxiliaries and piping are covered within the scope of this specification. The installation of all the above items will be contractor's responsibility even if:

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

b) Items are supplied by an agency other than BHEL.

Pre-heating, NDE and post weld heat treatment for above shall be done as per the specifications as part of work.

4.1.1.24
Certain instrumentation like pressure switches, air sets, filters, regulators, pressure gauges, junction boxes, power cylinders, dial thermometers, flow meters, valve actuators, flow indicators, centrifugal/speed switches of motors, accumulators etc are received in assembled condition as integral part of equipments. Contractor shall dismount such instruments for calibration and hand over the same to BHEL. C&I erection agency of B HEL will do storage, re-erection and calibration etc.

4.1.1.25
Fixing and seal welding of thermo-wells & plugs before hydro test/ steam blowing of equipment or other piping system are within the scope of work. Contractor shall also remove the seal welded plugs by process of grinding and fix and seal weld thermo-wells after hydro test/steam blowing of lines as part of work.

4.1.1.26
Actuators/drives of valves, dampers, gates, powered vanes etc may have to be serviced, lubricated, before erection, during pre-commissioning & commissioning, including carrying out minor adjustments required as incidental to the work.

4.1.1.27
All electrical motors have to be tested for IR & PI values prior to the trial run. Where required, dry out may have to be carried out by using external heating source.

Contractor shall make all arrangements in this regard and complete the work as instructed. BHEL will provide the motorized insulation testers.

4.1.1.28
In installation of various equipments it may become necessary to install these on temporary supports/ hanger due to various reasons including non-availability of suspension materials. Contractor shall install such temporary suspensions/hangers and later on shift the relevant equipments to their respective permanent hangers/ suspensions/ supports as incidental to work. Requisite materials for such temporary arrangements will be provided by BHEL on free-returnable basis which shall be returned to BHEL after the use.

4.1.1.29
The work shall be carried out strictly in accordance to the “Field Quality Plan” approved by BHEL/client. Contractor, jointly with BHEL, shall prepare all necessary records of measurements/readings/ protocols etc.

4.1.1.30
All works such as cleaning, levelling, aligning, trial assembly, dismantling of certain equipments / components for checking and cleaning, surface preparation, fabrication of sheets, tubes and pipes as per the general engineering practice and as per BHEL engineers instructions at site, cutting, weld disposing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scraping, lapping, fitting up etc as may be applicable in such erection works and which are treated incidental to the erection work and necessary to complete the work satisfactorily shall be carried out by the contractor as part of the work.

4.1.1.31
Interconnection/ hook-up, if any, with the existing system shall form part of work. Such interconnections, hook-ups may require shut down of running plant and the relevant work have to be completed within such planned shutdowns. This may call for working with enhanced resources and on extended hours. Contractor's offer shall cover all such contingencies.

4.1.1.32
It may so happen that certain components like manhole doors, hanger etc may be supplied in loose items. They need to be assembled as per relevant drawings or as per advice of BHEL engineer prior to erection. This forms the part of the scope of work.

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

The scope of work is further detailed in the specifications hereinafter.

4.2.1 Pressure Parts

A) Installation of **temporary structure** for erection of Boiler Drum is in the scope of the contractor’s work. BHEL will issue the required Built-Up Structural Beams and other structural steel for the purpose free of charges. Contractor shall have to fabricate minor members for fixing and strengthening the Built-Up beams. Contractor shall erect, fasten, weld these structures and carry out NDE as per

relevant codes and practices as part of work. After completion of drum erection activity, contractor shall dismantle these structures and return to BHEL stores. Contractor shall repair the areas of permanent equipment/structures as well as Built-Up Structural Beams affected due to installation of temporary structures and finish as per relevant codes of practice or as instructed by BHEL. Payment for installation of temporary structures as aforesaid will be made at the rate accepted for Structures; no separate payment will be made for fabrication, dismantling and finishing work and return of materials.

B) Pressure parts components like headers, panels, coils, loose tubes etc have to be flushed/blown with compressed air, checked for dimensional accuracy and configuration and minor rectifications, if necessary will have to be done before erection. This will involve making appropriate bed of steel structures over the concrete blocks/ steel pedestals. Necessary steel, concrete blocks shall be arranged by the contractor. Bed shall be fabricated as per BHEL requirement.

C) Normally the high pressure valves will have prepared edges for welding. But, if it becomes necessary, the contractor shall prepare new edges or recondition the edges by grinding or chamfering to match the corresponding tubes and pipes. No gas cutting will be permitted. All fittings like “T” pieces, weld neck flanges, reducers, etc shall be suitably matched with pipes for welding (this is applicable to piping work also).

D) Welding of all attachments on pressure parts including those required for insulation work is in the scope of work.

E) Surfaces inside seal box and other areas that are to be applied with castable refractory lining shall be painted with black bitumen paint before application of refractory. Seal boxes need to be partially cut open in order to pour refractory. Contractor shall carry out necessary cutting and subsequent seal welding of such cut-outs after setting of refractory. Contractor shall provide the black bitumen paint of required specification for such applications.

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

G) If required, the pressure parts, after initial erection and tests, will have to be preserved by either dry or wet preservation procedure. Contractor shall erect the piping & valves and provide necessary assistance for the same. Required piping, valves and preservative (gas/chemicals) will be provided by BHEL as free issue.

H) The boiler drum internals, if already installed, shall have to be removed to facilitate inspection by statutory authorities and before chemical cleaning. The drum internals are to be preserved properly and re-fitted at appropriate stage as part of work.

I) Super-heater and/or re-heater system will have High Pressure butt weld joints of **T-91 material**. Welding of these HP joints shall involve pre-heating and post

heating by resistance heating, argon purging of joints during welding process and full TIG welding. Contractor should follow required procedure for T-91 welding, NDE etc.

J) **Boiler drum**: BHEL will hand over the Boiler Drum duly unloaded at the railway unloading bay of client. BHEL will provide the saddles made of structural steel for resting of the Boiler Drum, further handling and transport. Contractor shall transport the Boiler Drum from the said spot to the cavity of boiler. Contractor shall make all necessary arrangements like arranging and laying of sleeper bed, steel plates & steel rails etc for transport of Boiler Drum.

   Boiler Drum is to be lifted using **strand & jack** method. Contractor may engage specialized agency to lift the Boiler Drum by this method. Contractor shall deploy the agency and other resources well in time to suit the milestone schedule.

K) Corrections in the profiles of scalloped plates/bars, skin casing, seal plates etc. For proper matching with mating parts, wherever required, shall be done as incidental to the work.

4.2.2 Trim & Integral Pipeline of Boiler, Power Cycle & TG Cycle Pipelines

4.2.2.1
The work on various piping systems will include cutting to required length, edge preparation, laying, fixing & welding of the pipes / elbows / fittings/ valves etc. In the pipeline, fixing & adjustment of supports / anchors / shock absorbers and carrying out all other activities / work to complete the erection and also carrying out all pre-commissioning / commissioning operations mentioned in the specification as per BHEL engineers instructions and / or as per approved drawings / documents.

4.2.2.2
Tubes or pipes wherever deemed convenient, will be sent in random lengths. These shall be cut and edge prepared to suit the site conditions and the layouts. Fittings like bends tees, elbows, reducers, flanges etc will be supplied as loose items. However, bends of tube size up to Nb 65 mm will have to be formed at site as incidental to work.

4.2.2.3
All drains / vents / relief/ escape / safety valve exhaust piping etc to various tanks / sewage / drain canal / flash box / sump / atmosphere etc from the stubs on the piping and equipments are covered in the scope of work.

4.2.2.4
Connection (flanged, bolted or welded) of piping to the terminal points/equipments etc is in the scope of work even though such terminal point/equipment may not form part of this work. All NDE including radiography of joints so made, post-weld-heat-treatment if any, are also within the scope of work/specification. The terminal points work is inclusive of cutting of existing lines, if required, edge preparation, welding/ blanking and hook-up work.

4.2.2.5
It should be ensured that all the terminal point connections are done without transferring any undue load or strain to the connected equipment. Necessary log

sheets have to be prepared for such fit-up along with BHEL/customer representative before connecting. All NDE including radiography of joints so made, post weld heat treatment if any, is also within the scope of work/ specification.

4.2.2.6

Mechanical freeness of valves has to be ensured prior to erection.

4.2.2.7

The above provisions shall be applicable, mutatis-mutandis, to other piping systems e.g. Fuel oil piping, lube oil piping of rotating m/c, ACW lines etc.

4.2.2.8

Main Steam pipeline up to turbine including the terminal joint with turbine is included in the scope of work. The material will be SA-335 P-91. Bidder shall follow BHEL approved procedure for welding, pre heating, PWHT & NDT of SA-335 P-91 material. Detailed procedure will be issued to the contractor.

4.2.2.9 Following items of work shall also form part of piping erection:

1. Installation & removal of isolating devices/ NRVs and removal & re-fixing of internals required for hydraulic testing, pre-commissioning and commissioning activities. Required gaskets will be supplied by BHEL free of cost.

2. Matching of flanges for achieving parallelism and alignment resorting to heat correction or other suitable methods as per instructions of BHEL engineers.

3. To locate the cause of vibrations in pumps or other auxiliaries and to carry out necessary corrections in piping and its supports. This may involve cutting, fresh edge preparation, welding, radiography, stress relieving, etc. of suction, discharge, re-circulating and other connected piping and its supports at a number of places.

4. Fabrication and erection of racks and steel supports for all the piping including critical piping. Steel for this purpose will be supplied by BHEL.

5. Erection, welding, Heat Treatment and NDE of certain equipments like Flow Nozzles, Control Valves etc, after completion of certain activities e.g. Chemical Cleaning, Steam Blowing etc is part of work. This may involve removal of portions from the already erected pipelines in order to introduce these equipments and resultant edge preparation etc shall be incidental to work. BHEL will make payments for the fresh items on pro-rata basis; the contractual item rate as applicable for the concerned Pipeline shall be adopted for such payment. No separate/additional payment is envisaged for cutting and edge preparation in this regard. The removed pieces of pipes shall be returned to BHEL stores with proper cleaning, dressing and identification marking.

6. Welding of root valves with small length of pipeline to the pressure, flow and level tapping points on piping or flow nozzles / orifices / metering elements fixed on piping.

7. Opening of valve actuators, dismantling of actuators from the valves, refitting and rendering assistance connected with the electrical and mechanical problems.

8. Fixing and welding including due NDE & PWHT etc of carrier plates on to the pipes.

4.2.2.10
As far as possible pre-assy of piping on ground is to be done. The erection of various piping may have to be started from any random reference instead of the terminal points in order to meet milestone completion schedule.

4.2.2.11
The location of drain headers, valves, stations, steam traps of piping as indicated in the BHEL drawings are suggestive only. The final location and routings shall be decided to suit the site conditions. While routing such lines and fixing the stations, it has to be erected so as to provide easy accessibility and free path for the purpose of easy operation and maintenance. These locations shall be acceptable to the client. Sometimes, the locations of stations and routing of lines may have to be changed as per the site conditions. All such works shall be carried out expeditiously as per the instructions of BHEL engineer. The decision of BHEL engineer is final and binding on the contractor.

4.2.2.12
The contractual rates shall deem to be inclusive of pre-heating, welding, post heating, post weld heat treatment/ stress relieving and NDE of piping.

4.2.2.13
Erection of piping systems shall involve co-ordination with the erection of the turbine, turbo-generator, condenser, boiler, boiler feed pumps and other major equipments. Wherever required, approval of concerned BHEL engineer/other erection agency must be obtained prior to making piping interface connections to such equipments. Sequence of work shall be carefully planned to minimize interference with other groups working in the same area. Actual sequence to be followed shall be subject to the approval of BHEL. BHEL may direct the contractor to reschedule his work to suit the status of the site work.

4.2.2.14
While erecting the field- routed pipelines, the contractor shall check the accessibility of valves, instruments tapping points and maintain minimum headroom/access requirement and other necessary clearances from the adjoining work areas to avoid interference and congestion.

4.2.2.15
All pipelines shall be given proper slope towards the drain points during erection. For maintaining the slopes as given in the drawings for larger thickness and larger dia pipelines, edge preparation for welding may have to be altered suitably.

4.2.2.16
All pipelines shall be provided, as per the instructions of BHEL engineer, with suitable vent and the drain points with valve (s) at the highest and the lowest points respectively of the pipeline although they may not be specifically mentioned in the drawings.

4.2.2.17

It may become necessary to make & install temporary spool pieces for certain process requirements. Contractor's scope shall include preparation, erection, fit-up, welding, NDE etc and dismantling of such spool pieces at appropriate stage without any additional payment.

4.2.2.18
Normally, setting of hangers in cold condition is done by simulation adding additional temporary weight, which will be roughly equal to the weight of the insulation. Attachment of temporary weights and floating of the joints in the simulation test is to be treated as part of contractual work. Hanger settings may have to be repeated till free-floating joints are achieving. Hanger adjustments to be repeated for steam blowing by resetting hot and cold values if required. This may have to be repeated several times after steam blowing and synchronization. The weights will be supplied by BHEL. Contractor has to transport from BHEL stores and return the same after completion of work. No extra claim on this account will be entertained.

4.2.3 Rotating Machinery

A) Specifications covered under the following paragraphs and also other relevant specifications contained in other paragraphs elsewhere in this tender specification document will be applicable for rotating machines like FD / ID / PA fans, air pre-heaters, seal air fans, blowers, coal mills, fuel feeders, HP & LP dosing pump skids and other similar auxiliaries.

B) All lubricants for testing, preservation and lubricants for trial runs of the equipments shall be supplied by BHEL as free issue. All services including labour shall be provided by the contractor for drawing these from BHEL / customer's stores, transporting, handling, filling, emptying, re-filling, accounting and return of surplus lubricants / empty containers / old & used lubricants after draining etc. Contractor should clean the spilled / leaking lubricants thoroughly; consumables for such cleaning will be in contractor's scope.

C) All rotating machinery and equipments shall be cleaned, lubricated, checked for their smooth rotation, if necessary, by dismantling and re-fitting before erection. Also, the equipments may have to be checked for clearances, tolerances at any stage of the work including during testing, commissioning etc. Shaft of the rotating machines shall be rotated periodically to avoid damages. All these shall be part of work.

D) Trial run of the drives in un-coupled state and then coupled with equipment as to be done after necessary alignment.
Forced lube oil systems including lube oil piping of drives, rotating equipments etc form part of the work under these specifications. Hydraulic test of oil coolers, oil piping etc is in the scope of work. Where required cooler may have to be dismantled for hydraulic test and re-erected thereafter as part of work.

E) Certain rotating machinery, after testing, pre-commissioning may have to be re-aligned/hot aligned and vital clearances re-set. This may call for disconnection of cabling, removal of certain instruments etc and restoration at appropriate stage.

F) Protective lubricant coats / fill provided on / in the critical area of equipments have to remove at appropriate stage and regular lubricants, after removal / cleaning of protective coat / fill, as per specifications should be filled / applied. Cleaning / flushing agents / oils will be provided by BHEL.

G) Chemical cleaning, steam blowing and air drying of the connecting pipes for the lube oil system have to be carried out wherever required as per instruction manuals/drawings. Chemicals, suiting BHEL specification, for such chemical cleaning is in the scope of contractor.

H) Even though rotating machines may be grouted to foundation using non-shrink grout mix, blue matching of packer plates / shims with foundation / between packers / equipment base should be done as incidental to work wherever instructed by BHEL engineer.

J) Skid mounted equipments may need checking, re-setting due to various reasons as incidental to work.

K) There are eight bowl mills for the boiler, four each located on left and right sides of the boiler.

4.2.4 Electrostatic Precipitator

4.2.4.1
Wherever called for, pre-assembly of supporting structures, casing walls have to be done, on ground.

4.2.4.2
Loading of collecting electrodes either from top or bottom, to be decided suiting site conditions, shall be done with due care as per instructions.

4.2.4.3
Straightness of all collecting electrodes has to be checked on ground prior to loading in to the field.

4.2.4.4
Bundle of collecting electrodes should be handled only with the set of special lifting beam & slings supplied by BHEL for the purpose.

4.2.4.5
Clearances as prescribed amongst collecting electrodes and with casing walls have to be maintained. Spot heating of collecting electrodes, wherever called for, shall be done as part of work to achieve the required clearances.

4.2.4.6
Erection, alignment/ fixing in final position, of high voltage rectifiers of ESP is in the scope of work. However testing & commissioning will be done by other agency.

4.2.4.7
Installation of high voltage interlocks (excepting rotary switch interlock of switchgear panels) is in the scope of work.

4.2.4.8
Complete erection, alignment, testing, pre-commissioning and commission etc for drive motors of collecting electrodes and emitting electrode rapping mechanism is in the scope of work.

4.2.4.10 **Air Leak Test**

After erection of ESP and before clearing for insulation, air leak test has to be carried out. Necessary equipment like, Air Blower, Ventury Meter and Instrument etc shall be arranged by contractor. Handling such equipment at stores, transport, erection, commissioning and carrying out the leakage test, attending to the leakages till satisfactory sealing and demonstration of permissible pressure decay condition are in scope of the work.

4.2.5 Main supporting structures, external structures, elevator structures, stairways, galleries & platforms, roofing and equipment handling arrangement

4.2.5.1
Boiler main supporting structures have to be erected in a sequential manner.

4.2.5.2
Quality norms with regard to verticality of column, inter-alia, have to be adhered to strictly, at various stages of erection.

4.2.5.3
Stiffening/strengthening of main supporting structure, if any, due to deviation in verticality of columns post drum lifting, shall be carried out, including fabrication, if any. Necessary steel for this will be provided in random sizes by BHEL as free issue. Payment for such stiffening/ strengthening shall be made for weight certified by BHEL engineer at the item rate applicable to structures, provided the deviation has occurred for the reasons not attributable to the contractor.

4.2.5.4
Each of the ceiling girders will be sent in 2 to 3 pieces which shall have to be assembled and welded. NDE & Post Weld Heat Treatment (Stress Relieving) shall be done on ground prior to their erection in position.

4.2.5.5
It is likely that, in deviation from prescribed sequence, erection of certain elements of structure may be deferred for later stage, to facilitate, say crane boom reach to higher elevation, passage of drum during drum lifting etc. This may necessitate temporary installation of some structural steels at appropriate locations to keep the stability of structure intact. Such temporary installations shall be removed subsequently and returned to BHEL stores/ storage yard. Finishing work in the related permanent structures shall be done as per the instruction of BHEL engineer. BHEL will provide necessary steels on free issue basis in random sizes for such installations, which shall be fabricated by the contractor to suit the requirement.

Payment for such installations shall be made on the accepted tonnage rate of structures. No separate payment will be made for fabrication, removal & return of the materials to BHEL stores.

4.2.5.6
In some cases, the structural material will be supplied in random lengths, which have to be fabricated to suit the requirement as incidental to work. Also, it may sometimes be necessary to remove some of the erected members to facilitate erection of bigger/ pre-assembled equipments. In such cases, the removal and re-erection of such members as agreed by the BHEL engineer will have to be done by the contractor as incidental to work.

4.2.5.7
Contractor shall arrange materials required for temporary cat ladders & working platforms during erection of columns, platforms and other structural components. Such arrangements shall, as far as possible, be only of clamping & bolting type, as welding on columns etc will not be permitted. After the completion of work these shall be removed.

4.2.5.8
All the hand rails and toe guards shall be provided as per drawings and site requirement. Hand rails supplied in running lengths shall be suitably cut, edge prepared and welded. Also, hand rails/ guards may have to be provided from the safety point of view in certain places though not indicated in the erection drawings. The weld joints of hand rails shall be ground smooth to flush finish.

4.2.5.9
Galvanized electro-forged floor grills will be supplied for this project. These may have to be cut to suit requirement. Cutting shall be done only by mechanical cutters **and not by gas cutting**. Cold galvanizing compound is to be applied on the cut surface/edge. Cold galvanizing paint will be supplied by BHEL free of cost.

Fixing of floor grills shall be done by self-tapping screws (approximately 5.5 mm dia and 32 mm long) **and not by welding of studs.** Special purpose electrically operated hand tools are available in the market for this, which drills, taps and fixes the screws in a single operation. BHEL will supply the necessary self-drilling-cum-tapping screws and fixing clips. Contractor shall deploy the **drilling cum fixing machine** required for this purpose as a regular scope of work.

4.2.5.10
The contractor shall also install additional platforms of permanent nature for approaching different equipment as per the site requirement and to meet O&M requirements, though these may not indicated in the erection drawings. Materials required for such platforms will be supplied by BHEL in random sizes on free issue basis. These have to be fabricated to suit the requirement. Payment for erected weight as certified by BHEL engineer shall be made at the rate applicable for structures. No payment is envisaged for fabrication of structures.

4.2.5.11

All relevant provisions as above shall apply, mutatis-mutandis, to the work of external structures, interconnecting structures, elevator structures, ESP stairways and galleries & equipment handling system etc.

4.2.5.12 PASSENGER CUM GOODS ELEVATOR

Contractor shall arrange 1 MT capacity passenger-cum-goods elevator in unit-1 boiler to facilitate access to various platform elevations up to top floor/boiler drum floor. Contractor, as part of his scope shall install, operate and carry out preventive maintenance (including supply of gear oil and grease) of this elevator. The elevator will be deployed shortly after boiler drum erection.

4.2.6 Other products and systems and common requirements

A) The ducting covered under this scope of work is flue gas ducting up to boiler outlet flange, boiler outlet flange to ESP, ESP to ID fans, ID Fans to Chimney, hot and cold secondary air ducting from FD fans outlet up to wind box, hot and cold primary air ducting from PA fans to Coal Mills including interconnections, flow-meters, dampers/gates and their drives, supports and suspensions etc for these systems.

B) Ducts / expansion bellows (metallic & non-metallic) are normally supplied in loose components / segments and these are to be assembled and welded/ jointed at site before erection. The fabric portion of non-metallic expansion joints (NMEJ) namely bolster, fabric belt and canopy shall be installed by contractor under supervision/guidance of equipment supplier/BHEL for the first few cases. Contractor shall ensure that all subsequent NMEJ are assembled with due care and proper procedure. In similar manner all joints, connecting ducts, expansion pieces and dampers shall be seal welded. These welds have to be made leak proof and tested as per technical instruction / requirement.

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

D) Contractor has to make canopies for motors, actuators, lube oil units, control valves, etc. Material for this will be supplied in random lengths / sizes. No separate payment for fabrication is envisaged. Only the erection tonnage rate applicable for structure will be paid for this work.

E) BHEL will supply **Metapoly Sheets** for Boiler Roof and cladding for elevator structure. These sheets are to be fixed with self tapping screws (supplied by BHEL) in similar manner as in case of Galvanized floor grills. Contractor shall deploy the **drilling cum fixing machine** required for this purpose as a regular scope of work.

F) ID fans are provided with variable frequency drives. Contractor has to erect & commission the only the motor and other mechanical components like coupling etc. Electrical/Electronic Panels, transformers, cabling etc are not in this work specification.

G) Actuators / drives of dampers, gates etc may have to be serviced, lubricated before erection, during pre-commissioning and commissioning, including carrying out adjustments required as incidental of the work.

H) All welded joints should be painted with anticorrosive paint/primer immediately after completion of all work. Necessary paints and other consumables for the above work are in the scope of the contractor.

I) Spring suspension / constant load hangers may have to be preassembled for required load and erection carried out as per instruction of BHEL. Adjustments, removal of temporary arrests / locks, cutting of excess thread length of hanger, tie rod etc, have to be carried out as and when required. Load setting of spring hangers, as per BHEL's documents / instructions, during various stages of erection and testing and after floating of piping / ducting during cold and hot condition will have to be done. This exercise may have to be repeated till satisfactory results are achieved.

J) Hangers and suspensions, support steels for ducts and other equipments, piping etc will be supplied in running/random lengths/ sizes, which shall be cut to suitable sizes and adjusted as required.

K) Touch up and preservative painting of all components issued to and/or erected by contractor shall form part of scope of work. The contractor shall arrange all paints, primer and consumables, T&P and facilities.

4.3 Preparations of foundations, Grouting of Various Equipment

4.3.1
Building foundations and other necessary civil works for supporting structures, equipments etc will be provided by BHEL / customer. The checking of dimensional accuracy, axes, elevation, levels etc, with reference to bench marks of foundations and anchor bolt pits have to be checked and logged by the contractor. The permanent benchmark / reference marks will have to be transferred to new locations with sufficient care to maintain the accuracy and protected / preserved with adequate care (to enable rechecking at later dates) as per BHEL instruction.

Minor adjustment of foundation level, dressing and chipping of foundation surfaces and blue-matching (wherever required) for of all equipments as per BHEL engineers instructions, should be done by the contractor as part of the work. Contractor/BHEL shall prepare protocols before taking over the foundations. Dressing and chipping of foundations up to 35 mm for achieving proper levels will be within the scope of work/specification.

4.3.2
All temporary foundations and anchor points required for installing erection equipments and winches, foundations for pumps, tanks etc are in the scope of contractor. All building materials like cement, steel including reinforcement bars, grits cements etc for such temporary foundations shall have to be arranged by the contractor within the quoted rates. All such foundations shall be demolished and normal ground conditions restored after the usage.

Neutralisation pit required for EDTA cleaning process is to be made by the contractor. After completion of cleaning process the pit has to be dismantled and area is to be backfilled, compacted and levelled before handing over of area to owner.
Effluent of the EDTA cleaning process is to be disposed off safely from neutralising pit to safe areas as per instruction of BHEL/Owner.

4.3.3
Contractor shall carry out scrapping and blue matching of embedded plates/ packers of rotating equipments. Chipping and the levelling of concrete surfaces, fine dressing up to the extent required to obtain contact between packer and concrete, is also covered in the scope of this work. Scrapping, chipping and matching shall be done so as to achieve prescribed percentage of contact between the two surfaces.

4.3.4
BHEL will provide free of cost only the shims and packer plates (either machined or plain) which go as permanent part of the equipment. Certain packer plates and shims over and above the quantity received as a part of supplies from manufacturing units of BHEL will have to be cut out from steel plates / steel sheets at site to meet site requirement. Contractor shall cut and prepare packers and shims by gas cutting / chiselling / grinding and de-burr the same. However, machining of the packers wherever necessary shall be arranged by contractor.

4.3.5
Complete grouting of structures equipments, including anchor/ foundation bolts, beneath base, base hollows etc, as may be applicable, is included in the scope of contractor. Arranging all labour, building materials including cement, ordinary Portland as well as quick setting – free flow - non-shrink grout mix (e.g. Conbextra GP1/GP2), form work, shuttering, and any other requirements is in the contractor's scope. Contractor shall obtain approval of BHEL for cement (ordinary Portland as-well-as quick setting – free flow- non-shrink grout mix) prior to use. Cleaning of foundation surfaces, pocket holes and anchor bolt pits, making them free of oil, grease, sand and other foreign materials by soda washing, water washing & de-watering and blowing with compressed air or any other methods approved by BHEL are within the scope of this specification/work.

4.3.6
After the grouting has finally set and cured, alignment of equipments involved shall be checked again to verify for any disturbance or any other reason. If required, de-coupling of equipments has to be done for conducting the verification. In case any disturbance is noticed the cause, if any, shall be removed and re-alignment done as part of work.

4.4 Welding, Radiography and Other Non-Destructive Testing, Post Weld Heat Treatment

4.4.1 Welding

4.4.1.1

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

4.4.1.2
The method of welding (viz) arc, TIG or other method will be indicated in the detailed drawing/documents. BHEL engineer will have the option of changing the method of welding as per site requirement.

4.4.1.3
Welding of high pressure joints shall be done by IBR certified & authorized high pressure welders who have been permitted by the Chief Inspector of Boiler (CIB) of state concerned for deployment at the site of work.

4.4.1.4
Welding of all attachments to pressure parts, piping shall be done only by the qualified and approved welders.

4.4.1.5
Before any welder is engaged on work, he shall be tested and qualified by BHEL/ customer, though they may possess the IBR/other certificate. BHEL reserves the right to reject any welder without assigning any reason. All the expenditure in testing/qualification of the contractor's welder shall be borne by contractor.

4.4.1.6
Unsatisfactory and continuous poor performance may result in discontinuation of concerned welder.

4.4.1.7
The welded surface shall be cleaned of slag and painted with primer paint to prevent rusting, corrosion. For this consumables like paint /primer etc will be in the contractor's scope.

4.4.1.8
Hp joint fit-up, should be protected, where required, by use of tapes/protective paint as may be prescribed by BHEL. The contractor shall arrange consumables like protective paints/tapes etc.

4.4.1.9
The contractor shall maintain welding records in the form as prescribed by BHEL containing all necessary details, and submit the same to the BHEL engineer as required. Interpretation of the BHEL engineer regarding acceptability of the welds shall be final.

4.4.1.10
In the case of P-91 pipe welding, contractor shall deploy welders having experience in welding of P-91 material. The welders engaged by contractor if not qualified for P-91 welding will be trained by BHEL at BHEL welding research institute (WRI) Trichy and allowed to work only after passing the required test arranged by BHEL. All the expenditure towards such qualification including cost of training, travelling expenses, stay etc., shall be borne by the contractor.

4.4.1.11
Joint fit up will be a stage of inspection. Where required, joints shall be offered for visual inspection after root run. Subsequent welding should be made only after the approval of root run.

4.4.1.12 Socket Welding:

In execution of this work, considerable number of socket weld joints is involved. The exact quantity of such socket welds or probable variation in the quantum cannot be furnished. The bidder shall take notice of this while quoting as no extra claim on this account will be entertained. The socket welding on hp parts/ hp piping shall be done by the IBR qualified welders. Contractor has to adhere to the procedures/ specification as indicated in the drawing for socket welding.

4.4.1.13
Welding electrodes have to be stored in enclosures having temperature and humidity control arrangements. This enclosure shall meet BHEL specifications.

4.4.1.14
Welding electrodes, prior to their use, call for baking for specified period and will have to be held at specified temperature for specified period. Also, during execution, the welding electrodes have to be carried in portable ovens.

4.4.2 HEAT TREATMENT:

4.4.2.1
For the purpose of temperature recording of stress relieving process, thermocouples have to be attached to the weld joint. The number of temperature measuring points and locations shall be as per the standards of BHEL. Thermocouples have to be attached using capacitor discharge type portable thermocouple attachment unit. Contractor shall arrange sufficient number of thermocouple attachment units.

4.4.2.2
Contractor should provide temperature indicator / temperature recorder for measuring temperature during pre-heating for welding or for controlling temperature of metal for hot correction etc. The temperature recorders should be preferably of solid state type.

4.4.2.3
Heat treatment may be required to be carried out at any time (day or night) to ensure the continuity of the process. The contractor shall make all necessary arrangements including labourer required for the same as per directions of BHEL.

4.4.2.4
In certain cases only the pre-heating of weld joints may be called for.

4.4.2.5
For weld joints of heavy structural sections, if heat treatment is required, the same shall be carried out as part of the work.

4.4.2.6
Checking effectiveness of stress relieving by hardness tests (by digital hardness tester or other approved test methods as per BHEL engineer's instruction) including necessary testing equipments is within the scope of the work / specification.

4.4.2.7
Preheating, inter-pass heating, post weld heating and stress relieving after welding are part of erection work and shall be performed by the contractor in accordance with BHEL engineer's instructions. Where the electric resistance heating method is adopted contractor shall make all arrangement including heating equipment with automatic recording devices, all heating elements, thermocouples and attachment units, graph sheets, thermal chalks, & insulating materials like mineral wool, asbestos cloth, ceramic beads, asbestos ropes etc, required for all heating and stress relieving works.

4.4.2.8
All the recorded graphs for heat treatment shall be handed over to BHEL/IBR authorities and due clearances obtained.

4.4.2.9
During welding & post weld heat treatment of main steam piping (P-91 material), the induction heating process shall continue un-interrupted. Therefore, contactor shall arrange back-up dg set to take care of power interruptions during the process.

4.4.2.10
Results of these processes shall be verified/ validated as per requirements of BHEL/client.

4.4.3 NON DESTRUCTIVE EXAMINATION:

4.4.3.1
Contractor shall provide all resources and make all arrangements for the radiographic examination of welds for this work. For reasons of safety, invariably the radiography work will be carried out after the normal working hours and close of other site activities only. In this regard, the contractor has to adhere to the safety rules / regulations laid by BARC authorities from time to time.

4.4.3.2
Radiography inspection of welds shall be performed in accordance with requirements and recommendation of BHEL engineer. The minimum quantum of radiographic inspection shall be as per provision of IBR/BHEL's erection documents. They may, however be increased depending upon the performance of the individual welder at the discretion of BHEL engineer/boiler inspecting authority. Bidder shall also arrange the UT equipment with recording facility at his own cost. Usage of UT equipment shall be as per direction of BHEL engineer. Records of UT shall be produced as per site requirement.

4.4.3.3
All x-ray / gamma ray films of weld joints shall be preserved properly and be handed over to BHEL/IBR authorities and requisite clearances shall be obtained by the contractor.

4.4.3.4
The field welded joints shall be subject to dye-penetration/MPT/RT/ other non-destructive examination as specified in the respective engineering documents/ as instructed by BHEL.

4.4.3.5
Where required, surface preparation, like smooth grinding of welded area, prior to radiography shall be done. It may also become necessary to adopt inter-layer radiography/MPT/UT depending upon the site/ technical requirement necessitating interruptions in continuity of the work and making necessary arrangements for carrying out the above work. The contractor shall take all this into account in his offer. The required NDE method/procedure will be decided by BHEL engineer at site.

4.4.3.6
Bidder shall note that 100% radiography shall be taken on all high pressure welding till such time the welders' performance is found by BHEL engineers to be satisfactory. Subsequently, subject to consistency in welder's performance. The percentage of radiography will be based on BHEL's standard practice/code requirement. The defects shall be rectified immediately and to the satisfaction of BHEL engineer. The decision of BHEL engineer regarding acceptance / rejecting the joints will be final and binding on the contractor.

4.4.3.7
100% radiograph of certain sizes in piping have to be taken as per BHEL standards/drawings.

4.4.3.8
For carrying out ultrasonic testing of welding joints of large size tubes and pipes, it will be necessary to prepare surface by grinding and buffing a smooth finish and contour as necessary. The contractor's scope of work includes such preparation as incidental to work.
4.4.3.9
After stress relieving 5% of UT for all critical lines and 2% of UT for other alloy steel lines to be taken to ensure soundness of joints particularly stress relieving cracks. No separate payment will be made.

4.4.3.10
Contractor may have to undertake radiography with Cobalt-60 isotope camera in certain cases of higher thickness jobs. However, for any reason if use of Cobalt-60 is not possible then these joints shall be checked by radiography after completion of welding up to suitable partial thickness with Iridium–192 or other suitable source. Subsequently after completing the joint, Ultrasonic Test (UT) is to be done. For this contractor has to deploy Level–2 certified operator.

4.4.3.11
In the case of P-91 piping wherever radiography is not possible, Ultrasonic Test has to be carried out apart from other NDE.

4.4.3.12

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

4.4.3.13
No separate payment for any NDE activities, except for radiography, is envisaged. For radiography payment will be made based on the accepted item rate on certified measurement.

4.5 LINING AND INSULATION

Application of insulation, finishing, cladding and outer casing etc of the following:

1. Main boiler
2. Boiler auxiliaries including, but not limited to, ESP, ducts, fuel oil system, fans etc
3. Boiler integral piping and tanks & vessels
4. Power cycle piping and Regenerative System piping including vessels and tanks & other equipments
5. LP piping and other equipments
6. Other equipments including BOIs, though not listed above but required for completion of any system.

4.5.1
The work shall conform to dimension and tolerances specified in the various drawing and documents that will be provided during the execution. If any portion of the work is found to be defective in workmanship or not conforming to drawings or other specifications, the contractor shall dismantle and re-do the work duly replacing the defective materials at his cost. Failing which the work will be got done by engaging other agencies or departmentally and recoveries will be deducted from contractor's bills towards expenditure incurred including 30% departmental charges.

4.5.2
The terminal points as decided by BHEL shall be final and binding on the contractor.

4.5.3
All insulation and refractory materials including iron components and outer sheet casing materials, cladding sheets etc required will be supplied by BHEL and the same have to be erected/ applied as per the drawings and specifications of BHEL by the contractor.

4.5.4
The contractor shall provide the required quantity of wire, nails, and planks for formwork and other materials for shuttering and curing works.

4.5.5
Contractor shall observe all precaution for laying, curing etc of pourable insulation. The contractor at his own cost shall redo any defective works found.

4.5.6

Wool insulation is received at site as loose bonded mattresses in standard sizes. These are to be dressed/cut to suite the equipments. Multiple layers of wool have to be applied as directed and as per drawings and specifications for all equipments/ systems covered under the scope of work.

4.5.6
Cutting & dressing of insulation bricks to suit the site area of application is incidental to work.

4.5.7
Removable type of insulation has to be provided for valves fittings, expansion joints etc as per drawing or as directed buy BHEL engineer.

4.5.8
The cladding and outer casing are aluminium sheets. All relevant specifications and procedures with regards to beading, sealing etc for aluminium sheets have to be adhered to.

4.5.9
Cladding/outer casing shall be fixed expeditiously, so as to avoid damage to the insulation from the weather.

4.5.10
The overlapping surface of outer casing/cladding sheet shall be coated with sealing compound, which will be supplied by BHEL free of cost.

4.5.11
To take care of bimetal corrosion due to variety of metals in contact of each other viz retainer to support, support to outer casing/cladding, cladding-to-cladding etc, suitable paints specified by BHEL, to be applied and/or neoprene rubber packing/ strips or any other insert may have to be fixed as required.

4.5.12
The contractor shall leave certain gaps and openings while doing the work as per the instructions of BHEL engineer to facilitate inspection by boiler inspector or during commissioning to fix gauges, fittings, instruments etc. These gaps will have to be finished as per drawings at later date by the contractor at his cost.

Contractor shall cut open works in needed as per BHEL engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over without any extra payment.

4.5.13
A log book shall be maintained by the contractor for the clearance of the area for application of refractory and insulation. Where the contractor dose the work on his own accord without prior permission, such work should be re-done at his own cost.

4.5.14
Wastage allowances for the material issued are envisaged as follows:

A	Pourable & Castable insulation	-	2%
B	Insulation bricks and motor	-	2%
C	Wool mattresses	-	2%
D	Cladding sheets	-	2%

The wastage allowance will be applicable on the net issued quantity i.e. Total quantity issued reduced by the quantity returned to stores as unused/fresh item. Contractor shall reconcile the material issues periodically as prescribed by BHEL site. Payment for the done will be regulated as per provision of Section –12.

4.5.15
The following works are also included in the scope of this contract.

Cutting of cladding sheets as per the profile of the equipment and painting on inner surface two coats of bituminous paint. Paint will be supplied by BHEL.

Cutting of the wool mattresses to the required shape and application of finishing cement of required thickness wherever required.

4.5.16
Insulation work of temporary piping for alkali boil out, steam blowing and chemical cleaning has to be carried out at site. The same have to be removed and returned to the BHEL stores after the completion of activity. Rates quoted for application of wool for boiler and auxiliaries will be applicable for this work also. No separate payment will be made for removal of temporary insulation and return of the same to BHEL stores/yard.

4.5.17
In certain instances, co-coordinated/phased application of castable refractory/ insulation on pressure parts etc may be necessitated in consideration of sequence of activities of other erection agencies. Contractor shall do such phased work as may be directed by BHEL.

4.5.18
Prior to application of refractory bituminous painting on the pressure parts and other area is under contractor scope. Only the bituminous paint will be supplied by BHEL free of cost. No separate payment will be made for application of paint.

4.6 PAINTING

4.6.1
Components of the Boiler & Auxiliaries will in general be supplied by BHEL with one coat of Primer and two coats of finish paint applied at the manufacturing shop; contractor shall apply finish coat as specified in painting scheme (Appendix –I) on all such components after erection at site unless and otherwise the shop coating is damaged.

4.6.2
In addition to components/equipment as above, there could be few others without any protective coating. Such components shall first be thoroughly cleaned of all dirt, rust, scales, greases, oils and other foreign materials by wire brushing, scraping,

washing, wiping with solvent or any appropriate method and the same being inspected and approved by BHEL followed by application coats of primer as specified in painting scheme (Appendix –I) Afterwards, the above parts shall be over-coated with layers of paint as per procedure prescribed by the paint manufacturer and as specified in painting scheme (Appendix –I)

4.6.2 Touch-up painting on damaged areas -

a) For coatings damaged up to metal surface

Surface preparation shall be carried out by manual cleaning. Minimum 6 inches adjoining area with existing coating shall be roughened by wire brushing, emery paper rubbing etc., for best adhesion of patch primer.

4.6.3
Tentative painting scheme is enclosed for information in **Appendix-1**. However, for actual execution, the contractor shall adhere to the latest documents issued by BHEL in due course.The tentative painting scheme enclosed in Appendix -1 is subjected to revision if required in due course.

4.6.4
Painting of welded areas / painting of areas exposed after removal of temporary supports / touch-up painting on damaged areas of employer's structures, where inter-connection, welding / modification etc has been carried out by the bidder.

(a) Clean the surface to remove flux spatters and loose rust, loose coatings in the adjoining areas of weld seams by wire brush and emery paper.

(b) Painting procedure to be followed as mentioned above for touch-up painting on damaged areas.

4.6.5
The scope of work includes painting of colour bands, lettering, marking and signs for direction of flow/rotation, names etc of approved colours as per the standard colour codes and specifications specified in tender specification or as advised by BHEL/ customer engineer at site for the equipments/ components covered in these specifications.

4.6.6
In certain isolated instances where it is not possible to clean the equipments as explained above, cleaning by grinding might have to be resorted to. No damage to the equipment/components should be caused.

4.6.7
Surface to be painted should be free of oil and grease. It should be removed by using suitable cleaning agents including permitted solvents. Surface cleaned by chemical agent, if required, shall be treated further as prescribed in use of such cleaning agents. The contractor at his own cost shall provide all the consumables and application implements.

4.6.8
During the preparation of surface, if the shop coat is damage by chemical cleaning or by mechanical means, contractor shall repair the same free of cost to BHEL.

BHEL will make available only the primer and paints free of any charge to contractor.

4.6.9
Specified drying time shall be permitted from one to another coat.

4.6.10
This work requires working at higher altitudes from ground level to as high as 90 m and more. The work spread is also substantial involving substantial run of structures and piping. Contractor shall take sufficient precautions to avoid any accident and hazard in all respects. The ropes, ladders, scaffolding materials, clamps etc and climber used should be of appropriate quality for safe and smooth execution of work.

4.6.11
Contractor shall carry out the work in such a way that other erected equipment, structure, civil foundations and other property are not damaged. For damages in any of such cases due to lapses by contractor, BHEL shall have the right to recover the cost of such damages from the contractor.

4.6.12
Contractor shall take due care to cover/protect the equipment which are already painted while carrying out the painting of other adjacent equipment. If so happens, it shall be cleaned and repainted by the contractor without any extra charges.

4.6.13
In general, painting of structural parts and colour bands, lettering, marking of direction of flow/rotation etc will be carried out by brush painting. However, areas/ equipment inaccessible for manual painting have to be painted by spray painting. The decision of BHEL engineer, in this regard, shall be final and binding on the contractor. For the purpose of spray painting, service air at one point will be made available by BHEL free of cost. Laying of air pipeline, hose and any other line required shall be done by contractor at his cost. The contractor shall provide spray equipment set.

4.6.14
The contractor shall provide all the necessary scaffolding materials, temporary structures and necessary safety devices etc, during execution of the work.

4.6.15
Final painting work shall be started after obtaining clearance from BHEL engineers and as per his instructions.

4.7 Testing, Pre-Commissioning, Assistance for Commissioning

4.7.1
Testing, pre-commissioning and assistance for commissioning will involve, though not limited to these, various testing e.g. Hydro-static pressure, pressure decay tests, leak test, trial runs of equipments; flushing by air, water, oil, steam as applicable; checking/ setting various clearances/parameters, ensuring operation of various equipments free of undue restrictions, chemical (EDTA) cleaning of boiler, steam blowing of the boiler and the critical piping, floating of safety valves, coal firing, trial

operation and loading etc are some of these activities. All the activities for commissioning of the set, as informed by BHEL from time to time shall be completed.

4.7.2
All these tests should be repeated till all the equipments satisfy the requirement / obligations of BHEL to their client and also the relevant statutory authority.

4.7.3
Contractor shall lay / install necessary temporary piping, pumps, valves, blanks, gauges, cables, switches etc for conduct of hydraulic / pressure test, chemical cleaning, steam / air blowing etc. This may involve cutting of some portion of existing piping / valves, placing of rubber wedges / blanks in the valves and other openings, fabrication and installation of temporary tanks for chemical mixing, temporary access platforms to mixing tanks etc. Where required, bends have to be fabricated / formed at site from random length / size of pipes / structural steel. Temporary installation itself has to be tested, tried, and subject to non-destructive examinations as per the instructions of BHEL as part of work**.**

No payment will be made for temporary installations made for hydraulic testing of various systems & piping. Similarly no payment will be made for electrical installations made for any temporary system.

4.7.4
All materials, equipments necessary for installation of temporary system as above will be supplied by BHEL as free returnable issue in random sizes / lengths. However, servicing, fabrication, erection, dismantling of the same after completion of the process, and handing over back to BHEL stores will be the responsibility of the contractor.

In accounting of materials following wastage allowances are provided:

1. Structural items : 5%
2. Pipes : 3%

No wastage allowance for valves & other equipments.

4.7.5
Fabrication, fit-up, pre-heating, welding, post-weld heating and post-weld-heat treatment if any, of requisite blanks for conduct of hydraulic test / leakage test is part of work. Similarly, removal of blanks, restoration and normalization of the concerned system / line is to be done as part of work. BHEL will provide the material for blanks free of charge. No separate payment is envisaged for these activities.

4.7.6
Overhauling, cleaning, servicing of tanks, pumps, equipments, valves, during erection and commissioning stages are in the scope of work. Gaskets, packing & spares for replacement will be provided free of charges by BHEL.

4.7.7
After chemical cleaning / pickling of lubricating system (including oil piping, oil tank and other fittings) of rotating machines, oil flushing for lubricating systems as per

instructions of BHEL engineer shall be carried out. Cleaning of oil tank of lubricating oil system of rotating machinery before and after oil flushing is in the scope of work.

4.7.8
Transportation of oil drums from customer's / BHEL's stores, filling of oil for flushing, first fill of lubricants and subsequent topping up during trials, tests and commissioning is included in the scope of this contract. The contractor shall have to return all the empty drums to the customer / BHEL stores. Similarly, for various pre-commissioning / commissioning activities / processes mentioned in various clauses, transport of chemicals from BHEL / customer's stores, charging of chemicals into the system and returning of remaining chemicals and the empty containers of the chemicals to customer / BHEL stores is the responsibility of the contractor.

4.7.9
During trial runs/ tests, pre-commissioning / commissioning, replacing / changing mechanical / other seals of equipments like pumps, removal and cleaning / replacing of filters etc is within the scope of work. Replacement spares for this purpose will be provided by BHEL.

4.7.10
In case any defect is noticed during tests, trial runs of all equipments and their auxiliaries, such as interferences, rubbing, loose components, abnormal noise or vibration, strain on connected equipment etc the contractor shall immediately attend to these defects and take necessary corrective measures. Readjustment and/or realignment, if necessary, shall be done as per BHEL engineer's instructions. Claim, if any, for these works shall be governed by Section-13, special conditions of contract provided the cause of such work is not attributable to the contractor.

4.7.11
i) Contractor shall cut / open / dismantle work, if needed, as per BHEL engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over.

ii) Similarly, during the course of erection, if certain portion of equipments erected by the contractor has to be undone for enabling other contractors / agencies of BHEL / customer to carry out their work, contractor shall carry out such jobs expeditiously and promptly and make good the job after completion of work by other contractors / agencies of BHEL / customer as per BHEL engineer's / agencies of BHEL / customers instructions. Claims, if any, in this regard shall be governed as per clauses in section-13 herein.

4.7.12
During this period, though BHEL/ client's staff will also be associated in the work, the contractor's responsibility will be to arrange for complete requirement of men and required tools and plants, consumables, scaffolding and approaches etc till such time the commissioned unit undergoes trial operations.

4.7.13
Commissioning activities will continue till the completion of trial operation. During this period contractor shall make available the services of separate dedicated

workforce comprising of suitable skilled and semi-skilled / un-skilled workmen and supervisory staff along with necessary tools and plants, consumables etc.

4.7.14
It shall be specifically noted that the contractor may have to work round the clock during the pre-commissioning and commissioning period along with BHEL engineers and hence considerable overtime payment is involved. The contractor's quoted rates shall be inclusive of all these factors.

4.7.15
The contractor shall carry out any other tests as desired by BHEL engineer on erected equipment covered under the scope of this contract during testing, pre-commissioning and commissioning, to demonstrate the completion of any part or whole of work performed by the contractor.

4.7.16
At various stages of completion boiler has to be preserved against corrosion either by wet preservation or by dry preservation as per the requirement of BHEL engineer. Contractor shall carry out the entire incidental jobs like filling up of water, dozing of chemicals and pressurizing the system to the required pressure, change of gas refills etc. The boilers have a permanent n_2 blanketing arrangement.

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

4.7.17
Commissioning activities will continue till the completion of trial run, trial operation. During this period contractor shall make available the services of separate dedicated labour force comprising of suitable skilled and semi/un-skilled hands along with necessary tools and plants, consumables etc.

4.7.18
It shall be specifically noted that the contractor may have to work round the clock during the pre-commissioning and commissioning period along with BHEL engineers and hence considerable overtime payment is involved. The contractor's quoted rates shall be inclusive of all these factors.
4.7.19
Assistance for conducting performance guarantee test is in the scope of contractor. Contractor shall install all necessary tapping points; instruments etc and provide necessary assistance in this regard.
In case PG test gets delayed beyond the contract period (normal plus grace plus extension if any) due to reasons not attributable to the contractor, PG test issue will be mutually discussed and commercially settled. However contractor shall install the tapping points, impulse pipes, approaches etc as per BHEL instruction and to the extent drawings are available prior to closure of contract.

4.7.20
The contractor shall carry out any other tests as desired by BHEL engineer on erected equipment covered under the scope of this contract during testing, pre-

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

4.8 GENERAL RESPONSIBILITY OF THE CONTRACTOR

4.8.1
The contractor shall have total responsibility for all equipment and materials in his custody at contractor's stores, loose, semi-assembled, assembled or erected by him at site. He shall effectively protect the finished works from action of weather and from damages or defacement and shall also cover the finished parts immediately on completion of work as per BHEL engineer's instructions. The machine surfaces/finished surfaces should be greased and covered.

4.8.2 **Preservation & Protection of Components**

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

4.8.3
The contractor shall make suitable security arrangements including employment of security personnel and ensure protection of all materials/ equipment in their custody and installed equipments from theft/fire/pilferage and any other damages and losses.

4.8.4
Contractor shall collect all scrap materials periodically from various area of work site, deposit the same at one place earmarked at site or shift the same to a place earmarked in BHEL/ client's stores. In case of failure of contractor in compliance of this requirement, BHEL will make suitable arrangement at contractor's risk and cost.

4.8.5
The entire surplus, damaged, unused materials, packaging materials / containers, special transporting frames, gunny bags, etc shall be returned to BHEL stores by the contractor.

4.8.6
The contractor shall not waste any materials issued to him. In case it is observed at any stage that the wastage/excess utilisation of materials is not within the permissible limits, recovery for the excess quantity used or wasted will be effected with departmental charges from the contractor. Decision of BHEL on this will be final and binding on the contractor.

4.8.7
For any class of work for which no specifications have been laid down in these specifications, work shall be executed as per the instructions of BHEL.

4.9 Computer Based System

BHEL is operating web based computerized site operation management system (SOMS) that includes, inter-alia, issue of materials, daily progress reporting, contractor's running monthly billing and material reconciliation through a computerized data management system. Contractor shall install necessary hardware to hook-up with the BHEL's system and use the same for his scope of work.

In the event the computerized SOMS is inoperative for any reasons, the contractor shall take delivery of materials from the storage area/sheds of BHEL/customer after getting the approval of the engineer/customer on standard indent forms to be specified by BHEL/customer. All these records however shall be updated in the SOMS as and when the SOMS is re-activated/normalized.

4.10 EXCLUSIONS

The following listed activities are specific exclusions from the scope of work under this tender specification-

1. LP By-pass valve with Hydraulic System
2. Downstream Steam Pipeline from LP by-pass valve to Condenser
3. Interceptor Valve to IP Turbine pipeline
4. Electrical components such as push-buttons, junction boxes etc.
5. E&C work of cable trays, cables and earthing etc
6. Control panels, EPMS, MCC etc.
7. Electrical & C&I items of equipment handling system
8. All electrical and control & instrumentation items except those specified elsewhere in these specifications.
9. Civil works except to the extent specifically indicated elsewhere in this tender.
10. Supply of primer and paints for final painting
11. Pneumatic copper tubing and fittings thereof.
12. Testing and commissioning of heating elements, thermostats, HV rectifier transformers.
13. Electrical and C&I items of variable frequency drives as provided elsewhere in these specifications.

SECTION-5

SPECIAL CONDITIONS OF CONTRACT

5.0 Obligations of the Contractor (Tools, Tackles, Consumables etc.)

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

Space as jointly decided with Customer & BHEL will be provided free of charges for construction of labour colony, temporary structures/facilities like office, storage sheds, pre-assembly and fabrication areas, toilets, etc. Contractor shall construct labour colony including lighting, internal, roads, water distribution ensuring proper hygiene and provide facilities for proper sanitation and drainage. Contractor shall comply with the stipulations of Maharashtra Pollution Control Board while constructing the labour colony Contractor shall make all arrangements himself for the supply of potable water at his own cost and services.

Contractor shall make complete arrangement for drinking water at his own cost and services fulfilling all the requirements including statutory & safety requirements in this regard as per the instructions from NTPC/BHEL.

5.2 TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES:

5.2.1
The contractor shall provide all (excepting those indicated in BHEL scope) required Tools & Plants (T&P), Monitoring and Measuring devices (MMD) and handling & transportation equipments for the scope of work covered under these specifications. Please refer relevant Appendix for the list of T&P being provided by BHEL free of charges on sharing basis.

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

5.2.3
Contractor's responsibilities with regard to operator, fuel, lubricants and daily upkeep of T&P provided by BHEL are further detailed in Section-7.

5.2.4
Timely deployment of adequate quantity of T&P is the responsibility of the contractor. The contractor shall be prepared to augment the T&P at short notice to match the planned programme and to achieve the milestones.

5.2.5
Contractor shall maintain and operate his tools and plants in such a way that major breakdowns are avoided. In the event of major breakdown, contractor shall make

alternative arrangements expeditiously so that the progress of work is not hampered.

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

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

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

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

5.2.10
BHEL T&P will be issued in basic assembled or knocked down condition; contractor shall transport them to & fro between BHEL stores and site. Additional loose components / sub-assemblies / attachments as and when necessary, will be issued by BHEL, to & fro between BHEL stores and site of such items shall also be done by the contractor. Assembly of such additional loose components/sub-assemblies/ attachments is in contractor's scope. Any boom reduction/ extension of BHEL cranes for contractor's use and restoration to previous state or as directed by BHEL shall be the contractor's responsibility. Contractor shall provide all enabling services with tools and tackles for assembly/dismantling and boom extension/reduction as above.

5.2.11 STRAND AND JACK ARRANGEMENT FOR BOILER DRUM ERECTION

Boiler drum will have provision of lifting lugs to enable erection by strand and jack method. Contractor shall arrange complete set up of strand and jack arrangement for erection of boiler drum to its designated elevation including the services of expert for execution and supervision. BHEL will not be providing the conventional electric winch and pulley set up for this purpose.

Some of the renowned agencies who can provide strand and jack lifting arrangement are –

1 M/s Fagioli PSC India Pvt Ltd (203, Krishna Bhavan, Govandi Station Road, Deonar, Mumbai 400 088, Telephone No 022 – 25564388, Fax No 022 – 25562565)

2 M/s Freight Wings (P) Ltd, (309, Rex Chambers, Walchand Hirachand Marg, Ballard Estate, Mumbai 400 001, Telephone No 022 – 22631714, 22632261, 22639988)

3 M/s Dorman Long Technology Ltd, (233 Bharat Industrial Estate, Lal Bahadur Shastri Marg, Bhandup (West), Mumbai 400 078, Telephone No 022 – 25961960, Mo 09820192807)

4 M/S Basu and Basu Engineers Pvt Limited, Kolkata, Telephone No 033 – 24642967, 24664069, Fax 033 – 24664621)

5 M/S Lift and Shift India Private Limited (96 Chembur, Mankhurd Link Road, Mumbai 400 043, Telephone 022 – 25484180, 25560101, Fax 022 – 25563573, E-Mail – projects@liftandshift.co.in)

Contractor may engage any of the above named agencies or any other competent agency known to contractor for this lifting activity.

Prior approval of BHEL is to be taken before assigning the work to the agency.

5.2.12 Huck Installation Tools & Hoses

Contractor shall arrange Huck Power Rig (hydraulic unit) for ESP Huck bolting activity alongwith installation tools (guns) and hose assemblies for this set. The installations tools are supplied by the following listed agency.

IN U.K.
Alcoa Fastening Systems
Commercial Products
Stafford Park 7
Telford Shropshire TF3 3BQ
United Kingdom
Tel No. 0044 – 1952 – 290 011
Fax No. 0044 – 1952 – 290 459

IN INDIA
Alcoa Asia Limited
India Liaison Office
Meridien Commercial Tower
7TH Floor, Raisina Road
New Delhi-110 001
Tel No. 011 – 2371 7870 to 75
Fax No. 011 – 2371 7876

5.3 CONSUMABLES

5.3.1
The contractor shall provide all consumables required for carrying out the work covered under these specifications excepting those specifically indicated as BHEL scope.

5.3.2
All consumables to be used for the work shall have prior approval of BHEL engineer with regard to brand and quality specifications. Test reports / certificates in respect of these consumables, wherever applicable, shall be submitted to BHEL engineer.

5.3.3 Primers & Paints

Contractor shall arrange ROZC (IS:2064) primers for preservation of components issued to him, touch-up of heat affected areas resulting due to site work and painting damaged due to erection related activities.

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

Refer relevant clause of Section-4, Section-7 of Special Conditions of Contract and relevant Appendix in this regard.

5.3.5 Welding electrodes, filler wires for TIG welding and gases

5.3.5.1
All the required welding electrodes, except those indicated as BHEL scope elsewhere in these specifications, as approved by BHEL shall be arranged by contractor at his cost. It shall be the responsibility of the contractor to obtain prior approval of BHEL, before procurement, regarding manufacturer, type of electrodes etc. On receipt of the electrodes at site, it shall be subject to inspection and approval by BHEL regarding type of electrodes, batch number, date of expiry etc. Batch test certificates shall be made available for verification & record before the actual use of the welding consumables.

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

5.3.5.2
Filler wires, for TIG welding of pressure parts & piping, to the extent supplied by the manufacturing units of BHEL along with 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 this free issue by BHEL. Similarly, BHEL will provide as free issue the welding electrode for welding of T-91/P-91 material tubes/pipes released as part of supply from manufacturing unit of BHEL.

5.3.5.3
Gases like argon, oxygen, acetylene etc that are required for erection related activities shall be arranged by the contractor at his cost. For T-91 material site weld joints argon as per grade-3 of IS:5760 (1998) with oxygen and water vapour restricted to max 6 ppm each and with argon purity level of minimum 99.99% shall be arranged and used by the contractor. The supply should accompany test certificate for the batch indicating individual element ‘ppm’ level and overall purity level.

5.3.5.4
Nitrogen gas, if required, for preservation of boiler and nitrogen capping during chemical cleaning process, will be provided by BHEL free of charge. Contractor shall arrange necessary connector, nipple, regulator, header and piping for usage of such gas from cylinders.

5.3.5.5
BHEL will provide free of charges the induction heating equipment set required for welding field joints of SA 335 P-91 material pipeline. The set will comprise of following:

(i) Main panel
(ii) Capacitor panel
(iii) Interconnection power & control cables between above panels
(iv) 185 sq mm special connecting cable from capacitor panel output – 5m length.

Contractor shall provide the input electrical power connection including arrangements such as db, cables etc, thermocouple pads, thermocouples and compensating cables, induction heating annealing cables (from the capacitor panel to joint and for wrapping around the weld joint) (spec: single core 240 sq. mm, 1200a, 3khz), ceramic wool and other consumables etc as may be required. Quantum of annealing cable requirement will depend on many parameters e.g. Weld joint size, heat input, type of connection i.e. Series or parallel etc.
Likely supplier: Mansfield cable co. Noida (U.P.).

5.4 FIELD OFFICE

5.4.1
Space as jointly decided with Customer & BHEL will be provided free of charges for construction of site office & stores. Contractor shall construct site office & stores including lighting complete arrangement for water including source and provide facilities for proper sanitation and drainage.

5.4.2
On completion of work, all the temporary buildings, structures, pipelines, cables, etc shall be dismantled and levelled 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 levelling the area is limited only to the contractor's site office, yard and other spaces occupied by the contractor.

5.4.3.
BHEL is installing a computerized site management system at site to cover areas of material management, erection & commissioning, quality control, billing, MIR, etc. This system can be accessed through normal telephone lines and through LAN installed at site.

Contractor shall ensure that all operations in their scope that has interface with BHEL system is done only through this computerized system. Contractor shall make all arrangements for connectivity, computing equipment, personnel, software, etc to operate and interact with BHEL system. No manual system other then what is not covered by computerized system will be acceptable to BHEL.

5.5 AREA LIGHTING

5.5.1

Contractor shall arrange adequate floodlights, hand lamps and area lighting for material handling, unloading, verification, stacking, erection, pre-assembly activities etc. All temporary wiring must comply with regulations and will be subjected to engineer's inspection before connecting to supply point. Contractor shall use his own materials like cables, fuses, switch-boards etc. BHEL/client will not provide anything in this regard.

5.6 CONSTRUCTION POWER & WATER

5.6.1 CONSTRUCTION POWER

Construction power at 415V shall be provided free of charge normally at one location in the site and more locations depending upon mutual discussion and agreement. Further distribution shall be arranged by the contractor at his own cost and services. All temporary wirings must comply with the local regulations and will be subject to NTPC & BHEL inspection and approval before connection to supply. Contractor shall be responsible for fulfilment of all such type requirements including statutory requirements in this regard

5.6.2

Contractor shall make necessary arrangements for onward distribution of construction power taking due care of surrounding construction activities like movement of cranes & vehicles, civil work, fabrication/construction/assembly/ erection etc and safety of personnel. It may become necessary to relocate some of the installations to facilitate work by other agencies or by him.

5.6.3

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

5.6.4

While BHEL will make reasonable efforts to ensure continuous electric power supply, interruptions cannot be ruled out. Contractor shall be well equipped with back-up power supply arrangement like DG set and diesel operated welding machine etc to tackle situations arising due to failure of customer supplied power, so as to ensure continuity and completion of critical processes that are underway at the time of power failure or important activities planned in immediate future.

5.6.5

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

5.6.6 CONSTRUCTION WATER

Contractor shall make all arrangements himself for the supply of construction water at his own cost and services with all further distribution network as and when required. Contractor shall be responsible for fulfilment of all requirements including

statutory & safety requirements in this regard as per the instructions from NTPC/BHEL.

BHEL/owner will provide water for construction purpose at a single point free of charges. All arrangements for further distribution beyond this point have to be made by the contractor.

5.7 Responsibilities with regard to labour employment etc.

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

5.7.1
Contractor shall also comply with the requirements of local authorities/ project authorities calling for police verification of antecedents of the workmen, staff etc.

5.7.2
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.

5.7.3
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.

5.7.4.
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
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.

5.9.0 TAXES, DUTIES, LEVIES

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

5.9.1

The contractor shall pay all (save the specific exclusions as enumerated in this contract) taxes, fees, license charges, deposits, duties, tools, royalty, commissions or other charges which may be levied on the input goods & services consumed and output goods & services delivered in course of his operations in executing the

contract. In case BHEL is forced to pay any of such taxes, BHEL shall have the right to recover the same from his bills or otherwise as deemed fit.

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

5.9.2 Service Tax & Cess on Service Tax

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

Contractor shall submit to BHEL documentary evidence of Service Tax registration certificate specifying name of services covered under this contract. **Contractor shall submit serially numbered Service Tax and Cess Invoice, signed by him or a person authorized by him in respect of taxable service provided, and shall contain the following, namely,**

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

All the four conditions shall be fulfilled in the invoice before release of service tax payment.

Contractor shall obtain prior written consent from BHEL before billing the amount towards such taxes.

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

5.9.3 VAT (Sales Tax /WCT)

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

5.9.4 Modalities of Tax Incidence on BHEL

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

5.9.5 New Taxes/Levies

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

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

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

5.11 Submission of periodical reports

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

1) Consumption of consumables like welding electrodes, gases and paints
2) Consumption of construction power
3) Availability and utilization of BHEL's tools & plants
4) Availability and utilization of contractor's tools & plants
5) Daily manpower reports
6) Daily progress reports of activities & incidents
7) Calibration reports
8) Records of wages payment
9) Any other report/record as may be specified by BHEL/client.

BHEL at site will suggest formats for these reports.

Section-6

Special conditions of contract

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

6.1

The contractor shall deploy all the skilled/semiskilled/ unskilled labour including highly skilled workmen etc. These workmen should have previous experience on similar job. They shall hold valid certificates wherever necessary. BHEL reserves the right to insist on removal of any employee of the contractor at any time if he is found to be unsuitable and the contractor shall forthwith remove him. Contractor should furnish a tentative deployment plan of his manpower as required vide appendix-vi. Also the actual deployment will be so as to satisfy the erection and commissioning targets set by BHEL.

6.2

It is the responsibility of the contractor to engage his workmen in shifts and or on overtime basis for achieving the targets set by BHEL. This target may be set to suit BHEL's commitments to its customer or to advance date of completion of events or due to other reasons. The decision of BHEL in regard to setting the erection and commissioning targets will be final and binding on the contractor.

6.3

Contractor shall deploy only qualified and experienced engineers/ supervisors. They shall have professional approach in executing the work.

6.4

The contractor's supervisory staff shall execute the work in the most professional manner in the stipulated time. Accuracy of work and aesthetic finish are essential part of this contract. They shall be responsible to ensure that the assembly and workmanship conform to dimensions and tolerances given in the drawings/ instructions given by BHEL engineer from time to time.

6.5

The supervisory staff employed by the contractor shall ensure proper outturn of work and discipline on the part of the labour put on the job by the contractor. Also in general they should see that the works are carried out in a safe and proper manner and in coordination with other labour and staff employed directly by BHEL or other contractors of BHEL or BHEL's client.

6.7

If at any time, it is found that the contractor is not in a position to deploy the required engineers/supervisors/workmen due to any reason; BHEL shall have the option to make alternate arrangements at the contractor's risk and cost.

6.8 SITE ORGANISATION

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

a) Material management
b) Overall planning, monitoring & control
c) Quality control and quality assurance
d) Safety, fire & security
e) Industrial relations and fulfilment of labour laws and other statutory obligations.

Section-7

Special Conditions of Contract

7.0 Obligations of BHEL

7.1 Facilities to be provided by BHEL

7.1.1 Space for site office / stores

Refer section-5 in this regard.

7.1.2 Construction power & water

Refer section-5 in this regard.

7.1.3 **Other materials and consumables:**

BHEL shall not provide any material / consumables except those specifically mentioned as BHEL scope in these specifications.

7.1.4 MATERIALS FOR IBR WELDER QUALIFICATION TEST AT SITE

BHEL will provide the raw material free of charges for preparation of test pieces for conducting the site qualification test of **IBR welders**. Contractor shall prepare the required test pieces from such raw materials.

Contractor shall arrange all the materials and prepare test coupons for site qualification test of **all other welders**.

7.2 Filler wire for TIG welding and welding electrodes for welding of T-91/P-91 material tubes/pipes

Refer section-5 in this regard.

7.3 EQUIPMENTS – TOOLS & PLANTS

BHEL will make available T&P listed in the relevant appendix free of charge. Further details are as under:

7.3.1 CRANES TO BE PROVIDED BY BHEL

7.3.1.1

BHEL will make available the crane (as per relevant A**ppendix** free of charge to the contractor on sharing basis mainly for the purposes enumerated vide notes in the relevant Appendix**.** BHEL cranes have to be shared with other agencies / contractors of BHEL. The allocation of cranes shall be at the discretion of BHEL engineer, which shall be binding on the contractor.

7.3.1.2

Contractor shall lay necessary sleeper beds, backfilling of approaches wherever necessary for safe movement of the cranes as directed by BHEL. Contractor shall transport the equipments and components/sub assemblies/ attachments of BHEL equipments to & fro between BHEL stores and site.

7.3.1.3
Cranes, including the crane hired by BHEL, will be initially issued in basic assembled condition. Any alteration/addition like boom reduction / extension, assembly of components/sub-assemblies needed for modulating the capacity/ reach/other features of cranes and restoration to the state as directed by BHEL shall be the contractor's responsibility.

7.3.1.4
The day-to-day upkeep and running maintenance like filling / topping up of lubricants, changing filters etc, of BHEL owned cranes shall be the responsibility of the contractor. Spares if any, required in normal course will be provided by BHEL. Major breakdowns will be attended to by BHEL. The cranes provided by BHEL will be withdrawn for regular and capital maintenance as per the respective schedule of maintenance. As far as possible such schedules will be intimated to the contractor in advance and may be adjusted depending on the work requirements at site. However no claim whatsoever will be entertained on account of non-availability of cranes.

7.3.1.5
Contractor shall provide the fuel for all the cranes. Operator for hired cranes will be provided by the crane hiring agency of BHEL.

7.3.1.6
Where the services of the cranes provided by BHEL are to be shared by other agencies/ contractors of BHEL, the contractor's responsibilities defined above will also be apportioned accordingly to the beneficiary agency. Working arrangements in this regard will be done at site by BHEL engineer and in any case his decision shall be final and binding.

7.4 OTHER T&P

7.4.1
The responsibilities of contractor defined above for BHEL cranes shall also be applicable, mutatis – mutandis, in respect of other tool & plants provided by BHEL.

7.4.2
Chemical cleaning equipments that have to be used in temporary installations for the respective purpose have to be serviced by the contractor prior to use. BHEL will provide necessary spares, packing etc free of charge for the same. These have to be returned to BHEL after due servicing and preservation.

7.4.4
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.

7.4.5
Lubricants like engine oil, cardium compound, hydraulic oil, gear oil, grease etc for BHEL's T&P including cranes will be provided by BHEL free of charge. Similarly

filters for cranes will be provided free of charge by BHEL. All other consumables like cotton waste, cleaning agents 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, conduct of hydraulic test, chemical cleaning / steam blowing / oil flushing / acid cleaning etc shall be provided by BHEL.

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

7.5.1
All lubricants and chemicals required for testing, preservation, chemical cleaning / acid cleaning, oil flushing, and the lubricants for trial runs of the equipments and trial operation of the unit will be supplied by BHEL free of charges.

7.6 PRIMER AND PAINTS FOR FINAL PAINTING

All primer, paints and thinner required for final painting shall be supplied by BHEL free of charges.

The contractor , however, shall provide account of all the items issued to him and return all primer, paints etc remaining extra over the normal requirement with proper identification tags in a packed condition to BHEL stores. In case of any misuse or excess use over the normal requirement, BHEL reserves the right to recover the cost of such misuse/ excess use. Decision of BHEL engineer in this regard will be final and binding on the contractor.

8.0 Inspection/Quality Assurance/Quality Control/ Statutory Inspection

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

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

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

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

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

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

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

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

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

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

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

8.8

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

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

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

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

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

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

8.14 Stage Inspection By FES/QA Engineers

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

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

Statutory Inspection of Work

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

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

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

The scope includes getting the approvals from the statutory authorities, which includes arranging for inspection visits of statutory authority periodically as per BHELl Engineer's instructions, arranging materials for ground inspection, taking rub outs for the pressure parts to be offered for inspection, submitting co-related inspection reports, documents, radiographs etc and following up

the matter with them. Contractor shall also make all arrangements for offering the Products / Systems for inspection at location, as applicable, to the concerned authority.

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

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

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

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

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

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

Field Quality Assurance

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

SECTION-9
SPECIAL CONDITIONS OF CONTRACT

Safety, Occupational Health and Environmental Management

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

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

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

9.1 The Contractor shall:

9.1.1

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

9.1.2

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

9.1.3

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

9.1.4

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

9.1.5

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

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

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

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

9.2 SPECIAL CONDITIONS

9.2.1 Safety

9.2.1.1 Safety Plan

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

9.2.1.14
Only authorized persons holding relevant license will drive and operate site plant and equipments e.g. cranes, dumpers, excavators, transport vehicles etc

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

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

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

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

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

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

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

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

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

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

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

9.2.1.25
If the contractor fails to improve the standards of safety in its operation to the satisfaction of BHEL after being given a reasonable opportunity to do so, and/or if the contractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instructions regarding safety issued by the authorized BHEL official, BHEL shall have the right to take corrective steps at the risk and cost of the contractor after giving a notice of not less than seven days indicating the steps that would be taken by BHEL.

9.2.1.26 **Emergency Response**

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

- Safeguard of life
- Protect assets under construction or neighbouring

- Protect environment
- Resumption of normal operations as soon as the emergency condition is called off

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

9.2.1.27
At least 5% Contractors supervisors and workmen shall undergo training in administering 'First Aid'. The trained persons should represent for all categories of work and for all areas of work. Adequate number of trained persons should be available for each shift. These first aides shall be included in the emergency response team. Contractor employees and workmen are encouraged to participate in first aid training programmes whenever organized by BHEL.

9.2.2 OCCUPATIONAL HEALTH

9.2.2.1
Specific occupational health hazards will be identified through the hazard evaluation processes in consultation with BHEL engineers and the necessary prevention/reduction/elimination methods implemented.

9.2.2.2
All personnel working in an activity with a potential risk to health shall be made aware of all those risks and the actions they must take to reduce/control/eliminate the risk

9.2.2.3
Safety coordinator shall conduct periodic checks to ensure that every group of workers engaged in similar activities are aware of potential risks to health and the actions required to be taken to mitigate the risk

9.2.2.4
In order to protect personnel from associated health hazards, the following main areas will be focused

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

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

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

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

9.2.2.8
Adequate arrangements shall be made to provide safe drinking water

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

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

9.2.3.0 HYGIENE and HOUSEKEEPING

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

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

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

9.2.4 ENVIRONMENT MANAGEMENT

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

9.2.4.2 WASTE MANAGEMENT

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

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

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

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

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

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

9.3 **SUPERVISION**

9.3.1

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

9.3.2

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

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

9.3.3

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

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

9.4.0 **TRAINING & AWARENESS**

9.4.1

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

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

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

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

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

9.5.0 **REPORTING**

9.5.1
The contractor shall submit report of all accidents, fires and property damage, dangerous occurrences to the authorized BHEL official immediately after such occurrence but in any case not later than twelve hours of the occurrence. Such report shall be furnished in the manner prescribed by BHEL and also to meet statutory requirement.

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

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

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

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

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

9.6 **AUDIT REVIEW AND INSPECTION**

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

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

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

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

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

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

9.7 **NON COMPLIANCE**:-

9.7.1
NONCONFORMITY OF SAFETY RULES AND SAFETY APPLIANCES WILL BE VIEWED SERIOUSLY AND THE BHEL HAS RIGHT TO IMPOSE FINES ON THE CONTRACTOR AS UNDER **for every instance of violation noticed**:

Sl. No	**Instance of Violation**	**Fine (in Rs)**
01	Not Wearing Safety Helmet	50/-
02.	Not wearing Safety Belt	100/-
03.	Grinding Without Goggles	50/-
04.	Not using 24 V Supply For Internal Work	500/-
05.	Electrical Plugs Not used for hand Machine	100/-
06.	Not Slinging property	200/-
07.	Using Damaged Sling	200/-
08.	Lifting Cylinders Without Cage	500/-

Sl. No	Instance of Violation	Fine (in Rs)
09.	Not Using Proper Welding Cable With Lot of Joints And Not Insulated Property.	200/-
10.	Not Removing Small Scrap From Platforms	200/-
11.	Gas Cutting Without Taking Proper Precaution or Not Using Sheet Below Gas Cutting	200/-
12.	Not Maintaining Electric Winches Which are Operated Dangerously	500/-
13.	Improper Earthing Of Electrical T&P	500/-
	Major Accident or Accidents causing partial loss of earning to the victim	50,000/- per victim
14	Fatal Accident or Accidents causing permanent loss of earning to the victim	1,00,000/- per victim

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

9.8

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

9.9 Memorandum of Understanding

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

Article I. Memorandum of Understanding

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

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

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

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

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

Name :

Place & Date:

9.10

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

IS No	YEAR	Amd upto	DESCRIPTION
IS 10204	1982		PORTABLE FIRE EXTINGUISHERS MECHANICAL FOAM TYPE
IS 10245	1994		SPECIFICATION FOR BREATHING APPARATUS
IS 10291	1982		SAFETY CODE FOR DRESS DRIVERS IN CIVIL ENGINEERING WORKS
IS 10658	1983		HIGHER CAPACITY DRY POWDER FIRE EXTINGUISHERS (TROLLEY MOUNTED)
IS 10662	1992		COLOUR TELEVISION
IS 10667	1983		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR PROTECTION OF FOOT AND LEG
IS 11037	1984		ELECTRONIC FAN REGULATORS
IS 11057	1984		INDUSTRIAL SAFETY NETS
IS 11451	1998		RECOMMENDATION FOR SAFETY AND HEALTH REQUIREMENT RELATING TO OCCUPATION EXPOSURE TO ASBESTOS
IS 1169	1967		PEDESTAL FANS
IS 1179	1967		SPECIFICATION FOR EQUIPMENT FOR EYE AND FACE PROTECTION DURING WELDING
IS 11833	1986		DRY POWDER FIRE EXTINGUISHERS FOR METAL FIRES
IS 11972	1987		CODE OF PRACTICE FOR SAFETY PRECAUTION TO BE TAKEN WHEN ENTERING A SEWARAGE SYSTEM
IS 1287	1986		ELECTRIC TOASTER
IS 13063	1991		STRUCTURAL SAFETY OF BUILDINGS ON SHALLOW FOUNDATIONS ON ROCKS
IS 13385	1992		SPECIFICATIONS FOR FIRE EXTINGUISHERS 50 LITRE WHEEL MOUNTED WATER TYPE (GAS CARTRIDGES)
IS 13386	1992		SPECIFICATIONS FOR FIRE EXTINGUISHERS 50 LITRE MECHANICAL FOAM TYPE
IS 13415	1992		CODE OF SAFETY FOR PROTECTIVE BARRIERS IN AND AROUND BUILDINGS
IS 13416	1992		RECOMMENDATIONS FOR PREVENTIVE MEASURES AGAINST HAZARDS AT WORKING PLACE PART 1 TO PART 5
IS 13430	1992		CODE OF PRACTICE FOR SAFETY DURING ADDITIONAL CONSTRUCTION AND ALTERATION TO EXISTING BUILDINGS
IS 13849	1993		PORTABLE FIRE EXTINGUISHERS DRY POWDER TYPE (CONSTANT PRESSURE)
IS 1446	1985		CLASSIFICATION OF DANGEROUS GOODS (FIRST REVISION)
IS 1476	1979		REFRIGERATORS
IS 1641	1988		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): GENERAL PRINCIPLES OF FIRE GRADING AND CLASSIFICATION
IS 1642	1989		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS-DETAILS OF CONSTRUCTION
IS 1643	1988		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): EXPOSURE HAZARD
IS 1646	1997		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): ELECTRICAL INSTALLATIONS
IS 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 No	YEAR	Amd upto	DESCRIPTION
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 No	YEAR	Amd upto	DESCRIPTION
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

SECTION-10

SPECIAL CONDITIONS OF CONTRACT

10.0 DRAWINGS AND DOCUMENTS

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

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

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

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

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

10.6
In case of any conflict between general instructions to tenderness, general conditions of contract contained in sections 1 & 2 respectively and special conditions of contract contained in sections 4 to 15 and appendices, provisions contained in special conditions of con t in sections 4 to 15 and appendices shall prevail.

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

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

Section-11

Special conditions of contract

Time Schedule, Mobilization, Progress Monitoring, Overrun, Variation etc.

11.1 MOBILIZATION, TIME SCHEDULE, CONTRACT PERIOD AND GRACE PERIOD

11.1.1 MOBILIZATION AND COMPLETION SCHEDULE

Contractor shall mobilize necessary resources within four weeks of issue of fax letter of intent to commence the erection work.

The contractor has to subsequently augment his resources in such a manner that following major milestones of erection & commission are achieved on specified schedules:

SN	Major milestone	Tentative completion
1	Boiler drum lifting	27-Feb-10
2	Boiler hydraulic test (drainable)	27-Jan-11
3	Boiler hydraulic test (non-drainable)	27-July-11
4	Boiler light up & alkali boil out	27-Aug-11
5	Acid cleaning completion (EDTA)	30-Sept-11
6	Steam blowing completion & safety valve floating	27-Nov-11
7	Synchronization	27-Jan-12
8	Coal firing	27-Jan-12
9	Trial Operation Completion	27-March-12
10	Performance Guarantee Test	27-April-12
11	Stabilization of the plant operation, Completion of all Facilities.	27-April-12

In order to meet above schedule in general, and any other intermediate targets set, to meet customer/ project schedule requirements, contractor shall arrange & augment all necessary resources from time to time on the instructions of BHEL.

11.1.2 **COMMENCEMENT OF CONTRACT PERIOD**

Erection/placement on it's designated foundation/location, of the first major permanent equipment/component/column covered in the scope of these specifications shall be recognized as "start of contract period". Smaller items like packer plates, shims, anchors, inserts etc will not be considered as start of contract period.

11.1.3 **CONTRACT PERIOD**

The contract period for completion of entire work under scope shall be **28 (Twenty Eight) months** from the "start of contract period" as specified earlier.

11.1.3 **GRACE PERIOD**

Grace period of 5 (Five) months beyond the Contract Period may be provided for this contract at the discretion of BHEL.

11.1.4 **CONSEQUENCE OF DELAY**

It may be noted that in the event delay in completion is attributable to the contractor and leads to imposition of liquidated damages by BHEL's client, BHEL will impose ld on the contractor as per GCC.

11.**2 PROGRESS MONITORING, CONTRACT EXTENSION AND OVERRUN**

11.2.1 PROGRESS MONITORING

Progress will be reviewed periodically (daily/weekly/monthly) including month end review vis-a-vis the plans drawn as above. The contractor shall submit periodical progress reports and other reports/information including manpower, consumables etc as desired by BHEL.

11.2.2 **ASCERTAINING AND ESTABLISHING THE REASONS FOR SHORTFALL**

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

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

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

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

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

11.2.3 **CONTRACT EXTENSION**

If the completion of work as detailed in these specification gets delayed beyond the end of contract period and grace period then depending on the balance work left out, BHEL at its discretion may extend the contract.

11.2.4
A joint programme shall be drawn for the work to be completed during the extended contract period. Review of the program and record of shortfall as describe vide clause no. 11.2.2 shall be done during the extended period. The over run charges will be paid in proportion to the achievement of the respective month vis-à-vis the plan for the month (for assessing the performance, the agreed plan shall be reduced by shortfall attributable to the BHEL). BHEL may disallow contractor's claim for over run charges if the monthly programme as mentioned in these specifications are not made by him.

11.2.5
The part of extension attributable to the contractor, if any, in total contract extension shall be exhausted first i.e., immediately after end of grace period. This shall be followed by the extension on account of force majeure conditions, if any, and lastly on account of BHEL.

11.2.6 OVERRUN COMPENSATION

If the contract is extended beyond the contract and grace period for any reason other than those attributable to the contractor or force majeure conditions, the contractor will be compensated by payment of overrun charges at the rate of Rs.1,00,000/- (Rupees one lakh only) per month. Overrun compensation will be paid for the extension attributable to BHEL only. **No overrun compensation shall be payable for the extension of contract on account of reasons of delay of erection & commissioning work attributable to contractor and/or force majeure conditions**. Overrun compensation for eligible period shall be in proportion to the progress achieved against the plan for respective period.

11.3 **PRICE VARIATION**

11.3 PRICE VARIATION

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

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

11.3.2

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

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

11.3.3

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

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

Where

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

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

R = Value of work done for the billing month

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

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

11.3.4

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

11.3.5

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

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

11.3.6

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

11.3.7

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

11.3.8

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

11.3.9

With the above provision, the clause no. 2.15 of General Conditions of Contract section-2 is not applicable.

11.4 CONTRACT VARIATIONS

11.4.1 VARIATION IN WEIGHT/QUANTITIES

Weight of various equipments, quantities of various items of work covered under these specifications and indicated in relevant appendices for erection & commissioning and material handling/material management services are likely to vary. For any upward or downward variation in the quantities, the rates accepted shall be applicable without any variation. Payment will be made by BHEL for the actual executed quantity of respective item as certified by BHEL engineers.

11.6 INTEREST BEARING ADVANCE

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

entitled to make recovery of the entire outstanding amount in case the contractor fails to comply with the BG requirement as above.

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

11.7 DEFINITION OF WORK COMPLETION

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

SECTION-12

SPECIAL CONDITIONS OF CONTRACT

12.0 TERMS OF PAYMENT

12.0.1
The contractor shall submit his monthly RA account bills with all the details required by BHEL on specified date every month covering progress of work in all respects and areas for the previous calendar month. However, first RA Bill shall be released only after signing of Contract Agreement.

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

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

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

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

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

9. Name of the Company
10. Name of Bank
11. Name of Bank Branch
12. City/Place
13. Account Number
14. Account type
15. IFSC code of the Bank Branch
16. MICR Code of the Bank Branch

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

12.1 STAGES OF PROGRESSIVE PRO-RATA PAYMENTS

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

12.1.1 E & C OF BOILER AND AUXILIARIES, PIPING, FABRICATED STRUCTURES ETC

SN	PART OF THE ACTIVITY COMPLETED	PERCENTAGE BREAK UP OF ACCEPTED ITEM RATES					
		NON-PR PARTS	STRUC-TURES	PR. PARTS	ROTATING M/c	E S P	INSULA-TION
A	TRANSPORT, & ERECTION / PLACEMENT	40	40	40	40	40	40
B	ALIGNMENT, BOLTING, GROUTING & WELDING	45	45	40	45	45	45
C	GAS TIGHTNESS TEST / KEROSENE LEAK TEST / LPI TEST ETC	5	---	---	---	5	5
D	NDE AND HEAT TREATMENT	---	3	10	---	--	--
E	TRIAL RUN OF ROT. M/C	---	---	---	5	--	--
F	ON COMPLETION OF DRUM LIFTING	---	3	---	---	--	--
G	ON COMPLETION OF HYDRAULIC TEST OF BOILER (DRAINABLE)	---	2	3	---	--	--
H	ON COMPLETION OF HYDRAULIC TEST OF BOILER (NON-DRAINABLE)	---	---	2	---	--	--
I	ON COMPLETION OF BOILER LIGHT UP AND ABO	2	2	2	2	2	2
J	ON COMPLETION OF FINAL PAINTING	2	3	---	1	1	1
K	ON COMPLETION OF SVF & STEAM BLOWING	1	1	1	2	1	1
L	COAL FIRING	4	---	1	4	5	5
M	TRIAL OPERATION	1	1	1	1	1	1
	TOTAL	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

12.1.2 PIPING (ITEM No. 7 OF RATE SCHEDULE)

(A) 25% OF THE CONTRACT RATE ON PRORATA BASIS AFTER PLACEMENT IS COMPLETED.

(B) 30% OF THE CONTRACT RATE ON PRORATA BASIS AFTER ALIGNMENT & JOINT FIT-UP IS COMPLETED.

(C) 25% OF THE CONTRACT RATE ON PRORATA BASIS AFTER COMPLETION OF WELDING

(D) 10% OF THE CONTRACT RATE ON PRORATA BASIS AFTER COMPLETION OF NDE & POST WELD HEAT TREATMENT, IF ANY.

(E) 4% OF THE CONTRACT RATE ON PRORATA BASIS AFTER COMPLETION OF HYDRAULIC TEST

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

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

(H) 1% OF CONTRACT RATE AFTER COMPLETION OF FINAL PAINTING & COLOUR BANDING.

12.1.3 RADIOGRAPHY TEST (Item No. 8 of Rate Schedule)

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

12.2 MODE OF PAYMENT AND MEASUREMENT OF WORK COMPLETED

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

12.3 GENERAL

12.3.1
WEIGHT OF PACKERS AND SHIMS WHICH BECOME PERMANENT PART OF EQUIPMENT, BOTH FIGURING IN SHIPPING LIST AND THOSE FABRICATED AT SITE WILL BE PAID FOR ON SHIPPING LIST BASED ACTUAL WEIGHT.

12.3.2
CERTAIN OPTIMIZED ASSEMBLIES / OR MODULES MAY BE MADE, ASSEMBLING PRODUCTS FROM TWO OR MORE DIFFERENT PRODUCT GROUP MAIN ASSEMBLY AND DISPATCHED. PAYMENT FOR ERECTION OF THESE OPTIMIZED ASSEMBLIES / OR MODULES WILL BE REGULATED AS PER THE WEIGHT OF INDIVIDUAL PRODUCT GROUP MAIN ASSEMBLIES CONTRIBUTING TO THE TOTAL WEIGHT OF THE MODULE OR OPTIMIZED ASSEMBLY AT THE QUOTED RATE FOR THE RESPECTIVE PRODUCT GROUP MAIN ASSEMBLIES, IN THE RATE SCHEDULE.

12.3.3
FOR PAYMENT OF TEMPORARY SYSTEM FOR CHEMICAL CLEANING AND STEAM BLOWING OF BOILER AND PIPING THE MEASUREMENT FOR THE PIPING, FITTING, VALVES ETC AND EQUIPMENTS LIKE TANKS, STRUCTURES PROVIDED BY BHEL & NOT FIGURING IN SHIPPING LIST WILL BE BASED ON JOINTLY MEASURED QUANTITY AND CORRESPONDING STANDARD WEIGHTS. PAYMENT WILL BE MADE AT THE RATE APPLICABLE FOR **NON-PRESSURE PARTS** FOR ITEMS. NO PAYMENT WILL BE MADE

FOR THE EQUIPMENTS BROUGHT BY THE CONTRACTOR SUCH AS PUMPS ETC AND FOUNDATIONS MADE BY THE CONTRACTOR FOR TEMPORARY SYSTEMS.

12.4 MEASUREMENT OF THE WORK COMPLETED

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

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

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

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

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

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

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

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

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

SECTION-13
SPECIAL CONDITIONS OF CONTRACT

13.0 EXTRA CHARGES FOR RECTIFICATION AND MODIFICATION

13.1

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

13.2

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

13.3

HOWEVER, BHEL MAY CONSIDER FOR PAYMENT AS EXTRA, FOR SUCH OF THOSE WORKS DETAILED IN CLAUSE 13.1 WHICH REQUIRE MORE THAN **100 MAN-HOURS** AND SUCH PAYMENT WILL BE REGULATED BY THE TERMS, CONDITIONS AND STIPULATIONS CONTAINED IN THE CLAUSES 13.4 TO13.8 AND/OR 14.2.1 TO 14.2.10 AS THE CASE MAY BE. IT MAY BE SPECIFICALLY NOTED THAT THE DECISION OF BHEL AS TO WHETHER SUCH PAYMENT IS DUE SHALL BE FINAL AND BINDING ON THE CONTRACTOR. IT MAY ALSO BE NOTED THAT ONLY THOSE WORKS THAT ARE IDENTIFIED AS MAJOR AND WARRANT EXTRA PAYMENT AND CERTIFIED AS SUCH BY THE SITE ENGINEER AND ACCEPTED BY THE DESIGNERS AND/OR COMPETENT AUTHORITY OF BHEL, WILL BE CONSIDERED FOR EXTRA PAYMENT.

13.4

FOR EXTRA WORKS ARISING OUT OF TRANSIT, STORAGE AND ERECTION DAMAGES, PAYMENT, IF FOUND DUE, WILL BE REGULATED BY CLAUSES 14.2.1 TO 14.2.10.

13.5

ALL THE EXTRA WORK SHOULD BE CARRIED OUT BY A SEPARATELY IDENTIFIABLE GANG, WITHOUT AFFECTING ROUTINE ACTIVITIES. DAILY LOG SHEETS IN THE PRO-FORMA PRESCRIBED BY BHEL SHOULD BE MAINTAINED AND SHALL BE SIGNED BY THE CONTRACTOR'S REPRESENTATIVE AND BHEL ENGINEER. NO CLAIM FOR EXTRA WORK WILL BE CONSIDERED/ENTERTAINED IN THE ABSENCE OF THE SAID SUPPORTING DOCUMENTS I.E. DAILY LOG SHEETS. IT MAY, HOWEVER BE NOTED THAT SIGNING OF LOG SHEETS BY BHEL ENGINEER DOES NOT MEAN THE ACCEPTANCE OF SUCH WORKS AS EXTRA WORKS. ALL ADMISSIBLE CLAIMS SHALL BE SUBMITTED TO BHEL

13.6

BHEL RETAINS THE RIGHT TO AWARD OR NOT TO AWARD ANY OF THE MAJOR REPAIR/ REWORK/MODIFICATION/RECTIFICATION/FABRICATION WORKS UNDER CLAUSES 13.1 TO 13.6 TO THE CONTRACTOR, AT THEIR DISCRETION WITHOUT ASSIGNING ANY REASON FOR THE SAME.

13.7

EXTRA WORKS THAT ARISE ON ACCOUNT OF CONTRACTOR'S FAULT WILL HAVE TO BE CARRIED OUT BY THE CONTRACTOR FREE OF COST INCLUDING THE SUPPLY OF MATERIAL AND CONSUMABLES

13.8

AFTER ELIGIBILITY OF EXTRA WORKS IS ESTABLISHED AND FINALLY ACCEPTED BY BHEL ENGINEER/DESIGNER, PAYMENT WILL BE RELEASED ON COMPETENT AUTHORITY'S APPROVAL AT THE FOLLOWING RATE.

MAN-DAY RATE FOR ELIGIBLE EXTRA WORKS :

SINGLE AVERAGE MAN-DAY RATE, INCLUDING OVERTIME IF ANY, AND OTHER SITE EXPENSES AND INCIDENTALS, INCLUDING CONSUMABLES, TOOLS AND TACKLES, FOR CARRYING OUT ANY MAJOR REWORK/ REPAIRS/ RECTIFICATION/ MODIFICATION/ FABRICATION OF 8 HOURS AS MAY ARISE DURING THE COURSE OF ERECTION. (REFER CLAUSES 13.1 TO 13.8 AND 14.2.1 TO 14.2.10) UNDER BOILER & AUX. ERECTION & COMMISSIONING WORKS WILL BE **RS. 320/- (RUPEES THREE HUNDRED AND TWENTY ONLY).**

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

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

SPECIAL CONDITIONS OF CONTRACT

INSURANCE

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

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

14.2

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

14.3

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

14.4

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

14.5

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

14.6

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

15.0 EARNEST MONEY DEPOSIT, SECURITY DEPOSIT & BANK GUARANTEE

15.1 Earnest Money Deposit:

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

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

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

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

15.1.2 EMD shall not carry any interest.

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

15.2 Security Deposit

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

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

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

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

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

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

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

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

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

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

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

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

ix. The Security Deposit shall not carry any interest.

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

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

15.3 BANK GUARANTEE

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

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

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

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

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

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

15.3.1 Guidelines for acceptance of Bank Guarantees are as follows :

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

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

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

Appendix-I

PAINTING SCHEME

Sl.No.	PGMA / Description	Surface Prepa-ration & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
1 PS 1AC1	Drum (Except Internals), Drum suspension 04 – 126,136,146	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744 DFT= 30µm per coat	2	–	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932 DFT= 20µm per coat	3	Inter-national-Orange Shade No: 592 of IS 5	100
2 PS5	Drum internals 43-104,105	SSPC-SP1/ or SSPC – SP3 Solvent / Power Tool Cleaning	Rust Preventive Fluid to PR: CHEM: 09 – 04 DFT=25µm per coat	1	–	--	--	–	–	25
3 PS19C	Buck stays 08 – 001, 003,006,007,111,380,382,400 08 – 501,503,901,907,910 Boiler supporting structures 35 – 111, 112,121,122,130,140,150, 35 – 211,212,213,214,221,222,231,232 35 – 311,312,321,322,331,332,341,342 35 – 351, 352,361,362,381,382,383,390 35 – 441,442,443,451,452,453,511,512	Blast cleaning to SA2 ½ (Near white metal) with surface profile 35-50 µm	Inorganic Ethyl Zinc Silicate Primer DFT=75µm per coat	1	Epoxy Based MIO /TiO2 Pigmented Intermediate Coat DFT=75µm per coat	1	#Epoxy Finish Coat, DFT=35µm per coat + #Ali.Acrylic PU Paint DFT=30µm per coat	2 1	Grey Shade To RAL 9002	250

Out of 2 coats of Epoxy based finish paint, one coat of Epoxy finish paint shall be given at shop / subcontracting works and second coat of Epoxy finish and one coat of aliphatic Polyurethane paint shall be applied at site.

.No.	PGMA / Description	Surface Prepn &-Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
3 PS19C	35-513,521,522,523,531,532,533 Galleries, Stair-ways & inter connecting walkways 36 – 110,130,150,311,312,313,314 36 – 315,316,321 to 327, 331 to 335,341 to 348,351 to 355,361 to 363, 391 to 395,610,620,621 38-110,210,299,310,381,410,510,610, 38-611,710 ID system structures 39 – 101,102,141,142,150,300,301 39 – 304,305,306 48-015,115,145,200,205,225,235,385,435, 465,485,495,665	Blast cleaning to SA2 ½ (Near white metal) with surface profile 35-50 µm	Inorganic Ethyl Zinc Silicate Primer DFT=75µm per coat	1	Epoxy Based MIO /TiO2 Pigmented Intermediate Coat DFT=75µm per coat	1	#Epoxy Finish Coat, DFT=35µm per coat + #Ali.Acrylic PU Paint DFT=30µm per coat	2 1	Grey Shade To RAL 9002	250

Out of 2 coats of Epoxy based finish paint, one coat of Epoxy finish paint shall be given at shop / subcontracting works and second coat of Epoxy finish and one coat of aliphatic Polyurethane paint shall be applied at site.

Sl.No.	PGMA / Description	Surface Prepn &- Surface Profile	Primer coat		Intermediate Coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
4 PS9	Components >95° C Insulated/Uninsulated other than components in Column 5 &7 Ring Headers,Down Comers,Hot air Headers outside the gas path etc. 05-137,139,147,158,159,227,229,231,251 09-001,002,003 18-002,003,010,020 10-135,178,191,195,218,235,278,283,291,295, 315,687 15-174,177,279 17-807,19-701,702,903 19-903 21-600,800,850 24-300,315,320,345, 24-360,375,380,385 28-220 42-020,030,070,120,128,150,152,154,157,158 300 48-032, 132,202,207,212,222, 48-232,372,382,386,388 48-432,438 48-439,462,468,482 48-486,489,492,494,662, 667	SSPC-SP3/ Power Tool Cleaning	Heat Resistant Aluminium Paint to IS 13183 Gr.II/DFT 20 µm per coat	2	--	--	--	--	–	40

Sl.No.	PGMA / Description	Surface Prepn &- Surface Profile	Primer coat		Intermediate Coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
5 PS2	Loose tubes, SH, RH & Eco.coils, 11 – 036,038,077,078,095,336,338 11 – 377,378,395,606,608,716,717,718,767,768, 769,787,791,916,917,918,967,968,969,987, 991 12-178,395,495,515,619,803,805,850 12-852,900,903,906,914,917,924,927, 12-928,944,948,954,968 16 – 077,079,377,379 19-814,824,884,914,924,984	SSPC – SP2 or SSPC – SP3 Hand tool / Power tool cleaning	Red Oxide Zinc Phosphate Dip coat primer to PR: CHEM: 09 – 03 DFT=35µm per coat	1	--	--	--	--	–	35
6 PS1A1	Components < 95° C Insulated 07-500,601 21-601,987 24-301,325,335,340,350,374, 987,989 36-610,613,740 37-010 39-302,810,41-350,390 42-002,005,010,065,070,120 43-004,005 45-321,325,326,47-261,263 48-012,022,48-112,132,142, 48-152 65-736, 67-204,272,276, 283,801,802,803	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744 DFT= 30µm per coat	2	--	--	Syn. Enamel paint (Long Oil Alkyd) to IS 2932 DFT= 20µm per coat	2	Smoke Grey Shade No: 692 of IS5	80

Sl.No.	PGMA / Description	Surface Prepn &- Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
7 PS3	Components >95° C coming in the gas path 07-102,104,106,107,215,216,217, 07-218,223,225,226,231,232 06-400,631,633,634,637,641,643 06-644,647,651,653,655,670; 10-, 182,183,185 12-993 19-850,851 30-105,211,212,219,220,233,235 31-010,102,104,105,993 32-010,110,120,310,410,510,520,710 36-993 48-993	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744 DFT= 30µm per coat	2	–	--	--	--	–	60
8 PS6	Hand rails and posts, ladders / rungs 35 – @ 821,822, @823,851 36 – @820,851,852,853 38 – @820,850 39 – @820,850 Floor Grills, Step treads 35 – 811,36-811,812,813,814 38 – 810, 39 – 810	a) Hot dip Galvanizing to a coating weight of 610 gm per sq.m (minimum) and to a coating thickness of 87.0 microns (minimum). Refer Notes given below **								

PAINTING SCHEME FOR VALVES

Sl.No.	PGMA / Description	Surface Prepa-ration & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
09	Cast carbon steel valves (Conventional) Cast alloy steel valves (Conventional) All API valves, QCNRV, SV & SRV Silencers	SSPC-SP3/ Power Tool Cleaning	Heat Resistant Aluminium Paint to IS 13183 Gr.I	2	–	--	--	--	–	40
	Forged valves	Phosphating	To a coating weight of 1500 mg per sq.ft.	--	–	--	--	--	–	–
1AS2	Soot Blower components	SSPC-SP6/ Comml. Blast Cleaning 35-50µm	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744 DFT= 30µm per coat	2	–	--	Syn. Enamel paint (Long Oil Alkyd) to IS 2932 DFT= 20µm per coat	2	Verdigris Green Shade No. 280 of IS5	80
	HP / LP system	SSPC-SP6/ Comml. Blast Cleaning 35-50µm	Heat Resistant Aluminium Paint to IS 13183 Gr.I	2	–	--	--	--	–	40

Sl.No.	PGMA / Description	Surface Prepa-ration & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
10 PS15	For CLH & VLH PGs 07,08,12,17,19,21,24,47,48 &80	Abrasive blast cleaning to Sa 2 ½ 35- 50 microns	Epoxy zinc rich primer To IS 14589 Gr.II %VS=35, (min) DFT=40 microns per coat	1	–	--	Aliphatic acrylic Poly-urethane paint %VS=40.0 (min) DFT=30.0 microns per coat	1	Phirozi Blue Shade No. 176 of IS5	70
11 PS8A	Components > 95 C, un-insulated Fuel pipes 47-266.267,268,269	SSPC-SP3/ Power Tool Cleaning	General purpose Aluminium paint to IS 2339	2	–	--	--	--	Alumunum	40
12 PS 1BE	All Columns below '0' level (embedded in concrete) PGs 35,36,38 39	SSPC-SP3/ Power Tool Cleani	HB Chlorinated Rubber Based Zinc Phosphate primer %VS=40, (min) DFT=50 microns per coat	1	–	--	--	--	Grey	50

Painting Scheme – Details for procurement & application purposes

Sl.No.	Generic nature of paint	Theoretical Covering Capacity Sq.m per Litre.	No. of pack	Volume solids, % (min)**	DFT in microns (min) per coat	Shade	Shade No. to IS5	Mode of appln.	Over coating interval, Hrs.
1	Inorganic ethyl zinc silicate to IS 14946 –Main Coat	8	2	60	75	Grey	--	Spray only	16
2	Poly amide cured Epoxy based Tio2/MIO pigmented intermediate coat	6	2	60	100	Grey/ Brown	--	## Spray	24
3	Epoxy based polyamide cured finish paint to IS 14209	10	2	40	40	Smoke Grey	692	Spray	24
4	Aliphatic acrylic polyurethane paint to IS 13213	10	2	40	30	**Grey** Phirozi – Blue.	RAL 9002 176	Spray Spray	24 24
5	Heat resistant Aluminimum paint to IS 13183 Grade I	10	1	-	-	--	--	Brush / Spray	24
6	Red oxide zinc phosphate primer paint to IS 12744	10	1	--	--	-	--	Brush / Spray	12
7	Red oxide Zinc Phosphate Dip coat primer paint to PR: CHEM: 09-03	10	1	--	--	--	---	Dip	12
8	Long oil alkyd synthetic enamel finish paint to IS2932	10	1	--	--	Reqd. shade	Corrpdg. Shade no.	Brush / Spray	12
9	Temporary Rust preventive fluid to PR: CHE: 09 – 04	10	1	--	--	--	--	--	12
10	Epoxy Zinc rich primer to IS14589 Gr.II	8	2	35	40	Grey	--	Spray	24
11	General purpose Aluminium paint to IS 2339	10	2	--	20	Aluminum	--	Brush	12
12	HB Chlorinated Rubber Based Zinc Phosphate Primer-Colour Grey	8	1	40	50	Grey	--	Brush / Spray	12

Brush painting is accepted, if recommended by the Paint suppliers. The covering capacity of paints specified is only approximate.
The paints and Rust Preventive fluid shall be procured from BHEL's approved suppliers. ** Values are indicative.

Painting of Damaged Areas

(Areas where the paint has deteriorated badly by erosion and areas where the paint film has lost its adhesion and where the steel has rusted appreciably, should be repainted as follows)

Sl.No.	Components	Surface Prepa-ration	Primer coat		Intermediate coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
1	Paint damaged components fall under Sl.no: 3	Power tool cleaning to bare metal	Epoxy zinc rich primer to IS 14589 Grade II to a DFT of 40 mic/coat T.DFT 100mic	2	As given in scheme	1	As given in scheme	3	As given in scheme	250
2	Paint damaged components fall under Sl.no: 10	Power tool cleaning to bare metal	One coat of Epoxy zinc rich primer to IS 14589 Grade II to a DFT of 40 microns	1	–	--	As given in scheme	1	As given in scheme	70
3	Paint damaged components fall under Sl.no: 1,2,4,5,6,7,9.	Power tool cleaning to bare metal	As given in scheme	As given in scheme	–	--	As given in scheme	As given in scheme	As given in scheme	As given in scheme

APPENDIX-II

DETAILS OF ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

PG	MA	PGMA DESCRIPTION		Wt (MT)	STAGE	PKG
A		**STRUCTURES**				
24	325	Silencer Support-Saf		22.597	LU	STR
24	335	Slncr&Suprt-Starting		3.392	DL	STR
		PG Weight		**25.989**		
30	103	Seal Plate Assy		3.7	LU	STR
30	105	Furnace Bottom Enclo		9.4	LU	STR
30	211	Furnace Rear Arch En		5.4	LU	STR
30	212	Furnace Extd Side Bo		3.8	LU	STR
30	215	Main Boiler		13.4	LU	STR
30	216	Main Boiler		0.613	LU	STR
30	219	Vertical Roof Enclos		68.6	LU	STR
30	220	Deck Supports and Seals		69.5	LU	STR
30	233	First Pass Deck Sprt		69.5	LU	STR
30	235	Enclosure Support St		28.2	LU	STR
		PG Weight		**272.113**		
35	010	Foundation Materials		3.52	DL	STR
35	010	Foundation Materials		30.814	DL	STR
35	110	Main Columns Left		17.855	DL	STR
35	111	Main Columns Left 1s		415.698	DL	STR
35	112	Main Columns Lert 2n		182.703	DL	STR
35	121	Maincolumns Right 1s		415.702	DL	STR
35	122	Main Columns Right 2		182.126	DL	STR
35	130	Main Columns Middle		307.67	DL	STR
35	140	Auxiliary Columns-Le		319.119	DL	STR
35	150	Auxiliary Columns-Ri		319.119	DL	STR
35	190	Girder Pin Connectio		12.977	DL	STR
35	211	Ceiling Structuremai		272.796	DL	STR
35	212	Ceiling Structuremai		141.88	DL	STR
35	213	Ceil Struct -Cross W		199.242	DL	STR
35	214	Ceil Struct -Cross W		74.398	DL	STR
35	221	Ceiling Structure Ro		45.941	DL	STR
35	222	Ceiling Structure Ro		29.501	DL	STR
35	231	Ceiling Structure Ho		18.177	DL	STR
35	232	Ceiling Structure Ho		10.185	DL	STR
35	311	Horizontal Bracing I		26.454	DL	STR
35	312	Horiz Bracing II Pas		18.824	DL	STR
35	321	Horiz Bracing I Pass		26.509	DL	STR
35	322	Horiz Bracing II Pas		17.002	DL	STR
35	331	Horiz Bracing I Pass		25.159	DL	STR
35	332	Horiz Bracing II Pas		21.829	DL	STR
35	341	Horiz Bracing I Pass		18.695	DL	STR

35	342	Horiz Bracing II Pas		38.54	DL	STR
35	351	Horiz Bracing I Pass		28.54	DL	STR
35	352	Horiz Bracing II Pas		17.836	DL	STR
35	361	Horiz Bracing I Pass		28.573	DL	STR
35	362	Horiz Bracing II Pas		20.697	DL	STR
35	381	Land Platform Lower		56.009	DL	STR
35	382	Land Platform Middle		46.305	DL	STR
35	383	Land Platform Upper		42.9	DL	STR
35	390	Platform At Drum Flo		64.27	DL	STR
35	410	Column Frames-Front Frame		12.611	DL	STR
35	441	Horizontal Beams-Low		123.317	DL	STR
35	442	Horizontal Beams Mid		99.443	DL	STR
35	443	Horizontal Beams-Upp		92.02	DL	STR
35	451	Horizontal Beams - L		82.84	DL	STR
35	452	Horizontal Beams - M		54.207	DL	STR
35	453	Horizontal Beams - U		46.259	DL	STR
35	510	Column Frames-Front Frame		13.357	DL	STR
35	511	Front Bracing-Lower		55.894	DL	STR
35	512	Front Bracing Middle		36.003	DL	STR
35	513	Front Bracing-Upper		27.946	DL	STR
35	521	Side Bracing-Lower		133.857	DL	STR
35	522	Side Bracing Middle		72.578	DL	STR
35	523	Side Bracing-Upper		67.617	DL	STR
35	531	Rear Bracing-Lower		88.538	DL	STR
35	532	Rear Bracing- Middle		40.62	DL	STR
35	533	Rear Bracing-Upper		57.183	DL	STR
35	610	Column Bracings-Front Bracing		3.239	DL	STR
35	611	Boiler Roof Sheeting		0.655	DL	STR
35	700	HSFG Fasteners		24.898	DL	STR
35	810	Temporary Structure For Drum Erection		4.001	DL	STR
35	811	Floor Grills And Gua		246.111	DL	STR
35	821	Stairs - Lower		10.181	DL	STR
35	822	Stairs - Middle		7.545	DL	STR
35	823	Stairs - Upper		9.206	DL	STR
35	851	Hand Rails And Posts		23.579	DL	STR
		PG Weight		**4931.27**		
36	110	Columns Near Air Pre		250	HT	STR
36	130	Middle Columns In Bo		88	HT	STR
36	150	Beams and bracings Near		454	HT	STR
36	310	Main Mbl Floor 11th Level		7.923	HT	STR
36	311	Main Floor I Mbl 1st		38	HT	STR
36	312	Main Floor I Mbl 2nd		41.7	HT	STR
36	313	Non-Mbl Floor Betwee		105	HT	STR
36	314	Non-Mbl Floor Betwee		19.8	HT	STR
36	315	Non-Mbl Floor Betwee		25.9	HT	STR
36	321	Main Floor II Mbl Is		102.6	HT	STR
36	322	Main Floor II Mbl 2n		31.2	HT	STR
36	323	Non-Mbl Floor Betwee		40	HT	STR

36	324	Non-Mbl Floor Betwee		34.8	HT	STR
36	325	Non-Mbl Floor Betwee		65	HT	STR
36	326	Non-Mbl Floor Betwee		42.8	HT	STR
36	327	Non-Mbl Floor Betwee		85.5	HT	STR
36	331	Main Floor III Mbl 1		28	HT	STR
36	332	Main Floor III Mbl 2		112	HT	STR
36	333	Non-Mbl Floor Betwee		39.7	HT	STR
36	334	Non-Mbl Floor Betwee		30.9	HT	STR
36	335	Non-Mbl Floor Betwee		49.4	HT	STR
36	341	Main Floor Iv Mbl 1s		47.9	HT	STR
36	342	Main Floor Iv Mbl 2n		14.4	HT	STR
36	343	Non-Mbl Floor Betwee		19.6	HT	STR
36	344	Non-Mbl Floor Betwee		23	HT	STR
36	345	Non-Mbl Floor Betwee		88	HT	STR
36	346	Non-Mbl Floor Betwee		16	HT	STR
36	347	Non-Mbl Floor Betwee		19.6	HT	STR
36	348	Non-Mbl Floor Betwee		81	HT	STR
36	351	Main Floor V Mbl Ist		18.5	HT	STR
36	352	Main Floor V Mbl Ii		7	HT	STR
36	353	Non-Mbl Floor Betwee		48	HT	STR
36	354	Non-Mbl Floor Betwee		22.7	HT	STR
36	355	Non-Mbl Floor Betwee		42	HT	STR
36	361	Main Floor Vi Mbl 1s		28.8	HT	STR
36	362	Main Floor Vi Mbl 2n		19.6	HT	STR
36	363	Non_Mbl Floor Above		21	HT	STR
36	391	Miscellaneous Platfo		75	HT	STR
36	392	Miscellaneous Platfo		78.8	HT	STR
36	393	Miscellaneous Platfo		72	HT	STR
36	394	Miscellaneous Platfo		20.6	HT	STR
36	610	Boiler Roof Structur		98	HT	STR
36	611	Boiler Roof Sheeting		19.297	HT	STR
36	613	Rain Water Pipes And		24.7	LU	STR
36	620	Boiler Side Cladding		75	LU	STR
36	621	Boiler Side Cladding		18.5	LU	STR
36	740	Posts And Hangers		70	HT	STR
36	811	Floorgrillsandguardp		8.597	HT	STR
36	811	Floorgrillsandguardp		102.601	HT	STR
36	812	Floorgrillsandguardp		81.562	HT	STR
36	813	Floorgrillsandguardp		224.636	HT	STR
36	814	Floorgrillsandguardp		84.519	HT	STR
36	820	Stairs And Ladders		30	HT	STR
36	820	Stairs And Ladders		1.209	HT	STR
36	850	Handrails And Posts		3.924	HT	STR
36	851	Handrails And Posts		15.987	HT	STR
36	852	Handrails And Posts		16	HT	STR
36	853	Handrails And Posts		62	HT	STR
36	993	Consumablesanderecit		16.554	HT	STR
		PG Weight		**3408.809**		

38	110	Lift columns		98.9	SY	STR
38	210	Inter Conn Platforms		49	SY	STR
38	299	Mill Handling Monora		117	LU	STR
38	310	Conn Platforms To Mi		23	SY	STR
38	381	Eco Handling Structu		33	SY	STR
38	410	Mill Maintanance Pla		170	SY	STR
38	510	Lift Beams And Braci		114	LU	STR
38	610	Elevator Cladding St		74	LU	STR
38	611	Elevator Cladding Sheets		38	LU	STR
38	710	Lift Machine Room De		68	LU	STR
38	810	Floorgrills And Guar		101	LU	STR
38	820	Stairs And Ladders		4.5	SY	STR
38	850	Hand Rails And Hand		8.5	LU	STR
		PG Weight		**898.9**		
39	012	Foundation Materials		26.294	DL	STR
39	101	Columns Frames Befor		166	LU	STR
39	102	Columns Frames Befor		333	LU	STR
39	141	Cols Frames Near Id		166	LU	STR
39	142	Cols Frames Near Id		333	LU	STR
39	150	Col Frames Betn I.D.		78	LU	STR
39	300	Platforms - External		333	LU	STR
39	301	Struc And Platform F		6.7	LU	STR
39	302	Struc For Motor Hood		6.7	LU	STR
39	304	Fan Handling Structu		23	LU	STR
39	305	Fan Handling Structu		11.5	LU	STR
39	306	Fan Handling Structu		67	LU	STR
39	700	Hsfg Fasteners For P		1.1	LU	STR
39	810	Floor Grill		77.454	LU	STR
39	820	Stairs		22	LU	STR
39	850	Hand Rail And Hand R		30	LU	STR
		PG Weight		**1680.748**		
80	812	Hangers & Supports -		23	LU	STR
		PG Weight		**23**		
		SUB TOTAL - A (STRUCTURES)		**11240.829**		
B		**PRESSURE PARTS**				
4	126	Upper Drum Without I		214.249	DL	PP
4	136	Upper Drum Internals		9.996	DL	PP
4	146	Upper Drum Sspn Id 6		17.3	DL	PP
4	196	Upper Drum Trans Str		4.483	DL	PP
4	114	Upper Drum + Intl Id 49-60		21.667	DL	PP
4	144	Upper Drum Sspn Id 49-60		0.437	DL	PP
4	210	Lower Drum + Intl Id Upto 36		8.7	DL	PP
		PG Weight		**276.832**		
5	137	Inlet Front Lower Ww		45.2	HT	PP
5	139	Lower Inlet Header I		0.1	HT	PP

5	147	Inlet Rear Lower Ww		43	HT	PP
5	158	Inlet Side Waterwall		38.2	HT	PP
5	159	Inlet Side Water Wal		38.2	HT	PP
5	227	Waterwall Rear Hange		4.793	HT	PP
5	229	Waterwall Rear Scree		6.342	HT	PP
5	231	Outlet Front Upper W		6.307	HT	PP
5	251	Outlet Side Upper Ww		14.431	HT	PP
		PG Weight		**196.573**		
6	400	Unclassified Burner		22.73	HT	PP
6	609	Corner Ww Pnl		2.307	HT	PP
6	614	'D'Pnl Ww Pnl		6.437	HT	PP
6	616	Baffle Ww Pnl		3.686	HT	PP
6	631	Front Upper Ww Pnl		63.6	HT	PP
6	633	Front Upper Inter Ww		58.6	HT	PP
6	634	Front Intermediate W		26.5	HT	PP
6	637	Water wall Lower Fron		28.44	HT	PP
6	641	Rear Upper Ww Pnl		30.5	HT	PP
6	643	Rear Upper Inter Ww		57.4	HT	PP
6	644	Rear Intermediate Ww		26.2	HT	PP
6	647	Rear Lower Ww Pnl		46.87	HT	PP
6	651	Side Upper Ww Pnl		83.7	HT	PP
6	653	Side Intermediate Ww		86.36	HT	PP
6	655	Side Lower Ww Pnl		64.47	HT	PP
6	657	Side Boiler Ww Pnl		4.104		
6	670	Extended Side Ww Pnl		20.73	HT	PP
		PG Weight		**632.634**		
7	102	Down comer Piping-Con		78.813	HT	PP
7	104	Discharge Line		24.9	HT	PP
7	106	Suction Manifold		14.5	HT	PP
7	107	Suction Spools		6.874	HT	PP
7	211	Boiler Bank Tubes		15.336	HT	PP
7	214	Boiler Side Wall Shield Tubes		1.652	HT	PP
7	215	Relief Tubes From Si		41.7	HT	PP
7	216	Relief Tubes From Re		5	HT	PP
7	217	Screen Relife Tubes		28.2	HT	PP
7	218	Relief Tubes From Fr		8.9	HT	PP
7	223	Furnace Screen Tubes		35.9	HT	PP
7	225	Furnace Rear Hanger		18.35	HT	PP
7	226	Furnace Rear Arch Tu		10.35	HT	PP
7	231	Lower Corner Transit		4.85	HT	PP
7	232	Upper Corner Transit		0.65	HT	PP
7	402	WW Front Header Susp		18.197	HT	PP
7	403	WW Side Header Suspe		19.579	HT	PP
7	404	WW Hanger Header Sus		29.603	HT	PP
7	405	WW Screen Header Sus		2.147	HT	PP
7	420	Down comer Guides		7.85	HT	PP
7	431	Riser Tube Support		2.7	HT	PP
7	500	Misc Components - Pr		0.55	HT	PP

7	601	Pressure Seals		3.3	HT	PP
7	601	Pressure Seals		2.728	HT	PP
7	989	Tools For Tube Expansion		0.055	HT	PP
7	992	Imported Electrodes		0.001	HT	PP
7	992	Imported Electrodes		0.136	HT	PP
7	993	Consumables & Erecti		0.293	HT	PP
7	993	Consumables & Erecti		1.267	HT	PP
		PG Weight		**384.381**		
10	135	Horizontal Spaced Sh		7.2	HT	PP
10	170	Vertical Sh Inlet Hdr		0.439	HT	PP
10	178	Vertical Platen Sh 1		17.618	HT	PP
10	182	Sh Rear Wall Inlet H		6.3	HT	PP
10	183	Sh Frontwall Inlet		11.484	HT	PP
10	185	Sh Rear Roof Inlet H		11.95	HT	PP
10	191	Sh Radiant Wall Roof		6.06	HT	PP
10	195	Sh Division Panel In		11.982	HT	PP
10	218	Rear Lower Sh Outlet		3.75	HT	PP
10	235	Horizontal Spaced Sh O/L		21.615	HT	PP
10	270	Vertical Sh Outlet Header		0.438	HT	PP
10	278	Vertical Platen Sh O/L		32.51	HT	PP
10	283	Sh Front wall Outlet		9.4	HT	PP
10	291	Sh Radiant Wall Roof		10.372	HT	PP
10	295	Sh Division Panel O/L		11.919	HT	PP
10	315	Sh Rear Intermediate		12.5	HT	PP
10	687	Sh Radiant Wall Junc		6.7	HT	PP
		PG Weight		**182.237**		
11	036	SH Rear Hori Spaced		69.8	HT	PP
11	038	SH Reor Hori Spaced		109	HT	PP
11	077	SH Reor Vertical Spa		50.35	HT	PP
11	078	SH Vertical Platen C		60	HT	PP
11	095	Sh Division Panel Co		78	HT	PP
11	170	Sh Vertical Coil Element		0.728	HT	PP
11	336	Sh Hor Spaced Upper		69.8	HT	PP
11	338	Sh Hor Spaced Lower		102.7	HT	PP
11	377	Sh Vertical Spaced R		50.35	HT	PP
11	378	Sh Vertical Platen C		43	HT	PP
11	395	Sh Division Panel Co		5	HT	PP
11	606	Sh Front Upper Panel		7	HT	PP
11	608	Sh Front Lower Panel		13.3	HT	PP
11	716	Sh Rear Upper Pnl +		6.2	HT	PP
11	717	Sh Rear Inter Pnl +		5.2	HT	PP
11	718	Sh Rear Lower Pnl +		5.4	HT	PP
11	767	Sh Stm Cool Side Wal		46.2	HT	PP
11	768	Sh Stm Cool Side Wal		7.9	HT	PP
11	769	Sh Stm Cool Side Wal		12	HT	PP
11	787	Sh Rear Roof Panel +		3.5	HT	PP
11	791	Sh Radiant Wall Roof		19	HT	PP
11	916	Sh Stm Cool Rear Wal		5.4	HT	PP

11	917	Sh Stm Cool Reor Wal		4.7	HT	PP
11	918	Sh Stm Cool Rear Wal		7	HT	PP
11	967	Sh Stm Cool Side Wal		10.9	HT	PP
11	968	Sh Stm Cool Side Wal		8	HT	PP
11	969	Sh Stm Cool Side Wal		11.7	HT	PP
11	987	Sh Stm Cool Rear Roo		9.1	HT	PP
11	991	Sh Radiant Roof Pane		18.5	HT	PP
		PG Weight		**839.728**		
12	178	Sh Vertical Platen I		59	HT	PP
12	395	Sh Division Panel In		13.1	HT	PP
12	495	Sh Div9sion Panel Ou		10	HT	PP
12	515	Sh Rear Hanger Tube		63.8	HT	PP
12	619	Sh Horizontal Suppor		12.6	HT	PP
12	803	Sh Steam Cooled Spac		4.2	HT	PP
12	805	Super Heater Hanger		15.1	HT	PP
12	850	Sh Conn Pipes-Satura		1.784	HT	PP
12	850	Sh Conn Pipes-Satura		9	HT	PP
12	852	Sh Desh Links		42.7	HT	PP
12	900	Sh Desh		0.687	HT	PP
12	900	Sh Desh		6.6	HT	PP
12	901	Sh Hngr,Suprts,Guides & Ties		0.315	HT	PP
12	903	5h Miscl Components		52.6	HT	PP
12	906	Sh Suprts For Lines		17.5	HT	PP
12	914	Suspension Of Sh Rad		4.198	HT	PP
12	917	Suspension Of Radian		32	HT	PP
12	924	Suspension Of Sh Bac		21.601	HT	PP
12	927	Suspension Of Rear R		2.006	HT	PP
12	928	Suspension Of Sh Rea		62.089	HT	PP
12	944	Suspension Of Sh Pla		2.333	HT	PP
12	948	Suspension Of Vertic		40.769	HT	PP
12	954	Suspension Of Vertic		26.5	HT	PP
12	968	Suspension Of Platen		31.325	HT	PP
12	991	Indigenous Electrode		0.079	HT	PP
12	992	Imported Electrodes		0.002	HT	PP
12	992	Imported Electrodes		0.25	HT	PP
12	993	Consumables & Erecti		0.258	HT	PP
12	993	Consumables & Erecti		0.372	HT	PP
		PG Weight		**532.768**		
15	174	RH Vertical Spaced I		12.214	HT	PP
15	177	RH Vertical Spaced R		19.058	HT	PP
15	278	RH Vertical Spaced O		14.84	HT	PP
15	279	RH Vertical Platen F		30.68	HT	PP
		PG Weight		**76.792**		
16	077	RH Ver Spaced Rear C		131.275	HT	PP
16	079	RH Ver Platen Front		120	HT	PP
16	377	RH Vertical Spaced R+H		131.248	HT	PP
16	379	RH Ver Platen Front		120	HT	PP
		PG Weight		**502.523**		

17	807	RH Steam Cooled Spac		0.5	HT	PP
17	904	RH Hdr Suprts & Susp		13.005	HT	PP
17	919	RH Front Suspension		32.217	HT	PP
17	929	RH Rear Suspension		63.282	HT	PP
17	991	Indigenous Electrode		0.15	HT	PP
17	992	RH Site Electrodes I		0.1	HT	PP
		PG Weight		**109.254**		
19	701	Inlet Eco Headers		20.6	HT	PP
19	702	Outlet Eco Headers		10.415	HT	PP
19	814	Economisercoil Assy		77	HT	PP
19	824	Economiser Coil Assy		121	HT	PP
19	850	Eco Feed Pipe		3.5	HT	PP
19	850	Eco Feed Pipe		0.121	HT	PP
19	851	Eco Links To Drum		6	HT	PP
19	884	Eco.Coil Assy Interm		193	HT	PP
19	903	Eco. Miscellaneous C		0.9	HT	PP
19	905	Eco Suprts & Suspens		0.5	HT	PP
19	906	Eco Suprts For Lines		3	HT	PP
19	907	Eco Supports/Feed Pi		1.3	HT	PP
19	914	Econ-Miser Coil Assy		70	HT	PP
19	924	Economiser Coil Assy		110	HT	PP
19	984	Economiser Coil Midd		193	HT	PP
19	991	Indigenous Electrode		0.1	HT	PP
19	992	Imported Electrodes		0.1	HT	PP
19	992	Imported Electrodes		0.001	HT	PP
		PG Weight		**810.537**		
21	600	Soot Blower Piping A		0.323	SY	PP
21	600	Soot Blower Piping A		14	SY	PP
21	601	Soot blower Piping Su		9.42	SY	PP
21	601	Soot blower Piping Su		0.617	SY	PP
21	700	Bulked Bps Component		0.86	SY	PP
21	700	Bulked Bps Component		0.005	SY	PP
21	800	SB Valves (BHEL)		2	SY	PP
21	800	SB Valves (BHEL)		0.127	SY	PP
21	825	SB Valves (Sub Delivery)		1.6	SY	PP
21	850	Soot blower safety valves (bhel)		0.055	SY	PP
21	992	Imported Electrodes		0.002	SY	PP
21	992	Imported Electrodes		0.065	SY	PP
		PG Weight		**29.074**		
24	300	Boiler Trim Piping A		76.62	HT	PP
24	301	Boiler Trim Piping S		14.51	HT	PP
24	315	Spray Water System		5.9	LU	PP
24	316	RH DeSh		4.2	LU	PP
24	340	Sample Cooler And Su		0.83	LU	PP
24	350	Boiler Filling Piping		1.5	HT	PP
24	351	Hangers And Supports		0.251	HT	PP

24	355	Circulating Pump Com		29.32	HT	PP
24	360	Valves (BHEL) Cc R		64.45	HT	PP
24	365	Valves & Fittings (S		6.17	LU	PP
24	373	Direct waterlevel Gauge-lp		0.28	LU	PP
24	374	Cooler & Strainer As		2	LU	PP
24	375	Headers For Trim Pip		2.62	HT	PP
24	380	ERV and Safety Valve		8.2	HT	PP
24	600	Boiler Trim Piping A		0.98	HT	PP
24	601	Boiler Trim Piping S		0.673	HT	PP
24	640	Sample Cooler And Supports		0.357	HT	PP
24	660	Valves (Bhel) Pack Blr		0.763	HT	PP
24	665	Valves & Fittings (Sd) Pack Blr		0.155	HT	PP
24	680	Erv And Safety Valves(Bhel)		0.171	HT	PP
24	700	Bulked BPS Component		0.051	HT	PP
24	700	Bulked BPS Component		0.64	HT	PP
24	950	Special Tools		0.18	SY	PP
24	955	Lapping Tools For Sv&Erv		0.12	SY	PP
24	960	Lapping Tools For Conventional Valves(		0.04	SY	PP
24	991	Imported Electrodes		0.448	HT	PP
24	992	Imported Electrodes		0.062	LU	PP
24	992	Imported Electrodes		0.005	LU	PP
24	993	Consumables & Erection Materials		0.001	HT	PP
24	993	Consumables & Erection Materials		0.025	HT	PP
24	994	Name Plates		0.31	SY	PP
24	994	Name Plates		0.06	SY	PP
		PG Weight		**221.892**		
42	002	Steam Blow Materials		2	LU	PP
42	128	Piping, Pump House St		2	LU	PP
42	158	Piping, Opr' G Floor S		3	LU	PP
42	300	BHEL Valve F.O. Syst		1	LU	PP
42	358	Bl Valve,Opr'G Flo		1	LU	PP
		PG Weight		**9**		
81	003	Cont Blow Down Expander		4.379	LU	PP
81	005	Inter Blow Down Expander-1200 Mm Od		2.336	LU	PP
81	009	Inter Blow Down Expander		6.821	LU	PP
81	012	Clean Drain Flash Tank-Dia 1500		5.134	SY	PP
		PG Weight		**18.67**		
97	088	Electronic Level Indicator		3	LU	PP
97	297	MTM Clamps And Pads		0.05	HT	PP
		PG Weight		**3.05**		
		De-aerating heater & Feed Storage Tank		85		
		PG Weight		**85**		

		SUB TOTAL - B (PR PARTS)		**4910.945**		
C		**NON PRESSURE PARTS**				
8	001	Furnace Upper Buckst		73.2	HT	NPP
8	003	Furnace Upp.Inter Bu		117.1	HT	NPP
8	006	Furnace Inter.Buckst		90.4	HT	NPP
8	007	Furnace Lower Buckst		80.9	HT	NPP
8	111	Furnace Rear Arch Bu		38	HT	NPP
8	380	Furnace Bottom Suppo		47.35	HT	NPP
8	382	Furnace Bottom Suppo		47.35	HT	NPP
8	400	Furnace Guide		6.6	HT	NPP
8	501	Furnace Backpass buck		76.9	HT	NPP
8	503	Furnace Back Pass Bu		88.6	HT	NPP
8	901	Furnace Key Buckstay		4.6	HT	NPP
8	907	Furnace Key Buckstay		2	HT	NPP
8	910	Ex. Movement Measurement		1	LU	NPP
		PG Weight		**674**		
9	001	Seal Boxes For Furnace Opening		0.282	HT	NPP
9	001	Seal Boxes For Furnace		10.7	HT	NPP
9	002	Seal Boxes For Instruments		0.112	HT	NPP
9	002	Seal Boxes For Instruments		2.7	HT	NPP
9	003	Material For Instruments		0.286	LU	NPP
9	003	Material For Instruments		0.6	LU	NPP
		PG Weight		**14.68**		
18	002	First Pass Roof Skin		17.2	HT	NPP
18	003	Second Pass Roof Sk9		3.7	HT	NPP
18	010	Pr Pts Attachments In		1.6	HT	NPP
18	020	Vibration Snubbers		0.5	HT	NPP
		PG Weight		**23**		
20	051	Long Retractable SB		57.027	SY	NPP
20	054	Wall Box Non Pressure		1.15	SY	NPP
20	201	Wall De-slagger Rw5e		14.001	SY	NPP
20	204	Wall Box Non Pressure		1.74	SY	NPP
20	301	Rotary Soot Blower Elec Optd-D5e		0.265	SY	NPP
20	304	Wall Box Non pressure		0.08	SY	NPP
20	511	DA Head Valve Assy		0.223	SY	NPP
20	621	Blowing Element For Rb		0.032	SY	NPP
20	671	Blowing Element For Rb		0.029	SY	NPP
20	794	Wall Box Non pressure		0.063	SY	NPP
20	801	Long Retractable Soot Blower-Czech Typ		0.318	SY	NPP
20	804	Wall Box Assembly For Lrsie		0.045	SY	NPP
20	962	Temp Probe Duplex Wi		2.035	LU	NPP
20	988	SB Commissioning spares		0.008	SY	NPP
20	998	Special Tools for SB		0.008	SY	NPP
20	998	Special Tools for SB		0.007	SY	NPP

		PG Weight		**77.031**		
22	xxx	(HP By pass system)		25		
		PG Weight		**25**		
24	320	Safety Valve Esc Pip		43.17	LU	NPP
24	620	Safety Valve Esc Pip		1.3	LU	NPP
24	625	Silencer Support-Safety Valves		0.988	LU	NPP
24	685	Safety Valve/ERV Silencer		1.29	LU	NPP
24	385	Safety Valve/ERV Silencer		45.751	DL	NPP
		PG Weight		**92.499**		
28	220	Doors		1.521	LU	NPP
28	220	Doors		12.1	LU	NPP
28	700	BPS Fasteners		0.9	LU	NPP
		PG Weight		**14.521**		
31	010	Skin Casing Comps We		0.395	HT	NPP
31	010	Skin Casing Comps We		7.7	HT	NPP
31	102	Furnace Bottom Skin		1	LU	NPP
31	104	Furnace Rear Arch Sk		5.8	LU	NPP
31	105	Second Pass Skin Casing		0.5	LU	NPP
31	301	Miscellaneous Casing		1.634	HT	NPP
31	993	Erection Materials		1	LU	NPP
		PG Weight		**18.029**		
41	200	Sv-Burner Assy With Oil Gun		2.114	LU	NPP
41	350	Air Cooled Oil Gun Assy		1.7	LU	NPP
41	390	Oil Gun Vice Assy An		1.6	LU	NPP
41	500	High Energy Arc Igniters		0.7	LU	NPP
41	500	High Energy Arc Igniters		0.037	LU	NPP
41	988	Oil & Gas Burner Commng spares		0.015	LU	NPP
		PG Weight		**6.166**		
42	001	Pneumatic Fittings		0.001	LU	NPP
42	001	Pneumatic Fittings		0.3	LU	NPP
42	002	Steam Blow Materials		0.111	LU	NPP
42	005	Instrument Fittings		1	LU	NPP
42	005	Instrument Fittings		0.009	LU	NPP
42	010	LFO Pump Set		6	LU	NPP
42	010	LFO Pump Set		1.99	LU	NPP
42	020	HFO Pump Set		12	LU	NPP
42	030	HFO Heater Set		31	LU	NPP
42	046	Drain Oil Pump-Motor		0.5	LU	NPP
42	065	Drain Oil Tank		7	LU	NPP
42	070	Burner Station Skid		10	LU	NPP
42	120	Piping, Pump House-F		12	LU	NPP
42	150	Piping, Operating Fl		5	LU	NPP
42	152	Piping, Opr'G Floor L		2	LU	NPP
42	152	Piping, Opr'G Floor L		0.325	LU	NPP
42	154	Piping, Opr'G Floor D		2	LU	NPP
42	157	Piping, Opr'G Floor A		2	LU	NPP

42	200	Sub-delivery Fuel Oil		3	LU	NPP
42	200	Sub-delivery Fuel Oil		0.012	LU	NPP
42	300	Bhel Valve F.O. System		0.072	LU	NPP
42	700	Bps Fasteners		1	LU	NPP
42	700	Bps Fasteners		0.023	LU	NPP
42	992	Imported Electrodes		0.1	LU	NPP
		PG Weight		**97.443**		
43	004	Assy Comp Scanner &		2.9	LU	NPP
43	005	Assy Comp Mill Seal		19.4	LU	NPP
43	104	M/C Comp Scanner & G		23	LU	NPP
43	105	M/C Comp Mill Seal A		43.2	SY	NPP
43	200	Sub-dely, Igniters & Scanner		10.5	LU	NPP
		PG Weight		**99**		
45	321	Wind Box Support 32		12	HT	NPP
45	325	Wind box For One & Three		73	HT	NPP
45	326	Wind box For Two & Four		73	HT	NPP
		PG Weight		**158**		
47	261	Fuel Pipe Supports		36	SY	NPP
47	263	Fuel Pipe Coupling C		50	LU	NPP
47	266	Fuel Pipe St Pipes F		115	SY	NPP
47	267	Fuel Pipe St Pipes F		150	SY	NPP
47	268	Fuel Pipe St Pipes F		137	SY	NPP
47	269	Fuel Pipe St Pipes F		37	SY	NPP
		PG Weight		**525**		
48	012	Rect Duct Bet F.D F		108	LU	NPP
48	015	Supportsetcbet F.D F		10	LU	NPP
48	019	Foundation Materials		4.276	DL	NPP
48	022	Rect Duct Sec.Air I		15	LU	NPP
48	032	Rect Duct A.H Bypas		51	LU	NPP
48	082	Sqduct,Cold Air Fdfon-Boiler		5.821	LU	NPP
48	084	Exppcs,Cold Air Fdfan-Boiler		0.232	LU	NPP
48	085	Supportsetccold Air Ducts Supports		1.242	LU	NPP
48	112	Rect Ducts Pri Fan T		67	SB	NPP
48	115	Supportsetcpri Fan T		29	SB	NPP
48	132	Rect Duct Pri Air F		36	SB	NPP
48	142	Rect Duct Coldairbu		46	SB	NPP
48	145	Supportsetccoldairbu		7	SB	NPP
48	152	Rect Duct Pri Air F		51	SB	NPP
48	200	Instrument Tappings		5	LU	NPP
48	200	Instrument Tappings		0.172	LU	NPP
48	202	Rect Ductsairheater		257	LU	NPP
48	205	Supportsetcairheater		25	LU	NPP
48	207	Flowmeters For Secon		26	LU	NPP
48	207	Flowmeters For Secon		0.694	LU	NPP
48	212	Wind Box Connecting		38	LU	NPP
48	222	Rect Duct-Airheater		125	LU	NPP
48	225	Supports For Hot P.A		13	LU	NPP

48	232	Rect Ducts Hot Air B		142	SB	NPP
48	235	Support Hot Air Bus		3	SB	NPP
48	332	Sqduct,Boiler-Chimney		5.317	LU	NPP
48	334	Support,Boiler-Chimney		0.533	LU	NPP
48	335	Supportsetcfluegas Ducts System		0.651	LU	NPP
48	372	Rect Duct Cascade E		14	LU	NPP
48	382	Rect Duct Economise		107	HT	NPP
48	385	Supportsetceconomise		43	LU	NPP
48	386	Duct Below Divertor		122	LU	NPP
48	388	Sq Duct,Economiser-P		148	LU	NPP
48	432	Rect Duct Airheater		92	LU	NPP
48	435	Supportsetcairheater		23	LU	NPP
48	438	Sq Duct,Pri Ah-Blr O		36	LU	NPP
48	439	Sq Duct,Sec Ah-Blr O		48	LU	NPP
48	462	Rect Duct Boiler Ou		337	LU	NPP
48	465	Bof To Ep Ducting Su		6	LU	NPP
48	468	Sq Duct,Blr Outlet F		163	LU	NPP
48	482	Rect Ducts-Elec Prpt		106	LU	NPP
48	485	Supportsetcelec Prpt		39	LU	NPP
48	486	Ep Spool Duct		163	LU	NPP
48	489	Sq Duct,Ep Interconn		77	LU	NPP
48	492	Rect Duct Ind Draft		375	LU	NPP
48	494	Expn Piecesind Draft		189	LU	NPP
48	495	I.D.System Duct Supp		80	LU	NPP
48	662	Rect Duct Hot Air B		81	SB	NPP
48	664	Expn Pieceshot Air B		10	SB	NPP
48	665	Supports For Hot Pa		20	SB	NPP
48	667	Venturi-Primary Air		23	SB	NPP
48	700	Bulked Bps Component		7	LU	NPP
48	700	Bulked Bps Component		0.042	LU	NPP
48	993	Erection Materials		21	LU	NPP
48	993	Erection Materials		0.712	LU	NPP
		PG Weight		**3403.692**		
67	204	Raw Coal Gates Needl		31	SY	NPP
67	272	Coal Valve-36 Inch M		9.555	SY	NPP
67	276	Raw Coal Gate Chain		9.891	SY	NPP
67	283	Feeder Outlet Isolat		12.248	SY	NPP
67	801	Down Spout		18	SY	NPP
67	802	Bunker Emptying Chut		24	SY	NPP
67	803	Feed Pipe To Mill		20.4	SY	NPP
		PG Weight		**125.094**		
81	018	Mixing Tanks For Che		0.6	LU	NPP
81	019	Metering Tanks For C		0.6	LU	NPP
81	026	Tray Type Deaerator < 100 C.M/Hr		23.16	LU	NPP
81	034	Platform&Stairs For Feed Tank & Deaer		2.771	LU	NPP
81	036	Cw Store Tank - 16-2		6.794	LU	NPP

81	041	Impure Condens Tank		4.1	SY	NPP
81	042	Make Up Water Store Tank < 300 C.M		0.034	LU	NPP
81	104	Boiler Feed Pump		3.53	LU	NPP
81	110	Cooling Water Pump		0.4	LU	NPP
81	120	HP Dozing Pump		0.8	LU	NPP
81	127	Lp Dosing System		3	LU	NPP
81	128	H P Dosing System		3	LU	NPP
81	161	Bcw Heat Exchanger		18	LU	NPP
		PG Weight		**66.789**		
99	099	Misc Chain Pully Block		0.1	SY	NPP
99	100	Fan Handling Equipment		18	SY	NPP
99	300	Handling System for Pumps		9	SY	NPP
99	400	Air heater, Steam coil		7.8	SY	NPP
99	502	Pre-part handling equipment		6.4	SY	NPP
99	514	Furnace Cradle 4 Wall		3.5	SY	NPP
99	600	FO System Handling E		1.2	SY	NPP
		PG Weight		**46**		
--		Ceraline bends for coal pipe		150	SYN	NPP
		PG Weight		**150**		
		SUB TOTAL-C (NON PR PARTS)		**5,615.94**		
D		**SG PIPING**				
80	300	Ms From Superheater To Boiler Stop Val		0.88	HT	SGP
80	342	Aux Steam To SCAPH		14	LU	SGP
80	343	Aux Steam To Soot blowers		2.1	LU	SGP
80	344	Aux. Steam To F. O. Pump		55	LU	SGP
80	345	Aux.Steam For Oil Line Tracing		2.28	LU	SGP
80	351	Aux Steam To Unlisted equip		16	SY	SGP
80	352	Aux Steam To Unlisted equip		2	SY	SGP
80	355	Steam Tracing Line		12.5	LU	SGP
80	364	CBD Tank Vent to Sys		2.8	SY	SGP
80	365	CBD Tank Vent/SV Exhaust		0.778	LU	SGP
80	366	IBD Tank Vent To Atmosphere		0.717	LU	SGP
80	366	IBD Tank Vent To Atmosphere		11.71	LU	SGP
80	368	SCAPH Drain Tank Vent		2.313	LU	SGP
80	395	Aux Steam to FO Atomiser		1.2	LU	SGP
80	417	Boiler Feed Discharge Piping		0.479	LU	SGP
80	418	Erection Materials		0.3	LU	SGP
80	418	Erection Materials		0.147	LU	SGP

80	420	Boiler Feed Pump Suction		0.678	LU	SGP
80	421	Boiler Feed Pump Recirculation		0.224	LU	SGP
80	446	Deaerating Heater Overflow And Drain		0.507	LU	SGP
80	450	CBD and Emergency Drain		0.314	LU	SGP
80	450	CBD and Emergency Drain		2	LU	SGP
80	451	Boiler Integral Piping		14	LU	SGP
80	451	Boiler Integral Piping		0.359	LU	SGP
80	453	LP Piping Drains-SG		4.9	LU	SGP
80	453	LP Piping Drains-SG		0.214	LU	SGP
80	454	SCAPH Drains		7.083	LU	SGP
80	455	Drain From Unlisted Equip		2.411	SY	SGP
80	460	SG Aux Cooling Water		0.559	LU	SGP
80	460	SG Aux Cooling Water		69.446	LU	SGP
80	471	Boiler Wash Water		12	SY	SGP
80	473	Dm Water System		0.558	LU	SGP
80	477	Service Water		3.1	LU	SGP
80	480	Fire Water-Other Areas		11	LU	SGP
80	600	HP Dozing Pipeline		1.112	LU	SGP
80	600	Hp Dozing		0.131	LU	SGP
80	601	Lp Dozing		0.078	LU	SGP
80	612	Service Air for Unit		22.429	LU	SGP
80	612	Service Air for Unit		0.219	LU	SGP
80	616	Inst Air for Unit		11	LU	SGP
80	616	Inst Air for Unit		0.387	LU	SGP
80	650	Heavy Fuel Oil Main		0.459	LU	SGP
80	650	Heavy Fuel Oil Main		125	LU	SGP
80	820	Aux. Structure-Drains		33	LU	SGP
80	901	SD Valves & Specialities		9	LU	SGP
80	901	SD Valves & Specialities		0.615	LU	SGP
80	904	Bhel Valves-Boiler Hydrotest		0.904	LU	SGP
80	905	BHEL Valves-Boiler LU		22	LU	SGP
80	905	BHEL Valves-Boiler LU		5.477	LU	SGP
80	917	Tg Valves(Pem Engineered)		5.5	SY	SGP
80	918	Quick Cl.Nrvs For Ext. Line(Hardwar Eng)		5.2	SY	SGP
80	920	H&S For Boiler Hydro Test		1.917	HT	SGP
80	921	H&S For Boiler Lightup-Steam Lines		3.91	LU	SGP
80	922	H&S For Boiler Lightup-Nonsteam Lines		1.089	LU	SGP
80	927	H&S For Temp Piping-Steam Blowing		9	SB	SGP
80	992	Imported Electrodes		0.022	HT	SGP
80	992	Imported Electrodes		0.2	HT	SGP
		PG Weight		**513.206**		
97	282	Flow meters		0.2	LU	SGP
97	282	Flow meters		0.01	LU	SGP

		PG Weight		**0.21**		
		SUB TOTAL - D (SG PIPING)		**513.416**		
E		**ROTATING MACHINES**				
65	736	36 Inch Gravimetric Coal Feeders		65	SYN	RTM
		Motors		200	BLU	RTM
		PG Weight		**265**		
F		**LINING AND INSULATION**				
32	009	Fixing Comp For Blr		2.899	HT	INS
32	010	Fixing Comp For Blr		7	HT	INS
32	110	Fixing Comp For Blr		3	LU	INS
32	120	Fixing Comp For SB Piping		1	SY	INS
32	310	Fixing Comp For Air		33	LU	INS
32	410	Fixing Comp For Ah A		15	LU	INS
32	510	Fixing Comp For ID Duct		65	LU	INS
32	520	Fixing Comp For Fans		26	LU	INS
32	710	Fixing Comp For Oil System		14	SB	INS
		PG Weight		**166.899**		
33	020	Blr Pr Parts Mineral Wool		6.478	LU	INS
33	021	Blr Pr Parts Mineral Wool		242	LU	INS
33	121	Blr Mountings Mineral Wool		10	LU	INS
33	126	SB Pipes Mineral Wool		3	SY	INS
33	200	Main Blr Formed Refractory		7.759	LU	INS
33	201	Main Blr Formed Refractory		1	LU	INS
33	210	Main Blr Formed Refractory		150	LU	INS
33	212	Main Blr Castable Refractory Gr C		55	LU	INS
33	230	Main Blr Pourable Insulation		270	LU	INS
33	321	Air Ducts Mineral Wool		245	LU	INS
33	421	Air Heater and Gas Duct Mineral Wool		122	LU	INS
33	521	ID Ducts Mineral Wool		105	LU	INS
33	526	Fans and EP Mineral Wool		280	LU	INS
33	721	Oil System Mineral W		5	SB	INS
33	924	Misc Eqpts Asbestos Material		0.2	SB	INS
33	970	Misc Eqpts Expanded Metal		0.7	LU	INS
33	971	Misc Eqpts Woven Wire Mesh		1	LU	INS
33	975	Misc Eqpts Sealing Compound		0.3	LU	INS
		PG Weight		**1504.437**		
37	010	Blr Outer Casing Components		0.516	LU	INS
37	010	Blr Outer Casing Components		35	LU	INS

37	810	Blr Outer Casing Sheets		0.929	LU	INS
37	810	Blr Outer Casing Sheets		46	LU	INS
		PG Weight		**82.445**		
79	867	MIN WOOL FOR ESP INSULATION		410		INS
79	868	FIXING COMP. FOR ESP INSULATIN		380		INS
		PG Weight		**790**		
81	300	Fix Comp For Mainsteam Line Insulation		0.794	SB	INS
81	318	Fix Comp for Piping Insulation		10	LU	INS
81	325	Mineral Wool Mattress for Piping		2.201	SB	INS
81	325	Mineral Wool Mattress for Piping		70	SB	INS
81	341	Sealing Compound		0.6	SB	INS
81	341	Sealing Compound		0.04	SB	INS
81	350	Aluminium Sheet for Piping		1.455	SB	INS
81	350	Aluminium Sheet for Piping		35	SB	INS
		PG Weight		**120.09**		
		SUB TOTAL - F (INSULATION)		**2,663.87**		
G		**ROTATING MACHINES**				
50	510	STEAM COIL A P H		9.6	BLU	RTM
		PG WEIGHT		**9.6**		
52	010	LARG AH-ROTOR ASSY		395.216	BLU	RTM
52	011	LARG AH-ROTOR POST		15.553	BLU	RTM
52	012	LARG AH-ROTORPINRACK		3.797	BLU	RTM
52	013	LARG AH-ROTORSEALS		4.58	BLU	RTM
52	030	LARG AH-ROTORHOUSING		35.812	BLU	RTM
52	041	HOT END CONN PLATE		31.407	BLU	RTM
52	042	COLD END CONN PLATE		51.15	BLU	RTM
52	054	LARG AH-AXIAL SEAL		0.416	BLU	RTM
52	055	LARG AH-BY PASS SEAL		0.875	BLU	RTM
52	100	LARGE AH ROTOR DRIVE		5.571	BLU	RTM
52	210	LARG AH-ACCESS DOOR		0.726	BLU	RTM
52	211	LARG AH-AIRSEAL PIPE		0.673	BLU	RTM
52	212	LARG AH-OBSER. PORTS		0.063	BLU	RTM
52	217	LARG AH-STOP.ALARMS		0.003	BLU	RTM
52	220	LARG AH-GENS DETAILS		9.315	BLU	RTM
52	261	LARG AH-GUIDE BEARNG		2.924	BLU	RTM
52	262	LARG AH-SUPRT BEARNG		4.258	BLU	RTM
52	271	OIL PIPING GUIDE BRG		0.498	BLU	RTM
52	272	OIL PIPING SUPRT BRG		0.536	BLU	RTM
52	274	LUB OIL CIRCULN UNIT		1.102	BLU	RTM
52	301	WASH MANIFLD GAS INL		0.914	BLU	RTM
52	302	WASH MANIFLD GAS OUT		0.568	BLU	RTM
52	326	CLEANG EQPT GAS OUT		0.261	BLU	RTM

52	329	CLE EQPT DRIVE UNIT		1.393	BLU	RTM
52	360	FIRE SENSING SYSTEM		0.034	BLU	RTM
52	401	WASH MANIFLD GI(SEC)		2.087		RTM
52	402	WASH MANIFLD GO(SEC)		1.266		RTM
52	410	ROTOR ASSY (SEC)		619.798		RTM
52	411	ROTOR POST (SEC)		32.602		RTM
52	412	ROTOR PIN RACK (SEC)		4.784		RTM
52	413	ROTOR SEALS (SEC)		6.797		RTM
52	426	CLEANG EQPT GO (SEC)		0.388		RTM
52	429	CLEAN EQPT DRIVE -SEC		0.852		RTM
52	430	ROTOR HOUSING (SEC)		42.128		RTM
52	441	HOT END CONN PLATE-S		51.729		RTM
52	442	COLD END CONN PLATE-S		87.259		RTM
52	454	AXIAL SEAL (SEAL)		0.518		RTM
52	455	BY PASS SEAL (SEC)		1.14		RTM
52	460	FIRE SENSING SYS-SEC		0.051		RTM
52	500	ROTOR DRIVE (SEC)		8.462		RTM
52	510	ACCESS DOOR (SEC)		0.726		RTM
52	511	AIR SEAL PIPING (SEC)		0.787		RTM
52	512	OBSERVATION PORT		0.063		RTM
52	517	ROTOR STOP ALARM-SEC		0.003		RTM
52	520	AH-GENRL DETAILS-SEC		11.174		RTM
52	561	GUIDE BEARING(SEC)		4.363		RTM
52	562	SUPPORT BEARING(SEC)		11.021		RTM
52	571	OIL PPG GUIDE BRG (S)		0.498		RTM
52	572	OIL PPG SUPRT BRG (S)		0.536		RTM
52	574	LUB OIL CIRC UNIT(S)		1.102		RTM
		PG WEIGHT		**1457.779**		
55	011	FD FAN FND MATL		1.8		RTM
55	017	FD FAN AND C&I ITEM		0.1		RTM
55	031	PA FAN FND MATL		1.5		RTM
55	037	PA FAN AND C&I ITEM		0.1		RTM
55	216	1REAC FDFAN 2500-300		38.3	BLU	RTM
55	335	2REAC PAFAN 2000-250		29.5	SYN	RTM
55	810	AXIAL FDFAN COUPLING		1	BLU	RTM
55	830	AXL PAFAN COUPLING		1	SYN	RTM
55	910	AXL FDFAN ACCESSORY		7.1	BLU	RTM
55	911	AXIAL FDFAN SILENCER		71	BLU	RTM
55	930	AXL PAFAN ACCESSORY		4.5	SYN	RTM
55	931	PA FAN SILENCER		65	SYN	RTM
		PG WEIGHT		**220.9**		
56	021	ID FAN FND MATL		4.5		RTM
56	027	ID FAN C&I ITEM		0.1		RTM
56	161	BAC 1 SUC SA FAN		1.6	SYN	RTM
56	173	BAC 1 SUC IGNTR FAN		6.225	BLU	RTM
56	228	BAC 2 SUC ID FAN		190	BLU	RTM
56	670	IGNITR FAN MOTOR		1.6	BLU	RTM
56	820	RADL IDFAN COUPLING		0.15	BLU	RTM

56	870	SEAL AIR FAN COUPLING(R		0.05	SYN	RTM
56	920	RAD IDFAN ACCESSORY		5	BLU	RTM
56	977			0.1		
		PG WEIGHT		**209.325**		
61	000	Journal Assembly		246.47		RTM
61	100	Mill Drive and Bowl Assembly		280.5		RTM
61	200	Mill Side and Liner Assembly		207.794		RTM
61	300	Classifier Assembly		452.778		RTM
61	400	MDV Assembly		57.094		RTM
61	700	Mill Motor Coupling		1.428		RTM
61	800	Tools and Accessories with Mill Handling System(per Unit)		46.74		RTM
61	900	Foundation FastenerAssembly		49.95		RTM
		PG WEIGHT		**1342.754**		
67	400	Seal Air Header Assembly		24.128		RTM
		PG WEIGHT		**24.128**		
		TOTAL - 'E' & 'G' (ROT M/C)		**3529.486**		
H		**NON PRESSURE PARTS**				
51	610	SCAPH - HORIZONTAL TYP		10.6	BLU	NPP
		PG WEIGHT		**10.6**		
57	013	DAMPERS BET FD FAN & APH		13		NPP
57	033	DAMPERS AH BY PASS SEC		22	BLU	NPP
57	110	GUILLOTINE GATE PA FAN		20	SYN	NPP
57	113	DAMPERS BETWEEN PA FAN		7.2	SYN	NPP
57	133	DAMPER PA FAN TO COLD AIR BUS		15.3		NPP
57	141	SEAL AIR HAG AND ID FAN OUTGAT		10		NPP
57	143	DAMPER COLD AIR BUS		4.3	SYN	NPP
57	160	COLD AIR GATE, AIR BUS		15.1	SYN	NPP
57	203	DAMP APH TO WIND BOX DUCT		20	BLU	NPP
57	209	LINKAGES FOR DAMPERS		7	BLU	NPP
57	223	DAMP APH PRIMARY SIDE		17	BLU	NPP
57	380	GATE PAPH/SAPH INLET		62		NPP
57	403	DAMPER PRIMARY GAS OUTLET		17.5		NPP
57	423	DAMPER CASCADE EVOP GAS INLET		17		NPP
57	433	DAMPER APH BOILER OUTLET		27	BLU	NPP
57	460	GUILLOTENE GATE EP INLET		43	BLU	NPP
57	466	PLATFORMS AND LADDERS		44	BLU	NPP
57	480	GUILLOTINE GATE EP OUTLET		67.1	BLU	NPP
57	490	GUILLOTINE GATE ID FAN		67.1	BLU	NPP
57	491	BLOWER WITH MOTOR		3.8	BLU	NPP
57	497	KNIFE GATE VALVE		2		NPP
57	577	ELECTRIC ACTUATOR FOR GATE		20	BLU	NPP
57	660	GATE HOT AIR BUS TO MILL		29.1		NPP
57	663	DAMPER HOT AIR BUS TO MILLS		11.75	SYN	NPP

		PG WEIGHT		**562.25**		
		SUB TOTAL - H (NPP)		**572.85**		
J		**E S P**				
79	801	ROLL/SLIDE SUPPORTS		37	BLU	ESP
79	805	ESP-SUB-DELIVERY COMPON		0.7	BLU	ESP
79	806	INSULATOR HOUSING AS		56	BLU	ESP
79	808	GAS DIST. ASSY		82	BLU	ESP
79	809	GD-RAPPING MECHANISM		13.1	BLU	ESP
79	810	GD-DRIVE ARRANGEMENT		0.9	BLU	ESP
79	811	GAS SCREEN-EP		4.3	BLU	ESP
79	813	EMIT SYST SUSPENSION		19.8	BLU	ESP
79	814	SUPPORT INSULATORS		8.7	BLU	ESP
79	815	EMITTING ELECTRODES		29.4	BLU	ESP
79	816	EMIT ELECT RAPP MECH		45.5	BLU	ESP
79	817	DRIVE ARGT. FOR EMIT. S		36.7	BLU	ESP
79	819	COL ELEC SUSPENSION		135	BLU	ESP
79	820	COLLECTING ELECTRODE		678	BLU	ESP
79	821	EMIT SYS FRAME-TOP		122	BLU	ESP
79	822	EMIT SYS FRAME BOTOM		176	BLU	ESP
79	823	INSPECTION DOORS		21.6	BLU	ESP
79	824	SHOCK BARS		108.2	BLU	ESP
79	825	COLL ELECT RAPP MECH		101.3	BLU	ESP
79	826	COLL ELEC RAPP DRIVE		7.8	BLU	ESP
79	828	ESP ROOF PANELS		184	BLU	ESP
79	831	GEARED MOTORS FOR RAPPI		23.2	BLU	ESP
79	832	EMIT SYS FRAME-MIDLE		254	BLU	ESP
79	842	OUTER ROOF-EP		264	BLU	ESP
79	843	HOPPER RIDGES		85	BLU	ESP
79	844	HOPPER UPPER PART		466	BLU	ESP
79	845	HOP MLD&LOWER PART		580	BLU	ESP
79	846	INSULATOR SUPP PANEL		94	BLU	ESP
79	847	ROOF PANEL ASSY		146	BLU	ESP
79	848	CASING STRUCTURE		469.7	BLU	ESP
79	849	CASING SHELL/PANEL		626.9	BLU	ESP
79	850	INLET-OUTLET FUNNEL		177	BLU	ESP
79	855	PENT HOUSE FOR E P		225	BLU	ESP
79	857	SPLITTER&GUIDE VANES		27.5	BLU	ESP
79	859	CONTROL ROOM-INSERTS		140	BLU	ESP
79	861	EP PERF TEST EQUIPT		1	BLU	ESP
79	863	ASH LEVEL INDICATOR		2.3	BLU	ESP
79	865	APP PLATFORM-HOPPER		224	BLU	ESP
79	866	WATER WASHING SYSTEM		5	BLU	ESP
79	872	INTERLOCKS-EP		2	BLU	ESP
79	873	ELECTRICALLY OPERTD HOI		5.2	BLU	ESP
79	881	SUPPORTING STRUCTURES FO		810	BLU	ESP
79	890	HEATING ELEMENTS		1.5	BLU	ESP
79	891	PANEL TYPE HOPPER HEATER		31.5	BLU	ESP
		PG WEIGHT		**6528.8**		

89	610	EP GALLERIES&STAIRS		151	BLU	ESP
89	611	ESP ROOF HANDRAILS		9	BLU	ESP
		PG WEIGHT		**160**		
		HIGH VOLTAGE RECTIFORMERS		120		
		PG WEIGHT		**120**		
		SUB TOTAL - J (ESP)				
		TOTAL WEIGHT 'ESP'		**6808.8**		
K	**POWER CYCLE PIPING**		**IBR/NON-IBR**			
80	300	MS FROM SUPERHEATER TO BSV	I	34	HT	PP
80	301	MS FROM BOILER STOP VALVE TO ESV	I	104	SB	PP
80	303	MS HEADER TO AUX PRDS	I	12	SB	PP
80	304	MS HEADER TO HPBP VALVE	I	21	SB	PP
80	307	HP & LP BYPASS WARM UP	I	1.5	SN	PP
80	310	HRH FROM REHEATER TO INTERCEPTOR VALVE	I	166	SB	PP
80	311	HRH FROM INTERCEPTOR VALVE TO TURBINE	I	14	SB	PP
80	312	LPBP VALVE UPSTREAM & DOWNSTREAM	I	62	SB	PP
80	320	CRH FROM TURBINE TO REHEATER	I	127	SB	PP
80	321	HPBP VALVE TO CRH PIPING	I	11	SB	PP
80	322	CRH PIPING TO DEAERATING HEATER	I	7.5	SN	PP
80	323	STEAM TO BFP DRIVE TURBINE	I	2	SB	PP
80	324	CRH HEADER TO AUX.PRDS	I	0.85	SB	PP
80	329	EXTRACTION STEAM TO BFP DRIVE TURBINE	I	6.5	SN	PP
80	331	EXTRACTION STEAM TO LP HEATER-2	I	4.5	SN	PP
80	332	EXTRACTION STEAM TO LP HEATER-3	I	3	SN	PP
80	335	EXTRACTION STEAM TO DEAERATING HEATER	I	15	SN	PP
80	336	EXTRACTION STEAM TO HP HEATER NO.1	I	5.5	SN	PP
80	337	EXTRACTION STEAM TO HP HEATER-2	I	3.5	SN	PP
80	339	AUX STEAM TO BFD TURBINE	I	1	SN	PP

80	340	AUX STEAM HEADER	I	4	LU	PP
80	341	AUX STEAM HEADER INTERCONN BETN UNITS	I	50	LU	PP
80	342	AUX STEAM TO SCAPH	I	14	LU	
80	343	AUX STEAM TO AH SOOT BLOWERS	I	2	LU	
80	344	AUX STEAM TO FO SYSTEM TP	I	29	LU	
80	345	AUX STEAM TO DEAERATING HEATER	I	2.5	LU	PP
80	349	AUX STEAM TO GLAND SEALS OF TG	I	1	SN	PP
80	351	AUX STEAM TO UNLISTED USERS - SG SCOPE	I	15	SN	
80	352	AUX STEAM TO UNLISTED USERS - TG SCOPE	I	1	SN	
80	355	STEAM TRACING PIPING	I	7	LU	
80	364	CBD TANK VENT TO SYSTEM	I	2.5	SN	
80	395	AUX STEAM TO FUEL OIL ATOMISING	I	0.9	LU	
80	421	BOILER FEED PUMP RECIRCULATION	I	30	LU	PP
80	423	BOILER FEED PUMP TO HPH INCLUDING BYPASS	I	66	LU	PP
80	424	BFD BETWEEN HTRS & GROUP PROTECTION VLV	I	25	LU	PP
80	425	BFD FROM FINAL HPH TO SG TP	I	115	LU	PP
80	430	SPRAY WATER TO HPBP	I	4	LU	PP
80	431	SPRAY WATER TO AUX PRDS	I	2	LU	
80	432	SPRAY WATER TO BOILER DESH UPTO SG TP	I	15	LU	PP
80	433	SPRAY WATER FROM BFP INTERSTAGE	I	5	LU	PP
80	450	CBD AND EMERGENCY DRUM DRAIN	I	1.5	LU	
80	451	BOILER INTEGRAL PIPING DRAINS	I	13	LU	
80	452	HP PIPING DRAINS - SG AREA	I	6.5	LU	PP
80	453	LP PIPING DRAINS - SG AREA	I	4.5	LU	PP
		PG WEIGHT		**1018.25**		
81	003	CONTINUOUS BLOW DOWN EXPANDER-D1500 MM	I	4	LU	
81	421	SENSING ELEMENTS FOR STEAM LINES	I	3	LU	
81	422	SENSING ELEMENTS FOR NON-STEAM LINES	I	2.5	LU	
		PG WEIGHT		**9.5**		
		TOTAL (IBR PIPELINES)		**1027.75**		

80	454	SCAPH DRAINS	N	7	LU	
80	455	DRAIN FROM UNLISTED EQPT/VESSEL-SG SCOPE	N	3.5	LU	
80	460	SG AUX COOLING WATER UNIT SYSTEM	N	69	LU	
80	363	EXHAUST STEAM FROM PRIME MOVERS-TG SCOPE	N	21		
80	365	CBD TANK VENT/SV EXHAUST TO ATMOSPHERE	N	0.75	SN	
80	366	IBD TANK VENT TO ATMOSPHERE	N	11	LU	
80	368	SCAPH DRAIN TANK VENT/SV EXHAUST TO ATM	N	2	LU	
80	371	DRAIN FLASH TANK VENT TO CONDENSER	N	9.5		
80	373	AUX STEAM HEADER SV EXHAUST	N	3.5	LU	LPP
80	375	UNLISTED SV EXHAUSTS - TG SCOPE	N	1.5		
80	379	HPH SV EXHAUST TO FLASH TANK	N	3.5		
80	381	HP HEATER VENTS - TG SCOPE	N	2.5		
80	382	LP HEATER VENTS	N	1		
80	385	VENT FROM UNLISTED PPG/EQPT TO COND	N	9.5		
80	388	CONDENSER AIR EVACUATION PIPING	N	3		
80	399	STEAM BLOWING PIPING-TEMPORARY	N	61		
80	400	CONDENSATE SUCTION	N	6.5		
80	401	CD FROM PUMP TO LPH1/DC INLET TEE&RECIR	N	27		
80	402	CD FROM LPH1/DC INLET TEE TO TG TP	N	18		
80	403	CD FROM TG TP TO DEAERATING HEATER	N	9.5		
80	407	CONDENSATE FOR SEALING OF VACUUM	N	2		
80	408	CONDENSATE DUMP FROM HEADER	N	0.7		
80	412	CONDENSATE TRANSFER	N	1		
80	418	ERECTION MATERIALS FOR INSTRUMENTS	N	1.2		
80	419	DEAERATOR SAFETY VALVE EXHAUST TO ATM	N	3	LU	LPP
80	420	BOILER FEED PUMP SUCTION	N	18	LU	

80	436	SPRAY WATER TO LPBP DESH	N	5	SN	
80	439	TURBINE FLASH TANK DRAIN TO CONDENSER	N	0.65	SN	
80	442	GLAND STEAM COOLER DRAINS	N	0.25	SN	
80	443	LP HEATER-1 TO CONDENSER	N	4	SN	
80	444	LP HEATER-2/3/4/5 DRAINS&DRIP PUMP INCL	N	6	SN	
80	446	DEAERATING HEATER OVER FLOW AND DRAIN	N	4	LU	LPP
80	447	HP HEATER DRAINS	N	13	SN	
80	448	DRAIN FROM UNLISTED EQPT/VESSEL-TG SCOPE	N	8.5	SN	
80	449	TG CYCLE PIPING DRAINS & VENTS	N	9	SN	
80	457	MANIFOLDS FOR HP FLASH BOX & CONDENSER	N	1.5		
80	459	HP FLASH TANK DRAIN TO CONDENSER	N	1		
80	463	TG AUX COOLING WATER	N	73		
80	468	MAIN CIRCULATION WATER PIPING	N	106		
80	473	DEMINERALISED WATER SYSTEM	N	3		
80	477	SERVICE WATER PIPING	N	5		
80	493	HP FLASH TANK VENT TO CONDENSER	N	3.5		
80	494	LP FLASH TANK VENT TO CONDENSER	N	2.5		
80	495	LP FLASH TANK DRAIN TO COND	N	2		
80	600	HIGH PRESSURE DOSING PIPING	N	1		
80	601	LOW PRESSURE DOSING PIPING	N	0.8		
80	604	ACID CLEANING PIPING-TEMPORARY	N	50		
80	610	SERVICE AIR-COMP SUCT & DIS TO RECEIVER	N	2		
80	612	SERVICE AIR FOR INDIVIDUAL UNITS	N	22	LU	LPP
80	614	INST AIR COMP SUC & DIS TO RECEIVER	N	3		
80	650	FUEL OIL SUPPLY AND RETURN PIPING	N	110	LU	
80	673	LUBE OIL PIPING SYSTEM	N	6		
80	901	SUB DELIVERY VALVES FOR LIGHT UP	N	0.3	LU	LPP
		PG WEIGHT		**739.15**		

81	009	INTERMITTENT BLOW DOWN EXPANDER-D2500 MM	N	6.5	LU		
81	012	CLEAN DRAIN FLASH TANK - DIA 1500 MM	N	5	LU		
81	036	CW STORAGE TANK 16-25 CUM	N	6.5	LU		
81	041	IMPURE CONDENSATE TANK	N	4	SN		
81	042	MAKE UP WATER STORAGE TANK BELOW 300 CUM	N	7.5	SN		
81	110	COOLING WATER PUMP	N	0.6	LU		
81	128	HIGH PRESSURE DOSING SYSTEM	N	3.5	LU		
81	318	FIX COM FOR MISCELLANEOUS PPG INSULATION	N	30	SB		
81	325	MINERAL WOOL MATTRESS	N	300	LU		
81	341	SEALING COMPOUND FOR INSL	N	1.2	LU		
81	350	ALUMINIUM CLADDING FOR INSULATION	N	81	LU		
81	411	DIRECT GAUGES FOR STEAM LINES	N	0.15	LU		
81	411	DIRECT GAUGES FOR STEAM LINES	N	1.25	LU		
81	412	DIRECT GAUGES FOR NON-STEAM LINES	N	0.36	SB		
81	412	DIRECT GAUGES FOR NON-STEAM LINES	N	1	SB		
81	414	LOCAL CONTROL EQPT FOR NON-STEAM LINES	N	0.9	LU		
81	414	LOCAL CONTROL EQPT FOR NON-STEAM LINES	N	0.36	LU		
81	415	TEST THERMOWELLS	N	0.5	LU		
81	416	PERFORMANCE GUARANTEE TEST MATERIALS	N	1	SN		
81	435	JUNCTION BOXES	N	18	LU		
81	437	SUPERVISORY CONTROL PANEL	N		LU		
		PG WEIGHT		**469.32**			
		TOTAL (NON-IBR PIPELINES)		**1208.47**			
L	**STRUCTURES (HANGERS & SUPPORTS FOR PIPELINES)**						
80	812	H&S FOR AUXILIARY STEAM PIPING FOR LU	N	23	LU	STR	
80	816	H&S - ACID CLEANING,LU		8		STR	
80	830	H&S FOR CRITICAL PIPING - STEAM LINES	N	106	SB	STR	
80	840	AUX STR FOR MAIN STEAM PIPING FOR SB	N	236	SB	STR	
80	901	SUB DELIVERY VALVES FOR LIGHT UP	N	11	LU		
80	902	SUBDELIVERY VALVES FOR STEAM BLOWING	N	0.55	SB	STR	

80	920	H&S FOR HYDRO TEST	N	8	HT	STR
80	921	H&S FOR LIGHT UP STEAM LINE	N	75	LU	STR
80	927	H&S FOR TEMPORARY PIPING - STEAM BLOWING	N	9	SB	STR
80	928	H&S FOR BOILER LIGHT UP - TG	N	103		STR
80	930	H&S FOR SYNCHRONISATION - TG	N	20		STR
80	933	H & S FOR LP PIPING	N	15	LU	STR
80	934	STANDARD HANGER COMPONENTS	N	20.5	LU	STR
80	992	IMPORTED ELECTRODES	N	7.2	HT	STR
		PG WEIGHT		**642.25**		STR
		TOTAL (H & S FOR PIPELINES)		**642.25**		STR

APPENDIX-III

SUMMARY OF ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

SN	PACKAGE/SYSTEM	PG/DESCRIPTION	WEIGHT IN MT
1	STRUCTURES		
		24	25.989
		30	272.113
		35	4931.27
		36	3408.809
		38	898.9
		39	1680.748
		80 (Hangers & Supports for pipelines)	642.25
		80-812	23
		TOTAL OF STRUCTURES	**11883.079**
2	PRESSURE PARTS		
		4	276.832
		5	196.573
		6	632.634
		7	384.381
		10	182.237
		11	839.728
		12	532.768
		15	76.792
		16	502.523
		17	109.254
		19	810.537
		21	29.074
		24	221.892
		42	9
		81	18.67
		97	3.05
		De-aerating heater & Feed Storage Tank	85
		TOTAL OF PRESSURE PARTS	**4910.945**
3	NON PRESSURE PARTS		
		8	674
		9	14.68
		18	23
		20	77.031
		24	92.499
		28	14.521
		31	18.029
		41	6.166
		42	97.443
		43	99
		45	158
		47	525
		48	3403.692
		51	10.6
		57	586.25
		67	125.094

APPENDIX-III

SUMMARY OF ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

		81	66.789
		99	46
		Ceraline Bends For Coal Pipe	150
		TOTAL OF NON PRESSURE PARTS	**6187.794**
4	**ROTATING MACHINES**		
		65	65
		50	9.6
		52	1457.779
		55	220.9
		56	209.325
		61	1342.754
		67	24.128
		Motors	200
		TOTAL OF ROTATING MACHINES	**3529.486**
5	**LINING AND INSULATION**		
		32	166.899
		33	1504.437
		37	82.445
		79	790
		81	120.09
		TOTAL OF LINING AND INSULATION	**2663.871**
6	**ESP**		
		79	6528.8
		89	160
		HV RECTIFORMERS	120
		TOTAL OF ESP	**6808.8**
7	**PIPING**		
		22 (HP By-pass system)	25
		80 (SG Piping)	513.206
		80 (Critical IBR)	1018.25
		81 (Critical IBR)	9.5
		97 (Flow elements)	0.21
		80 (NON-IBR)	739.15
		81 (NON-IBR)	469.32
		TOTAL OF PIPING	**2774.636**
	GRAND TOTAL		**38,758.611**

NOTES:

1. BESIDES PRODUCT GROUPS INDICATED HEREIN, THERE IS LIKELIHOOD OF ADDITION OF NEW PRODUCT GROUPS BY BHEL' s UNIT FOR RELEASE OF SOME ITEMS, INTEGRAL TO THIS WORK. BIDDERS' QUOTED UNIT RATES SHALL BE APPLICABLE FOR SUCH PRODUCT GROUPS ALSO.

APPENDIX-III

SUMMARY OF ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

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

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

4. BESIDES THE ABOVE, WEIGHT OF ALL TEMPORARY PIPING, VALVES, PUMPS, TANKS AND OTHER MISCELLANEOUS EQUIPMENTS ETC FOR CARRYING OUT HYDRAULIC TEST, CHEMICAL CLEANING, STEAM BLOWING AND OTHER TESTS, AS STATED ELSEWHERE WILL GET ADDED.

5. ELECTRICAL & C&I ITEMS OF HANDLING SYSTEM (PG-99) IS EXCLUDED FROM THE SCOPE OF WORK.

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

A: TOOL & PLANTS

SN	DESCRIPTION	CAPACITY (MINIMUM)	*MINIMUM* QUANTITY
*1	Crawler Crane	75 MT	1
2	Mobile Crane	35 MT	1
3	Mobile Crane	18 MT	1
4	Pick & Carry Crane	8 MT	3
5	Trailer with Prime Mover	30 MT	2
6	Trailer with Prime Mover	20 MT	2
7	Truck	9 MT	1
8	Air Compressor (Electric/Diesel operated)	140 CFM, 7 Kg/cm^2	1
9	Strand and Jack Arrangement for Boiler Drum Erection	Adequate to erect Boiler Drum	1 set
10	**Huck Installation Tool (Guns)**	For fastening 12 mm and 16 mm diameter Huck Bolts in ESP	12 mm – 2 sets, 16 mm – 1 set
11	**Hydraulic cum Electrical Hose Assembly for Huck Bolting**	For connecting Huck Power Rig with Installation Tools	1 set
12	TIG Welding Set	As required	As required
13	Plasma Cutting M/c	For cutting up to 10 mm thick Stainless Steel	As required
14	3-Phase Distribution Board with Complete Set Up for Drawl of Construction Power	As required	As required
15	Power Cable for drawl of Construction Power	As required	As required
16	Pre Heating / Stress Relieving Set (Heating Control Panel, Cables, Heating Elements, Thermometers etc.)	As required	As required
17	Radiography Arrangement with Radioactive Isotope Source	Iridium-192	2 sets
18	Radiography Arrangement with Radioactive Isotope Source	Cobalt-60	1 set
19	Theodolite of Required Accuracy	To ensure verticality of structural columns	1
20	Self Drilling Cum Tapping Machine for Screws of Boiler Roof Sheets	As required	2

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

SN	DESCRIPTION	CAPACITY (MINIMUM)	*MINIMUM* QUANTITY
21	Chemical circulation pumps to handle acid solution, opr temp 80 deg cel, with drive motors, starter panel, cable, switch fuse unit etc. Suggested rating: 150 m^3, 120 – 150m WC, with 90 kw, 3000 rpm, 150 amps motor. However, contractor shall deploy the required capacity pump with accessories after obtaining written approval of BHEL.	As required	4 sets
22	Arrangement for UT of higher thickness joints with recording facility	Type USN 50 or equivalent/ upgraded type	1 Set
23	Electro-hydraulic pipe bending machine	Up to 2" Nb and 12 mm thick pipes	3 Sets
24	Welding Generator (Electrical)	300 Ampere rating	As required
25	Welding Generator (Diesel Operated)	300 Ampere rating	4 sets
26	Radiography Film Viewer	As required	As required
27	Hydraulic Pipe Bending Machine (manual)	For bending of pipes up to 50 mm Nb size	4 sets
28	Baking Oven with thermostat and temperature gauge for welding electrodes	As required	3
29	Holding Oven with thermostat and temperature gauge for welding electrodes	As required	2
30	Portable Over for welding electrodes	As required	25
31	Electric Winch	3 Ton Capacity	5
32	Electric Winch	1 Ton Capacity	5
33	Hand Winch	0.5 Ton Capacity	3
34	Scaffolding Materials	Suitable for working at various heights	Adequate qty for parallel working in multiple workfronts.

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

SN	DESCRIPTION	CAPACITY (MINIMUM)	*MINIMUM* QUANTITY
35	Profile making M/c	for aluminium sheet cladding work	As required
36	Nibbling M/c		As required
37	Shearing M/c		As required
38	Water Pump to lift water to top of boiler	for refractory and other required activities	1 Set
39	Portable Grinding M/c	As required	As required
40	Portable Drilling M/c	As required	As required
41	Chain Pulley Blocks	Up to 15 MT Capacity	As required
42	Fire retardant Tarpaulines	As required	As required
43	Fire Extinguisher	As required	As required

"*" The crane shall be for a period before two months of start of Boiler erection till synchronisation of the unit

B: MEASURING AND MONITORING DEVISES (MMD):

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

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

APPENDIX – V
LIST OF T&P TO BE ISSUED BY BHEL FREE OF CHARGES ON SHARING BASIS

SN	Description	Capacity	Quantity	Remarks
(i)	Heavy Lift High Reach Crane	~ 325 MT	1	See Notes-1, 2, 3 & 4 here
(ii)	Crawler Crane	~180 MT	1	To be deployed from second month. See Note 5 here for additional conditions.
(iii)	Crawler Crane	~100 MT	2*	To be deployed from first month. See Notes 5 & 7 here for additional conditions.
(iv)	Crawler Crane	75 MT	2*	To be deployed from first month. See Notes 6 & 7 here for additional conditions.
(v)	Crawler Crane	18-25 MT	1	BHEL crane. Will be provided from fifth month.
(vi)	Passenger cum Goods Elevator	1 MT	1	See Sections-4 & 5 of SCC
(vii)	Furnace Maintenance Platform (Sky Climber)	0.5 MT	1	See Note 8 here
(viii)	Pressurizing Pump	450 Kg/cm^2 & 600 Kg/cm^2	1 each	For hydraulic test of boiler & HP pipelines.
(ix)	Huck Power Rig	As required	1	For ESP work
(x)	Induction Heating Equipment	As required	4	For welding of P-91 pipeline
(xi)	Air-leak test set up	As required	1	For lekage test of ESP
(xii)	Fogging Machine / Air Blower	As required	1	For leakage test of Furnace and ducts

APPENDIX – V
LIST OF T&P TO BE ISSUED BY BHEL FREE OF CHARGES ON SHARING BASIS

Notes

Notes	
1	This crane belongs to BHEL and will be used for erection of boiler structures, ceiling structures and equipment/components above boiler ceiling structure or components/equipment out of reach of other cranes or non-availability of other bhel cranes or for activities that essentially require services of this crane as decided by BHEL. This crane will accordingly be deployed at appropriate time as decided by BHEL for suitable duration and intended purpose.
2	Further, above use of cranes may be allowed for any other erection related activity at the discretion & approval of BHEL site in-charge.
3	This crane is owned by BHEL and BHEL will provide its own operator.
4	Contractor shall make necessary arrangements like laying of special sleeper beds and steel plates (all provided by bhel), assembly and dismantling of heavy lift attachment, boom, jib etc for movement and operation of the crane.
5	BHEL will obtain these cranes on hiring basis including operating and maintenance crew.
6	BHEL will provide its own 75 MT crawler crane. Contractor shall provide operator for the same.
7	Second cranes in these (*) categories will be issued only in contingency situations as decided by BHEL.
8	Contractor shall transport from BHEL stores, install, operate, carry out maintenance, dismantle after use and return to BHEL stores.

APPENDIX-VI

ANALYSIS OF UNIT RATE QUOTED

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

DATE: SIGNATURE & SEAL OF THE BIDDER

APPENDIX-VII

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

SN	CATEGORY	MONTHS										
		1	2	3	4	5	6	7	8	9	10	SO ON
01	RESIDENT ENGINEER											
02	ERECTION ENGINEERS											
03	ERECTION SUPERVISORS											
04	QUALITY ASSURANCE ENGINEER											
05	SAFETY ENGINEER											
06	MATERIALS MANAGEMENT SUPERVISORS											
07	HIGH PRESSURE WELDERS											
08	STRUCTURAL & OTHER WELDERS											
09	FITTERS											
10	CRANE OPERATOR											
11	TRUCK/TRAILER DRIVERS											
12	STORE KEEPERS											
13	ELECTRICIANS											
14	SEMISKILLED/ UNSKILLED WORKERS											
SO ON												
	MONTH WISE TOTAL											

SIGNATURE OF BIDDER

DATE:

APPENDIX–VIII

FORMAT FOR DEPLOYMENT PLAN FOR MAJOR TOOLS AND PLANTS BY BIDDER

SN	DESCRIPTION & CAPACITY OF T&P	MONTHS										
		1	2	3	4	5	6	7	8	9	10	SO ON
01												
02												
03												
04												
05												
06												
07												
08												
09												
10												
11												
12												
13												
14												
SO ON												

SIGNATURE OF THE BIDDER

DATE:

APPENDIX-IX

CONCURRENT COMMITMENTS OF BIDDER

SN	FULL POSTAL ADRESS OF CLIENT AND NAME OF OFFICER IN-CHARGE	DESCRIPTION OF THE WORK	VALUE OF THE CONTRACT	COMMENC-EMENT DATE	SCHEDU-LED COMPLE-TION	% COMPL-TD. AS ON DATE	ANTICIPA-TED COMPLN. DATE	REMARKS

DATE

SIGNATURE OF THE BIDDER WITH SEAL

APPENDIX–X

DETAILS OF SIMILAR WORK DONE DURING THE LAST SEVEN YEARS

SN	FULL POSTAL ADDRESS OF CLIENT & NAME OF OFFICER IN CHARGE	DESCRIP-TION OF WORK	VALUE OF CONTRACT	DATE OF AWARD OF WORK	DATE OF COMMENCE MENT OF WORK	ACTUAL COMPLETION TIME (MONTHS)	DATE OF ACTUAL COMPLETION OF WORK	REMARKS
1								
2								
3								
4								
5								
6								

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

DATE SIGNATURE OF BIDDER WITH SEAL