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

Sl No	Tender Specification Number	Unit Number & Project
1	**BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-1 & 3 /743**	**BLOCK-I** Unit-1 & 3 of 4X250MW BRBCL Nabhinagar Boiler Vertical Pkg
2	**BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-2 & 4/744**	**BLOCK-II** Unit-2 & 4 4X250MW BRBCL Nabhinagar Boiler Vertical Pkg

FOR

COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE; ERECTION, TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF BOILER AND ITS AUXILIARIES, AUXILIARY BOILER, AIR PREHEATERS, DUCTS AND DAMPERS, FUEL PIPING, BOILER INTEGRAL PIPING & ASSOCIATED VALVES, ELECTROSTATIC PRECIPITATOR, FANS, POWER CYCLE PIPING, COAL MILLS AND COAL FEEDERS, CHEMICAL DOZING SYSTEM, INSULATION, FINAL PAINTING ETC OF 4x250 MW BRBCL NABINAGAR THERMAL POWER PROJECT GROUPED INTO BLOCK – I (UNIT 1 & 3) AND BLOCK – II (UNIT 2 & 4)

AT

BHARATIYA RAIL BIJLEE COMPANY LIMITED

NABINAGAR THERMAL POWER PROJECT (4x250 MW)

NABINAGAR, DISTT: AURANGABAD, BIHAR

PART I

TECHNICAL BID SPECIFICATION NOTICE INVITING TENDER & GCC

BOOK NO.:

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

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LEGEND:

$: Included in Tender Specifications Part-I. Hosted in BHEL web page (www.bhel.com) as file titled **"GCC-743,744".**

@: Issued as separate hard copy booklet 'Tender Specifications Part-II (Price Bid)' for BLOCK I and BLOCK II. Hosted in BHEL web page (www.bhel.com) as file titled **"PRICE BID-743" and "PRICE BID -744"**

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-743,744**"

Applicable Painting Scheme has been uploaded as a Corrigendum and same shall form the part of tender specification.

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

TENDER SPECIFICATION ISSUE DETAILS

Sl No	Tender Specification Number	Unit Number & Project
1	**BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-1 & 3 /743**	**BLOCK-I** **Unit-1 & 3** of 4X250MW BRBCL Nabhinagar Boiler Vertical Pkg
2	**BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-2 & 4/744**	**BLOCK-II** **Unit-2 & 4** 4X250MW BRBCL Nabhinagar Boiler Vertical Pkg

FOR

COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE; ERECTION, TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF BOILER AND ITS AUXILIARIES, AUXILIARY BOILER, AIR PREHEATERS, DUCTS AND DAMPERS, FUEL PIPING, BOILER INTEGRAL PIPING & ASSOCIATED VALVES, ELECTROSTATIC PRECIPITATOR, FANS, POWER CYCLE PIPING, COAL MILLS AND COAL FEEDERS, CHEMICAL DOZING SYSTEM, INSULATION, FINAL PAINTING ETC OF 4x250 MW BRBCL NABINAGAR THERMAL POWER PROJECT GROUPED INTO BLOCK – I (UNIT 1 & 3) AND BLOCK – II (UNIT 2 & 4)

AT

BHARATIYA RAIL BIJLEE COMPANY LIMITED

NABINAGAR THERMAL POWER PROJECT (4x250 MW)

NABINAGAR, DISTT: AURANGABAD, BIHAR

EARNEST MONEY DEPOSIT: Please see Notice Inviting Tender.

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

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

M/s. ……

……
PLEASE NOTE:
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

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

NOTICE INVITING TENDER

Sealed tenders are invited in two bid system (viz. Part-I: Technical cum Commercial Bid and Part-II : Price Bid) from bidders meeting Qualifying Requirements (QR) as specified later in this NIT. Brief details of job and Tender Specification (T.S.) No. are as under.

Sl No	Tender Specification Number	Unit Number & Project
1	**BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-1 & 3 /743**	**BLOCK-I** Unit-1 & 3 of 4X250MW BRBCL Nabhinagar Boiler Vertical Pkg
2	**BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-2 & 4/744**	**BLOCK-II** Unit-2 & 4 4X250MW BRBCL Nabhinagar Boiler Vertical Pkg

FOR COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE; ERECTION, TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF BOILER AND ITS AUXILIARIES, AUXILIARY BOILER, AIR PREHEATERS, DUCTS AND DAMPERS, FUEL PIPING, BOILER INTEGRAL PIPING & ASSOCIATED VALVES, ELECTROSTATIC PRECIPITATOR, FANS, POWER CYCLE PIPING, COAL MILLS AND COAL FEEDERS, CHEMICAL DOZING SYSTEM, INSULATION, FINAL PAINTING ETC OF 4x250 MW BRBCL NABINAGAR THERMAL POWER PROJECT GROUPED INTO BLOCK – I (UNIT 1 & 3) AND BLOCK – II (UNIT 2 & 4) AT **BHARATIYA RAIL BIJLEE COMPANY LIMITED** NABINAGAR THERMAL POWER PROJECT (4x250 MW)NABINAGAR, DISTT: AURANGABAD, BIHAR

- **Sales of T. S. Documents:** **from 22/06/2010 to 10/07/2010***
- **Last Date for Tender Submission:** **11/07/2010 15.00 HRS***
- **Date of Opening Technical Bid:** **11/07/2010 16.00 HRS** *

Earnest Money Deposit (EMD) : Rs 2.00 LAKHS

* : Prospective bidders to obtain latest update of these dates from our web page www.bhel.com → Tender Notifications → View Corrigendum

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- Tender Specification documents with complete details are hosted in web page (www.bhel.com). Bidders can directly download the same and use for submission of offer. Tender Document charges shall be paid to BHEL along with or before submission of Offer.
- Interested bidders may alternately collect hard copy of T.S. documents from this office on all working days within the sale period on payment of Tender Document charges.
- Tender Specification Document Charges: Rs. 2,000/- by DD (in favour of BHEL payable at Nagpur) or cash. Courier charges will be Rs. 500/- extra if T.S. documents are requested through courier.
- BHEL takes no responsibility for any delay/loss of documents or correspondences sent by courier/post.
- Bidders who have deposited One Time EMD of Rs. 2.00 Lakhs with BHEL:PSWR:Nagpur will be exempted from submission of EMD with these tenders.
- BHEL reserves the right to accept or reject any or all tenders without assigning any reasons whatsoever.
- ~~BHEL will operate Purchase Preference Policy of the Government of India as applicable.~~
- Tenderers whose bids are found techno commercially qualified shall be informed the date and time of opening of the Price Bids.
- All corrigenda, addenda, amendments and clarifications to Tender Specifications will be hosted in this web page (www.bhel.com → Tender Notifications → View Corrigendum) and not in the newspaper. Bidders shall keep themselves updated with all such amendments.

- BHEL reserves the right to reject any tender on the basis of unsatisfactory performance of the bidder in any ongoing job or any similar job in the last seven years or for furnishing false information/declaration in the offer
- Scope of work shall be as detailed in tender specification No. BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U- 1&3/743 and BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-2&4/744

Qualifying Requirements (QR)

Bidder must fulfill the Qualifying Requirements as under in order to be considered as technically qualified for this Tendering process

a) Bidder must have, achieved any one of the following:

a.1) Executed in the last seven years as on 31/05/2010, One job of Erection, Testing and Commissioning (Upto Boiler Light Up of the Unit or beyond) of Coal Fired Boiler of rating 100 MW or higher.

a.2) Bidder should have been Techno Commercially Qualified for E&C works of atleast one unit of Coal Fired Boiler of rating 250 MW or higher by any of the Power Sector Region of BHEL, in the last 3(Three) years as on 31/05/2010

a.3) Bidder should be empanelled with BHEL-PSWR for M-VP-2 (Boiler Vertical Package rating 100 MW to 300 MW) OR M-VP-3 (Boiler Vertical Package of Rating above 300 MW) category.

AND

b) Bidder must have achieved average financial turnover (Audited) of Rs 1770 Lakhs over last three financial years i.e. 2007-08, 2008-09 & 2009-10 **OR** 2006-07, 2007-08 & 2008-09 if Accounts for FY 09-10 has not been audited.

AND

c) Net worth of bidder based on Audited Accounts of 2009-10 (**OR** 2008-09 incase accounts for FY 09-10 has not been audited) should be higher than 50% of paid up capital in case of companies.

AND

d) Bidder must have earned cash profit in any one of the three Financial Years as applicable in case of 'b' above based on latest Audited Accounts.

Explanatory Notes for QR 'a'

1. The word 'executed' means the bidder should have achieved the criteria specified in the QR even if the total contract has not been completed or closed

GENERAL

1) **Timing of sale of Documents:** Tender Specification documents will be issued from BHEL PSWR Nagpur office from 10:00 AM to 4:00 PM on all working days within the period specified in the NIT.

2) **Holidays:**
Sale of Tender Documents shall not take place on National Holidays, holidays declared by the Central or State Governments, Sundays, second and last Saturdays and holidays of BHEL PSWR Nagpur HQ.

3) **Seeking Clarifications on Tender Specification:**
Clarifications on the Tender Specifications, if any, may be sought by the bidders so as to reach this office at least **seven days before the Due Date** for submission.

4) **Fulfillment of Qualifying Requirements:**
A bidder must satisfy **all the Qualifying Requirements** stipulated under 'a', 'b' etc of this tender concurrently in order to get qualified.

5) **Customer Approval**: customer approval is required for this package; Bidder's offer will be accepted subject to approval of bidder by customer.

6) **Supporting Documents:**
Bidders shall submit documents in support of possessing "Qualifying Requirements" as under duly self-certified and stamped by the authorized signatory.
   - List of jobs done with Name of the Project, Owner of Project, Name of Customer, Work Order Ref. No. & Date, Brief Details of Job, Executed Value, Date of Start, Date of Completion.
   - Photocopies of Work Orders issued by the Customer containing details of Bill of Quantities/Schedule of Rates.
   - Empanelment certificate issued by BHEL-PSWR
   - Photocopies of Completion Certificate issued by Customer or Owner of Project.
   - Photocopies of audited Profit and Loss accounts accompanied by relevant schedules for turnover figures.

7) **Earnest Money Deposit (EMD):** Refundable, Non-interest bearing EMD for each tender is indicated against each job earlier here. Bidders may also opt to deposit "One Time EMD" of Rs. 2.0 lacs and thus be exempted henceforth from payment of EMD with each Erection and Commissioning tender of BHEL-PSWR Nagpur. EMD shall be paid ONLY by **Account Payee Demand Draft** in favour of "Bharat Heavy Electricals Limited" payable at Nagpur.

Those bidders who have already deposited 'One Time EMD' earlier need not submit EMD with the present tenders. Please indicate the payment details of the 'One Time EMD' in each tender.

8) **Tender Document Cost and Courier Charges:**
Tender document charges @ Rs 2000/- per set and courier charges @ Rs 500/- per set shall be made by Account Payee Demand draft in favour of "Bharat Heavy Electricals limited" payable at Nagpur or in cash payable at cash counter of this Office. Courier charges shall be paid in case bidders requests for dispatch of Tender specifications by courier. In case bidder downloads the Tender specifications etc from web page, they shall remit the Tender document charges (Rs 2000/-) positively along with or before submission of offer.

9) **Liquidated Damages/Penalty:** BHEL will impose Liquidated Damages and Penalty as per suitable clauses in the respective Tender Specifications on account of delay, violation of contract conditions and non-performance attributable to the contractor.

10) LATE TENDER : Tender received after the specified time of submission shall not be considered in any circumstances.

11) **BHEL may resort to the process of REVERSE AUCTION (on Line bidding) among the bidders who are found to be qualified on the basis of Technical Bid and approval of customer. Details of Reverse Auction process are furnished in Section 18 of SCC under title "Reverse Auction Procedure". Date of Reverse Auction/On-line bidding shall be intimated to all techno-Commercially qualified bidders later. In case the option of Reverse Auction/On-line bidding is not exercised by BHEL, the sealed price bid of technically qualified bidders shall be considered for further processing of the offer and evaluation**.

12. Tenders Submitted By Hand

Tenders being Submitted through representative shall be handed over to any of the following BHEL offcials after making entry/registration at the reception:

1. SM Borkar/ Sr Manager (Purchase)
2. RK Ranade/ Manager (Purchase)
3. Vivek Kamal/ Engineer(Purchase)
4. Pratish Gee Varghese/Engineer(Purchase)

Sr.Dy. General Manager (Purchase)

BHEL:PSWR:Nagpur

IMPORTANT INFORMATION

There are 4 Units which is divided into 2 Blocks. Block – I comprises of (U # 1 & 3) and Block – II comprises of (U # 2 & 4).

1. This is a combined tender for E & C of 4 Units of 250 MW Boilers (Unit 1 to 4 at NABINAGAR) with separate price bids for each block of 2 Units comprising Block – 1 (Units – 1 & 3) and Block – 2 (Units – 2 & 4)

2. Part – I of Tender Specifications consists of "Technical Bid Specifications" for each Block which is COMMON to all the 2 Blocks.

3. Part – II of Tender Specifications consists of "Price Bid Specifications" for each of the 2 Blocks.

4. One Auxiliary Boiler is in the scope of work. This has been clubbed with Unit 1 which makes it a part of Block – 1(comprising Unit 1 & 3).

5. Bidders can participate for both the 2 Blocks subject to the following :

   a. One bidder shall get only one job (of E & C of **1 Block** of 2 Boilers of 250 MW), i.e if a bidder is awarded the job for one of the Blocks, then the bidder is not eligible for E & C of Boilers of other Block and his price bid shall not be opened.

   b. BHEL reserves the right to open the price bids of any of the Blocks in any order.

   c. Price bids of only Bidders who have been qualified by the customer shall be opened.

6. Price bids for the 2 Blocks are issued separately. Each price bid shall be sealed in separate covers and enclosed in the main envelope/cover. Each price bid covers shall be clearly super scribed with Tender specification number, project location, Block number.

Note: There is a slight difference in scope of work between the two Blocks. Details in Technical Specifications.

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" and "Part-II " and also indicating on each of the Price Bid covers the Tender Specification Number and due date and time as mentioned in the Tender Notice.

PART-I : (TECHNICAL BID SPECIFICATION & GCC) COVER-I:
All Details as called for in the specification shall be enclosed in an envelope (Cover-I) and super scribed "Part-I :TECHNICAL BID SPECIFICATION & GCC".

EARNEST MONEY DEPOSIT (EMD)
EMD(s) or copy of "One Time EMD" certificate shall be included in this envelope. **EMD shall be paid by bidders only in the manner prescribed in Section-15 of this Tender Specification.** No other mode of payment of EMD shall be acceptable.

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.**

Each of the 2 price bids shall be enclosed in separate sealed Covers Superscribing "Part-II: PRICE Bid for Tender Specification No: BHE/PW/PUR/ ..... " .

COVER-III
The above two separate covers-I and II (Part-I and Part-II) shall together be enclosed in a third envelope (Cover-III) along with requisite EMD as indicated earlier and this sealed cover shall be superscribed and submitted to 'Additional General Manager (Purchase) at the above mentioned address on or before the due date as indicated.

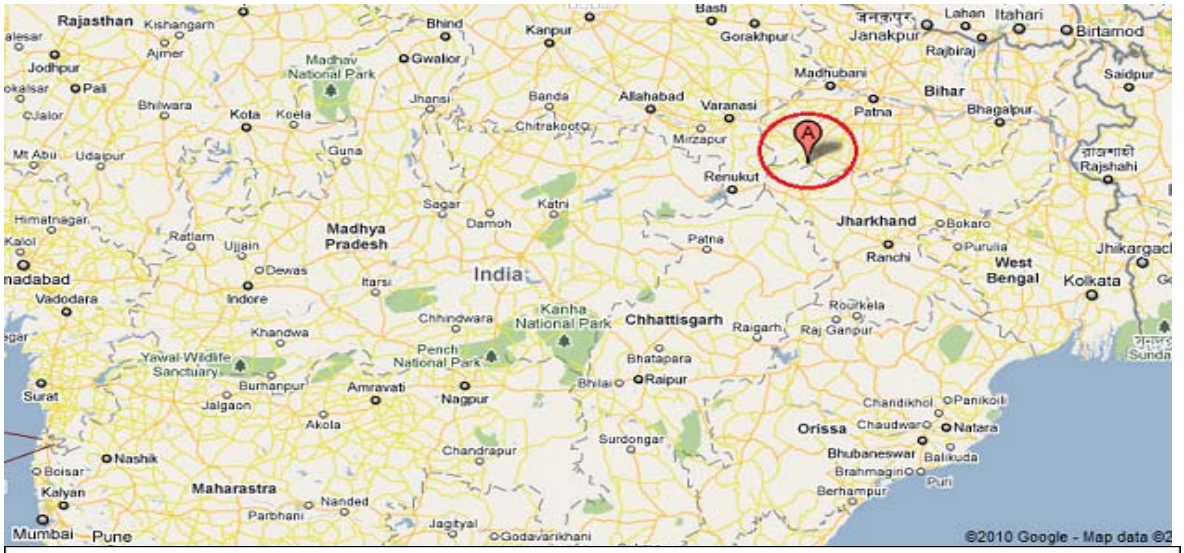
The Customer approved bidders shall be intimated separately the date of Price Bid Opening.

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.

PROJECT INFORMATION

1. OWNER	:	BHARATIYA RAIL BIJLEE COMPANY LIMITED
2. PROJECT TITLE	:	NABINAGAR THERMAL POWER PROJECT
3. PROJECT RATING	:	4 x 250 MW
4. LOCATION	:	NABINAGAR, DISTT – AURANGABAD, BIHAR
5. NEAREST RAILWAY STN.	:	DEHRI–ON–SONE (30 KM FROM PROJECT LOCATION)
6. NEAREST PORT	:	PARADIP
7. NEAREST AIRPORT	:	GAYA (100 KM FROM PROJECT LOCATION)
8. ROAD APPROACH	:	NATIONAL HIGHWAY – 2 (25 KM FROM PROJECT SITE)
9. LATTITUDE	:	24°42'30" N
10. LONGITUDE	:	84°05'36" E



CLIMATE

Nabinagar has an average elevation of 138 meters (452 feet). The climate of this region is Tropical. During the summer day's temperature rises up to 40 to 50 degree Celsius, whereas during the winter temperature falls almost near 5 degrees Celsius. Average rainfall in this region is near 50 to 75 centimeter.

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

CHECK LIST

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	WHETHER NO DEVIATION CERTIFICATE FURNISHED	YES	NO
5	TENDERER HAS VISITED THE PROJECT SITE AND ACQUAINTED WITH THE SITE CONDITIONS	YES	NO
6	DETAILS OF CONCURRENT JOBS ARE FURNISHED (AS PER RELEVANT APPENDIX)	YES	NO
7	HEAD QUARTER'S ORGANISATION IS FURNISHED	YES	NO
8	PROPOSED SITE ORGANISATION IS FURNISHED	YES	NO
9	PROFIT & LOSS ACCOUNT FOR PRECEDING THREE YEARS IS FURNISHED	YES	NO
10	LATEST INCOME TAX CLEARANCE CERTIFICATE OR COPY OF PAN CARD ACCOMPANIED BY 'IT RETURN' COPY IS FURNISHED	YES	NO
11	MANPOWER DEPLOYMENT PLAN (AS PER RELEVANT APPENDIX) IS FURNISHED	YES	NO
12	ANALYSIS OF UNIT RATES QUOTED (AS PER RELEVANT APPENDIX) IS FURNISHED	YES	NO
13	POWER OF ATTORNEY ENCLOSED IN FAVOUR OF PERSON MAKING OFFER.	YES	NO
14	DETAILS OF SIMILAR WORK DONE IN LAST SEVEN YEARS (AS PER RELEVANT APPENDIX) AND SUPPORTING DOUCMENTS FURNISHED.	YES	NO
15	PROGRAMME FOR THE SUBJECT WORK FURNISHED	YES	NO
16	BIDDER HAS FMILIARIZED HIMSELF WITH ALL RELEVANT LOCAL LAWS & CONDITIONS.	YES	NO
17	WHETHER ALL THE PAGES OF THE TENDER DOCUMENTS ARE READ, UNDERSTOOD AND SIGNED	YES	NO

18	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 } 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

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

TENDER SPECIFICATIONS Nos :-

Sl No	Tender Specification Number	Unit Number & Project
1	**BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-1 & 3 /743**	**BLOCK-I** **Unit-1 & 3** of 4X250MW BRBCL Nabhinagar Boiler Vertical Pkg
2	**BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-2 & 4/744**	**BLOCK-II** **Unit-2 & 4** 4X250MW BRBCL Nabhinagar Boiler Vertical Pkg

AUTHORISED REPRESENTATIVE'S SIGNATURE WITH
NAME AND ADDRESS

DATE:

TENDERER'S NAME AND ADDRESS

CERTIFICATE OF NO DEVIATION

TENDER SPECIFICATION Nos.

Sl No	Tender Specification Number	Unit Number & Project
1	**BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-1 & 3 /743**	**BLOCK-I** Unit-1 & 3 of 4X250MW BRBCL Nabhinagar Boiler Vertical Pkg
2	**BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-2 & 4/744**	**BLOCK-II** Unit-2 & 4 4X250MW BRBCL Nabhinagar Boiler Vertical Pkg

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

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

SIGNATURE OF THE TENDERER

DATE:

SECTION-3
OFFER OF THE CONTRACTOR

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

DEAR SIR,

I/WE HEREBY OFFER TO CARRY OUT THE WORK DETAILED IN TENDER SPECIFICATION NOS. **BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-1 & 3 /743 AND BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-2 & 4/744** 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 TENDERERS
2. GENERAL CONDITIONS OF CONTRACT
3. SPECIAL CONDITIONS OF CONTRACT
4. OTHER SECTIONS, APPENDICES, SCHEDULES AND DRAWINGS.

I/WE HAVE DEPOSITED / FORWARDED HEREWITH THE EARNEST MONEY DEPOSIT FOR A SUM OF RS. 2,00,000/- (RUPEES TWO LAKH ONLY) DETAILS OF EMD PAYMENT ARE FURNISHED IN THE CHECK LIST.

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

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

PLACE: SIGNATURE OF TENDERER:
DATE : ADDRESS:

WITNESSES WITH THEIR ADDRESS

SIGNATURE	NAME	ADDRESS
1.		
2.		

SECTION-4
SPECIAL CONDITIONS OF CONTRACT

SCOPE OF WORK

4.0 GENERAL

The work to be carried out under the scope of these specifications is broadly as under:

1) Collection of materials/components/equipments from BHEL/ customer stores/ storage yard, handling/ loading and transportation to erection site/ site of work, handling/unloading and feeding at erection site/ site of work.

2) Transportation / dragging of boiler drum from unloading bay to inside boiler structures and positioning on ground, erection using Strand Jack Method including final alignment.

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

4) Erection, testing & commissioning, of:

a) Boiler supporting structures, stairways and galleries.
b) Boiler pressure parts
c) Boiler trim & integral piping and mountings
d) Auxiliary Boiler (for Block 1 only)
e) Fuel oil piping
f) Non-pressure parts, ducts, dampers
g) Rotating machines (e.g. Mills, fans, air pre-heaters, coal feeders and motors etc. with their drives & lube oil system etc.)
h) Electrostatic precipitator and Stairways & Galleries
i) One no. Elevator serving each ESP control room.
j) Pulverized fuel piping
k) External structures (e.g. Duct supporting, pipe rack structures, elevator structure etc.)
l) Handling arrangements for rotating machines
m) Mill reject handling system
n) Power Cycle Piping (Main Steam, HRH, CRH etc) including P-91 material piping and valves including HP/LP Bypass
o) Low pressure (air & water) pipeline
p) Hp by-pass system (valves, control fluid system with pipeline).
q) HP & LP chemical dozing systems
r) Roof & side cladding of boiler & elevator.
s) Passenger elevator and goods elevator.
t) Entire piping supplied by PC Chennai (SG piping, TG piping, LP piping)
u) Deaerator along with their structure.

5) Non-Destructive Examination & post weld heat treatment

6) Application of thermal lining & insulation on all the above equipments and TG equipments & auxiliaries as applicable

7) Pre-commissioning checks/tests, Trial Runs/Testing and Commissioning

8) Final painting of erected items

9) Trial operation and associated tests

10) Making unit ready for PG test and assistance for conductance.

11) Completion of all facility/systems

12) Handing over of the unit

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

4.1.1 GENERAL REQUIREMENTS – COMMON TO ALL WORK

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

4.1.1.2
The terminal points decided by BHEL shall 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 adequately 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 workman like manner. The stores shall be handled with care and diligence.

4.1.1.12

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

4.1.1.13
All cranes, transport equipment, handling equipment, tools, tackles, fixtures, equipment, manpower, supervisors/engineers, consumables etc, except otherwise specified as BHEL scope of free issue, required for this scope of work shall be provided by the Contractor. All expenditure including taxes and incidentals in this connection will have to be borne by Contractor unless otherwise specified in the relevant clauses. The Contractor's quoted rates should be inclusive of all such contingencies.

4.1.1.14
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. The claims of Contractor, if any, for such works will be governed by relevant clauses of Section-13.

4.1.1.15
All works such as cleaning, leveling, aligning, trial assembly, dismantling of certain equipments / components for checking and cleaning, surface preparation, fabrication of structures, tubes and pipes as per general engineering practice and as per BHEL Engineer's instructions at site, cutting, gouging, weld depositing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scrapping, lapping, fitting up 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.

4.1.1.16
The Contractor shall make all fixtures, temporary supports, steel structures required for jigs & fixtures, anchors for load and guide pulleys required for the work. Contractor shall arrange necessary steel for such usage. Only the steel for making temporary structure (cat head) for drum lifting will be provided by BHEL in random sizes materials available at site.

4.1.1.17
The Contractor shall take delivery of the components, equipments, chemicals, and lubricants etc from the BHEL stores/ storage area after getting

the approval of BHEL Engineer on standard indent forms of BHEL. Complete and detailed account of the materials and equipments after usage shall be submitted to the BHEL and reconciled periodically.

4.1.1.18
Contractor shall plan and transport equipments, components from storage to erection site and erect them in such a manner and sequence that material accumulation at site does not lead to congestion at site of work. Materials shall be stacked neatly, preserved and stored in the Contractor's shed and at work areas in an orderly manner. In case it is necessary to shift and re-stack the materials kept at work areas/ site to enable other agencies to carry out their work or for any other reason, same shall be done by Contractor most expeditiously as incidental to work.

4.1.1.19
Plant materials should not be used for any temporary supports / scaffolding/ preparing pre-assembly bed etc.
4.1.1.20
The detail of equipments to be erected under this contract is generally as per the schedule given in relevant appendices. These details are approximate and meant only to give a general idea to the tenderer about the magnitude of the work involved. Actual quantum and type of equipments will be based on the 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.

4.1.1.21
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.

4.1.1.22
Spring suspension / constant load hangers may have to be pre-assembled for required load and erection carried out as per instructions of BHEL. Adjustments, removal of temporary arrests/locks, cutting of excess thread length of hanger tie-rod etc have to be carried out as and when required. Load setting of spring hangers, as per BHEL's documents/instructions, during various stages of erection & testing and after floating of piping/ducting during cold and hot condition will have to be done as part of work. This exercise may have to be repeated till satisfactory results are achieved.

4.1.1.23
Layout of field routed/ small bore piping shall be done as per site requirement. Necessary sketch for routing these lines should be got approved from BHEL by the Contractor. There is a possibility of slight change in routing the above pipe lines even after completion of erection.

4.1.1.24

Welding of necessary instrumentation tapping points, thermo-well, thermocouple pad, metal temp 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.

4.1.1.25
Certain instrumentation like pressure switches, air sets, filters, regulators, pressure gauges, junction boxes, power cylinders, dial thermometers, flow meters, valve actuators, flow indicators, centrifugal/speed switches of motors, accumulators etc are received in assembled condition as integral part of equipments. Contractor shall dismount such instruments for calibration and hand over the same to BHEL. C & I erection agency will do storage / re-erection calibration etc.

4.1.1.26
Fixing and seal welding of thermowells & plugs before Hydro test/ steam blowing of equipment or other piping system is within the scope of work. Contractor shall also remove the seal welded plugs by process of grinding and fix and seal weld thermowells after hydro test/steam blowing of lines as part of work.

4.1.1.27
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.

4.1.1.28
All electrical motors have to be tested for IR & PI values prior to the trial run. Where required, dry out may have to be carried out by using external heating source. Contractor shall make all arrangements in this regard and complete the work as instructed. BHEL will provide the motorized insulation testers.

4.1.1.29
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.

4.1.1.30
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.

4.1.1.31
All works such as cleaning, leveling, aligning, trial assembly, dismantling of certain equipments / components for checking and cleaning, surface preparation, fabrication of sheets, tubes and pipes as per 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.

4.1.1.32
Interconnection/ hookup, if any, with the existing system shall form part of work. Such interconnections, hookups may require shut down of running plant and the relevant work have to be completed within such planned shutdowns. This may call for working with enhanced resources and on extended hours. Contractor's offer shall cover all such contingencies.

4.1.1.33
Contractor shall regulate flow of material to and from site in such a manner and sequence that material accumulation at site does not lead to congestion at site. In case it is necessary to shift and restack the materials kept at work areas / site to enable other agencies to carry out their work or further any other reason, it shall be done by the Contractor most expeditiously. No claim for extra payment for such work will be entertained.

4.1.1.34
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 AUXILIARY BOILER

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

4.2.1 PRESSURE PARTS

A) Fabrication and installation of **temporary structure** for erection of boiler drum is in the scope of the contractor's work. BHEL will issue the required

structural steel for this purpose free of charges. Contractor shall have to fabricate built up beams and other structural members that are required for supporting the drum lifting equipment. 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 boxing up and application of refractory. Seal boxes need to be partially cut open in order to pour refractory. Contractor shall carry out necessary cutting and seal welding of such cutouts. 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 drum internals, if already installed, may have to be removed to facilitate inspection by statutory authorities and 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 HP 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 weld. Contractor should follow required procedure for T91 welding NDT, etc.

J) **Boiler drum**: Boiler drum may need to be led from the point of unloading to the cavity of boiler. The same is in the Contractor's scope and shall make all arrangements, including fabrication of saddle if required. Structural materials required for the same will be provided by BHEL on free-returnable basis.

Boiler drum is to be lifted using strand jack method. Contractor to engage services of expert agency to lift the boiler drum by this method. Contractor shall make necessary tie up with the agency well in advance and deploy the expert agency and other resources well in time to suit the milestone requirement.

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 & OTHER PIPELINE

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 other equipments. Necessary protocols have to be prepared for such fit-up along with BHEL/customer representative before connecting. All NDE including radiography of joints so made, post weld heat treatment if any, 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 piping upto turbine stop valve released in PG 80 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:

a. 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.

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

c. 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.

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

e. Erection, welding, NDE and stress relieving of certain equipments, e.g. 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. No separate/ additional payment is envisaged for cutting, welding and edge preparation in this regard. The removed pieces of pipes shall be returned to BHEL stores with proper cleaning, dressing and identification marking.

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

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

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

4.2.2.10
As far as possible, pre-assembly 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 certain completion commitments.

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 rate quoted in rate schedule is also 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 Engineer and BHEL Engineer may direct the Contractor to reschedule his work to suit the status of the site work.

4.2.2.14
While erecting the field run pipes, the Contractor shall check the accessibility of valves, instruments tapping points and maintain minimum head room requirement and other necessary clearance from the adjoining work areas to avoid interferences.

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 diameter pipelines, edge preparation for welding may have to be altered suitably to achieve the slope.

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) on the highest and lower points of the pipe run although may not be specifically mentioned in the drawing.

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
In pipelines like CRH lines, extraction lines, etc., the NRVS, strainers etc will be erected by other erection agency. Alignment of these valves to match the pipe ends (both sides), welding, heat treatment and NDE etc is in the scope as incidental to work.

4.2.2.19
Normally, hangers setting in cold condition are 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 job. Hanger settings have to be repeated for achieving free-floating joints. 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 para and also other relevant specifications contained in other para's elsewhere in this tender document will be applicable for rotating machines like FD / ID / PA / 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 has to be done after necessary alignment.

E) 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.

F) 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.

G) Protective lubricant coats / fill provided on / in the critical area of equipments have to be removed 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.

H) Chemical cleaning, steam blowing and air drying of the connecting pipes for the lube oil system has 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.

I) 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 incidentals to work.

K) There are 7 Nos of XRP 883 Bowl Mill per unit.

4.2.4 Erection of 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 special lifting beam and slings supplied for the purpose.

4.2.4.5
BHEL will supply huck bolting m/c with necessary auxiliaries free of charges. However, electrical connections, operation etc shall be arranged by the contractor.

4.2.4.6
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.

4.2.4.7
Erection, alignment/ fixing in final position, of high voltage rectifiers of ESP are in the scope of work. However testing & commissioning will be done by other agency.

4.2.4.8
Installation of high voltage interlocks (excepting rotary switch interlock of switchgear panels) is in the scope of work.

4.2.4.9
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, ducting, and instrumentation etc. will be provided by BHEL free of charges. Handling at stores, transport, erection, commissioning and carrying out the leakage test, attending to the leakages till satisfactory sealing / leak proof shall be in scope of the work. Contractor shall dismantle the test equipments and return to BHEL stores in good condition after due reconciliation, cleaning and servicing. No separate/ additional payment is envisaged for the above.

4.2.5

4.2.5.1
Contractor shall supply and erect one number passenger cum goods elevator of 1.5 MT capacities to reach upto the boiler drum level to facilitate erection, movement of person and goods etc. The arrangement shall confirm to applicable safety norms. Contractor shall dismantle and take the elevator back after completion of work. The elevator shall be made ready at the time of drum lifting.

4.2.5.2
Boiler main supporting structures have to be erected in a sequential manner.

4.2.5.3
Quality norms, with regard to verticality of column and inter-alia, have to be adhered to strictly, at various stages of erection.

4.2.5.4
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.

4.2.5.5
Each of the ceiling girders will be sent in 2 pieces and will have to be assembled, welded and NDE & PWHT (SR) done on ground prior to their erection in position.

4.2.5.6
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.

4.2.5.7
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.

4.2.5.8
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.

4.2.5.9
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.

4.2.5.10
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 **and not by weldable 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.

4.2.5.11
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 only 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.

4.2.5.12

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.

4.2.6 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 to chimney, hot and cold secondary air ducting from FD fans outlet to wind box, hot and cold primary air ducting from PA fans to 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 portions 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) Boiler roof sheets shall be erected on boiler roof structure. Payment shall be made as per the tonnage rate quoted for boiler non pressure part.

F) ID fans are provided with variable frequency drive. Contractor has to erect & commission the mechanical components of the fan. Electrical/ electronic panels, transformers, cabling etc are not in this work specification. However in case of hydraulic coupling, the coupling shall be in scope of this contractor.

G) Actuator/ 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 consumables, T&P and facilities.

4.3 PREPARATION OF FOUNDATIONS, AND GROUTING OF EQUIPMENT OF BOILER & AUXILIARIES

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 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 upto 35mm 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 re-enforcement 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.
Neutralization pit for EDTA cleaning is to be made by the Contractor. After completion of job pit has to be dismantled and area is to be leveled before handing over of area to owner.

Effluent has to be disposed off safely from neutralizing pit to a safe area as per the instruction of BHEL Engineer.

4.3.3
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 and de-watering and making them free of oil, grease, sand and other foreign materials by soda washing, water washing, compressed air and other approved methods are within the scope of this specification/ work.

4.3.4
BHEL will provide only the shims and packer plates (either machined or plain), free of cost, 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 / chiseling / grinding and de-burr the same. However, machining of the packers, wherever necessary, shall be arranged by contractor.

4.3.5
Contractor shall carry out scrapping and blue matching of embedded plates/ packers of rotating equipments. Chipping and the leveling 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.

4.3.6
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 high pressure welders who have been permitted by 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, traveling expenses, stay etc., shall be borne by the contractor.

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

4.4.1.12 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 tenderer shall take notice of this while quoting as no extra claim on this account will be entertained. The socket welding on HP parts/ HP piping shall be done by the IBR qualified welders. Contractor has to adhere to the procedures/specification as indicated in the drawing for socket welding.

4.4.1.13
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 labours 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.

BHEL will provide the induction heating equipment set for SA 335 P-91 materials piping only. 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 (UP).

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 BHEL 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-penetrant/MPT/RT/ other non-destructive examination as specified in the respective engineering documents/ as instructed by BHEL.

4.4.3.5
Wherever 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 NDT method/procedure will be decided by BHEL engineer at site.

4.4.3.6

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

4.4.3.7
100% radiography of certain sizes in piping has 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. 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 part of thickness with IR–192 other suitable source. Subsequently after completing, the joint UT has to be done. For this contractor has to deploy level–II operator certified by BARC.

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

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 should 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 equipments, fans etc
3. Boiler integral piping and tanks & vessels

4. Power cycle piping and critical 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

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 all the necessary scaffolding materials, temporary structures and necessary safety devices etc, during all stages of work. Scaffolding materials (poles, gratings etc) shall be of light weight construction. Contractor shall arrange steel pipes & clamps with accessories like base plate attachment, fixing pins, struts etc for scaffolding required for this work. However, BHEL's decision in this regard shall be final and binding. Contractor shall arrange the scaffolding materials in sufficient quantity.

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 by BHEL Engineer.

4.5.8
The cladding and outer casing are aluminum sheets. All relevant specifications and procedures with regards to beading, sealing etc for aluminum 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 does the work on his own accord without prior permission, the work should be re-done, at his own cost, where necessitated.

4.5.14
Wastage allowance for the materials issued is 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 work 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 Contractor.

- 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, 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. The bituminous paint will be supplied by Contractor. No separate payment will be made for application of paint.

4.6 PAINTING

4.6.1
All exposed metal parts of the equipment including piping, structures, railings etc. wherever applicable, after installation unless otherwise surface protected, shall be first painted with at least one coat of suitable primer

which matches the shop primer paint used, after thoroughly cleaning all such parts of all dirt, rust, scales, greases, oils and other foreign materials by wire brushing, scraping or sand blasting, and the same being inspected and approved by BHEL engineer for painting. Afterwards, the above parts shall be finished with two coats of alloyed resin machinery enamel paints.

4.6.2 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.

Primer coat of touch-up primer has to be applied by brush immediately after the surface preparation.

Over this primer coat, finish coat and final finish coat shall be applied as covered above by brush within maximum seven (7) days of application of touch up primer.

Painting scheme is enclosed for information. However, for execution only the latest document shall be applicable and no claim whatsoever shall be entertained in case of any variance between such documents. Similarly, documents as provided progressively during the execution of work for all other products/ equipments etc shall be applicable.

4.6.3
Painting of welded areas / painting of areas exposed after removal of temporary supports / touch-up painting on damaged areas of employer's structures, where inter-connection, welding / modification etc. has been carried out by the bidder.

(a.) clean the surface to remove flux spatters and loose rust, loose coatings in the adjoining areas of weld seams by wire brush and emery paper.
(b.) painting procedure to be followed as mentioned above for touch-up painting on damaged areas.

4.6.4
The scope of work includes painting of colour bands, lettering, marking and signs for direction of flow/rotation, names etc of approved colours as per the standard colour codes and specifications specified in tender specification or as advised by BHEL/customer engineer at site for the equipments/

components covered in these specifications. Applicable paints and primer shall be supplied by BHEL.

4.6.5
All exposed metal parts of the equipment including piping, structures, hand railing, grating etc shall be thoroughly cleaned off dust, rust, scales and other foreign materials by manual or mechanized wire brushing, scrapping, sand blasting etc and the same being inspected and approved by BHEL/customer engineer before application of primer. Afterwards, the above parts shall be finish painted with specified number of coats as per specification.

4.6.6
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 standard 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 has to be painted by spray painting. The decision of BHEL engineer, in this regard, shall be final and binding on the Contractor. For the purpose of spray painting, air at one point will be made available by BHEL free. Laying of air hose pipe and any other line required shall be done by Contractor at his cost. The Contractor shall provide spray equipment set.

4.6.14
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.

Note : Applicable Painting Scheme is Uploaded in BHEL Web as "Corrigendum 01".

4.7 TESTING, PRE-COMMISSIONING, AND COMMISSIONING

4.7.1
Testing, pre-commissioning, & 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 & alkali boil out 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

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

- ✓ Similarly, during the course of erection, if certain portion of equipments erected by the Contractor has to be undone for enabling other Contractors / agencies of BHEL / customer to carry out their work, Contractor shall carry out such jobs expeditiously and promptly and make good the job after completion of work by other Contractors / agencies of BHEL / customer as per BHEL engineer's / agencies of BHEL / customers instructions. Claims, if any, in this regard shall be governed as per clauses 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 all 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 labor 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
Conduct of performance guarantee test is in the scope of work. Contractor shall install all necessary tapping points, instruments, etc and provide necessary assistance in this regard.

In case PG test is getting 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 decided. However installation of necessary tapping points, impulse pipes, approaches etc are to be completed by the Contractor.

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 utilization of materials is not within the permissible limits, recovery for the excess quantity used or wasted will be effected with departmental charges from the Contractor. Decision of BHEL on this will be final and binding on the Contractor.

4.8.7
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 reactivated/ normalized.

4.10 EXCLUSIONS

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

The following works are specific exclusions from the scope of work under erection, testing & commissioning of tender specification-

i) Sub-delivery items and electrical components such as push-buttons, junction boxes etc.
ii) E&C work of cable trays, cables and earthing etc
iii) Control panels, EPMS, MCC etc.
iv) Electrical & C&I items of handling system (PG 99)
v) All electrical and control & instrumentation items except those specified elsewhere in these specifications.

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

vii) Supply of primer and paints for final painting

viii) Pneumatic copper tubing and fittings thereof.

ix) Testing and commissioning of heating elements, thermostats, HV rectifier transformers.

x) 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

Customer/BHEL will provide, free of charge, sufficient open land for construction of labour colony. Contractor shall make his own arrangements for construction of labour colony including lighting, internal roads, water distribution etc. Contractor shall maintain proper hygiene and provide facilities for proper sanitation and drainage. Contractor shall comply with the stipulations of Bihar State Pollution Control Board while constructing the labour colony.

Customer/BHEL will provide electricity on chargeable basis for labour and staff colony at one point within the plant boundary either at 11KV or 415 V. Contractor shall make further necessary arrangements like distribution network with necessary poles, conductors, cables, Energy Meter, protection devices, distribution board etc. at his own cost and services as per the requirement and instruction from Customer / BHEL.

Contractor shall arrange for potable water and drinking water at his own cost and services for labour and staff colony.

The contractor has to make his own arrangement for transportation of his workmen and other employees. BHEL/client shall not provide any facility in this regard.

5.2 TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES:

5.2.1
The contractor shall provide all (excepting those indicated in BHEL scope) required tools and plants, monitoring and measuring devices (MMD) and handling & transportation equipments for the scope of work covered under these specifications. Contractor have to provide suitable cranes for lifting and loading of materials issued to the contractor at BHEL/client's stores/storage yard, material handling yard / siding. BHEL's crane will not be available for this purpose. Please refer relevant appendix for the list of T&P being provided by BHEL free of charges on sharing basis.

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

other T&P necessary for timely and satisfactory completion of the work in scope.

5.2.3
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. MMD's shall be calibrated only at accredited laboratory as per the list available with BHEL or any other laboratory approved by BHEL.

5.2.10
BHEL T&P will be issued in basic assembled condition. Contractor shall transport these T&P to & fro between BHEL stores and site. Additional loose components / sub-assemblies / attachments as and when necessary, will be

issued by BHEL, to & fro between BHEL stores and site of such items shall also be done by the contractor. Assembly of such additional loose components/sub-assemblies/ attachments is in contractor's scope. 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. This is also applicable in respect of cranes hired by BHEL and made available to the contractor for this work.

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 PSE INDIA PVT LTD (203, KRISHNA BHAVAN, GOVANDI STATION ROAD, DEONAR, MUMBAI 400 088, TELPHONE 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, TELPHONE 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, TELEPHOHE 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 **PASSENGER CUM GOODS ELEVATOR**

Contractor, as part of his T&P, shall arrange, install, operate and maintain 1.5 MT capacity passenger-cum-goods elevator in each boiler to facilitate

access to various platform elevations upto top floor/boiler drum floor. The elevator shall conform to the national standard and industrial safety code as applicable. These shall be deployed at the time of Boiler Drum erection in consultation with BHEL site engineer.

The probable suppliers for the elevator are:

1. M/s Avon Cranes Pvt Ltd, Gurgaon

2. M/s Mekaster Engineering & Equipment Pvt Ltd, Halol

5.2.13
Laying of sleepers and rails and routine maintenance of the dip trolley system including assembly and dismantling are in Contractor's scope.

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

All primers and paints for preservation purpose are in the contractor's scope unless provided otherwise in BHEL scope as free issue.

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

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

5.4 WELDING ELECTRODES, FILLER WIRES FOR TIG WELDING AND GASES

5.4.1
All the required welding electrodes, 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.

5.4.2
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 these free issues 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**.

5.4.3
Gases like argon, oxygen, and acetylene etc that are required for erection related activities shall be arranged by the contractor at his cost. Argon gas for P-91 pipe joints welding process shall be conforming to grade –3 of is: 5760-1998 with oxygen and water vapour restricted to maximum 6 ppm each and with argon purity level of minimum 99.99%. The supply should accompany test certificate for the batch indicating individual element 'ppm' level and overall purity level.

5.4.4
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.

5.5 FIELD OFFICE

5.5.1
The contractor shall make his own arrangements for field office and stores for accommodating necessary equipments, tools room for execution of the work. Only open space will be provided by BHEL/ customer, free of charges as per the availability of space.

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

5.5.3.

BHEL is installing a computerized site management system at site to cover areas of material management, erection & commissioning, quality control, billing, MIR's 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.

5.6 AREA LIGHTING

5.6.1
Contractor shall arrange adequate floodlights, hand lamps and area lighting for material handling, unloading, verification, stacking, erection, pre-assembly activities etc. All temporary wiring must comply with regulations and will be subjected to engineer's inspection before connecting to supply point.
Contractor shall use his own materials like cables, fuses, switch-boards etc. BHEL/client will not provide anything in this regard.

5.7 CONSTRUCTION POWER & WATER

5.7.1 CONSTRUCTION POWER

Construction power (three phase, 50 Hz, 415v) will be provided at one point near the erection site. **The electricity will be free of charge.** All temporary wiring must comply with local regulations and will be subject to Employer's inspection and approval before connection to supply. Required energy meter, all cables, fuses, distribution boards, switches, switchboards, bus bars, earthing arrangements, protection devices e.g. ELCB, if any, and any other installation as specified by statutory authority, client in this regard, for drawl of construction power shall be arranged by the Contractor. Obtaining approvals, payment of necessary fees, duties etc towards the clearance of such installations, prior to these being put to use or as may be specified, shall be the responsibility of the Contractor.

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

5.7.3
While reasonable efforts will be made to ensure continuous electric power supply, interruptions cannot be ruled out and no claim from the Contractor shall be entertained on this account such as idle labour, extension of time etc. The Contractor shall adjust his working shift accordingly and deploy additional manpower, if necessary, so as to achieve the target.

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

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

5.7.6 **CONSTRUCTION WATER**

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

5.8 RESPONSIBILITIES WITH REGARD TO LABOUR EMPLOYMENT ETC.
Refer clause 2.8 of general conditions of contract also in this regard.

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

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

5.8.3
It is the responsibility of the contractor to arrange gate pass for all his employees, T&P etc for entering the project premises. Necessary coordination with customer officials is the responsibility of the contractor. Contractor has to follow all the procedures laid down by the customer for making gate passes. Where permitted, by customer / BHEL, to work beyond normal working hours, the contractor shall arrange necessary work permits for working beyond normal working hours.

5.8.4

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

5.9

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.

5.10.0 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.~~

5.10.1

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.

5.10.2 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.

5.10.3 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.

5.10.4 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.

5.10.5 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 will 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 fulfillment of labour laws and other statutory obligations.

SECTION-7

SPECIAL CONDITIONS OF CONTRACT

7.0 OBLIGATIONS OF BHEL

7.1 FACILITIES TO BE PROVIDED BY BHEL

7.1.1 SPACE FOR SITE OFFICE / STORES: REFER SECTION-5 IN THIS REGARD.

7.1.2 CONSTRUCTION POWER & WATER: REFER SECTION-5 IN THIS REGARD.

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 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 appendix**)** free of charge to the Contractor on sharing basis mainly for the purposes enumerated in notes in same appendix**.** BHEL cranes have to be shared with other agencies / Contractors of BHEL. The allocation of cranes shall be 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 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. For hired cranes these responsibilities will be in the scope of crane hiring agency. The cranes provided by BHEL (including hired crane) 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. Operator for BHEL owned crane shall be in the scope of Contractor.

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.

7.4.3
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.

7.4.4
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.

7.4.5
The Contractor must not use these equipments for any purpose other than what they are intended for.

7.4.6
If the above items issued to Contractor are found not utilized / not maintained to the satisfaction of BHEL engineer or misused, these will be withdrawn and no replacement will be done for such items.

7.4.7
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 and paints required for final painting shall be supplied by BHEL free of charges.

The Contractor , however, shall provide account of all the items issued to him and return all primer, paints etc remaining extra over the normal requirement with proper identification tags in a packed 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.

SECTION-8 (Rev 01, 24/01/2009)
SPECIAL CONDITIONS OF CONTRACT

8.0 Inspection/Quality Assurance/Quality Control/ Statutory Inspection

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

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

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

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

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

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

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

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

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

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

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

8.8

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

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

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

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

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

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

8.14 Stage Inspection By FES/QA Engineers

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

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

Statutory Inspection of Work

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

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

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

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

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

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

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

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

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

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

Field Quality Assurance

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

SECTION-9

SPECIAL CONDITIONS OF CONTRACT

Safety, Occupational Health and Environmental Management

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 <u>TRAINING & AWARENESS</u>

9.4.1

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

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

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

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

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

9.5.0 REPORTING

9.5.1
The contractor shall submit report of all accidents, fires and property damage, dangerous occurrences to the 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/-
09.	Not Using Proper Welding Cable With Lot of Joints And Not Insulated Property.	200/-
10.	Not Removing Small Scrap From Platforms	200/-
11.	Gas Cutting Without Taking Proper Precaution or Not Using Sheet Below Gas Cutting	200/-
12.	Not Maintaining Electric Winches Which are Operated Dangerously	500/-
13.	Improper Earthing Of Electrical T&P	500/-
	Major Accident or Accidents causing partial loss of earning to the victim	50,000/- per victim
14	Fatal Accident or Accidents causing permanent loss of earning to the victim	1,00,000/- per victim

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

9.8
CITATION:-If safety record of the contractor in execution of the awarded job is to the satisfaction of safety department of BHEL, issue of an appropriate certificate to recognize the safety performance of the contractor may be considered by BHEL after completion of the job

9.9 Memorandum of Understanding

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

Memorandum of Understanding

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

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

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

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

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

Name :

Place & Date:

9.10

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

IS No	YEAR	Amd upto	DESCRIPTION
IS 10204	1982		PORTABLE FIRE EXTINGUISHERS MECHANICAL FOAM TYPE
IS 10245	1994		SPECIFICATION FOR BREATHING APPARATUS
IS 10291	1982		SAFETY CODE FOR DRESS DRIVERS IN CIVIL ENGINEERING WORKS
IS 10658	1983		HIGHER CAPACITY DRY POWDER FIRE EXTINGUISHERS (TROLLEY MOUNTED)
IS 10662	1992		COLOUR TELEVISION
IS 10667	1983		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR PROTECTION OF FOOT AND LEG
IS 11037	1984		ELECTRONIC FAN REGULATORS
IS 11057	1984		INDUSTRIAL SAFETY NETS
IS 11451	1998		RECOMMENDATION FOR SAFETY AND HEALTH REQUIREMENT RELATING TO OCCUPATION EXPOSURE TO ASBESTOS
IS 1169	1967		PEDESTAL FANS
IS 1179	1967		SPECIFICATION FOR EQUIPMENT FOR EYE AND FACE PROTECTION DURING WELDING

IS No	YEAR	Amd upto	DESCRIPTION
IS 11833	1986		DRY POWDER FIRE EXTINGUISHERS FOR METAL FIRES
IS 11972	1987		CODE OF PRACTICE FOR SAFETY PRECAUTION TO BE TAKEN WHEN ENTERING A SEWARAGE SYSTEM
IS 1287	1986		ELECTRIC TOASTER
IS 13063	1991		STRUCTURAL SAFETY OF BUILDINGS ON SHALLOW FOUNDATIONS ON ROCKS
IS 13385	1992		SPECIFICATIONS FOR FIRE EXTINGUISHERS 50 LITRE WHEEL MOUNTED WATER TYPE (GAS CARTRIDGES)
IS 13386	1992		SPECIFICATIONS FOR FIRE EXTINGUISHERS 50 LITRE MECHANICAL FOAM TYPE
IS 13415	1992		CODE OF SAFETY FOR PROTECTIVE BARRIERS IN AND AROUND BUILDINGS
IS 13416	1992		RECOMMENDATIONS FOR PREVENTIVE MEASURES AGAINST HAZARDS AT WORKING PLACE PART 1 TO PART 5
IS 13430	1992		CODE OF PRACTICE FOR SAFETY DURING ADDITIONAL CONSTRUCTION AND ALTERATION TO EXISTING BUILDINGS
IS 13849	1993		PORTABLE FIRE EXTINGUISHERS DRY POWDER TYPE (CONSTANT PRESSURE)
IS 1446	1985		CLASSIFICATION OF DANGEROUS GOODS (FIRST REVISION)
IS 1476	1979		REFRIGERATORS
IS 1641	1988		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): GENERAL PRINCIPLES OF FIRE GRADING AND CLASSIFICATION
IS 1642	1989		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS-DETAILS OF CONSTRUCTION
IS 1643	1988		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): EXPOSURE HAZARD
IS 1646	1997		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): ELECTRICAL INSTALLATIONS
IS 1904	1986		CODE OF PRACTICE FOR DESIGN AND CONSTRUCTION OF FOUNDATIONS IN SOIL
IS 1905	1987		STRUCTURAL SAFETY OF BUILDINGS MASONARY WALLS
IS 2082	1985		ELECTRICAL GEYSERS
IS 2171	1985		PORTABLE FIRE EXTINGUISHERS DRY POWDER TYPE (CARTRIDGE)
IS 2309	1989		PRACTICE FOR THE PROTECTION OF BUILDINGS AND ALLIED BUILDINGS AGAINST LIGHTENING
IS 2312	1967		EXHAUST FANS
IS 2361	1994		SPECIFICATION FOR BUILDING GRIPS - FIRST REVISION
IS 2418	1977		TUBULAR FLUORSCENT LAMPS IS 2418 (FT-1)
IS 2750	1964		STEEL SCAFFOLDINGS
IS 2762	1964		SAFE WORKING LOADS IN KGS FOR WIRE ROPE SLINGS
IS 2878	1986		FIRE EXTINGUISHERS CARBON DIOXIDE TYPE (PORTABLE AND TROLLEY MOUNTED)
IS 2925	1984		SPECIFICATION FOR INDUSTRIAL SAFETY HELMETS

IS No	YEAR	Amd upto	DESCRIPTION
IS 3016	1982		CODE OF PRACTICE FOR FIRE PRECAUTIONS IN WELDING AND CUTTING OPERATIONS- FIRST REVISION
IS 3315	1974		DESERT COOLERS
IS 3521	1989		INDUSTRIAL SAFETY BELTS AND HARNESS
IS 368	1983		IMMERSION WATER HEATERS
IS 3696	1991		SAFETY CODE OF SCAFFOLDS AND LADDERS PART 1 TO 2
IS 3737	1996		LEATHER SAFETY BOOTS FOR WORKERS IN HEAVY METAL INDUSTRIES
IS 374	1979		CEILING FANS INCLUDING REGULATORS
IS 3764	1992		EXCAVATION WORK - CODE OF SAFETY
IS 3786	1983		METHOD FOR COMPUTATION OF FREQUENCY AND SEVERITY RATES FOR INDUSTRIAL INJURIES AND CLASSIFICATION OF INDUSTRIAL ACCIDENTS
IS 3935	1966		CODE OF PRACTICE FOR COMPOSITE CONSTRUCTION
IS 4014	1967		CODE OF PRACTICE FOR STEEL TUBULAR SCAFFOLDING
IS 4081	1986		SAFETY CODE FOR BLASTING AND RELATED DRILLING OPERATIONS
IS 4082	1977	1996	STACKING AND STORAGE OF CONSTRUCTION MATERIALS AND COMPONENTS AT SITE
IS 4130	1991		DEMOLITION OF BUILDINGS - CODE OF SAFETY PART 1 TO 2
IS 4138	1977		SAFETY CODE FOR WORKING IN COMPRESSED AIR (FIRST REVISION)
IS 4155	1966		GLOSSARY OF TERMS RELATING TO CHEMICAL AND RADIATION HAZARDS AND HAZARDOUS CHEMICALS
IS 4209	1967		CODE OF SAFETY FOR CHEMICAL LABORATORY
IS 4250	1980		FOOD MIXERS
IS 4262	1967		CODE OF SAFETY FOR SULFURIC ACID
IS 4756	1978		SAFETY CODE FOR TUNNELING WORK
IS 4912	1978		SAFETY REQUIREMENTS FOR FLOOR AND WALL OPENINGS, RAILINGS AND TOE BOARDS
IS 5121	1969		SAFETY CODE FOR PILING AND OTHER DEEP FOUNDATIONS
IS 5182	1969	1982	METHODS FOR MEASUREMENT OF AIR POLLUTION
IS 5184	1969		CODE OF SAFETY FOR HYDROFLUORIC ACID
IS 5216	1982	2000	RECOMMENDATIONS ON SAFETY PROCEDURES AND PRACTICE IN ELECTRICAL WORK PART I AND II
IS 555	1979		TABLE FANS
IS 5557	1995		INDUSTRIAL AND SAFETY LINED RUBBER BOOTS (SECOND REVISION)
IS 5916	1970		SAFETY CODE FOR CONSTRUCTION INVOLVING USE OF HOR BITUMINOUS MATERIALS
IS 5983	1980		SPECIFICATION FOR EYE PROTECTORS - FIRST REVISION
IS 6234	1986		PORTABLE FIRE EXTINGUISHERS WATER TYPE (STORED PRESSURE)

IS No	YEAR	Amd upto	DESCRIPTION
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.

SECTION-11

SPECIAL CONDITIONS OF CONTRACT

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

11.1 MOBILIZATION, TIME SCHEDULE, CONTRACT PERIOD AND GRACE PERIOD

11.1.1 INITIAL MOBILIZATION

After receipt of fax LOI, Contractor shall discuss with Project Manager / Construction Manager regarding initial mobilization. Contractor shall mobilize necessary resources within 2 weeks of issue of fax letter of intent or as per the directive of Project Manager / Construction Manager. Such resources shall be progressively augmented to match the schedule of milestones and commissioning.

11.1.2 MOBILIZATION FOR ERECTION, TESTING, ASSISTANCE FOR COMMISSIONING ETC.

The activities for erection, testing etc. shall be started as per directions of Construction Manager of BHEL. Contractor shall mobilize further resources (in addition to those required for activities under clause no. 11.1.1) as per requirement to commence the work of erection, testing etc. of boiler and auxiliaries and progressively augment the resources to match schedule of the project.

11.1.3 COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE

Erection/placement on its 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.

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

According to the contract between BHEL and BRBCL, the schedule of important milestones is as follows:

Major Project milestones for Nabinagar TPP (4x250 MW)

S.No	Milestones	Unit-1	Unit-2	Unit-3	Unit-4
	Project Zero Date	**22-11-09**			
1	Boiler Erection Start	22-08-10	22-11-10	22-02-11	22-05-11
2	Boiler Drum Lifting (17% MT Tonnage completion)	22-12-10	22-03-11	22-06-11	22-09-11
3	Boiler Hydro Test (61% MT tonnage completion)	22-09-11	22-12-11	22-03-12	22-06-12
4	Boiler Light Up (BLU) - (81% MT Tonnage Completion)	22-02-12	22-05-12	22-08-12	22-11-12
5	Steam Blowing completion and Safety Valve Floating	22-03-12	22-06-12	22-09-12	22-12-12
6	Synchronization with coal firing (95%) MT tonnage Completion	22-05-12	22-08-12	22-11-12	22-02-13
7	Completion of trail run	22-08-12	22-11-12	22-02-13	22-05-13

THE PHASE DIFFERENCE BETWEEN SUCCESSIVE UNITS IS 3 MONTHS FOR ALL ACTIVITIES. WITHIN A BLOCK, THE PHASE DIFFERENCE BETWEEN SUCCESSIVE UNITS IS 6 MONTHS.

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

11.1.4 **CONTRACT PERIOD**

The contract period for completion of entire work under scope shall be **34 (Thirty Four) months for Block 1(Unit 1 & 3) and Block 2 (Unit 2 & 4)** from the "start of contract period" as specified earlier.

The period from the commencement of preparatory work for erection till the actual "start of contract period" shall not be reckoned for the above purpose.

11.1.5 **CONSEQUENCE OF DELAY**

It may be noted that in the event delay in completion is attributable to the Contractor, BHEL will impose LD on the Contractor as per GCC.

11.2 PROGRESS MONITORING, CONTRACT EXTENSION AND OVERRUN

11.2.1 **PROGRESS MONITORING**

Refer 'General conditions of Contract'

11.2.3 CONTRACT EXTENSION

Refer 'General conditions of Contract'

11.2.6 OVERRUN COMPENSATION

Refer 'General conditions of Contract'

11.3 PRICE VARIATION

Refer 'General conditions of Contract'

11.4 CONTRACT VARIATIONS

11.4.1 VARIATION IN WEIGHT/QUANTITIES

Refer 'General conditions of Contract'

11.4.2 VARIATION IN SITE WELD JOINT QUANTITIES

The indicative quantities of site weld joints are furnished in relevant appendix. However, for any variation in these quantities, no additional payment/ compensation is envisaged in this contract.

11.5 INTREST BEARING ADVANCE

Refer 'General conditions of Contract'

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.~~
Release of Remaining 5% shall be as per 'General Conditions of Contract'. Guarantee Period for the contract shall be the 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 5% of contract value in BHEL's prescribed format. The BG shall be kept valid till completion of such guarantee period and an additional six months claim period. This is also subject to the condition that the contractor has started the work and also furnished/remitted the initial Security Deposit as per contract.~~

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

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

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

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

12.1 STAGES OF PROGRESSIVE PRO-RATA PAYMENTS

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

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:

12.1.1.1

SL. NO.	PART OF THE ACTIVITY COMPLETED	PERCENTAGE 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	9	---	--	--
E	TRIAL RUN OF ROT. M/C	---	---	---	5	--	--
F	ON COMPLETION OF DRUM LIFTING	---	4	---	---	--	--
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	2	2	2	2	2

K	ON COMPLETION OF SVF & STEAM BLOWING	1	1	1	1	--	--
L	COAL FIRING	4	---	---	4	5	5
M	TRIAL OPERATION	1	1	1	1	1	1
	TOTAL	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

12.1.1.2 SOOT BLOWING STEAM PIPING, BOILER TRIM AND INTEGRAL PIPING, FUEL OIL PIPING, CRITICAL PIPING, PC PIPING, LP PIPING

(A) 25% of the contract rate on pro-rata basis after placement is completed.

(b) 30% of the contract rate on pro-rata basis after alignment & joint fit-up is completed.

(c) 25% of the contract rate on pro-rata basis after completion of welding

(d) 10% of the contract rate on pro-rata basis after completion of NDE & Post weld heat treatment, if any.

(e) 5% of the contract rate on pro-rata basis after completion of hydraulic test

(f) 3% of the contract rate on pro-rata basis after floating of line on permanent supports and removal of temporary support

(g) 2% of the contract rate on pro-rata basis after final adjustment of supports for cold and hot values for boiler trim, integral piping and critical piping.

12.1.1.3 Radiography test (item no. H of rate schedule)

100% of the contract rate on pro-rata basis on acceptance of the same. In case, Radiography Test is substituted with ultrasonic test, the rates will be limited to that of radiography.

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. The payment will be released as per the following breakup:
1) 80% of accepted item rate on completion of installation, testing & rediness of the system.
2) 20% on completion of dismantling & return to BHEL stores as per instructions of BHEL Engineer.

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 platforms – 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

Refer ‘General Conditions of Contract’

SECTION-14

SPECIAL CONDITIONS OF CONTRACT

INSURANCE

Refer ‘General Conditions of Contract’

SECTION-15 (Rev dated 13/8/2009)
SPECIAL CONDITION OF CONTRACT

15.0 EARNEST MONEY DEPOSIT, SECURITY DEPOSIT & BANK GUARANTEE

15.1 Earnest Money Deposit:

REFER 'GENERAL CONDITIONS OF CONTRACT

15.2 Security Deposit

REFER 'GENERAL CONDITIONS OF CONTRACT

15.3 BANK GUARANTEE

REFER 'GENERAL CONDITIONS OF CONTRACT

15.3.1 Guidelines for acceptance of Bank Guarantees are as follows :

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

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

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

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

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

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

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

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

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

SECTION-17

IMPLEMENTION OF INTEGRITY PACT IN BHEL

INTEGRITY PACT (IP)

1.0 The IP shall be a part of tender document and shall be returned by bidder along with techno-commercial bid duly signed by the authorized signatory who signs the bid. The IP duly signed by bidder and authorized official of BHEL will form a part of purchase order/contract.

2.0 Only those bidders who have entered into such IP would be competent to participate in the bidding. In other words, entering into this pact would be preliminary qualification.

3.0 Independent External Monitor (IEM):- BHEL has appointed IEM as detailed below to oversee the compliance of obligations under IP.

a) Names of IEM are as below:

Sl No	BLOCK Number & T.S.No	Name of the IEM	Address
1	**BLOCK 1,** BHE/PW/PUR/NBNT-BLR (Vertical Pkg) U-1&3 /743	Shri J M Lyngdoh, IAS (Retd.)	Plot No 144 – 145, Pragati resort, Proddator Village & P.O Shankarpally Road, Rangareddy Dist. AP
2	**BLOCK 2**, BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-2 & 4 /744	Shri Kanwarjit Singh, IAS (Retd)	D6/12, Vasant Vihar, G.F New Delhi – 110057 E-mail: kanwarfeb@gmail.com

INTEGRITY PACT

Between

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at "BHEL House" Siri Fort, New Delhi – 110049 (India) hereinafter referred to as "The Principal", which expression unless repugnant to the context of meaning hereof shall include its successors or assigns of the ONE PART

And

_____, (description of the party along with address), hereinafter referred to as "The Bidder/ Contractor" which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

Preamble

The Principal intends to award, under laid-down organizational procedures, contract/s for

_____

_____

_____. The Principal values full compliance with all relevant laws of the land, rules and regulations and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint Independent External Monitor(s), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 - Commitments of the Principal

1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for itself or third person, any material or immaterial benefit which the person is not legally entitled to.

1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

1.1.3 The Principal will exclude from the process all known prejudiced persons.

1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

Section 2 – Commitments of the Bidder(s)/ Contractor(s)

2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.

2.1.1 the Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he / she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

2.1.2 The bidder(s)/ Contractors(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant IPC/PC Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

2.1.4 The Bidders (s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section 3 – Disqualification from tender process and execution from future contracts

If the Bidder(s)/Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process or take action as per separate "Guidelines on for Suspension of Business Dealings with Suppliers/ Contractors" framed by the Principal.

Section 4 – Compensation for Damages

4.1 If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.

4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher.

Section 5 – Previous Transgression

5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

5.2 If the Bidder makes incorrect statement on his subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

Section 6 – Equal treatment of all Bidders/ Contractors/ Sub-Contractors

6.1 The Bidder(s)/ Contractor(s) undertake(s) to obtain from his sub-contractors a commitment consistent with this Integrity Pact and report Compliance to the Principal. This commitment shall be taken only from those sub-contractors whose contract value is more than 20% of Bidder's/ Contractor's contract value with the Principal. The Bidder(s)/Contractor(s) shall continue to remain responsible for any default by his Sub-contractor(s).

6.2 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.

6.3 The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

Section -7 Criminal Charges against violating Bidders/ Contractors/ Sub-contractors

If the Principal obtains knowledge of conduct of a Bidder. Contractor or Sub-contractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

Section – 8 Independent External Monitor(s)

8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.

8.3 The Bidder(s)/ Contractors(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-

contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s)/ Sib-contractor(s) with confidentiality.

8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meeting could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

8.5 As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or heal the situation, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

8.6 The Monitor will submit a written report to the CMD, BHEL within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.

8.7 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.

8.8 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant IPC/PC Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8.9 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.

8.10 The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

9.1 This Pact begins and shall be binding on and from the submission of bid(s) by bidder(s). It expires for the Contractor 12 months after the last payment under the respective contract and for all other Bidders 6 months after the contract has been awarded.

9.2 If any claim is made/ lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified as above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 – Other Provisions

10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.

10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

10.3 If the contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.

10.4 Should one or several provisions of this agreement turn out to be invalid, the reminder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10.5 Only those Bidders/ Contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

_____	_____
For & On Behalf of the Principal	For & On Behalf of the Bidder/ Contractor
(Office Seal)	(Office Seal)

Place: _____
Date: _____

Witness: _____	Witness:_____
(Name & Address)_____	(Name & Address) _____
_____	_____

SECTION 18

REVERSE AUCTION PROCEDURE (Dtd 08/04/2010)

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

Sl No	Tender Specification Number	Unit Number & Project
1	**BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-1 & 3 /743**	**BLOCK-I** Unit-1 & 3 of 4X250MW BRBCL Nabhinagar Boiler Vertical Pkg
2	**BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-2 & 4/744**	**BLOCK-II** Unit-2 & 4 4X250MW BRBCL Nabhinagar Boiler Vertical Pkg

FOR COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE; ERECTION, TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF BOILER AND ITS AUXILIARIES, AUXILIARY BOILER, AIR PREHEATERS, DUCTS AND DAMPERS, FUEL PIPING, BOILER INTEGRAL PIPING & ASSOCIATED VALVES, ELECTROSTATIC PRECIPITATOR, FANS, POWER CYCLE PIPING, COAL MILLS AND COAL FEEDERS, CHEMICAL DOZING SYSTEM, INSULATION, FINAL PAINTING ETC OF 4x250 MW BRBCL NABINAGAR THERMAL POWER PROJECT GROUPED INTO BLOCK – I (UNIT 1 & 3) AND BLOCK – II (UNIT 2 & 4) AT **BHARATIYA RAIL BIJLEE COMPANY LIMITED** NABINAGAR THERMAL POWER PROJECT (4x250 MW)NABINAGAR, DISTT: AURANGABAD, BIHAR

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

BUSINESS RULES FOR REVERSE AUCTION

GENERAL TERMS AND CONDITIONS OF REVERSE AUCTION

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

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

Business Rules for finalization of the procurement

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

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

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

3. **MATERIAL FOR BID**: Scope of Work as detailed in Tender Specification No: **BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-1 & 3 /743 AND BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-2 & 4/744**

4.

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

6. **BIDDING CURRENCY AND UNIT OF MEASUREMENT:** Bidding and evaluation will be conducted in **Indian Rupees (INR)** of the item. The price bid placed during the "Sealed Bid Auction" as well as "Reverse Auction" shall be the 'Single Notional Rate' for Scope of Work as mentioned in Price Bid Specification of Tender Specification No

BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-1 & 3 /743 AND BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-2 & 4/744

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

8. The technical & commercial terms are as per BHEL Tender Specification No **BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-1 & 3 /743 AND BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-2 & 4/744**

9. . Vendors technical and commercial bid and subsequent correspondences between BHEL and the vendors regarding commercial terms & conditions.

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

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

12. Procedure of Reverse Auctioning:

1. **Online Initial Sealed Bid:** The opening bid (In the initial auction) of the bidders shall place a bid which shall be same as that quoted in their Final Sealed price submitted to BHEL or lesser. The bidders shall confirm in writing to BHEL that their opening bid shall be same as that quoted in their final sealed price bid submitted against Tender Specification No **BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-1 & 3 /743 AND BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-2 & 4/744**

i. . If it is found to be otherwise at a later date, the bidder will be disqualified from the tender.

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

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

iv. Online Initial Sealed Bid will be for **30 minutes** and Online English Reverse (no ties) Auction shall be for a **period of one hour**. If a bidder places a bid in the last 10 minutes of closing of the Reverse Auction and if that bid gets accepted, then the auction's duration shall get extended automatically for another 10 minutes, for the entire auction, from the time that bid comes in. Please note that the auto-extension will take place only if a bid comes in those last 10 minutes and if that bid gets accepted. If the bid does not get accepted, the auto-extension will not take place even if that bid might have come in the last 10 minutes. In case, there is no bid in the last 10 minutes of closing of Reverse Auction, the auction shall get closed automatically without any extension. However, vendors are advised not to wait till the last minute or last few seconds to enter their bid during the auto-extension period to avoid complications related with internet connectivity, network problems, system crash down, power failure, etc.

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

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

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

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

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

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

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

16. You shall be assigned a **Unique User Name** & **Password** by BHEL (or) e-Procurement Technologies Ltd. **You are advised to change the Password** and edit the information in the Registration Page after the receipt of initial Password from BHEL / e-Procurement

Technologies Ltd. to ensure confidentiality. All bids made from the Login ID given to you will be deemed to have been made by your company.

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

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

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

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

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

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

Terms & Conditions of Reverse Auction

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

10. **OTHER TERMS & CONDITIONS:**

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

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

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

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

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

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

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

N.B.

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

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

ANNEXURE- I

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

DESCRIPTION OF WORK:

Sl No	Tender Specification Number	Unit Number & Project
1	**BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-1 & 3 /743**	**BLOCK-I** Unit-1 & 3 of 4X250MW BRBCL Nabhinagar Boiler Vertical Pkg
2	**BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-2 & 4/744**	**BLOCK-II** Unit-2 & 4 4X250MW BRBCL Nabhinagar Boiler Vertical Pkg

FOR COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE; ERECTION, TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF BOILER AND ITS AUXILIARIES, AUXILIARY BOILER, AIR PREHEATERS, DUCTS AND DAMPERS, FUEL PIPING, BOILER INTEGRAL PIPING & ASSOCIATED VALVES, ELECTROSTATIC PRECIPITATOR, FANS, POWER CYCLE PIPING, COAL MILLS AND COAL FEEDERS, CHEMICAL DOZING SYSTEM, INSULATION, FINAL PAINTING ETC OF 4x250 MW BRBCL NABINAGAR THERMAL POWER PROJECT GROUPED INTO BLOCK – I (UNIT 1 & 3) AND BLOCK – II (UNIT 2 & 4) AT **BHARATIYA RAIL BIJLEE COMPANY LIMITED** NABINAGAR THERMAL POWER PROJECT (4x250 MW)NABINAGAR, DISTT: AURANGABAD, BIHAR

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

Annexure- II

Process Compliance Form

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

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

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

Dear Sir,

This has reference to the Terms & Conditions for the Reverse Auction mentioned in the Tender Specification No **BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-1 & 3 /743 AND BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-2 & 4/744**

This letter is to confirm that:

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

With regards,

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

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

Annexure III
Price Confirmation

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

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

Sub: Final price quoted during Reverse Auction

Ref :

1. BHEL Tender Specification No **BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-1 & 3 /743 AND BHE/PW/PUR/NBNT-BLR(Vertical Pkg) U-2 & 4/744**

2. Reverse Auction dtd. (Shall be informed later)
3. Our Offer No. dtd.

Dear Sir,

We confirm that we have quoted.

1. _____
2. _____

(Price quoted on Total Cost to BHEL basis)

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

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

Yours sincerely,

For _____

Name:
Company:
Date:
Seal:

CONTACT INFORMATION

M/s. e-Procurement Technologies Ltd., Ahmedabad (abcprocure)	Bharat Heavy Electricals Limited, PSWR
B-705, Wall Street-II, Opp. Orient Club, Nr. Gujarat College, Ellis Bridge, Ahmedabad – 380 006, Gujarat, India. Ph. Nos. : +91 79 – 4001 6860 / 861 / 863 / 864 / 866 / 874 / 875 / 877 / 878 / 880 / 882 Fax Nos. : +91 79 – 4001 6876 / 816 Helpdesk Email-Id: helpdesk@tendertiger.com Mr. Parin Desai Cell : 0 – 93745 19754 E-mail : parin@abcprocure.com	Mr Santosh Nair Sr Deputy General Manager/Purchase E mail : snair@bhelpswr.coin Phone : 0712 - 3048645 Fax : 0712 - 3048605 (Or) Mr. R K Ranade Manager/Purchase Email : rkranade@bhelpswr.co.in Phone: 0712 - 3048635 Fax : 0712 - 3048605 (Or) Mr. Pratish Gee Varghese Engineer/Purchase Email: pgv@bhelpswr.co.in Phone: 0712 - 3048713 Fax : 0712 - 3048605

APPENDIX-I

ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN (TENTATIVE) SCOPE OF WORK

TRICHY SUPPLIES

S.No	PG	MA	PGMA DESCRIPTION	Weight-U#1 (In MT)	Weight-U#2,3&4 (In MT)	STAGE	Package	Remarks
		A	**STRUCTURES**					
1	30	103	Seal Plate Assy	2.70	2.70	LU	STR	
2	30	105	Furnace Bottom Enclosure Framing	5.05	5.05	LU	STR	
3	30	211	Furnace Rear Arch Enclosure Framing	1.95	1.95	LU	STR	
4	30	212	Furnace Extd Side Bottom Enclosure Fra	8.20	8.20	LU	STR	
5	30	215	Main Boiler	3.85	3.85	LU	STR	
6	30	215	Main Boiler	0.65	0.00	LU	STR	Aux Blr
7	30	219	Vertical Roof Enclosure Framing	41.05	41.05	LU	STR	
8	30	220	Deck Support And Seals	24.65	24.65	LU	STR	
			PG Weight	**88.10**	**87.45**			
9	35	010	Foundation Materials-Boiler	11.50	11.50	DL	STR	
10	35	010	Foundation Materials-Boiler	4.40	0.00	DL	STR	Aux Blr
11	35	110	Main Columns Left	222.00	222.00	DL	STR	
12	35	110	Main Columns Left	17.90	0.00	DL	STR	Aux Blr
13	35	120	Main Columns Right	243.00	243.00	DL	STR	
14	35	130	Main Columns Middle	140.00	140.00	DL	STR	
15	35	140	Auxiliary Columns-Left Side	105.00	105.00	DL	STR	
16	35	150	Auxiliary Columns-Rightside	61.00	61.00	DL	STR	
17	35	190	Girder Pin Connections	5.50	5.50	DL	STR	
18	35	210	Boiler Ceiling Structure-Fabricated	335.00	335.00	DL	STR	
19	35	220	Boiler Ceiling Structure-Rolled Beams	49.50	49.50	DL	STR	
20	35	230	Boiler Ceiling Structure-Bracings	16.00	16.00	DL	STR	
21	35	310	Horizontal Bracing I Mbl	20.70	20.70	DL	STR	
22	35	320	Horizontal Bracing Ii Mbl	21.00	21.00	DL	STR	
23	35	330	Horizontal Bracing Iii Mbl	16.40	16.40	DL	STR	
24	35	340	Horizondal Bracing Iv Mbl	14.70	14.70	DL	STR	
25	35	350	Horizondal Bracing V Mbl	16.50	16.50	DL	STR	
26	35	360	Horizondal Bracing Vi Mbl	14.60	14.60	DL	STR	
27	35	380	Landing Platforms	44.00	44.00	DL	STR	

28	35	390	Platform At Drum Floor Level	37.50	37.50	DL	STR	
29	35	410	Column Frames-Front Frame	12.60	0.00	DL	STR	Aux Blr
30	35	441	Horizontal Beams-Lower	125.50	125.50	DL	STR	
31	35	443	Horizontal Beams-Upper	92.10	92.10	DL	STR	
32	35	510	Column Bracings-Front Bracing	13.40	0.00	DL	STR	Aux Blr
33	35	511	Front Bracing-Lower	18.20	18.20	DL	STR	
34	35	513	Front Bracing-Upper	15.00	15.00	DL	STR	
35	35	521	Side Bracing-Lower	33.70	33.70	DL	STR	
36	35	523	Side Bracing-Upper	48.50	48.50	DL	STR	
37	35	531	Rear Bracing-Lower	34.70	34.70	DL	STR	
38	35	533	Rear Bracing-Upper	26.10	26.10	DL	STR	
39	35	610	Boiler Roof Structure	52.70	52.70	DL	STR	
40	35	610	Boiler Roof Structure	3.50	0.00	DL	STR	Aux Blr
41	35	700	Hsfg Fasteners For Pg 35	9.30	9.30	DL	STR	
42	35	810	Temporary Structure For Drum Erection	4.00	0.00	DL	STR	Aux Blr
43	35	811	Floor Grills And Guard Plate	116.00	116.00	DL	STR	
44	35	820	Stairs	18.00	18.00	DL	STR	
45	35	851	Hand Rails And Posts	23.70	23.70	DL	STR	
46	35	993	Consumables and erection materials	11.00	11.00	DL	STR	
			PG Weight	**2054.20**	**1998.40**			
47	36	110	Columns Near Air Pre Heaters	36.40	36.40	HT	STR	
48	36	310	Main Mbl Floor 11th Level	43.40	43.40	HT	STR	
49	36	310	Main Mbl Floor 11th Level	8.00	0.00	HT	STR	Aux Blr
50	36	311	Main Floor I Mbl 1st Pass	48.10	48.10	HT	STR	
51	36	320	Main Floor 12th Level	55.00	55.00	HT	STR	
52	36	321	Main Floor Ii Mbl Ist Pass	91.00	91.00	HT	STR	
53	36	322	Main Floor Ii Mbl 2nd Pass	42.50	42.50	HT	STR	
54	36	330	Main Floor 13th Level	22.30	22.30	HT	STR	
55	36	331	Main Floor Iii Mbl 1st Pass	23.00	23.00	HT	STR	
56	36	332	Main Floor Iii Mbl 2nd Pass	22.10	22.10	HT	STR	
57	36	340	Main Floor 14th Level	21.20	21.20	HT	STR	
58	36	341	Main Floor Iv Mbl 1st Pass	69.20	69.20	HT	STR	
59	36	350	Main Floor 15th Level	39.50	39.50	HT	STR	
60	36	351	Main Floor V Mbl Ist Pass	23.30	23.30	HT	STR	
61	36	352	Main Floor V Mbl Ii Nd Pass	8.70	8.70	HT	STR	
62	36	360	Main Floor 16th Level	7.60	7.60	HT	STR	
63	36	361	Main Floor Vi Mbl 1st Pass	36.40	36.40	HT	STR	
64	36	391	Miscellaneous Platforms-Part I	24.60	24.60	HT	STR	

65	36	392	Miscellaneous Platforms-Part Ii	181.30	181.30	HT	STR	
66	36	393	Miscellaneous Platforms Part Iii	16.00	16.00	HT	STR	
67	36	610	Boiler Roof Structure	46.80	46.80	HT	STR	
68	36	612	Weather Protection For Burner Roof	17.60	17.60	LU	STR	
69	36	740	Posts And Hangers	32.40	32.40	HT	STR	
70	36	811	Floorgrillsandguardplates-Lower	89.60	89.60	HT	STR	
71	36	811	Floorgrillsandguardplates-Lower	9.00	0.00	HT	STR	Aux Blr
72	36	813	Floorgrillsandguardplates-Upper	43.70	43.70	HT	STR	
73	36	820	Stairs And Ladders	1.20	0.00	HT	STR	Aux Blr
74	36	850	Handrails And Hand Rail Post	4.00	0.00	DL	STR	Aux Blr
75	36	853	Handrails And Posts Upper	36.00	36.00	HT	STR	
			PG Weight	**1099.90**	**1077.70**			
76	38	110	Lift Columns	50.80	50.80	SY	STR	
77	38	210	Inter Conn Platforms betn Boiler/Elevat	10.10	10.10	SY	STR	
78	38	299	Mill Handling Monorails	51.30	51.30	LU	STR	
79	38	310	Conn Platforms To Mill Deaerator Bay	0.50	0.50	SY	STR	
80	38	381	Eco Handling Structure	58.20	58.20	SY	STR	
81	38	410	Mill Maintanance Platforms	79.00	79.00	SY	STR	
82	38	510	Lift Beams And Bracings	34.20	34.20	LU	STR	
83	38	610	Elevator Cladding Structure	15.00	15.00	LU	STR	
84	38	611	Elevator Cladding Sheeting	14.80	14.80	LU	STR	
85	38	710	Lift Machine Room Details and misc Struct	4.00	4.00	LU	STR	
86	38	810	Floorgrills And Guard Plate	66.00	66.00	LU	STR	
87	38	850	Hand Rails And Hand Rail Posts	15.90	15.90	LU	STR	
88	38	993	Consumables And Erection Materials	2.70	2.70	SY	STR	
			PG Weight	**402.50**	**402.50**			
89	39	012	Foundation Materials I.D.Duct Supports	10.60	10.60	DL	STR	
90	39	101	Columns Frames Before Esp-Left	23.00	23.00	LU	STR	
91	39	102	Columns Frames Before Esp -Right	49.20	49.20	LU	STR	
92	39	140	Cols Frames Near I.D.Fan	153.90	153.90	LU	STR	

93	39	150	Col Frames Betn I.D.Fan And Chimney	52.00	52.00	LU	STR	
94	39	300	Platforms - External Structure	127.00	127.00	LU	STR	
95	39	301	Struc And Platform For Fans	3.90	3.90	LU	STR	
96	39	302	Struc For Motor Hood Covering	7.40	7.40	LU	STR	
97	39	303	Monorail Beams For Fans	217.20	217.20	LU	STR	
98	39	304	Fan Handling Structure For Fd Fan	24.80	24.80	LU	STR	
99	39	305	Fan Handling Structure For Pa Fan	20.00	20.00	LU	STR	
100	39	810	Floor Grill	40.70	40.70	LU	STR	
101	39	820	Stairs	6.70	6.70	LU	STR	
102	39	850	Hand Rail And Hand Rail Posts	13.20	13.20	LU	STR	
103	39	993	Consumables And Erection Materials	11.20	11.20	LU	STR	
			PG Weight	**760.80**	**760.80**			
			Sub-Total - A (Structure)	**4405.50**	**4326.85**			
		B	**PRESSURE PARTS**					
1	04	114	Upper Drum + Intl Id 49-60	21.67	0.00	DL	PP	Aux Blr
2	04	126	Upper Drum Without Intl Id 61-71	132.75	132.75	DL	PP	
3	04	136	Upper Drum Internals Only For Id 61-71	4.06	4.06	DL	PP	
4	04	144	Upper Drum Sspn Id 49-60	0.44	0.00	DL	PP	Aux Blr
5	04	146	Upper Drum Sspn Id 61-71	13.79	13.79	DL	PP	
6	04	210	Lower Drum + Intl Id Upto 36	8.70	0.00	DL	PP	Aux Blr
			PG Weight	**181.41**	**150.60**			
7	05	137	Inlet Front Lower Ww Header	13.73	13.73	HT	PP	
8	05	147	Inlet Rear Lower Ww Header	13.73	13.73	HT	PP	
9	05	155	Inlet Side Lower Ww Header	16.70	16.70	HT	PP	
10	05	175	Inlet Extended Side Lower Ww Header	1.28	1.28	HT	PP	
11	05	227	Waterwall Rear Hanger Outlet Header	2.79	2.79	HT	PP	
12	05	229	Waterwall Rear Screentube Outlet Heade	5.26	5.26	HT	PP	
13	05	231	Outlet Front Upper Ww Header	3.79	3.79	HT	PP	
14	05	251	Outlet Side Upper Ww	6.84	6.84	HT	PP	

			Header					
			PG Weight	**64.12**	**64.12**			
15	06	400	Unclassified Burner Panel	15.84	15.84	HT	PP	
16	06	609	Corner Ww Pnl	2.31	0.00	HT	PP	Aux Blr
17	06	614	D'Pnl Ww Pnl	6.44	0.00	HT	PP	Aux Blr
18	06	616	Baffle Ww Pnl	3.69	0.00	HT	PP	Aux Blr
19	06	631	Front Upper Ww Pnl	45.44	45.44	HT	PP	
20	06	634	Front Intermediate Ww Pnl	29.18	29.18	HT	PP	
21	06	637	Waterwall Lower Front Panel	22.20	22.20	HT	PP	
22	06	644	Rear Intermediate Ww Pnl	45.60	45.60	HT	PP	
23	06	647	Rear Lower Ww Pnl	22.92	22.92	HT	PP	
24	06	651	Side Upper Ww Pnl	64.68	64.68	HT	PP	
25	06	655	Side Lower Ww Pnl	61.71	61.71	HT	PP	
26	06	657	Side Boiler Ww Pnl	4.10	0.00	HT	PP	Aux Blr
27	06	670	Extended Side Ww Pnl	8.36	8.36	HT	PP	
			PG Weight	**332.46**	**315.92**			
28	07	108	Down Comer Piping Upper Portion	64.76	64.76	HT	PP	
29	07	109	Down Comer Piping Lower Portion	87.53	87.53	HT	PP	
30	07	211	Boiler Bank Tubes	15.34	0.00	HT	PP	Aux Blr
31	07	214	Boiler Side Wall Shield Tubes	1.65	0.00	HT	PP	Aux Blr
32	07	215	Relief Tubes From Side Wall Outlet Hea	20.29	20.29	HT	PP	
33	07	216	Relief Tubes From Rear Hanger Header	20.21	20.21	HT	PP	
34	07	218	Relief Tubes From Front Outlet Header	6.56	6.56	HT	PP	
35	07	223	Furnace Screen Tubes	22.51	22.51	HT	PP	
36	07	225	Furnace Rear Hanger Tubes	9.67	9.67	HT	PP	
37	07	226	Furnace Rear Arch Tubes	16.45	16.45	HT	PP	
38	07	231	Lower Corner Transition Tubes	1.79	1.79	HT	PP	
39	07	232	Upper Corner Transition Tubes	0.54	0.54	HT	PP	
40	07	401	Waterwall Suspension	21.65	21.65	HT	PP	
41	07	410	Downcomer Suspension	8.27	8.27	HT	PP	
42	07	420	Downcomer Guides	3.56	3.56	HT	PP	
43	07	431	Riser Tube Support	2.21	2.21	HT	PP	
44	07	500	Misc Components - Pressure Parts	0.33	0.33	HT	PP	
45	07	501	Furnace Insert Tubes	2.14	2.14	HT	PP	

46	07	601	Pressure Seals	0.76	0.76	HT	PP	
47	07	601	Pressure Seals	2.73	0.00	HT	PP	Aux Blr
48	07	700	Bulked Bps Items For Pg 04 To 07	0.90	0.90	HT	PP	
49	07	989	Tools For Tube Expansion	0.06	0.00	HT	PP	Aux Blr
50	07	992	Imported Electrodes	0.10	0.10	HT	PP	
51	07	992	Imported Electrodes	0.00	0.00	HT	PP	Aux Blr
52	07	993	Consumables & Erection Materials	0.44	0.44	HT	PP	
53	07	993	Consumables & Erection Materials	0.29	0.00	HT	PP	Aux Blr
			PG Weight	**310.72**	**290.66**			
54	10	135	Horizontal Spaced Shinlet Header	7.20	7.20	HT	PP	
55	10	170	Vertical Sh Inlet Hdr	0.44	0.00	HT	PP	Aux Blr
56	10	174	Vertical Spaced Sh Centre Inlet Header	11.30	11.30	HT	PP	
57	10	178	Vertical Platen Sh 1nlet Header	7.37	7.37	HT	PP	
58	10	182	Sh Rear Wall Inlet Header	3.75	3.75	HT	PP	
59	10	183	Sh Frontwall Inlet Header	5.33	5.33	HT	PP	
60	10	184	Sh Extended Side Wall Inlet Header	0.62	0.62	HT	PP	
61	10	185	Sh Rear Roof Inlet Header	3.68	3.68	HT	PP	
62	10	191	Sh Radiant Wall Roof Inlet Hdr	2.86	2.86	HT	PP	
63	10	235	Horizntl Spaced Sh Outlet Header	8.69	8.69	HT	PP	
64	10	270	Vertical Sh Outlet Header	0.44	0.00	HT	PP	Aux Blr
65	10	274	Vertical Spaced Sh Centre Outlet Heade	15.58	15.58	HT	PP	
66	10	278	Vertical Platen Sh Outlet Header	7.99	7.99	HT	PP	
67	10	283	Sh Frontwall Outlet Header	4.94	4.94	HT	PP	
68	10	284	Sh Extended Side Wall Outlet Header	1.00	1.00	HT	PP	
69	10	291	Sh Radiant Wall Roof Outlet Hdr	5.53	5.53	HT	PP	
70	10	687	Sh Radiant Wall Junction Header	3.18	3.18	HT	PP	
			PG Weight	**89.90**	**89.02**			
71	11	170	Sh Vertical Coil Element	0.73	0.00	HT	PP	Aux Blr
72	11	236	Sh Hor Spaced Upper Coil + Atch	122.00	122.00	HT	PP	

73	11	237	Sh Hor Spaced Inter Coil + Atch	101.45	101.45	HT	PP	
74	11	274	Sh Vertical Spaced Coil + Attachment	86.20	86.20	HT	PP	
75	11	278	Vert Platen Centre Sh Coil Assy+Attach	123.00	123.00	HT	PP	
76	11	616	Sh Rear Upper Panels	10.96	10.96	HT	PP	
77	11	618	Sh Rear Lower Panels	4.96	4.96	HT	PP	
78	11	684	Sh Extended Side Wall Panels	2.58	2.58	HT	PP	
79	11	685	SH front wall panel	13.10	13.10	HT	PP	
80	11	686	Sh Roof Panels	9.46	9.46	HT	PP	
81	11	687	Sh Rear Roof Panels	7.45	7.45	HT	PP	
82	11	688	Sh Center Roof Panels	11.67	11.67	HT	PP	
83	11	691	Sh Radiant Wall Roofpanels	20.55	20.55	HT	PP	
84	11	694	S.H.Extended Bottom Panels	1.92	1.92	HT	PP	
			PG Weight	**516.03**	**515.30**			
85	12	174	Vertical Spaced Sh Inlet Pipes	8.16	8.16	HT	PP	
86	12	184	Roof Inlet Sh Pipes	2.24	2.24	HT	PP	
87	12	187	Sh Inlet Rear Roof Pipe	1.24	1.24	HT	PP	
88	12	535	Sh Hor Spaced Hanger Tube	38.08	38.08	HT	PP	
89	12	803	Sh Steam Cooled Spacer Tubes	1.08	1.08	HT	PP	
90	12	805	Super Heater Hanger Tubes	5.08	5.08	HT	PP	
91	12	850	Sh Conn Pipes-Saturated	5.30	5.30	HT	PP	
92	12	850	Sh Conn Pipes-Saturated	1.78	0.00	HT	PP	Aux Blr
93	12	852	Sh Desh Links	11.17	11.17	HT	PP	
94	12	900	Sh Desh	2.34	2.34	HT	PP	
95	12	900	Sh Desh	0.69	0.00	HT	PP	Aux Blr
96	12	901	Sh Hngr,Suprts,Guides & Ties	0.32	0.00	HT	PP	Aux Blr
97	12	903	5h Miscl Components	45.66	45.66	HT	PP	
98	12	906	Sh Suprts For Lines & Links	4.66	4.66	HT	PP	
99	12	914	Suspension Of Sh Radiant Roof Headers	0.64	0.64	HT	PP	
100	12	917	Suspension Of Radiant Roof	3.89	3.89	HT	PP	
101	12	924	Suspension Of Sh Back Pass Headers	13.23	13.23	HT	PP	
102	12	927	Suspension Of Rear Roof	2.37	2.37	HT	PP	
103	12	928	Suspension Of Sh Rear Wall	4.95	4.95	HT	PP	
104	12	944	Suspension Of Sh Platen Headers	1.70	1.70	HT	PP	
105	12	948	Suspension Of Vertical Spaced Assembly	18.33	18.33	HT	PP	

106	12	954	Suspension Of Vertical Spaced Headers	4.27	4.27	HT	PP	
107	12	968	Suspension Of Platen Assembly	15.50	15.50	HT	PP	
108	12	992	Imported Electrodes	0.07	0.07	HT	PP	
109	12	992	Imported Electrodes	0.00	0.00	HT	PP	Aux Blr
110	12	993	Consumables & Erection Materials	0.32	0.32	HT	PP	
111	12	993	Consumables & Erection Materials	0.26	0.00	HT	PP	Aux Blr
			PG Weight	**193.30**	**190.26**			
112	15	174	Reheater Vert Spaced Inlet Header Rhh1	4.12	4.12	HT	PP	
113	15	274	Reheater Vert Spaced Outlet Header Rhh	15.80	15.80	HT	PP	
			PG Weight	**19.92**	**19.92**			
114	16	275	Rh Vertical Spaced Front Coil + Att	70.00	70.00	HT	PP	
115	16	277	Vert Rear Platen Rhcoil Assy Attach	77.00	77.00	HT	PP	
			PG Weight	**147.00**	**147.00**			
116	17	904	Rh Hdr Suprts & Suspensions Above Roof	4.80	4.80	HT	PP	
117	17	919	Rh Front Suspension	7.59	7.59	HT	PP	
118	17	929	Rh Rear Suspension	13.33	13.33	HT	PP	
119	17	992	Rh Site Electrodes Imported	0.04	0.04	HT	PP	
			PG Weight	**25.76**	**25.76**			
120	19	114	Coils And Supports Of Upper P.Tube Ec	110.89	110.89	HT	PP	
121	19	124	Coils And Supports Of Lower P.Tube Ec	167.72	167.72	HT	PP	
122	19	701	Inlet Eco Headers	6.04	6.04	HT	PP	
123	19	702	Outlet Eco Headers	4.81	4.81	HT	PP	
124	19	753	Headers Of Rear Intert Eco	2.89	2.89	HT	PP	
125	19	763	Headers Of Front Intert Eco	2.90	2.90	HT	PP	
126	19	783	Headers Of Centre Intert Eco	2.90	2.90	HT	PP	
127	19	802	Eco Hanger Tubes	13.88	13.88	HT	PP	
128	19	850	Eco Feed Pipe	2.90	2.90	HT	PP	
129	19	850	Eco Feed Pipe	0.12	0.00	HT	PP	Aux Blr
130	19	851	Eco Links To Drum	10.26	10.26	HT	PP	
131	19	904	Eco Suprts & Suspensions	15.16	15.16	HT	PP	

			Above Roof					
132	19	905	Eco Suprts & Suspensions Below Roof	12.38	12.38	HT	PP	
133	19	906	Eco Suprts For Lines & Links	0.74	0.74	HT	PP	
134	19	907	Eco Feed Pipe Support	0.80	0.80	HT	PP	
135	19	992	Imported Electrodes	0.02	0.02	HT	PP	
136	19	992	Imported Electrodes	0.00	0.00	HT	PP	Aux Blr
			PG Weight	**354.40**	**354.28**			
137	21	600	Soot Blower Piping And Fittings	6.80	6.80	SY	PP	
138	21	600	Soot Blower Piping And Fittings	0.35	0.00	SY	PP	Aux Blr
139	21	601	Sootblower Piping Supports	5.60	5.60	SY	PP	
140	21	601	Sootblower Piping Supports	0.60	0.00	SY	PP	Aux Blr
141	21	700	Bulked Bps Components For Sb Piping	0.80	0.80	SY	PP	
142	21	700	Bulked Bps Components For Sb Piping	0.01	0.00	SY	PP	Aux Blr
143	21	800	Sb Valves (Bhel)	1.00	1.00	SY	PP	
144	21	800	Sb Valves (Bhel)	0.13	0.00	SY	PP	Aux Blr
145	21	825	Sb Valves (Sub Delivery)	1.60	1.60	SY	PP	
146	21	850	Soot Blower Safety Valve (Bhel)	0.03	0.03	SY	PP	
147	21	992	Imported Electrodes	0.05	0.05	SY	PP	
148	21	992	Imported Electrodes	0.00	0.00	SY	PP	Aux Blr
			PG Weight	**16.96**	**15.87**			
149	24	200	Boiler Trim Piping And Fittings	34.20	34.20	HT	PP	
150	24	201	Supports For Trim Piping	10.00	10.00	HT	PP	
151	24	215	Spray Water System Rh Uty Blr	2.00	2.00	LU	PP	
152	24	220	Safety Valve Esc Pipe&Drain - Rh Uty B	14.40	14.40	LU	PP	
153	24	225	Silencer Support-Safety Valves	13.30	13.30	LU	PP	
154	24	235	Slncr&Suprt-Starting Vent - Rh Uty Blr	2.50	2.50	DL	PP	
155	24	240	Sample Cooler And Supports	0.65	0.65	LU	PP	
156	24	260	Valves (Bhel) Rh Uty Blr	17.00	17.00	HT	PP	
157	24	265	Valves & Fittings (Sd) Rh Uty Blr	7.10	7.10	LU	PP	
158	24	273	Direct Water Level Gauge - Bhel	0.25	0.25	LU	PP	
159	24	275	Headers For Trim Piping	1.60	1.60	HT	PP	

160	24	280	Erv And Safety Valves(Bhel)	3.80	3.80	HT	PP	
161	24	285	Safety Valve/Erv Silencers(Bhel)	34.00	34.00	DL	PP	
162	24	316	RH DESH	6.80	6.80	LU	PP	
163	24	350	Boiler Filling Piping	0.60	0.60	HT	PP	
164	24	350	Boiler Filling Piping	0.70	0.00	HT	PP	Aux Blr
165	24	351	Hangers And Supports Of Blr Filling Pipe	0.40	0.40	HT	PP	
166	24	351	Hangers And Supports Of Blr Filling Pipe	0.30	0.00	HT	PP	Aux Blr
167	24	600	Boiler Trim Piping And Fittings	1.00	0.00	HT	PP	Aux Blr
168	24	601	Boiler Trim Piping Supports	0.70	0.00	HT	PP	Aux Blr
169	24	620	Safety Valve Esc Pipe&Drain - Pack Blr	1.30	0.00	LU	PP	Aux Blr
170	24	625	Silencer Support-Safety Valves	1.00	0.00	LU	PP	Aux Blr
171	24	640	Sample Cooler And Supports	0.35	0.00	HT	PP	Aux Blr
172	24	660	Valves (Bhel) Pack Blr	0.80	0.00	HT	PP	Aux Blr
173	24	665	Valves & Fittings (Sd) Pack Blr	0.15	0.00	HT	PP	Aux Blr
174	24	673	Direct Water Level Gauge	0.25	0.00	LU	PP	Aux Blr
175	24	675	Headers For Trim Piping	0.20	0.00	HT	PP	Aux Blr
176	24	680	Erv And Safety Valves(Bhel)	0.18	0.00	HT	PP	Aux Blr
177	24	685	Safety Valve/Erv Silencers(Bhel)	1.30	0.00	LU	PP	Aux Blr
178	24	700	Bulked Bps Components For Trim Pipes	0.35	0.35	HT	PP	
179	24	700	Bulked Bps Components For Trim Pipes	0.05	0.00	HT	PP	Aux Blr
180	24	955	Lapping Tools For Sv&Erv	0.10	0.10	SY	PP	
181	24	960	Lapping Tools For Conventional Valves(	0.05	0.05	SY	PP	
182	24	987	Commg Spares For Safety Valves/Erv	0.00	0.00	LU	PP	
183	24	987	Commg Spares For Safety Valves/Erv	0.10	0.00	LU	PP	Aux Blr
184	24	988	Commg Spares For Imported Sub-Dely	0.01	0.00	LU	PP	Aux Blr
185	24	989	Commg Spares For Conventional Valves	0.03	0.03	LU	PP	
186	24	989	Commg Spares For Conventional Valves	0.01	0.00	LU	PP	Aux Blr
187	24	991	Imported Electrode For Ms & Blr Filling	0.00	0.00	HT	PP	Aux Blr
188	24	992	Imported Electrodes	0.03	0.03	LU	PP	
189	24	992	Imported Electrodes	0.01	0.00	LU	PP	Aux Blr

190	24	993	Consumables & Erection Materials	0.01	0.01	HT	PP	
191	24	993	Consumables & Erection Materials	0.01	0.00	HT	PP	Aux Blr
192	24	994	Name Plates	0.23	0.23	SY	PP	
193	24	994	Name Plates	0.06	0.00	SY	PP	Aux Blr
			PG Weight	**157.86**	**149.39**			
194	97	297	Mtm Clamps And Pads	0.10	0.10	HT	PP	
			PG Weight	**0.10**	**0.10**			
			Sub-Total - B (Pressure Parts)	**2409.93**	**2328.19**			
		C	**NON-PRESSURE PARTS**					
1	08	101	Furnace Upper Buckstay	52.90	52.90	HT	NPP	
2	08	104	Furnace Intermediate Buckstay	44.60	44.60	HT	NPP	
3	08	107	Furnace Lower Buckstay	30.60	30.60	HT	NPP	
4	08	111	Furnace Rear Arch Buckstay	2.20	2.20	HT	NPP	
5	08	380	Furnace Bottom Support	34.40	34.40	HT	NPP	
6	08	400	Furnace Guide	7.20	7.20	HT	NPP	
7	08	500	Furnace Back Pass Buckstay	64.40	64.40	HT	NPP	
8	08	700	Ex.Movement Measurement Componnts.	0.50	0.50	LU	NPP	
9	08	900	Furnace Key Buckstay	2.80	2.80	HT	NPP	
			PG Weight	**239.60**	**239.60**			
10	09	001	Seal Boxes For Furnace Opening	6.67	6.67	HT	NPP	
11	09	001	Seal Boxes For Furnace Opening	0.28	0.00	HT	NPP	Aux Blr
12	09	002	Seal Boxes For Instrument Inserts	1.28	1.28	HT	NPP	
13	09	002	Seal Boxes For Instrument Inserts	0.11	0.00	HT	NPP	Aux Blr
14	09	003	Material For Instrument Inserts	0.19	0.19	LU	NPP	
15	09	003	Material For Instrument Inserts	0.29	0.00	LU	NPP	Aux Blr
			PG Weight	**8.81**	**8.13**			
16	18	001	Furnace Roof Skin Casing	10.43	10.43	LU	NPP	
17	18	010	Pr Pts Attachmnts In Furn	2.09	2.09	HT	NPP	

			Roof Skn Cas					
18	18	020	Vibration Snubbers	0.30	0.30	HT	NPP	
			PG Weight	**12.82**	**12.82**			
19	20	051	Long Retractable Soot Blower T30 Mk Ii	23.84	23.84	SY	NPP	
20	20	054	Wall Box Non Pressurised For Lrsb Mk I	0.56	0.56	SY	NPP	
21	20	201	Wall Deslagger Rw5e	9.14	9.14	SY	NPP	
22	20	204	Wall Box Non Pressurised For Rw5e	1.11	1.11	SY	NPP	
23	20	301	Rotary Soot Blower Elec Optd-D5e	0.27	0.00	SY	NPP	Aux Blr
24	20	304	Wall Box Non Pressurised For Rb	0.08	0.00	SY	NPP	Aux Blr
25	20	511	Da Head Valve Assy	0.11	0.11	SY	NPP	
26	20	621	Blowing Element For Rb	0.03	0.00	SY	NPP	Aux Blr
27	20	671	Blowing Element For Rb	0.03	0.00	SY	NPP	Aux Blr
28	20	794	Wall Box Non 7ressurised For Temp Prob	0.06	0.06	SY	NPP	
29	20	801	Long Retractable Soot Blower-Czech Typ	0.32	0.00	SY	NPP	Aux Blr
30	20	804	Wall Box Assembly For Lrsie	0.04	0.00	SY	NPP	Aux Blr
31	20	972	Temp Probe Duplex Power Track & No Ac	1.55	1.55	LU	NPP	
32	20	988	Sdot Blower Commissioning Spare	0.01	0.00	SY	NPP	Aux Blr
33	20	998	Special Tools For Soot Blowers	0.01	0.00	SY	NPP	Aux Blr
			PG Weight	**37.16**	**36.38**			
34	28	220	Doors	4.85	4.85	LU	NPP	
35	28	220	Doors	1.50	0.00	LU	NPP	Aux Blr
36	28	700	Bps Fasteners	0.65	0.65	LU	NPP	
			PG Weight	**7.00**	**5.50**			
37	31	010	Skin Casing Comps Welded To Pressure P	3.45	3.45	HT	NPP	
38	31	010	Skin Casing Comps Welded To Pressure P	0.40	0.00	HT	NPP	Aux Blr
39	31	102	Fornace Bottom Skin Casing	1.00	1.00	LU	NPP	
40	31	104	Furnace Rear Arch Skin Casing	5.45	5.45	LU	NPP	
41	31	105	Second Pass Skin Casing	0.30	0.30	LU	NPP	
42	31	301	Miscellaneous Casing	1.65	0.00	LU	NPP	Aux Blr

			PG Weight	**12.25**	**10.20**			
43	35	611	Boiler Roof Sheeting	18.00	18.00	DL	NPP	
44	35	611	Boiler Roof Sheeting	1.00	0.00	DL	NPP	Aux Blr
			PG Weight	**19.00**	**18.00**			
45	36	611	Boiler Roof Sheeting	11.40	11.40	HT	NPP	
			PG Weight	**11.40**	**11.40**			
46	41	200	Sv-Burner Assy With Oil Gun	2.50	0.00	LU	NPP	Aux Blr
47	41	350	Air Cooled Oil Gun Assy,	0.60	0.60	LU	NPP	
48	41	390	Oil Gun Vice Assy And Rack	1.10	1.10	LU	NPP	
49	41	500	High Energy Arc Ignitor	0.65	0.65	LU	NPP	
50	41	500	High Energy Arc Ignitor	0.10	0.00	LU	NPP	Aux Blr
			PG Weight	**4.95**	**2.35**			
51	42	001	Pneumatic Fittings	0.30	0.30	LU	NPP	
52	42	001	Pneumatic Fittings	0.01	0.00	LU	NPP	Aux Blr
53	42	002	Steam Blow Materials	1.50	1.50	LU	NPP	
54	42	002	Steam Blow Materials	0.20	0.00	LU	NPP	Aux Blr
55	42	005	Instrument Fittings	0.80	0.80	LU	NPP	
56	42	005	Instrument Fittings	0.20	0.00	LU	NPP	Aux Blr
57	42	010	Lfo Pump Set	5.20	5.20	LU	NPP	
58	42	010	Lfo Pump Set	0.60	0.00	LU	NPP	Aux Blr
59	42	020	Hfo Pump Set	10.00	10.00	LU	NPP	
60	42	030	Hfo Heater Set	29.00	29.00	LU	NPP	
61	42	046	Drain Oil Pump-Motor Assy	0.30	0.30	LU	NPP	
62	42	065	Drain Oil Tank	6.00	6.00	LU	NPP	
63	42	070	Burner Station Skid Assembly	4.50	4.50	LU	NPP	
64	42	120	Piping, Pump House-Fuel Oil	11.00	11.00	LU	NPP	
65	42	128	Piping,Pump House Steam - Ibr	0.75	0.75	LU	NPP	
66	42	150	Piping, Operating Floor Hfo & Tracer	3.50	3.50	LU	NPP	
67	42	152	Piping,Opr'G Floor Lfo	0.90	0.90	LU	NPP	
68	42	152	Piping,Opr'G Floor Lfo	0.50	0.00	LU	NPP	Aux Blr
69	42	154	Piping,Opr'G Floor Drain Oil	2.00	2.00	LU	NPP	
70	42	157	Piping,Opr'G Floor Atm Air	0.80	0.80	LU	NPP	
71	42	158	Piping,Opr'G Floor Steam-Ibr	2.50	2.50	LU	NPP	
72	42	200	Subdelivery Fuel Oil System	4.00	4.00	LU	NPP	
73	42	200	Subdelivery Fuel Oil System	0.20	0.00	LU	NPP	Aux Blr
74	42	300	Bhel Valve F.O. System	1.00	1.00	LU	NPP	
75	42	300	Bhel Valve F.O. System	0.03	0.00	LU	NPP	Aux Blr

76	42	358	Bhel Valve,Opr'G Floor Stm-Ibr	0.80	0.80	LU	NPP	
77	42	700	Bps Fasteners	1.20	1.20	LU	NPP	
78	42	700	Bps Fasteners	0.06	0.00	LU	NPP	Aux Blr
79	42	992	Imported Electrodes	0.01	0.01	LU	NPP	
			PG Weight	**87.85**	**86.06**			
80	43	004	Assy Comp Scanner & Gun Air System	2.00	2.00	LU	NPP	
81	43	005	Assy Comp Mill Seal Air System	7.00	7.00	LU	NPP	
82	43	104	M/C Comp Scanner & Gun Air System	9.00	9.00	LU	NPP	
83	43	105	M/C Comp Mill Seal Air System	16.00	16.00	SY	NPP	
84	43	200	Subdel,Ignitor&Scanner Air System	5.20	5.20	LU	NPP	
			PG Weight	**39.20**	**39.20**			
85	45	220	Wind Box Assembly 22-In Width	69.70	69.70	HT	NPP	
86	45	221	Wind Box Support 22-In Width	6.50	6.50	LU	NPP	
			PG Weight	**76.20**	**76.20**			
87	47	221	Fuel Piping Supports With 22-In Pipe	30.20	30.20	SY	NPP	
88	47	223	Pipe Couplings,Orifice & Misc Items	28.30	28.30	LU	NPP	
89	47	229	St Pipes,Shop Bends For Rest Of The Mi	325.00	325.00	SY	NPP	
			PG Weight	**383.50**	**383.50**			
90	48	012	Rect Duct Bet F.D Fan And Airheater	66.85	66.85	LU	NPP	
91	48	014	Expn Piecesbet F.D Fan And Airheater	7.00	7.00	LU	NPP	
92	48	015	Supportsetcbet F.D Fan And Airheater	7.58	7.58	LU	NPP	
93	48	019	Foundation Materials	3.46	3.46	DL	NPP	
94	48	082	Sqduct,Cold Air Fdfon-Boiler	5.80	0.00	LU	NPP	Aux Blr
95	48	084	Exppcs,Cold Air Fdfan-Boiler	0.25	0.00	LU	NPP	Aux Blr
96	48	085	Supportsetccold Air Ducts Supports	1.30	0.00	LU	NPP	Aux Blr
97	48	112	Rect Ducts Pri Fan To Airheater Prisid	72.52	72.52	SB	NPP	

98	48	114	Expn Piecespri Fan To Airheater Prisid	2.85	2.85	SB	NPP	
99	48	115	Supportsetcpri Fan To Airheater Prisid	10.29	10.29	SB	NPP	
100	48	141	Seal Air Hag And Id Fan Outgate	3.00	3.00	SB	NPP	
101	48	142	Rect Duct Coldairbus(Temp Air To Mill	34.34	34.34	SB	NPP	
102	48	144	Expn Piecescoldairbus(Temp Air To Mill	0.70	0.70	SB	NPP	
103	48	145	Supportsetccoldairbus(Temp Air To Mill	3.65	3.65	SB	NPP	
104	48	200	Instrument Tappings On Ducting	3.38	3.38	LU	NPP	
105	48	200	Instrument Tappings On Ducting	0.20	0.00	LU	NPP	Aux Blr
106	48	202	Rect Ductsairheater To Windboxduct	54.24	54.24	LU	NPP	
107	48	204	Expn Piecesairheater To Windboxduct	12.70	12.70	LU	NPP	
108	48	205	Supportsetcairheater To Windboxduct	5.14	5.14	LU	NPP	
109	48	207	Flowmeters For Secondary Air Flow	8.94	8.94	LU	NPP	
110	48	207	Flowmeters For Secondary Air Flow	0.70	0.00	LU	NPP	Aux Blr
111	48	212	Wind Box Connecting Ducts - Rectangula	16.81	16.81	LU	NPP	
112	48	214	Expn Pieceswindbox Connecting Duct	3.30	3.30	LU	NPP	
113	48	222	Rect Duct-Airheater Prisidetohotair B	70.97	70.97	LU	NPP	
114	48	224	Expn Piecesairheater Prisidetohotair B	9.70	9.70	LU	NPP	
115	48	225	Supports For Hot P.A (Ah To Hot Bus)	6.59	6.59	LU	NPP	
116	48	332	Sqduct,Boiler-Chimney	5.50	0.00	LU	NPP	Aux Blr
117	48	334	Support,Boiler-Chimney	0.60	0.00	LU	NPP	Aux Blr
118	48	335	Supportsetcfluegas Ducts System	0.70	0.00	LU	NPP	Aux Blr
119	48	382	Rect Duct Economiser To Airheater2nop	92.46	92.46	HT	NPP	
120	48	384	Expn Pieceseconomiser To Airheater2nop	10.90	10.90	LU	NPP	
121	48	385	Supportsetceconomiser To Airheater2nop	3.26	3.26	LU	NPP	
122	48	432	Rect Duct Airheater Boiler Outlet-Gas	49.11	49.11	LU	NPP	

123	48	434	Expn Piecesairheater Boiler Outlet-Gas	3.90	3.90	LU	NPP	
124	48	435	Supportsetcairheater Boiler Outlet-Gas	5.30	5.30	LU	NPP	
125	48	462	Rect Duct Boiler Outlet To Elec Precp	235.08	235.08	LU	NPP	
126	48	464	Expn Piecesboiler Outlet To Elec Precp	21.00	21.00	LU	NPP	
127	48	465	Bof To Ep Ducting Supports	29.35	29.35	LU	NPP	
128	48	482	Rect Ducts-Elec Prptr/M.S To Inddraftf	116.63	116.63	LU	NPP	
129	48	484	Expn Pieceselec Prptr/M.S To Inddraftf	10.00	10.00	LU	NPP	
130	48	485	Supportsetcelec Prptr/M.S To Inddraftf	1.03	1.03	LU	NPP	
131	48	492	Rect Duct Ind Draft Fan To Chimney	170.90	170.90	LU	NPP	
132	48	494	Expn Piecesind Draft Fan To Chimney	4.00	4.00	LU	NPP	
133	48	495	I.D.System Duct Supports	12.08	12.08	LU	NPP	
134	48	499	Chimney Wall Frame For Embedding	4.00	4.00	LU	NPP	
135	48	662	Rect Duct Hot Air Bus To Mills	63.21	63.21	SB	NPP	
136	48	664	Expn Pieceshot Air Bus To Mills	2.20	2.20	SB	NPP	
137	48	665	Supports For Hot Pa To Mills	9.25	9.25	SB	NPP	
138	48	667	Venturi-Primary Air Flow	12.58	12.58	SB	NPP	
139	48	700	Bulked Bps Components	2.58	2.58	LU	NPP	
140	48	700	Bulked Bps Components	0.10	0.00	LU	NPP	Aux Blr
141	48	993	Erection Materials	3.81	3.81	LU	NPP	
142	48	993	Erection Materials	1.00	0.00	LU	NPP	Aux Blr
			PG Weight	**1282.77**	**1266.62**			
143	67	204	Raw Coal Gates Needle Type	3.50	3.50	SY	NPP	
144	67	272	Coal Valve-36 Inch Motor Operated	6.80	6.80	SY	NPP	
145	67	276	Raw Coal Gate Chain Op 36" Circular	7.00	7.00	SY	NPP	
146	67	283	Feeder Outlet Isolation Gate	9.00	9.00	SY	NPP	
147	67	801	Down Spout	10.00	10.00	SY	NPP	
148	67	802	Bunker Emptying Chute	14.00	14.00	SY	NPP	
149	67	803	Feed Pipe To Mill	10.00	10.00	SY	NPP	
			PG Weight	**60.30**	**60.30**			
150	97	593	Elevator & Accessories	15.00	15.00	SY	NPP	

			PG Weight	**15.00**	**15.00**			
151	99	099	Misc Chain Pully Blocks	0.15	0.15	SY	NPP	
152	99	100	Fan Handling Equipment	13.00	13.00	SY	NPP	
153	99	100	Fan Handling Equipment	0.50	0.00	SY	NPP	Aux Blr
154	99	400	Airheater,Steamcoil Airheater Handlg E	3.00	3.00	SY	NPP	
155	99	501	Quick Erect Scaffolds	80.00	80.00	SY	NPP	
156	99	502	Pre.Parts Handling Equipmens	4.80	4.80	SY	NPP	
157	99	512	Furnace Cradle 2 Wall Covrage Electr	6.00	6.00	SY	NPP	
158	99	600	Fo System Handling Equipment	1.50	1.50	SY	NPP	
			PG Weight	**108.95**	**108.45**			
			Sub-Total - C (Non Pressure Parts)	**2406.75**	**2379.70**			
		D	**LINING & INSULATION**					
1	32	010	Fixing Comp For Blr Pr Parts Insul	7.13	7.13	HT	INS	
2	32	010	Fixing Comp For Blr Pr Parts Insul	2.90	0.00	HT	INS	Aux Blr
3	32	110	Fixing Comp For Blr Mountings Insul	5.00	5.00	LU	INS	
4	32	120	Fixing Comp For Sb Pipes Insul	1.40	1.40	SY	INS	
5	32	310	Fixing Comp For Air Ducts Insul	28.40	28.40	LU	INS	
6	32	410	Fixing Comp For Ah And Gas Ducts Insul	6.30	6.30	LU	INS	
7	32	510	Fixing Comp For Id Ducts Insul	50.30	50.30	LU	INS	
8	32	710	Fixing Comp For Oil System Insul	2.00	2.00	SB	INS	
			PG Weight	**103.43**	**100.53**			
9	33	021	Blr Pr Parts Mineral Wool	75.10	75.10	LU	INS	
10	33	021	Blr Pr Parts Mineral Wool	6.50	0.00	LU	INS	Aux Blr
11	33	121	Blr Mountings Mineral Wool	8.80	8.80	LU	INS	
12	33	126	Sb Pipes Mineral Wool	2.65	2.65	SY	INS	
13	33	201	Main Blr Formed Refractory Is8	0.50	0.50	LU	INS	

14	33	201	Main Blr Formed Refractory Is8	7.80	0.00	LU	INS	Aux Blr
15	33	210	Main Blr Castable Refractory Gr A	100.00	100.00	LU	INS	
16	33	212	Main Blr Castable Refractory Gr C	55.00	0.00	LU	INS	Aux Blr
17	33	230	Main Blr Pourable Insulation	140.00	140.00	LU	INS	
18	33	321	Air Ducts Mineral Wool	98.00	98.00	LU	INS	
19	33	421	Air Heater And Gas Ducts Mineral Wool	20.00	20.00	LU	INS	
20	33	521	Id Ducts Mineral Wool	34.00	34.00	LU	INS	
21	33	721	Oil System Mineral Wool	3.60	3.60	SB	INS	
22	33	924	Misc Eqpts Asbestos Materials	0.20	0.20	SB	INS	
23	33	970	Misc Eqpts Expanded Metal	5.00	5.00	LU	INS	
24	33	971	Misc Eqpts Woven Wire Cloth	0.70	0.70	LU	INS	
25	33	975	Misc Eqpts Sealing Compound	0.20	0.20	LU	INS	
			PG Weight	**558.05**	**488.75**			
26	37	010	Blr Outer Casing Components	8.40	8.40	LU	INS	
27	37	010	Blr Outer Casing Components	0.55	0.00	LU	INS	Aux Blr
28	37	810	Blr Outer Casing	41.60	41.60	LU	INS	
29	37	810	Blr Outer Casing	1.00	0.00	LU	INS	Aux Blr
			PG Weight	**51.55**	**50.00**			
			Sub-Total - D (Lining & Insulation)	**713.03**	**639.28**			
		E	**ROTATING EQUIPMENT**					
1	65	736	36 Inch Gravimetric Feeder	46.00	46.00	SY	RTM	
			PG Weight	**46.00**	**46.00**			
			Sub-Total - E (Rotating Equipments)	**46.00**	**46.00**			
			Total (A+B+C+D+E)	**9981.21**	**9720.02**			

APPENDIX-I

ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN (TENTATIVE) SCOPE OF WORK

BAP RANIPET SUPPLIES

For Each Unit 1 to 4

Sl.No	PGMA	DESCRIPTION	EST.WT (MT) for I Unit	Package

APPENDIX-I

ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN (TENTATIVE) SCOPE OF WORK

	A	Rotating Machines		
1	50510	STEAM COIL A P H	6.20	RTM
2	50610	SCAPH-HORIZONTAL TYPE	7.46	RTM
		PG WEIGHT	**13.66**	
3	52000	SPECIAL TOOLS/CONTRA	0.42	RTM
4	52010	LARG AH-ROTOR ASSY	395.22	RTM
5	52011	LARG AH-ROTOR POST	15.55	RTM
6	52012	LARG AH-ROTORPINRACK	3.80	RTM
7	52013	LARG AH-ROTORSEALS	4.58	RTM
8	52030	LARG AH-ROTORHOUSING	43.08	RTM
9	52041	HOT END CONN PLATE	39.68	RTM
10	52042	COLD END CONN PLATE	60.06	RTM
11	52054	LARG AH-AXIAL SEAL	0.42	RTM
12	52055	LARG AH-BY PASS SEAL	0.87	RTM
13	52100	LARGE AH ROTOR DRIVE	3.90	RTM
14	52211	LARG AH-AIRSEAL PIPE	0.67	RTM
15	52212	LARG AH-OBSER. PORTS	0.07	RTM
16	52217	LARG AH-STOP.ALARMS	0.00	RTM
17	52220	LARG AH-GENS DETAILS	10.22	RTM
18	52261	LARG AH-GUIDE BEARNG	2.92	RTM
19	52262	LARG AH-SUPRT BEARNG	4.26	RTM
20	52271	OIL PIPING GUIDE BRG	0.52	RTM
21	52272	OIL PIPING SUPRT BRG	0.54	RTM
22	52274	LUB OIL CIRCULATION UN	1.10	RTM
23	52301	WASH MANIFLD GAS INL	0.60	RTM
24	52302	WASH MANIFLD GAS OUT	0.57	RTM
25	52326	CLEANG EQPT GAS OUT	0.33	RTM
26	52329	CLE EQPT DRIVE UNIT	1.63	RTM
27	52360	FIRE SENSING SYSTEM	0.03	RTM
28	52600	LARGE AH E,C&I COMPONE	0.12	RTM
29	52988	LARG AH COMMISSIONING	0.29	RTM
		PG WEIGHT	**591.46**	
30	55011	FD FAN FOUNDATION MATL	1.43	RTM
31	55017	FD FAN C&I ITEMS	0.02	RTM
32	55031	PA FAN FOUNDATION MATL	1.35	RTM
33	55037	PA FAN C&I ITEMS	0.02	RTM
34	55214	1REAC FDFAN1600-2000	15.22	RTM
35	55334	2 REACT PA FAN	24.50	RTM
36	55810	AXIAL FDFAN COUPLING	0.85	RTM
37	55830	AXL PAFAN COUPLING	1.00	RTM

38	55910	AXL FDFAN ACCESSORY	4.35	RTM
39	55911	AXIAL FDFAN SILENCER	31.23	RTM
40	55916	ADDITIONAL FD ROTOR	3.40	RTM
41	55930	AXL PAFAN ACCESSORY	4.40	RTM
42	55931	PA FAN SILENCER	31.12	RTM
43	55936	ADDITIONAL PA ROTOR	9.00	RTM
		PG WEIGHT	**127.88**	
44	56000	TOOLS & FIXTURE/CONT	0.50	RTM
45	56021	ID FAN FOUNDATION MATL	2.77	RTM
46	56027	ID FAN C&I ITEMS	0.01	RTM
47	56077	SEAL AIR FAN C&I ITEMS	0.01	RTM
48	56161	BAC 1 SUC SA FAN	0.90	RTM
49	56171	SEALAIRFAN BCSS<1000	6.30	RTM
50	56227	ID FAN ASSY NDZV33SIDO	101.68	RTM
51	56670	IGNITR FAN MOTOR	1.20	RTM
52	56820	RADL IDFAN COUPLING	0.10	RTM
53	56870	SEAL AIR FAN COUPLING(	0.05	RTM
54	56920	RAD IDFAN ACCESSORY	2.65	RTM
55	56926	ADDITIONAL ID ROTOR	30.00	RTM
56	56988	RADIAL FAN COMMG SPA	0.03	RTM
57	56011	FD FAN FOUNDATION MATL	0.39	RTM
58	56017	FD FAN C&I ITEMS	0.04	RTM
59	56113	BAC 1 SUC FD FAN	6.44	RTM
60	56610	RADL FDFAN MOTOR	1.79	RTM
61	56810	RADL FDFAN COUPLING	0.04	RTM
62	56911	FD FAN SILENCER	1.32	RTM
		PG WEIGHT	**156.21**	
		Sub-Total A	**889.22**	
	B	**NON-PRESSURE PARTS**		
1	57013	DAMPERS BET FD FAN & A	4.91	NPP
2	57033	SA SCAPH INLET DAMPER	9.50	NPP
3	57083	DAMPER COLD AIR FD FAN	1.40	NPP
4	57110	GUILLOTENE GATE PA FAN	10.30	NPP
5	57113	DAMPERS BETWEEN PAFAN	3.91	NPP
6	57143	DAMPER COLD AIR BUS(TE	1.82	NPP
7	57160	COLD AIRGATE, AIRBUS T	11.30	NPP
8	57203	DAMP APH TO WINDBOX DU	11.33	NPP
9	57209	MTG BKT FOR CL DAMPER	3.81	NPP

10	57223	DAMP APH PRIMARY SIDE	7.10	NPP
11	57270	GUILLOTENE GATE DUCT T	18.00	NPP
12	57383	FLUE GAS SAH INLET DAM	25.03	NPP
13	57433	DAMPER APH BOILER OUTL	20.21	NPP
14	57460	GUILLOTENE GATE EP INL	21.31	NPP
15	57466	PLATFORMS AND LADDERS	25.00	NPP
16	57470	EP OUTLET GATE	21.32	NPP
17	57480	ID FAN INLET GATE	29.34	NPP
18	57490	GUILLOTENE GATE ID FAN	29.72	NPP
19	57491	BLOWER WITH MOTOR	1.50	NPP
20	57497	KNIFE GATE VALVE	1.00	NPP
21	57577	ELECT ACTUATOR FOR GAT	10.00	NPP
22	57663	DAMPER HOT AIR BUS TO	6.40	NPP
23	57988	DUCTS COMMISSIONING SP	0.02	NPP
		PG WEIGHT	**274.22**	
23	87010	CHIMNEY FDN MATERIAL	2.97	NPP
24	87100	CHIMNEY SHELL	26.40	NPP
25	87150	CHIMNEY STRAKES	2.63	NPP
26	87200	PAINTER TROLLEY	0.58	NPP
27	87300	PLATFORMS & LADDERS	5.00	NPP
28	87930	AVIATION LAMPS	0.50	NPP
29	87950	CHIMNEY INSULATION	6.57	NPP
30	87960	CHIMN INS FIX COMP	1.78	NPP
		PG WEIGHT	**46.43**	
		Sub-Total B	**320.65**	
	C	**ESP**		
1	79901	ROLL/SLIDE SUPPORTS	20.00	ESP
2	79905	ESP-SUB-DELIVERY COMPO	0.31	ESP
3	79906	INSULATOR HOUSING AS	31.70	ESP
4	79908	GAS DIST. ASSY	37.12	ESP
5	79909	GD-RAPPING MECHANISM	6.38	ESP
6	79910	GD_DRIVE ARRANGEMENT	0.43	ESP
7	79911	GAS SCREEN-EP	25.80	ESP
8	79913	EMIT SYST SUSPENSION	9.91	ESP
9	79914	SUPPORT INSULATORS	8.21	ESP
10	79915	EMITTING ELECTRODES	14.18	ESP
11	79916	EMIT ELECT RAPP MECH	22.09	ESP
12	79917	DRIVE ARGT. FOR EMIT.	18.94	ESP

APPENDIX-I

ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN (TENTATIVE) SCOPE OF WORK

13	79919	COL ELEC SUSPENSION	72.58	ESP
14	79920	COLLECTING ELECTRODE	664.97	ESP
15	79921	EMIT SYS FRAME-TOP	58.48	ESP
16	79922	EMIT SYS FRAME BOTOM	85.82	ESP
17	79923	INSPECTION DOORS	10.79	ESP
18	79924	SHOCK BARS	52.91	ESP
19	79925	COLL ELECT RAPP MECH	46.62	ESP
20	79926	COLL ELEC RAPP DRIVE	3.88	ESP
21	79928	ESP ROOF PANELS	84.82	ESP
22	79930	ELECTRICAL SD COMPTS	13.19	ESP
23	79931	GEARED MOTORS FOR RAPP	13.40	ESP
24	79932	EMIT SYS FRAME-MIDLE	107.78	ESP
25	79937	JUNCTION BOX & PUSH BU	1.00	ESP
26	79942	OUTER ROOF-EP	154.35	ESP
27	79943	HOPPER RIDGES	37.77	ESP
28	79944	HOPPER UPPER PART	185.32	ESP
29	79945	HOP MLD&LOWER PART	287.14	ESP
30	79946	INSULATOR SUPP PANEL	56.17	ESP
31	79947	ROOF PANEL ASSY	74.15	ESP
32	79948	CASING STRUCTURE	289.25	ESP
33	79949	CASING SHELL/PANEL	567.98	ESP
34	79950	INLET-OUTLET FUNNEL	81.86	ESP
35	79955	PENT HOUSE FOR E P	116.45	ESP
36	79957	SPLITTER&GUIDE VANES	13.96	ESP
37	79959	CONTROL ROOM-INSERTS	70.00	ESP
38	79960	CABLE-CABLE RACKS	163.00	ESP
39	79961	EP PERF TEST EQUIPT	0.65	ESP
40	79962	EARTHING,CABLE TRAYS,S	74.00	ESP
41	79963	ASH LEVEL INDICATOR	1.10	ESP
42	79965	APP PLATFORM-HOPPER	130.04	ESP
43	79966	WATER WASHING SYSTEM	3.85	ESP
44	79967	MIN WOOL FOR ESP INSUL	225.24	ESP
45	79968	FIXING COMP. FOR ESP I	119.50	ESP
46	79972	INTERLOCKS-EP	1.00	ESP
47	79973	ELECTRICALLY OPERTD HO	14.00	ESP
48	79974	OPACITY MONITOR & ACCE	1.00	ESP
49	79978	BAPCON & ACCESSORIES	0.50	ESP
50	79980	FOUNDATION MATLS FOR E	14.69	ESP
51	79981	SUPPOTING STRUCTURES F	449.56	ESP
52	79988	COMMISSIONING SPARES	0.50	ESP
53	79990	HEATING ELEMENTS	1.00	ESP
54	79991	PANEL TYPE HOPPER HEAT	12.00	ESP

55	79992	AUXILIARY CONTROL PANE	18.00	ESP
56	79993	RAPPER CONTROL PANEL	1.20	ESP
57	79994	STATCON PANEL	1.00	ESP
58	79995	IOS PANEL	0.30	ESP
59	79996	TOOLS & TACKLES	0.50	ESP
		PG WEIGHT	**4578.36**	
60	89610	EP GALLERIES&STAIRS	96.92	ESP
61	89611	ESP ROOF HANDRAILS	6.12	ESP
		PG WEIGHT	**103.04**	
		Sub-Total C (ESP)	**4681.39**	
		TOTAL (A+B+C)	**5891.26**	

PC CHENNAI SUPPLIES

S.No	PG	MA	DESCRIPTION	Weight-U#1 (MT)	Weight-U# 2,3 &4 Each (MT)	IBR / Non IBR	Pkg

APPENDIX-I

ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN (TENTATIVE) SCOPE OF WORK

		A	**IBR PIPING**				
1	80	300	Ms From Super heater To Boiler Stop Val	0.90	0.00	I	Aux Blr
2	80	345	Aux. Steam For Oil Line Tracing	2.30	0.00	I	Aux Blr
3	80	417	Boiler Feed Discharge Piping	0.50	0.00	I	Aux Blr
4	80	421	Boiler Feed Pump Recirculation	0.30	0.00	I	Aux Blr
5	80	450	Cbd And Emergency Drum Drain	0.40	0.00	I	Aux Blr
6	80	451	Boiler Integral Piping Drains	0.40	0.00	I	Aux Blr
7	80	453	LP Piping Drains-SG Scope	0.30	0.00	I	Aux Blr
8	81	026	Tray Type Deaerator < 100 C.M/Hr	24.00	0.00	I	Aux Blr
9	81	421	Sensing Elements In Steam Lines	0.20	0.00	I	Aux Blr
10	80	342	Aux Steam To Scaph	5.10	5.10	I	INTEGRAL
11	80	343	Aux Steam To Soot blowers	1.25	1.25	I	INTEGRAL
12	80	344	Aux. Steam To F.O. Pump House/Tank Heati	62.00	0.00	I	INTEGRAL
13	80	351	Aux Steam To Unlisted Users-SG Scope	8.10	8.10	I	INTEGRAL
14	80	355	Steam Tracing Line Of Hfo	12.00	0.00	I	INTEGRAL
15	80	364	Cbd Tank Vent To System	1.55	1.55	I	INTEGRAL
16	80	395	Aux Steam To Fo Atomising	0.65	0.65	I	INTEGRAL
17	80	450	Cbd And Emergency Drum Drain	4.90	4.90	I	INTEGRAL
18	80	451	Boiler Integral Piping Drains	3.05	3.05	I	INTEGRAL
19	80	453	Lp Piping Drains-Sg Scope	2.30	2.30	I	INTEGRAL
20	81	003	Cont Blow Down Expander-1500 Mm Od	2.45	2.45	I	INTEGRAL
21	80	300	MS from Super heater to Boiler Stop Valve	10.00	10.00	I	PCP
22	80	301	MS from Boiler Stop Valve to ESV	75.00	75.00	I	PCP
23	80	303	MS Header to Aux Prds	12.50	12.50	I	PCP
24	80	304	MS Header to HPBP Valve	5.00	5.00	I	PCP
25	80	310	HRH from Re-heater to Inceptor Valve	115.00	115.00	I	PCP
26	80	311	HRH from Interceptor Valve to Turbine	11.50	11.50	I	PCP
27	80	312	LPBP Valve Upstream and Downstream	33.00	33.00	I	PCP
28	80	320	CRH from Turbine to Re-heater	55.00	55.00	I	PCP
29	80	321	HPBP Valve to CRH Piping	6.00	6.00	I	PCP
30	80	324	CRH Header to Aux. Prds	1.20	1.20	I	PCP
31	80	340	Aux Steam Header	2.00	2.00	I	PCP
32	80	341	Aux Steam Header Interconn between Units	45.00	0.00	I	PCP
33	80	431	Soray water to Aux Prds	2.50	2.50	I	PCP
34	80	452	HP Piping Drains - SG Scope	5.00	5.00	I	PCP
35	80	453	LP Piping Drains - SG Scope	0.70	0.70	I	PCP
36	81	421	Sensing elements for Steam Lines	3.30	3.30	I	PCP
37	80	349	Aux Steam to gland Seals - TG Scope	0.85	0.85	I	TG PPG

APPENDIX-I

ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN (TENTATIVE) SCOPE OF WORK

			Sub-Total-A (IBR PIPING)	**516.20**	**367.90**		
38	80	366	Ibd Tank Vent To Atmosphere	0.80	0.00	N	Aux Blr
39	80	418	Erection Materials For Instruments	0.20	0.00	N	Aux Blr
40	80	420	Boiler Feed Pump Suction	0.70	0.00	N	Aux Blr
41	80	446	Deaerating Heater Overflow And Drain	0.60	0.00	N	Aux Blr
42	80	460	SG Aux Cooling Water Unit System	0.60	0.00	N	Aux Blr
43	80	473	Dm Water System	0.60	0.00	N	Aux Blr
44	80	600	Hp Dozing	0.20	0.00	N	Aux Blr
45	80	601	Lp Dozing	0.08	0.00	N	Aux Blr
46	80	612	Service Air For Unit	0.30	0.00	N	Aux Blr
47	80	616	Inst Air For Unit	0.40	0.00	N	Aux Blr
48	80	650	Heavy Fuel Oil Main Lines	1.00	0.00	N	Aux Blr
49	80	901	Sd Valves & Specialties-Boiler Light-up	0.70	0.00	N	Aux Blr
50	80	920	H&S For Boiler Hydro Test	2.00	0.00	N	Aux Blr
51	80	921	H&S For Boiler Light-up-Steam Lines	4.00	0.00	N	Aux Blr
52	80	992	Imported Electrodes	0.03	0.00	N	Aux Blr
53	81	128	H P Dosing System	3.00	0.00	N	Aux Blr
54	81	325	Mineral Wool Mattress-External Piping	2.30	0.00	N	Aux Blr
55	81	341	Sealing Compound-External Piping	0.04	0.00	N	Aux Blr
56	81	350	Aluminium Sheet-External Piping	1.50	0.00	N	Aux Blr
57	81	411	Direct Gauges For Steam Lines	0.20	0.00	N	Aux Blr
58	81	412	Direct Gauges For Non steam Lines	0.09	0.00	N	Aux Blr
59	81	414	Local Control Eqpt-Non-steam Lines	0.40	0.00	N	Aux Blr
60	81	435	Field Junction Boxes	0.50	0.00	N	Aux Blr
61	81	436	Lv Cables	0.10	0.00	N	Aux Blr
62	80	904	BHEL Valves-Boiler Hydro test	1.00	0.00	N	Aux Blr
63	80	905	BHEL Valves-Boiler Light-up	5.50	0.00	N	Aux Blr
64	80	922	H&S For Boiler Light-up- Non-steam Lines	1.10	0.00	N	Aux Blr
65	81	005	Inter Blow Down Expander-1200 Mm Od	2.40	0.00	N	Aux Blr
66	81	034	Platform & Stairs For Feed Tank & Deaer	2.80	0.00	N	Aux Blr
67	81	104	Boiler Feed Pump	3.60	0.00	N	Aux Blr
68	81	127	Lp Dosing System	3.00	0.00	N	Aux Blr
69	81	300	Fix Comp For Main steam Line Insulation	0.80	0.00	N	Aux Blr
70	81	422	Sensing Elements In Non Steam Lines	0.04	0.00	N	Aux Blr
71	80	365	Cbd Tank Vent/Sv Exhaust To Atmosphere	0.05	0.05	N	INTEGRAL
72	80	366	Ibd Tank Vent To Atmosphere	7.40	7.40	N	INTEGRAL
73	80	418	Erection Materials For Instruments	0.10	0.10	N	INTEGRAL

APPENDIX-I

ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN (TENTATIVE) SCOPE OF WORK

74	80	454	Scaph Drains	4.95	4.95	N	INTEGRAL
75	80	455	Drain From Ulisted Eqpt/Vessel-Sg Scop	2.40	2.40	N	INTEGRAL
76	80	460	SG Aux Cooling Water Unit System	25.80	25.80	N	INTEGRAL
77	80	471	Boiler Wash Water To & From Unit	9.20	9.20	N	INTEGRAL
78	80	480	Fire Water-Other Areas	5.20	5.20	N	INTEGRAL
79	80	600	Hp Dozing	0.40	0.40	N	INTEGRAL
80	80	612	Service Air For Unit	3.35	3.35	N	INTEGRAL
81	80	616	Inst Air For Unit	8.60	8.60	N	INTEGRAL
82	80	650	Heavy Fuel Oil Main Lines	65.00	0.00	N	INTEGRAL
83	80	901	Sd Valves & Specialties-Boiler Light-up	6.00	6.00	N	INTEGRAL
84	80	921	H&S For Boiler Light-up-Steam Lines	22.60	22.60	N	INTEGRAL
85	80	992	Imported Electrodes	0.10	0.10	N	INTEGRAL
86	81	009	Inter Blow Down Expander-2500 Mm Od	6.55	6.55	N	INTEGRAL
87	81	128	H P Dosing System	3.00	3.00	N	INTEGRAL
88	81	318	Fix Comp For Insuln Of Misc Piping	5.60	5.60	N	INTEGRAL
89	81	325	Mineral Wool Mattress-External Piping	35.30	35.30	N	INTEGRAL
90	81	341	Sealing Compound-External Piping	0.60	0.60	N	INTEGRAL
91	81	350	Aluminium Sheet-External Piping	21.10	21.10	N	INTEGRAL
92	81	411	Direct Gauges For Steam Lines	0.55	0.55	N	INTEGRAL
93	81	412	Direct Gauges For Non-steam Lines	0.35	0.35	N	INTEGRAL
94	81	414	Local Control Eqpt- Non-steam Lines	0.10	0.10	N	INTEGRAL
95	81	435	Field Junction Boxes	8.50	8.50	N	INTEGRAL
96	81	437	Supervisory Control For Pumps	0.40	0.40	N	INTEGRAL
97	80	368	Scaph Drain Tank Vent/Sv Exhaust To At	2.35	2.35	N	INTEGRAL
98	80	399	Steam Blowing	28.00	0.00	N	INTEGRAL
99	80	604	Acid Cleaning	27.00	0.00	N	INTEGRAL
100	80	905	BHEL Valves-Boiler Light-up	19.25	19.25	N	INTEGRAL
101	80	917	TG Valves(PEM Engineered)	5.60	0.00	N	INTEGRAL
102	80	918	Quick Cl.Nrvs For Ext. Line(Hardwar Eng)	5.20	0.00	N	INTEGRAL
103	80	922	H&S For Boiler Light-up-Non-steam Lines	21.20	21.20	N	INTEGRAL
104	80	926	H&S For Temp Piping-Acid And Alkali	4.10	0.00	N	INTEGRAL
105	80	927	H&S For Temp Piping-Steam Blowing	6.00	0.00	N	INTEGRAL
106	81	010	Clean Drain Flash Tank-Dia 1000	2.60	2.60	N	INTEGRAL
107	81	041	Impure Condens Tank	3.00	0.00	N	INTEGRAL
108	81	042	Make Up Water Store Tank < 300 C.M	8.10	8.10	N	INTEGRAL
109	81	161	Bcw Heat Exchanger	15.00	15.00	N	INTEGRAL
110	81	422	Sensing Elements In Non Steam Lines	2.90	2.90	N	INTEGRAL
111	80	373	AUX STEAM HEADER SV EXHAUST	5.00	5.00	N	PCP
112	80	418	ERECTION MATERIALS FOR INSTRUMENTS	1.30	1.30	N	PCP

113	80	901	SUB DELIVERY VALVES FOR LIGHT UP	9.10	9.10	N	PCP
114	80	920	H AND S FOR HYDRO TEST	6.00	6.00	N	PCP
115	80	921	H AND S FOR LIGHT UP STEAM LINE	9.00	9.00	N	PCP
116	80	923	H AND S FOR STEAM BLOWING	120.00	120.00	N	PCP
117	80	992	IMPORTED ELECTRODES	0.50	0.50	N	PCP
118	80	993	MISC ERECTION MATLS	0.50	0.50	N	PCP
119	81	318	FIX COM FOR MISCELLANEOUS PPG INSULATION	9.00	9.00	N	PCP
120	81	325	MINERAL WOOL MATTRESS	160.00	160.00	N	PCP
121	81	341	SEALING COMPOUND FOR INSL	0.50	0.50	N	PCP
122	81	350	ALUMINIUM CLADDING FOR INSULATION	25.00	25.00	N	PCP
123	81	411	DIRECT GAUGES FOR STEAM LINES	0.30	0.30	N	PCP
124	81	414	LOCAL CONTROL EQPT FOR NON-STEAM LINES	0.30	0.30	N	PCP
125	81	415	TEST THERMOWELLS	0.40	0.40	N	PCP
126	81	416	PERFORMANCE GUARANTEE TEST MATERIALS	1.20	1.20	N	PCP
127	81	435	JUNCTION BOXES	11.00	11.00	N	PCP
128	80	902	SUBDELIVERY VALVES FOR STEAM BLOWING	0.60	0.60	N	PCP
129	80	444	LP HEATER-2/3/4/5 DRAINS AND DRIP PUMP I	4.70	4.70	N	TG PPG
130	80	446	DEAERATING HEATER OVER FLOW AND DRAIN	3.50	3.50	N	TG PPG
131	80	447	HP HEATER DRAINS	6.70	6.70	N	TG PPG
132	80	449	TG CYCLE PIPING DRAINS AND VENTS	29.00	29.00	N	TG PPG
133	80	463	TG AUX COOLING WATER	165.00	165.00	N	TG PPG
134	80	468	MAIN CIRCULATION WATER PIPING	63.00	63.00	N	TG PPG
135	80	473	DEMINERALISED WATER SYSTEM	18.00	18.00	N	TG PPG
136	80	477	SERVICE WATER PIPING	17.00	17.00	N	TG PPG
137	80	601	LOW PRESSURE DOSING PIPING	0.90	0.90	N	TG PPG
138	80	610	SERVICE AIR-COMP SUCT AND DIS TO RECEI	12.00	12.00	N	TG PPG
139	80	614	INST AIR COMP SUC AND DIS TO RECEIVER	10.00	10.00	N	TG PPG
140	80	673	LUBE OIL PIPING SYSTEM	7.00	0.00	N	TG PPG
141	80	901	SUB DELIVERY VALVES FOR LIGHT UP	0.70	0.70	N	TG PPG
142	80	930	H AND S FOR SYNCHRONISATION - TG	20.00	20.00	N	TG PPG
143	80	933	H AND S FOR LP PIPING	15.00	15.00	N	TG PPG
144	80	992	IMPORTED ELECTRODES	0.50	0.50	N	TG PPG
145	80	371	DRAIN FLASH TANK VENT TO CONDENSER	4.50	4.50	N	TG PPG
146	80	411	CONDENSATE/MAKE-UP TO CONDENSER	3.20	3.20	N	TG PPG

147	80	435	UNLISTED SPRAY WATER - TG SCOPE	1.70	1.70	N	TG PPG
148	80	478	DRINKING WATER PIPING	9.40	9.40	N	TG PPG
149	80	922	H AND S FOR BOILER LIGHT UP - TG	29.00	29.00	N	TG PPG
			Sub-Total-B (NON-IBR PIPING)	**1214.58**	**1023.10**		
			Total (A+B)	**1730.78**	**1391.00**		

HYDERABAD MILLS SUPPLIES

For Each Unit 1 to 4

(7 Nos. XRP 883 BOWL MILL PER UNIT)

S.No	PGMA No.	DESCRIPTION	WT. (MT)	Stage	Pkg
1	61088	Journal Assembly	137.8	BLU	RTM
2	61188	Mill Drive and Bowl Assembly	200.5	BLU	RTM
3	61288	Mill Side and Liner Assembly	124.1	BLU	RTM
4	61388	Classifier Assembly	249.3	BLU	RTM
5	61488	MDV Assembly	43.2	BLU	RTM
6	61788	Mill Motor Coupling	1.05	BLU	RTM
7	61888	Mill Handling System (per Unit)	24.3	BLU	RTM
8	61988	Commissioning Spares (per Unit)	0.63	BLU	RTM
9	61888	Lubricating Oil (per unit)	10.88	BLU	RTM
		Total Wt.	**780.88**		

HYDERABAD PUMPS SUPPLIES

For Each Unit 1 to 4

S N	Item	Weight (In MT)	Stage	Package
1	Deaerator Approach platform (Str. Steel Lot)	10.0	BLU	STR
2	Deaerator FST Sections & Heater with associated items	72.0	BLU	PP
	Total	**82.0**		

BHOPAL SUPPLIES

S.No.	Item Description	Total Qty	Qty U#1	Qty for U#2,3 & 4 (for Each Unit)	Unit Weight (in MT)	Weight-U#1 (MT)	Weight-U# 2,3 &4 Each (MT)	Stage	Package
	Motors								
1	4065 KW ID Fan Motor	9	3	2	31.0	93.0	62.0	BLU	RTM
2	1125 KW FD Fan Motor	9	3	2	9.0	27.0	18.0	BLU	RTM
3	1750 KW PA Fan Motor	9	3	2	8.0	24.0	16.0	BLU	RTM
4	425 KW Mill Motor	29	8	7	6.0	48.0	42.0	BLU	RTM
				Total	**54.0**	**192.0**	**138.0**		

PEM SUPPLIES

For Each Unit 1 to 4

S.No	Item	Weight / Unit (In MT)	Package
1	PEM Supplied Insulation, Ancilliary & Cladding materials	228.0	Boiler/ESP/ Piping

	Total	**228.0**	

JHANSI SUPPLIES

For Each Unit 1 to 4

S N	Item	Weight / Unit (In MT)	Stage	Package
1	HVR TRANSFORMER(ESP) WITH ELECTRONOC CONTROLERS	120.0	BLU	ESP
	Total	**120.0**		

SUMMARY

For Unit - 1

Weight in MT

S.No	Package	Trichy	BAP	PC	Hyderabad	Jhansi	PEM	Bhopal	Total	Remarks
1	Structures	4405.50			10.00				4415.50	
2	Pressure Parts	2409.93			72.00				2481.93	
3	Non Press Parts	2406.75	320.65						2727.40	
4	Rotating M/c	46.00	889.22		780.88			192.00	1908.10	
5	ESP		4681.39			120.00			4801.39	
6	Lining & Insulation	713.03					228.00		941.03	
7	Piping - IBR			516.20					516.20	
8	Piping - Non-IBR			1214.58					1214.58	
	TOTAL	**9981.21**	**5891.26**	**1730.78**	**862.88**	**120.00**	**228.00**	**192.00**	**19006.13**	

For Unit - 2,3 & 4

Weight in MT

S.No	Package	Trichy	BAP	PC	Hyderabad	Jhansi	PEM	Bhopal	Total	Remarks
1	Structures	4326.85			10.00				4336.85	
2	Pressure Parts	2328.19			72.00				2400.19	

APPENDIX-I

ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN (TENTATIVE) SCOPE OF WORK

3	Non Press Parts	2379.70	320.65						2700.35	
4	Rotating M/c	46.00	889.22		780.88			138.00	1854.10	
5	ESP		4681.39			120.00			4801.39	
6	Lining & Insulation	639.28					228.00		867.28	
7	Piping - IBR			367.90					367.90	
8	Piping - Non-IBR			1023.10					1023.10	
	TOTAL	**9720.02**	**5891.26**	**1391.00**	**862.88**	**120.00**	**228.00**	**138.00**	**18351.16**	

BLOCK-WISE WEIGHT SUMMARY

For Block - 1 (Unit 1 & 3)

Weight in MT

S.No	Package	Trichy	BAP	PC	Hyderabad	Jhansi	PEM	Bhopal	Total	Remarks
1	Structures	8732.35			20.00				8752.35	
2	Pressure Parts	4738.12			144.00				4882.12	
3	Non Press Parts	4786.46	641.30						5427.76	
4	Rotating M/c	92.00	1778.44		1561.76			330.00	3762.20	
5	ESP		9362.78			240.00			9602.78	
6	Lining & Insulation	1352.30					456.00		1808.30	
7	Piping - IBR			884.10					884.10	
8	Piping - Non-IBR			2237.68					2237.68	
	TOTAL	**19701.23**	**11782.52**	**3121.78**	**1725.76**	**240.00**	**456.00**	**330.00**	**37357.29**	

For Block - 2 (Unit 2 & 4)

Weight in MT

S.No	Package	Trichy	BAP	PC	Hyderabad	Jhansi	PEM	Bhopal	Total	Remarks

APPENDIX-I

ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN (TENTATIVE) SCOPE OF WORK

1	Structures	8653.70			20.00				8673.70	
2	Pressure Parts	4656.39			144.00				4800.39	
3	Non Press Parts	4759.41	641.30						5400.71	
4	Rotating M/c	92.00	1778.44		1561.76			276.00	3708.20	
5	ESP		9362.78			240.00			9602.78	
6	Lining & Insulation	1278.55					456.00		1734.55	
7	Piping - IBR			735.80					735.80	
8	Piping - Non-IBR			2046.20					2046.20	
	TOTAL	**19440.04**	**11782.52**	**2782.00**	**1725.76**	**240.00**	**456.00**	**276.00**	**36702.32**	

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. Tenderer's quoted unit rates shall be applicable for such product groups also.

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 a particular product group 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 is excluded from the scope of work.

APPENDIX – II
LIST OF IBR SITE WELD JOINTS

HIGH PRESSURE WELD JOINTS FOR PRERSSURE PARTS SYSTEM

Sl. No.	Description	Material	Size (mm) (Dia. x Thickness)	No.of Joints
PG 04 TO 07:				
1.	Down Comer	SA 515 Gr.70 + SA 515 Gr.70	457.2 x 40	58 Nos.
2.	Ring Headers	SA 106 Gr.C + SA 106 Gr.C	406.4 x 56	4 Nos.
3.	Water Wall Panels	SA 210 Gr.C + SA 210 Gr.C	63.5 x 5.6	3428 Nos.
4.	Rear Arch Screen Tube	SA 210 Gr.C + SA 210 Gr.C	76.1 x 7.1	315 Nos.
5.	Riser Pipe	SA 210 Gr.C + SA 210 Gr.C	127 x 12.5	454 Nos.
6.	Hand Hole Pipe Assly.	SA 106 Gr.B + SA 234 wpc	127 x 20	12 Nos.
PG 12:				
1.	SH Conn. Pipes	SA 106 Gr.C + SA 106 Gr.C	127 x 12.5	66 Nos.
2.	SH Roof Tubes	SA 213 T 11 + SA 213 T 11	51 x 5	400 Nos.
3.	SH Roof Outlet Header + SH Side Wall Inlet Header	SA 106 Gr.B + SA 106 Gr.A	323.9 x 40	2 Nos.
4.	SH Side Wall Inlet Header + Tubes	SA 210 Gr.C + SA 210 Gr.C	44.5 x 4.5	750 Nos.
5.	SH Side Wall Outlet Header Elbow + Front / rear Wall Inlet Header	SA 106 Gr.C + SA 106 Gr.C	273 x 36	4 Nos.
6.	SH Rear Wall Inlet Header + SH Rear Wall	SA 210 Gr.C + SA 210 Gr.C	44.5 x 5	216 Nos.
7.	Hand Hole Plate	SA 106 Gr.B + SA 234 wpc	127 x 20	2 Nos.
8.	SH Jn. Header Nipple + SH Rear Roof	SA 210 Gr.C + SA 210 Gr.C	44.5 x 4.5	408 Nos.
9.	SH Front Wall Header + SH Extl. Side Wall Supply Pipe	SA 106 Gr.C + SA 1-6 Gr.C	127 x 12.5	4 Nos.
10.	SH Extl. Header Nozzle + Roof Inlet Pipe	SA 106 Gr.C + SA 106 Gr.C	127 x 12.5	12 Nos.

APPENDIX – II
LIST OF IBR SITE WELD JOINTS

Sl. No.	Description	Material	Size (mm) (Dia. x Thickness)	No.of Joints
11.	LTSH Inlet Header Nipple + Loose Tube + LTSH Coils	SA 210 Gr.C + SA 210 Gr.C	47.63 x 5	924 Nos
12.	LTSH Coils	SA 210 Gr.C + SA 213 T 11	47.63 x 5	528 Nos.
13.	LTSH Coil	SA 213 T 11 + SA 213 T 11	47.63 x 5	1280 Nos.
14.	SH DESH	SA 335 P 12 + SA 335 P 12	368 x 40	10 Nos.
15.	SH Platen Coil	SA 213 T 11 + SA 213 T 22 SA 213 T 22 + SA 213 T 22	47.63 x 10 47.63 x 10	32 Nos. 930 Nos.
16.	SH DESH Stage-II	SA 234 WP12 + SA 234 WP12 SA 335 P 12 + SA 335 P 12	406.4 x 65 406.4 x 65	4 Nos. 8 Nos.
17.	Steam Cooled Spacer	SA 210 Gr.C + SA 213 T 11 SA 213 T 11 + SA 213 T 11	44.5 x 4 44.5 x 5 51 x 5	15 Nos. 7 Nos. 1 No.
18.	Platen SH Coil	T 91	51 x 7.1	300 Nos.
19.	Final SH Coil	T 91	44.5 x 5.6	400 Nos.
20.	RH Coil	T 91	54 x 4	400 Nos.
PG 17:				
1.	RH Header Nipple + Coil	SA 213 T 11 + SA 213 T 11 SA 213 T 11 + SA 213 T 22 SA 213 T 11 + SA 213 T 22	63.5 x 4.5 51 x 5 47.63 x 4	65 Nos. 65 Nos. 260 Nos.
2.	RH Coil + Coil	SA 213 T 22 + SA 213 T 22 SA 213 T 22 + SA 213 T 22 SA 213 T 22 + SA 213 T 22 SA 213 T 22 + SA 213 T 22 SA 213 T 22 + SA 213 T 22	54 x 4 44.5 x 5 63.5 x 6.3 51 x 5 63.5 x 4.5	390 Nos. 195 Nos. 65 Nos. 65 Nos. 65 Nos.

PG 19 : Economiser:				
1.	Eco Feed Pipe + Reducer Valve	SA 106 Gr.C + SA 234 wpc + SA 217 wcb	368 x 48	2 Nos.
2.	Eco Feed Pipe	SA 106 Gr.C + SA 234 wpc SA 234 wpc + SA 234 wpc	368 x 32 323.9 x 40	1 No. 1 No.
3.	Eco Coil	SA 210 Gr.A1 + SA 210 Gr.A1 SA 210 Gr.A1 + SA 210 Gr.A1	44.5 x 4.5 44.5 x 5	591 Nos. 354 Nos.
4.	Hand Hole Plate	SA 106 Gr.B + SA 234 wpc	127 x 20	6 Nos.

APPENDIX – II
LIST OF IBR SITE WELD JOINTS

5.	Eco Coil + Coil	SA 210 Gr.C + SA 210 Gr.C	44.5 x 5	594 Nos.
6.	Eco Link to Drum + Hdr. Tee	SA 234 wpc + SA 234 wpc	323.9 x 35	2 Nos.
7.	Eco Pipe + Elbow	SA 106 Gr.C + SA 234 wpc	273 x 32	14 Nos.

NOTE:
The number of joints indicated herein above are only tentative and likely to vary in actual. Contractor shall carry out all necessary site weld joints required for completion of entire scope of work under these specifications. No additonal payments shall be made for any variations in the actual quantity of joints carried out.

APPENDIX – III

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

For Each Unit 1 to 4

SL NO	DESCRIPTION & CAPACITY OF T&P	QUANTITY	REMARKS
1	HEAVY LIFT-HIGH REACH CRANE FOR CEILING GIRDER LIFT	01	For all four units on sharing basis. See Notes- 1, 2, 3 & 4 here.
3	INDUCTION HEATING M/C	As required	FOR WELDING OF P-91 pipeline.
3	HUCK BOLTING MACHINE COMPLETE SET	01 SET	For ESP work.
4	AIR LEAK TEST EQUIPMENTS WITH ALL AUXILIARIES	01 SET	For leakage test of ESP.

Note:

1. This crane 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. This crane is owned or hired by BHEL. Operator for BHEL owned crane will be arranged by contractor.

3. Contractor shall make necessary arrangements like lying of special sleeper beds and steel plates (all arranged by contractor), assembly and dismantling of heavy lift attachment, boom, jib etc for movement and operation of the crane.

4. BHEL may obtain these cranes on hiring basis including operating and maintenance crew.

5. Other T&P mention above, Contractor shall transport from BHEL stores, install, operate, carry out maintenance, dismantle after use and return to BHEL stores.

LIST OF TOOL & PLANTS TO BE DEPLOYED BY THE CONTRACTOR

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For Each Unit 1 to 4

SN	DESCRIPTION	CAPACITY (MINIMUM)	MINIMUM QUANTITY	*REMARKS*
1	Crawler Crane	150 MT capable of lifting 9T at elevation of 64m.	1	From BES+2 Months to SYN. Crane to be of manufacture after Jan 2000.
2	Crawler Crane	75 MT	1	One Month before BES to Trial Operation. Crane to be of manufacture after Jan 2000.
3	Mobile Crane	18 MT	2	Crane to be of manufacture after Jan 2000.
4	Pick & Carry Crane	8 MT	2	Crane to be of manufacture after Jan 2000.
5	Trailer with Prime Mover	30 MT	2	
6	Trailer with Prime Mover	20 MT	2	
7	Truck	9 MT	1	
8	Passenger cum Goods Elevator	1.5 MT	1	
9	Air Compressor (Electric/Diesel operated)	140 CFM, 7 Kg/cm^2	1	
10	Strand and Jack Arrangement for Boiler Drum Erection	Adequate to erect Boiler Drum	1 set	For Boiler Drum Erection
11	TIG Welding Set	As required	As required	
12	Plasma Cutting M/c	For cutting up to 10 mm thick Stainless Steel	As required	
13	3-Phase Distribution Board with Complete Set Up for Drawl of Construction Power	As required	As required	
14	Power Cable for drawl of Construction Power	As required	As required	
15	Pre Heating / Stress Relieving Set (Heating Control Panel, Cables, Heating Elements, Thermometers etc.)	As required	As required	

SN	DESCRIPTION	CAPACITY (MINIMUM)	MINIMUM QUANTITY	*REMARKS*
16	Radiography Arrangement with Radioactive Isotope Source	Iridium-192	2 sets	
17	Radiography Arrangement with Radioactive Isotope Source	Cobalt-60	1 set	
18	Theodolite of Required Accuracy	To ensure verticality of structural columns	1	
19	Self Drilling Cum Tapping Machine for Screws of Boiler Roof Sheets	As required	2	
20	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	
21	Arrangement for UT of higher thickness joints with recording facility	Type USN 50 or equivalent/ upgraded type	1 Set	
22	Electro-hydraulic pipe bending machine	Up to 2” Nb and 12 mm thick pipes	3 Sets	
23	Welding Generator (Electrical)	300 Ampere rating	As required	
24	Welding Generator (Diesel Operated)	300 Ampere rating	4 sets	
25	Radiography Film Viewer	As required	As required	
26	Hydraulic Pipe Bending Machine (manual)	For bending of pipes up to 50 mm Nb size	4 sets	
27	Baking Oven with thermostat and temperature gauge for welding electrodes	As required	3	
28	Holding Oven with thermostat and temperature gauge for welding electrodes	As required	2	
29	Portable Over for welding electrodes	As required	25	

SN	DESCRIPTION	CAPACITY (MINIMUM)	MINIMUM QUANTITY	*REMARKS*
30	Electric Winch	3 Ton Capacity	5	
31	Electric Winch	1 Ton Capacity	5	
32	HYDRAULIC TEST/ PRESSURIZING PUMP	600 & 450 Kg per cm^2	01 No EACH	For Hydraulic test of Boiler and HP pipelines.
33	Furnace Maintenance Platform (Sky Climber)	0.5 MT	1	
34	Hand Winch	0.5 Ton Capacity	3	
35	Scaffolding Materials	Suitable for working at various heights	Adequate qty for parallel working in multiple work fronts.	
36	Profile making M/c	for aluminium sheet cladding work	As required	
37	Nibbling M/c		As required	
38	Shearing M/c		As required	
39	Water Pump to lift water to top of boiler	for refractory and other required activities	1 Set	
40	Portable Grinding M/c	As required	As required	
41	Portable Drilling M/c	As required	As required	
42	Chain Pulley Blocks	Up to 15 MT Capacity	As required	
43	Fire retardant Tarpaulins	As required	As required	
44	Fire Extinguisher	As required	As required	

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:

1. BES = BOILER ERECTION START, SYN = UNIT SYNCHRONISATION

APPENDIX-V

ANALYSIS OF UNIT RATE QUOTED

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

SIGNATURE OF THE TENDERER

DATE:

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

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

SIGNATURE OF TENDERER

DATE:

APPENDIX-VII

CONCURRENT COMMITMENTS

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

DATE

SIGNATURE OF THE TENDERER

APPENDIX–VIII

DETAILS OF SIMILAR WORK DONE DURING THE LAST SEVEN YEARS

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

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

DATE SIGNATURE OF TENDERER WITH SEAL