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

TENDER NO. BHEL:NR(SCT): BARSINGSAR:BLR & MM:348

FOR

Erection, testing, commissioning and trial operation of CFBC-boiler (consisting of structure, pressure parts, ESP, fans & blowers, piping and all related auxiliaries) and total Material Handling work for 2X125 MW at BARSINGSAR TPS, BIKANER, RAJASTHAN.

PART I – TECHNICAL BID

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
Power Sector – Northren Region,
Plot No. 25 , Sector - 16A ,
Distt. Gautam Budh Nagar, NOIDA – 201 301.INDIA

ISO 9001-2000, ISO 14001 and OHSAS 18001 certified company
SubContract and Purchase Deptt.

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
Power Sector – Northren Region,
Plot No. 25 , Sector - 16A ,
Distt. Gautam Budh Nagar, NOIDA – 201 301.INDIA
Phone: 0091-0120-2515476 / 2515464 / 2515479
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TENDER NO. BHEL:NR(SCT): BARSINGSAR:BLR & MM:348

IMPORTANT NOTE

PURCHASER OF THIS TENDER DOCUMENT IS ADVISED TO CHECK AND ENSURE COMPLETION OF ALL PAGES OF TENDER DOCUMENT AND REPORT ANY DISCREPANCY TIMELY FOR CORRECTIVE ACTION, IF ANY, TO THE ISSUING AUTHORITY BEFORE THE BIDS ARE SUBMITTED. ORIGINAL COPY OF TENDER DOCUMENT COMPLETE IN ALL RESPECTS MUST BE SUBMITTED BACK AS PART OF THE BID WITHOUT WHICH THE SAME IS LIABLE TO BE REJECTED BY BHEL.

THIS TENDER SPECIFICATION ISSUED TO:

M/S----------

INDEX

Sl. No.	CONTENTS	PAGE
1.	Tender Notice	04-05
2.	Tender Notice- Newspaper	06
3.	Project synopsis	07
4.	Procedure for submission of tender	08
5.	Section-III Special Conditions of Contract	09-64
6	Annexure-IA, IB & IC, GENERAL IDEA OF WEIGHTS ETC. TO BE HANDLED FOR GIRAL II SG & MH	65-75
7.	Annexure-IIA, IIB, LIST OF T&P and IMTEs BEING PROVIDED BY BHEL ON FREE OF HIRE CHARGES AND ON SHARING BASIS	76-77
8.	Annexure-III A & B, INDICATIVE LIST OF MAJOR T&P and IMTEs TO BE PROVIDED BY CONTRACTOR FOR EXECUTION OF TENDERED WORKS FOR MOST DURATION OF THE CONTRACT	78-79
9.	Annexure-IV, CERTIFICATE OF DECLARATION FOR CONFIRMING THE KNOWLEDGE OF SITE CONDITIONS	80
10.	Annexure-V, NON DISCLOSURE AGREEMENT	81

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TENDER NOTICE

Sealed tenders are invited from the contractors fulfilling qualifying requirements for the "erection, testing, commissioning and trial operation of CFBC-boiler (consisting of structure, pressure parts, ESP, fans & blowers, piping and all related auxiliaries) and total Material Handling work for 2X125 MW at BARSINGSAR TPS, BIKANER, RAJASTHAN."

TENDER NO. BHEL:NR(SCT): BARSINGSAR:BLR & MM:348

QUALIFYING REQUIREMENTS:

" Tenderers who wish to participate should have completed erection, testing & commissioning work of at least one Boiler of 67.5 MW Unit or higher rating Units, alternatively at least one CFBC/HRSG of minimum rating of 300 TPH or higher rating units during the last five years and also have an average annual financial turnover of minimum of Rupees 700 lacs during last three years (2002-03, 03-04 and 04-05)". Bidders selection is subject to approval of the BHEL's Customer.

NOTES:

(i) The Tender Documents comprise of following;
(a) General Conditions of Contract
(b) Special Conditions of Contract, Tender Notice, Project Synopsis etc.
(c) Rate Schedule

(ii) Tender Documents with complete details are hosted in this web page. Bidder(s) intending to participate may download the tender document from the web site. Bidder(s) downloading the tender documents from the web site, shall remit Rs.1000/- (Rupees One thousand only) in the form of crossed demand draft (non-refundable), in favour of BHEL, NOIDA along with their offer

(iii) Bidder(s) can also purchase hard copy of tender documents from this office. Tender documents (non transferable) will be issued on all working days between 09.30 Hrs. to 12.30 Hrs within the sale period i.e ***upto*** **14.08.2006** on payment of Rs.1,000/- (non-refundable) either in cash or by crossed demand draft in favors of BHEL, NOIDA. Request for issue of tender document should clearly indicate Tender No. and work.

(iii) Tenders must be submitted to the undersigned **latest by 14.08.2006** before opening of technical bids commences. Technical bids shall **be opened at 15.30 Hrs. on 14.08.2006**

(iv) Earnest Money Deposit (EMD): Refundable, Non-interest bearing **EMD of *Rs 2,00,000/-*** shall be deposited by Account Payee Pay Order 'OR' Demand Draft in favour of " Bharat Heavy Electricals Limited" payable at Delhi/NOIDA . Those bidders who have already deposited ' One Time 'EMD' of Rs. 2,00,000/- with BHEL, PSNR, NOIDA need not submit EMD with the present tender.

(v) Tenders not accompanied with Full Earnest Money Deposit, as indicated above, will not be considered.

(vi) All corrigenda, addenda, amendments and clarifications to this Tender will be hosted in this web page and not in the newspaper. Bidders shall keep themselves updated with all such amendments.

(vii) BHEL reserves the right to accept or reject any or all tenders without assigning any reason whatsoever.

(viii) BHEL takes no responsibility for any delay/loss of documents or correspondences sent by courier/post.

(ix) Purchase Preference will be given to CPSUs as per Govt. Guidelines.

(x) **Unsolicited rebate/discount shall not be accepted after bid opening**.

AGM/SCP

ISO 9001-2000, ISO 14001 and OHSAS 18001 certified company
SubContract and Purchase Deptt.

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DOMESTIC NOTICE INVITING TENDER

LAST DATE OF SALE : 14.08.2006
DATE OF OPENING : 14.08.2006

NIT NO. / NAME OF WORK
TENDER NO. BHEL:NR(SCT): BARSINGSAR:BLR & MM:348 Sealed tenders are invited from the contractors fulfilling qualifying requirements for the "erection, testing, commissioning and trial operation of CFBC-boiler (consisting of structure, pressure parts, ESP, fans & blowers, piping and all related auxiliaries) and total material handling work for 2X125 MW at BARSINGSAR TPS, BIKANER, RAJASTHAN."

NOTES

1. Purchase Preference will be given to CPSU as per Govt. Guidelines.
2. Please visit our website at www.bhel.com for details of NIT including Qualifying Requirements.
3. Earnest Money Deposit (EMD): Refundable, Non - interest bearing **EMD of *Rs. 2,00,000/-*** shall be deposited by Account Payee Pay Order 'OR' Demand Draft in favour of " Bharat Heavy Electricals Limited" payable at Delhi/NOIDA . Those bidders who have already deposited ' One Time 'EMD' of Rs. 2,00,000/- with BHEL, PSNR, NOIDA need not submit EMD with the present tender.

AGM/SCP

PROJECT SYNOPSIS

2 X 125 MW THERMAL POWER PROJECT, BARSINGSAR (RAJ.)

M/s Neyveli Lignite Corporation Ltd., Neyveli, a Govt of India Enterprise with Head Office at Cuddalore Distt, Tamilnadu has entrusted BHEL for Erection, Testing And Commissioning of 2 x 125 MW Thermal Power Project at Barsingsar, Distt. Bikaner, Rajasthan. The Thermal Power Project at Barsingsar is a lignite based Power House.

The site location is about 25 KM South west of Bikaner (8 KM west of Palana on NH – 89 Bikaner-Jodhpur-Ajmer road and 15 Km from Bikaner-Jaisalmer-Kandla NH - 15). Palana is the nearest Railway station on Merta Road – Bikaner Section of Northern Railways. The nearest Airport is at Jodhpur

All dispatches are expected by road, as there is no railway siding available. All bidders are advised to visit site and acquaint themselves with the condition prevailing at site before quoting for the work.

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PROCEDURE FOR SUBMISSION OF SEALED TENDERS:

The tenderers must submit their tenders as required in **two parts** in separate sealed covers **prominently superscribed as Part-I Technical bid and Part-II ,Price bid** also indicating on each of the cover tender specification no., date and time as mentioned in tender notice.

TECHNICAL BID (COVER-I)

Except **Price bid Part-II**, complete set of tender document consisting of General conditions of Contract, "Technical specification & Special terms and condition" (Part-I) issued by BHEL shall be enclosed in **Part I Technical Bid only**. All schedules, data sheets and details called for in the specification shall also be submitted along with technical bid. All details / Data / Schedules including offer letter duly signed and stamped are to be **submitted in duplicate**.

PRICE BID (COVER-II)

Tenderers may please note that price bid is **to be submitted only in original copy** of Tender i.e. Price bid (Part-II) issued by BHEL and no duplicate copy of same is required.

These Two separate covers i.e. cover I & II shall together be enclosed in a **third envelope (Cover-III)** and this sealed cover shall be superscribed with tender specification No., due date, time and submitted to officer inviting tender as indicated in tender notice on or before due date as indicated.

SECTION - III `A'

SPECIAL CONDITIONS OF CONTRACT

INDEX

CLAUSE No.	DESCRIPTION
34.	General
35.	Civil works, foundation and grouting
36.	Consumables
37.	Tools & Plants / IMTE's
38.	Supervisory staff & workmen
39.	Material handling and storage
40.	Preservation of components
41.	Erection
42.	Welding HT, RG and NDT
43.	Application of Insulation and refractory
44.	Testing, Pre-commissioning, commissioning and post-commissioning.
45.	Finish Painting
46.	Progress reporting
47.	Drawings and documents
48.	Income tax and sales tax
49.	Extra work
50.	Price variation
51.	Rate schedule
52.	Instructions to tenderers

SECTION - III `A'

SPECIAL CONDITIONS OF CONTRACT

34.0 GENERAL

34.1 The intent of this specification is to provide services for execution of the project according to most modern and proven techniques and codes. The omission of specific reference to any method, equipment or material necessary for the proper and efficient services towards installation of the plant shall not relieve the contractor of the responsibility of providing such services / facilities to complete the work or portion of work awarded to him. The quoted / accepted rates / lumpsum price shall deem to be inclusive of all such contingencies.

34.2 The contractor shall carry out the work in accordance with standard practices / codes / instructions / drawings / documents / specification supplied by BHEL from time to time.

34.3 The work shall conform to dimensions and tolerances given in various drawings and documents that will be provided during erection. If any portion of work is found to be defective in workmanship, not conforming to drawings or other stipulations, the contractor shall dismantle and redo the work duly replacing the defective materials at his cost. Failing which the job will be carried out by BHEL by engaging other agencies/ departmentally and recoveries will be affected from contractor's bills towards expenditure incurred including BHEL's usual overhead charges.

34.4 Following shall be the responsibility of contractor and have to be provided within finally accepted rates / prices:

a Provision, as required, of all types of labour, supervisors, engineers, watch and ward, tools & tackles, calibrated inspection, measuring and testing equipment as specified and otherwise required for the work, consumables for erection, testing and commissioning including material handling.

b Taking delivery / lifting of components / materials from store area within Project complex.

c Provision for labour colony and needful accommodation for their staff.

d Arrangement of construction power and water from single point terminal in project area.

e Proper out-turn as per BHEL plan and commitment.

f Completion of work as per BHEL Schedule.

g Good quality and accurate workmanship for proper performance of the equipment.

h Repair and rectification.

i Preservation / Re-conservation of all components during storage / erection / commissioning till handing over.

34.5 **BHEL-Power Sector (NR) is ISO 9001-2000,ISO14001-1996 and OHSAS 18001 certified company. Work quality to customer's satisfaction, system requirements, health, safety & environmental protection are the basic essence of this certification. The contractor in all respects will organize his work, systems, process control documentation, T&P, inspection, measuring and testing equipment etc. meeting above requirement as per instructions of BHEL Engineer. The contractor shall also comply with applicable legislation and regulations with regards to Health, safety and environmental aspects for minimising risk arising from occupational health, safety hazards, controlling pollution and wastage.**

Contractor shall arrange for following provisions of HSE:

1. Contractor has to maintain contact with local hospital having scanning & other ultra modern medical facilities required during emergency.

2. Contractor has to ensure pre employment medical check for all staff & workers.

3. Contractor has to ensure that adequate First Aid facilities with trained nurse are available at work site for emergency purpose. This emergency set-up should include, but not limited to, following

- Oxygen set up
- Breathing apparatus
- Eye wash facility
- Stretcher
- Trauma blanket
- Medicines.

In addition to above, BHEL has arranged ambulance at work site for emergency purpose, which can be utilized, free of cost, by contractor in case of emergency.

34.6 The contractor shall comply with following towards Social Accountability;

(a) The contractor shall not employ any employee less than 15 years of age in pursuant to ILO convention. If any child labour were found to have been engaged, the Contractor shall be levied with expenses of bearing his education expenditure which will include stipend to substantiate appropriate education or employ any other member of family enabling to bear the child education expenditure.

(b) The contractor shall not engage Forced/Bonded Labour and shall abide by abolition of Bonded Labour System(Abolition) Act, 1976.

(c) The contractor shall maintain Health & safety requirement as stipulated in the Contract and Contract Labour(Regulation & Abolition) Act,1970.

(d) The Contractor shall abide by UN convention w.r.t Human Rights and shall be liable for Discrimation/Corporal punishment for failure in meeting with relevant requirements.

(e) The Contractor shall abide the requirement of Contract Labour(Regulation & Abolition) Act,1970 for working hours.

(f) The Contractor shall abide by the Statutory requirement of Minimum Wages Act 1948, payment of Wages Act 1936.

(g) The Contractor shall arrange potable drinking water to its employees & workers.

34.7 In order to meet the environmental concerns it is expected that the contractor shall **plant at least 300 trees and maintain the trees throughout the period of Contract** in the vicinity of the project as per advise of Engineer

35.0 FOUNDATIONS AND GROUTING.

35.1 BHEL shall provide foundations for all the equipment and columns including their grouting and necessary other civil work. The contractor for their scope shall check the dimensions of the foundations, locations of pockets, pitch of anchor bolts and other inserts as per drawings. Further, top elevation of foundations shall be checked with respect to benchmark etc. All minor adjustments of foundation level, dressing and chipping of foundation surfaces up to 50 mm, enlarging the pockets in foundations etc., as may be required for the erection of equipment / plants shall be carried out by the contractor.

35.2 While on the job, care is essential to avoid too much chipping and resultant lowering of level. In case of excess chipping, contractor has to arrange additional packing plates as per requirements provided BHEL Engineer allows it. When required by manufacturers, the embedded sub-sole plates shall be scraped and checked with prussian blue to get the required contact with frames.

35.3 The contractor shall ensure perfect matching of packer plates including machining, scraping and blue matching with foundation by dressing the foundation, as well as perfect matching between the packer plates and the base plate of equipment to the satisfaction of BHEL Engineer. If required the packer plates may have to be aligned and fixed on the foundations using approved quality special high strength, non-shrinking and quick-setting grouts. The minimum thickness below the packer plate should be 20 mm. The material required for this has to be arranged for by the contractor at his cost.

35.4 **While grouting will be carried out by other agency / customer, the contractor has to ensure that all the matching joints which are not to be grouted shall be kept free from the grouting mixture by applying tape or any other alternative method approved by Engineer. All assistance required has to be provided by the contractor.**

35.5 Besides grouting as above, any civil works required for safe and efficient operation of tools and tackles like grouting / excavation/ casting of foundation / anchor points for derricks, winches, guy ropes fastening, etc and any other temporary supports shall also be the contractor's responsibility. For these civil works, all materials including cement and required facilities shall have to be arranged by contractor at his own cost.

36.0 CONSUMABLES

36.1 The contractor shall provide within finally accepted price / rates, all consumables like all welding electrodes (including alloy steel and stainless steel), filler wires, all gases (inert, welding, cutting), soldering material, dye penetrants, radiography films. Other erection consumables such as tapes, jointing compound, grease, mobile oil, M-seal, Araldite, petrol, CTC / other cleaning agents, grinding and cutting wheels are to be provided by the contractor. Steel, H&S, packers, shims, wooden planks, scaffolding materials hardware items etc required for temporary works such as supports, scaffoldings are to be arranged by him. Sealing compounds, gaskets, gland packing, wooden sleepers, for temporary work, required for completion of work except those which are specifically supplied by manufacturing unit are also to be arranged by him.

36.2 All the shims, gaskets and packings, which go finally as part of equipment, shall be supplied by BHEL free of cost.

36.3 It shall be the responsibility of the contractor to plan the activities and store sufficient quantity of consumables. Non-availability of any consumable materials or equivalent suggested by BHEL cannot be considered as reason for not attaining the required progress or for additional claim.

36.4 Only TIG filler wire shall be supplied by BHEL free of cost. Required quantity as arrived at by calculation / standards will only be supplied. It would be the contractors' responsibility to account for the consumption of these filler wires. Additional requirement beyond standard / calculated quantity will be at cost recovery basis only unless and otherwise accounted for. Surplus quantity of TIG filler wire, if any, shall be properly stored and

returned to BHEL stores.

36.5 It shall be the responsibility of the contractor to obtain prior approval of BHEL, regarding suppliers, type of electrodes etc before procurement of welding electrodes. On receipt of electrodes at site these shall be subjected to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch number, date of expiry etc and produce test certificate for each lot / batch with correlation of batch / lot number with respective test certificate. No electrode without a valid test certificate will to be used.

36.6 BHEL reserves the right to reject the use of any consumable including electrodes, gases, lubricants / special consumables if it is not found to be of the required standard / make / purity or when shelf life has expired. Contractor shall ensure display of shelf life on consumable wherever required and records maintained.

36.7 Storage of all consumables including welding electrodes shall be done as per requirement / instruction of the Engineer by the contractor at his cost.

36.8 In case of improper arrangement for procurement of any consumable, BHEL reserves the right to procure the same from any source and recover the cost from the Contractor's first subsequent bill at market value plus the departmental charges of BHEL from time to time (30% at present). Postponement of such recovery is normally not permitted. The decision of Engineer in this regard shall be final and binding on the Contractor.

36.9 All lubricants and chemicals required for cleaning, pre-commissioning, commissioning, testing, preservation and lubricants for trial runs of the equipment shall be supplied by BHEL / BHEL's client. All services including labour and T&P will be provided by the contractor for handling, filling, emptying, refilling etc. the consumption of lubricants / chemicals shall be properly accounted for. Surplus material if any shall be properly stacked / packed and returned to stores.

36.10 Transportation of oil drums, from stores, filling of oil and filling of oil for flushing, first filling of oil and subsequent changeover or topping / making up till the unit is fully commissioned and handed over to customer is included in scope of this contract. The contractor shall have to return all the empty drums to BHEL / BHEL's client store at no extra cost. Any loss / damage to above drums shall be to contractor's account.

37.0 TOOLS AND PLANTS / IMTE's

37.1 T&P being provided by BHEL to sub-contractor free of hire charges shall be shared by other subcontractors working for BHEL at site and the allotment done by BHEL Engineer shall be final and binding.

37.2 Besides the T&P and IMTEs being made available to contractor free of hire charges by BHEL, all other T&Ps and IMTEs which are required for successful and timely execution of the work covered within the scope of this tender, shall be arranged and provided by the contractor. He should ensure that these are in good working condition. In the event of the failure of contractor to bring necessary and sufficient T&Ps and IMTEs, BHEL will be at liberty to arrange the same and hire charges as applicable shall be

deducted from contractor's bill. Decision of BHEL in this regard shall be final and binding on contractor.

37.3 All distribution boards, connecting cables, wire ropes, hoses, pipes etc, including temporary air / water / electrical connections etc shall have to be arranged by the contractor at his own cost.

37.4 In case of non-availability of the T&Ps to be provided by BHEL due to breakdown, major overhauls, distribution pattern or any other reason, the contractor shall plan / amend / alter his activities to meet erection / commissioning targets in consultation with BHEL.

37.5 The operation of all BHEL's T&P being provided free of hire charges shall be in the scope of the contractor. The contractor shall arrange, at his own cost, trained operators, fuel and other consumables for their operation**. The operator for 100 / 150 MT crane will be provided by BHEL** but one helper, fuel and other consumable shall be provided by contractor within the final accepted rates. All lubricants for cranes such as Mobil oil, gear oil, brake oil, hydraulic oil, torque converter oil & grease shall be provided by BHEL free of cost. The contractor will give the requirement well in advance.

37.6 The contractor shall engage trained and experienced operators for the operation of BHEL's T&Ps. Their skill / performance will be checked by BHEL Engineer before they are allowed to operate the same. However checking of skills by BHEL does not absolve the contractor of his responsibilities for proper and safe handling of equipment, consistent good performance of operators and regular performance evaluation of operators.

37.7 The day to day maintenance of BHEL's T&Ps should be carried out by contractor as per manufacturer's / BHEL's maintenance schedule at his cost. These shall be maintained in good working condition during the entire period of use. T&Ps in defective / damaged condition shall be rectified promptly to the full satisfaction of BHEL engineer. Contractor shall maintain records for maintenance of major T&Ps that shall be made available for Inspection whenever required. In case of any lapses on the part of the contractor BHEL at its own discretion get the servicing / repair of equipment done at the risk and cost of the contractor with BHEL overheads.

BHEL shall be deploying a separate group for the maintenance of the cranes. Contractor shall carry out maintenance of other BHEL equipments. The contractor should make available the equipment to maintenance agency as per schedule. It is essential that the activities be so planned so that the planned output does not suffer on account of maintenance on critical construction equipment. The contractor will provide all assistance required by way of semi-skilled labour and welders.

37.8 All spares needed for upkeep of all T&Ps shall be supplied by BHEL. For cranes the repair of self, dynamo, battery and electric wiring shall be the responsibility of the contractor. However, the charges of the replacement of the other damaged / worn out parts of BHEL cranes will be borne by BHEL, provided the damage is not due to the negligence of the contractor. However, if there are breakdowns / damages due to negligence of the contractor, the complete service / repair charges and cost of all the spares damaged with BHEL overheads shall be recovered from contractor's RA bills.

37.9 Increasing / shortening of the crane boom to suit work requirements shall have to be arranged by the indenting contractor at his cost. All necessary manpower tools, support, consumables, illumination etc. will have to be arranged by contractor at his cost. If required, contractor has to return the crane with original boom.

37.10 The area and infrastructure development of the area to be carried out by the customer. However in construction projects of this magnitude it is possible that all the areas / approaches may not be ready. In such cases consolidation of ground and arrangement of sleepers / sand bag filling etc for safe operation / movement of equipment including cranes / trailers etc shall be the responsibility of the contractor at his cost. No compensation on this account shall be payable.

37.11 In the event of contractor not using and maintaining BHEL T&Ps according to BHEL's instructions. BHEL will have the right to withdraw such item without any notice and no claim in this regard shall be entertained and contractor shall be responsible for delay in execution on this account.

37.12 The contractor shall furnish regular utilization report of the BHEL T&Ps, as per requirement of BHEL.

37.13 Any loss / damage to any part of BHEL T&Ps and IMTEs shall be to the contractor's account and any expenditure on these accounts by BHEL will be recovered from the contractor's bill in case the contractor fails to make good the loss.

37.14 It shall be responsibility of the contractor to take delivery of T&Ps from stores or place of use by other contractor at project site, transport the same to site and return the same to BHEL store / place as intimated by Engineer in project site in good working conditions after use.

37.15 The contractor shall return BHEL T&Ps and IMTEs issued to him in good working condition as and when desired by BHEL (on completion or reduction of workload). If contractor delays return of T&P and IMTE, hire charges as applicable shall be levied by BHEL from time, it was requisitioned till the time of actual return.

T&Ps and IMTEs returned in damaged / unserviceable condition shall be got repaired by BHEL at its own discretion and entire cost of repair with BHEL overheads shall be recovered from the contractor.

37.16 Replacement cost including BHEL overheads in respect of irreparable / completely damaged / non return of T&Ps and IMTEs shall be recovered from the contractor's running / final bills

37.17 Contractor shall ensure deployment of serviced and healthy T&Ps including cranes, lifting tackles, wire ropes, manila ropes, winches and slings etc. History card and maintenance records for major T&Ps will be maintained by the contractor and will be made available to BHEL Engineer for inspection as and when required. Identification for such T&Ps will be done as per BHEL Engineer's advice.

37.18 Contractor shall ensure deployment of reliable and calibrated IMTEs (Inspection measuring and testing equipment). The IMTEs shall have test / calibration certificates from authorized / Government approved / accredited agencies traceable to National / International standards. Each IMTE shall have a label indicating calibration status i.e. date of calibration, calibration agency and due date for calibration. A list of such instruments deployed by contractor at site with its calibration status is to be submitted to BHEL Engineer for control.

37.19 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 IMTE so that work does not suffer when the particular instrument is sent for calibration. If any IMTEs not found fit for use, BHEL shall have the right to stop the use of such item. It will be necessary for the contractor to deploy proper item. Any readings taken by the defective instrument will be recalled and repeat the readings taken by that instrument with a proper one. In case he fails to do so, BHEL may deploy IMTEs and retake the readings at contractor's cost.

37.20 BHEL shall have lien on all T&P, IMTEs and other equipment of the contractor brought to the site for the purpose of erection, testing and commissioning. BHEL shall continue to hold the lien on all such items throughout the period of contract / extended period. The contractor and / or his sub-contractors, without the prior written approval of the Engineer, shall remove no material brought to the site.

37.21 The month wise T&P deployment plan to be submitted as per format (at Annexure-D to general conditions of contract) is only to assess the capability as well as understanding of the contractor to execute the work. It shall be the contractor's responsibility to deploy the required T&P, for timely and successful completion of the job, to any extent over and above those indicated in the above deployment plan (including those which are not covered in the plan submitted) without any compensation on this account.

37.22 ***One passenger lift will be provided to the erection agency. Who will do its erection. Necessary supervision of the supplier will be arranged for by BHEL.***

All day to day and routine maintenance and checking of the lift is to be carried out by the contractor as per the recommendations of the supplier. He should periodically check the brakes and carry out all the works to ensure the safety for all those using the lift.

The lift should never be overloaded as this can lead to serious accidents. All the landing platforms are to be erected by him. They are to be provided with proper barricades and hand railings. No separate payment for the temporary jobs will be made. The contractor will have

to dismantle such temporary works and return the material to the stores.

The construction and dismantling of the foundations required for the passenger lifts is included in the scope of the contractor.

38.0 SUPERVISORY STAFF AND WORKMEN

38.1 The contractor shall deploy all the skilled workmen like millwright fitters, welders, crane operators, drivers, gas cutters, riggers, sarangs, masons, carpenters, electricians, helpers and instrument technicians to carry out the works as per specifications. In addition to skilled, semi-skilled and unskilled workmen required for all the works, suitable workmen required for handling and transporting of equipment from site storage to erection site, erection, testing and commissioning as contemplated under this specification shall be deployed. Only fully trained and competent men with previous experience on the job shall be employed. They shall hold valid certificates wherever necessary.

The contractor shall **engage <u>separate Stores - Incharge</u>** (minimum Diploma holder) and other experienced supervisory staff and especially skilled labour e.g. crane operators, heavy-duty vehicle driver, sarangs, riggers, khalasis, etc. under this contract **specially for material handling work**. To execute material handling work and to assist Stores-Incharge for issue and receipt of Boiler, TG and other packages material, minimum four qualified and experienced supervisors shall have to be deployed along with a qualified computer operator for maintaining records. Contractor shall have to deploy other staff as per site requirement for the successful execution of material handling work. The contractor shall not divert the labour and staff deployed for material handling work to erection work area.

BHEL reserves the right to decide on the suitability of the workers and other personnel who will be deployed by the contractor. BHEL reserves the right to insist on removal of any employee / workman of the contractor at any time, if they find him unsuitable. The contractor shall remove him forthwith.

38.2 The supervisory staff including qualified Engineers deployed by the contractor shall ensure proper out-turn of work and discipline on the part of the labour put on the job by the contractor. They should in general see and ensure that the works are carried out in a safe and proper manner and in coordination with other labour and staff deployed directly by BHEL or other contractors of BHEL or BHEL's client / other agency.

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

38.4 The contractor's supervisory staff shall execute the work in the most substantial and workman like manner in the stipulated time. Accuracy of work and aesthetic finish are essential part of this contract. The contractor shall be responsible to ensure that assembly and workmanship conforms to the dimensions and tolerances given in the drawings / documents /

instructions given by BHEL Engineer from time to time.

38.5 The contractor shall deploy the necessary number of qualified and approved full time electricians at his cost to maintain his temporary electrical installation till the completion of work.

38.6 It is the responsibility of the contractor to engage his workmen in shifts or on overtime basis for achieving the targets set by BHEL and also during the period of commissioning and testing of unit. The contractor's finally accepted rates / prices shall include all these contingencies.

38.7 During the course of erection,

- If the progress is found unsatisfactory,
- If the target dates fixed from time to time for every mile stones are to be advanced / not being met,
- if it is found that the skilled workmen like fitters, operators, technicians etc deployed are not sufficient,

BHEL after giving reasonable opportunity to the contractor will induct on the work the required workmen in addition to contractor's workmen to improve the progress. The expenses so incurred will be recovered from the contractor's bills with overheads.

38.8 If the contractor or his workmen or employees shall break, deface, injure or destroy any part of a building, road kerb, fence, enclosure, water pipes, cables, drains, electric / telephone poles, wire, trees or any other property or to any part of erected components, the contractor shall make the same good at his own expense. In default, BHEL may cause the same to be made good by other workmen or by other means and deduct the expenses from any money due to the contractor. BHEL's decision will be final and binding.

38.9 It shall be the responsibility of the contractor to ensure safe lifting of the equipment taking due precautions to avoid any accident and damage to other equipment and personnel. Contractor shall be liable for all accidents, damages etc. to personnel and equipment etc. during the execution of the work.

38.10 The work shall be executed under the usual conditions like rain, insufficient space, improper approach roads etc. affecting major power plant construction and in conjunction with numerous other operations at site. The contractor and his personnel shall cooperate with other personnel. The contractor will coordinate his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.

38.11 The month wise manpower deployment plan to be submitted as per format Annexure-C to general conditions of contract) is only to assess the capability as w as understanding of the contractor to execute the work. It shall be the contracto responsibility to deploy the required manpower, for timely and successful completi of the job, to any extent over and above those indicated in the above deployment pl (including those which are not covered in the plan submitted) without a compensation on this account. The contractor shall identify separate persons at s for quality control and safety.

38.12 Though every endeavor shall be made to ensure that all plant materials are supplied as per schedule. However in a job of this kind it is possible that

some materials may be delayed. In order to achieve the ultimate targets, the contractor may have to augment his manpower and resources. No compensation on this account shall be admissible.

38.13 The month wise manpower deployment plan to be submitted as per format (at Annexure-C to general conditions of contract) is only to assess the capability as well as understanding of the contractor to execute the work. It shall be the contractor's responsibility to deploy the required manpower, for timely and successful completion of the job, to any extent over and above those indicated in the above deployment plan (including those which are not covered in the plan submitted) without any compensation on this account. The contractor shall identify separate persons at site for quality control and safety.

39.0 MATERIAL HANDLING AND STORAGE

39.1 All the equipment furnished under this contract shall be received from the project stores, sheds / storage yards and transported to pre assembly area / erection site and stored in the storage spaces in a manner so that they are easily retrievable till the contractor erects them. While drawing / lifting material from BHEL / customer stores, contractor shall ensure that the balance / other materials are stacked back immediately.

39.2 While BHEL will endeavor to store / stack / identify materials properly in their open / close / semi closed / tarpaulins covered storage yard / shed, it shall be contractor's responsibility to assist BHEL in identifying materials well in time for erection. They should take the delivery of the same, following the procedure indicated by BHEL, and transport the material safely to pre-assembly yard / erection site in time, according to program.

39.3 The contractor shall take delivery of components, equipment / consumables from storage area after getting the approval of BHEL Engineer on standard indent forms.

39.4 The contractor shall identify and deploy necessary Engineers / supervisors / workmen for the above work in sufficient number as may be needed by BHEL, for areas covering their scope.

39.5 All the equipment shall be handled very carefully to prevent any damage or loss. No untested wire ropes / slings etc. shall be used for unloading / handling. The equipment shall be properly protected to prevent damage either to the equipment or to the floor where they are stored. The equipment from the stores shall be moved to the actual location at the appropriate time so as to avoid damage of such equipment at site.

39.6 Contractor shall ensure that while lifting slings shall be put over the points indicated on the equipment or as indicated in the manufacturer's drawings. Slings / shackles of proper size shall be used for all lifting and rigging purposes. All care shall be taken to safe guard the equipment against any damage. Dragging of piping / valves should be avoided. In case of any damage the cost shall be covered from the contractor.

39.7 Approach road conditions from the stores / yards to the erection site may not be equipped and ideal for smooth transportation of the equipment. Contractor may have to be adequately prepared to transport the materials

under the above circumstances without any extra cost.

39.8 Contractor shall be responsible for examining all the plant and materials issued to him and notify the Engineer immediately of any damage, shortage, discrepancy etc before they are moved out of the stores / storage area. The contractor shall be solely responsible for any shortages or damages in transit, handling, storage and erection of the equipment once received by him. As the erection work will be spread in different areas / locations of the project, contractor has to arrange sufficient number of watch / ward personal to avoid any pilferage of material. As per General Conditions of contract under provisions of clause No 29 BHEL will reserve the right to recover the cost of repair / replacement, if any, to bring back the equipment in original order, in case the equipment / material is lost / damaged while in the custody of the contractor. BHEL's decision in this regard shall be final and binding on the contractor.

39.9 The contractor shall maintain an accurate and exhaustive record-detailing out the list of all equipment received by him for the purpose of erection and keep such record open for the inspection of the engineer at any time.

39.10 All the material in the custody of contractor and stored in the open or dusty locations must be covered with suitable weather proof / fire retardant covering material wherever applicable and shall be blocked up on raised level above ground. All covering materials including blocks and sleeper shall be arranged by the contractor at his cost.

39.11 If the material belonging to the contractor are stored in area other than those earmarked for his operation the engineer will have the right to get it moved to the area earmarked for the contractor at the contractors risk and cost.

39.12 The contractor shall be responsible for making suitable indoor storage facilities to store all equipment (drawn by the contractor from BHEL / customer stores), which require indoor storage till the time of their installation. The Engineer will direct the contractor in this regard, which item in his opinion will require indoor storage, and the contractor shall comply with Engineer's decision.

39.13 The contractor shall ensure that all surplus / damaged / scrap / unused material, packing wood / containers/ special transporting frames etc are returned to BHEL at a place in project area identified by the Engineer. The contractor will maintain an account for all items received and returned to BHEL. Any shortage in returning such items shall be chargeable to the contractor except for a 5% allowable against wastage for packing wood only.

39.14 The contractor shall hand over all parts / materials remaining extra over the normal requirement with proper identification tags to the stores as directed by the concerned BHEL engineer.

39.15 The contractor shall ensure that all the packing materials and protective devices installed on equipment during transit and storage are removed before installation.

39.16 It shall be the responsibility of the contractor to keep the work / storage areas in neat, tidy and working conditions. All surplus/unusable packing and

other materials shall be removed and deposited at location(s) specified by BHEL within the project premises. If required weighing of the same within the project premises will have to be carried out.

40.0 PRESERVATION OF COMPONENTS

40.1 After taking delivery from BHEL / customer's stores, plant materials storage shall be subjected to the following protection besides other provisions indicated in these specifications elsewhere.

a) Items stored outdoors shall be blocked up at least six inches (6") off the ground

b) Motors, valves, electrical equipment, control equipment and instruments etc shall be stored indoors in a warehouse provided by contractor. Motor windings shall be kept dry by use of external heat or space heaters.

c) Bearings and other wearing surfaces of plant materials shall be protected against corrosion and kept clean.

d) Insulation materials shall be stored indoors or otherwise protected against getting wet.

40.2 It shall be the responsibility of the contractor to apply preservatives / touch up paints (primer) on equipment handled and erected by him till such time of final painting. It shall be contractor's responsibility to arrange for required paints (primer), thinners, labour, scaffolding materials, cleaning materials like wire brush, emery sheets, etc, cleaning of surface and provide one coat of preservatives / paints (primer) from time to time as decided by BHEL engineer. The accepted rate shall include this work also. It is to be noted that such painting may have to be done as and when required till such time the final painting is carried out.

40.3 The contractor shall effectively protect the finished work from action of weather and from damage or defacement and shall cover the finished parts then and there for their protection.

40.4 Any failure on the part of contractor to carry out works according to above clauses will entail BHEL to carry out the job from any other party and recover the cost from contractor.

41.0 ERECTION

41.1 All normal erection and assembly techniques necessary for completion of works under this specification and magnitude have to be carried out. It is not possible to specifically list out all of them. Absence of any specific reference will not absolve the contractor of his responsibility for the particular operation. These would include,

- Scaffolding and rigging operations,
- Machine / flame / electric cutting, grinding, welding, radiography and stress relieving
- Fitting, fettling, filing, straightening, chamfering chipping, scrapping, reaming, as cleaning, checking, leveling, blue matching, aligning and assembly.
- Machining, surface grinding, drilling, doweling, shaping
- Temporary erections for alignment, dismantling of certain equipment for checking, cleaning, servicing and site fabrication.

41.2 Any fixtures, scaffolding materials, approach ladder, concrete block supports, steel structures required for temporary supporting, pre-assembly or checking, welding, lifting and handling during pre-assembly and erection shall be arranged by contractor at his cost.

41.3 No members of any ladder / structure / platform should be cut without specific approval of BHEL. In case it is necessary to cut, the contractor shall rectify / repair in a manner acceptable to BHEL / customer without any additional cost.

41.4 The contractor shall erect scaffolding / temporary platforms for erection. These should be of adequate capacity and shall never be over loaded. These should be replaced when not found suitable during erection work and dismantled on work completion and removed from work site.

41.5 It shall be the responsibility of the contractor to provide ladders on columns for initial work till such time stairways are completed. For this, the ladder should not be welded on the column and should be pre-fabricated clamping type ladders. No temporary welding on any structural member is permitted except under special circumstances with the approval of BHEL. In case it is absolutely necessary then the contractor shall cut the temporary structure and rectify the column as directed by the engineer.

41.6 The contractor is strictly prohibited in using the Boiler / ESP / Auxiliary Components for any temporary supporting or scaffolding works etc. In case of such misuse a sum of determined by Engineer will be recovered from contractor's bills.

41.7 Boiler auxiliary columns are plate formed box section and the erection joint is welded type where as the columns are butt type with HSFG bolted flange and partition plates, boiler main column are having flange with splice plates and bolted connections. However, the contractor has to carry out work at site as per drawing.

41.8 The material for platform section under PG-36 and other supplies shall be supplied in running meters. These shall be cut to size / shape / fabricated to required size / shape and to be welded by contractor.

41.9 Certain adjustment in length may be necessary while erecting pipelines / ducts / casings etc. The contractor should remove the extra lengths / add extra lengths to suit the final layout after preparing edges afresh by adopting specified heat treatment procedures.

41.10 Economizer, Super-heater, re-heater coils, burner panels may have to be hydraulically tested individually, if required, before erection, as instructed by BHEL engineer within finally accepted rates/prices.

41.11 Suspensions for ducting will be supplied in running lengths, which shall be cut to size and adjusted as required. Ducts / expansion bellows are dispatched to site in loose walls plates / pieces and these are to be assembled and welded at site along with stiffeners etc., before erection within the finally accepted rates. All joints connecting duct expansion piece and dampers shall be seal welded on inside as well as on outside.

41.12 Assistance in mechanical work associated with the power cylinders, valves, valve actuators etc. coming under various groups shall be

valves, valve actuators etc., coming under various groups shall be provided by contractor within the finally accepted rates.

41.13 Hanger rods are shown in the pressure parts arrangement drawings for boiler. Any cutting / welding of these hangers rods will be done by the contractor. The hangers for pressure parts will be tested for even distribution of load with the help of a torque wrench.

41.14 The headers are provided with hand holes. The contractor, shall as per requirement, carry out removal and re-fixing of hand hole plates within finally accepted rates.

41.15 Burner tilt mechanism will be checked for freeness, serviced and adjusted, if necessary to obtain optimum tilt before installation.

41.16 Skin casing sheet for covering the boiler roof panels, rear arch tube and other areas will be supplied by BHEL. Any cutting, addition and re-fabrication to suit the site conditions shall be carried out within the finally accepted rates.

41.17 ESP collecting electrodes may require straightening and repair due to minor transport damages before erection and spot heating in position to get correct alignment and same will be carried out by the contractor at no extra cost.

41.18 The contractor shall carry out trial run of all motors including checking the direction of rotation in the uncoupled condition. Checking of alignment and re-coupling of the motor to the driven equipment as per instructions of BHEL engineer and to their satisfaction.

41.19 The contractor shall fabricate pipe, special bends etc., threading and welding as required for installing lube oil system and carry out the acid cleaning of the fabricated piping. The contractor shall also service the lube oil system, carrying out the hydraulic test of oil coolers etc.

41.20 Contractor shall carry out kerosene testing of all bearing housings of various rotating equipment like pumps, fans etc., as per BHEL engineer's instructions. Performance of hydro test of oil coolers of rotating machines and hydro test of SCAPH and other equipment as per BHEL engineer's instructions is included in the scope of work.

41.21 Forced lube oil system of motors or rotating equipment form parts of the work under this specification.

41.22 Certain rotating machinery after initial runs and commissioning of the equipment have to be hot aligned as per the instructions of BHEL engineer. Cleaning air pre-heater, fans, boiler ducting etc., free of extraneous steel, scaffolding materials electrodes, all foreign materials etc., before trial run of rotating machinery, and at various stages of pre-commissioning activities as per BHEL engineer's instruction, is within the scope of work.

41.23 Some of the rotating equipment and electrical motors are provided with protective greases only. Contractor shall arrange for cleaning of the same with kerosene or some other reagent. If necessary, dismantling some of the parts of the equipment would be necessary. He shall arrange for re-greasing / lubricating them with recommended lubricants and for

assembling back the dismantled parts, at quoted rate. Lubricants will, however, be supplied free of cost by BHEL.

41.24 After initial trial of rotating equipment, control and power cabling for motors and other equipment / instrumentation shall have to be disconnected for checking alignment and re-setting / re-alignment / hot alignment. Contractor shall have to arrange for disconnecting control and power cabling as per BHEL engineer's instructions and clearance and reconnect the control and power cabling after realignment. Quoted tonnage rate shall be inclusive of the above.

41.25 Packer plates supplied may have to be machined to the correct dimensions. It may also be necessary to blue match the same with each other/ with equipment / with foundations as per BHEL instructions.

41.26 Contractor shall arrange changing of preservative oil in the gearboxes, journal and other bearing assemblies of rotating equipment when in storage areas or after erection of equipment as the case may be as per the instructions of BHEL engineer. Necessary lubricants / oil will be supplied by BHEL and the same will be drawn by contractor from BHEL / customer's stores and transporting to site. No additional payment will be made for such works even though supply of lube oil might have been made under regular dispatchable unit (DU) number against product group main assembly (PGMA) and appearing in the shipping list. Prior to the commissioning of the equipment, oil should be drained and collected in drums provided by BHEL and returned to BHEL / customer's stores.

41.27 Tubular Air Preheater shall have 03 No. of Blocks per Boiler. The air-preheater rotor may be disturbed during the initial operation. This may change the original clearances. It requires rechecking and correction of seal clearances. Contractor shall carry out such checks and resetting of clearances as per the instructions of BHEL engineer. The resetting may have to be repeated till satisfactory results are obtained.

41.28 Checking of air gaps and adjustment of stator / rotor for magnetic center of HT motors shall be carried out as part of erection.

41.29 The fans, mills and other rotating machines shall be checked for clearances and other vital tolerances. The IGV unit shall be serviced. Necessary assistance for balancing of equipment during trial run, if required, shall be provided by the contractor free of cost. Proper Installation testing and commissioning of Diesel operated Emergency Boiler Feed Pump and its other associated systems shall be ensured.

41.30 Erection of Ceralin tiles / liners, if supplied loose, may have to be fixed in position as per standard procedure.

The contractor will be compensated at the rate of Rs.75.00 per square decimeter, or part thereof, for these works.

41.31 Complete penetration of water wall (Panel to Panel) welding shall be achieved either by one side or both sides welding.

41.32 Whenever required the contractor shall arrange for pre-qualification of process task performers.

41.33 All attachments welding including those for insulation works coming on pressure parts / non-pressure parts which the contractor has erected shall

pressure parts / non-pressure parts which the contractor has erected shall be done by IBR / BHEL tested welders only.

41.34 All electrical cabling including proper glanding, termination, dressing etc., control and instrumentation works required for completion of Electrostatic Precipitator including its commissioning shall be part of this work. This will include erection of all electrical equipment such as rectifier, transformers, and power supply and control panel, laying of trays and cables and other associated equipment.

41.35 All rotating machines and equipment shall be cleaned, lubricated, checked for their smooth rotation, if necessary by dismantling and refitting before erection. If, in the opinion of Engineer, the equipment is to be checked for clearance, tolerance at any stage of work or during commissioning period, all such works are to be carried out by contractor at his cost.

41.36 All the shafts of rotating equipment shall be properly aligned to those of the matching equipment within design tolerances. All bearings, shafts and other rotating parts shall be thoroughly cleaned and suitably lubricated before starting.

41.37 All the motors and equipment shall be suitably doweled after alignment of shafts with taper / parallel machined dowels as per the direction of the Engineer. Dowel pins required are be machined by the contractor at his own cost. However the materials for dowel pins shall be issued by BHEL free of cost.

41.38 The HT motor bearings shall be blue matched at site and checked for bearing clearances. The contractor if required shall carry out scraping of bearing housing. No extra claim for blue matching up to 1mm initial gap will be entertained.

41.39 The contractor at no extra cost to BHEL shall carry out servicing and realignment of skid mounted equipment.

41.40 Certain instruments like pressure gauges, pressure transmitters, temperature gauges, flow switches and indicators, etc., are received in assembled condition as integral part of equipment. Contractor shall be responsible for safe receipt, installation and custody of these instruments supplied mounted on skids / equipment. BHEL will get these instruments calibrated. The contractor for this scope of work shall assist and co-ordinate for the same with the agency engaged by BHEL to calibrate such instruments.

41.41 All electrical panels, control gears, motors and such other devices shall be properly dried by heating to improve IR valve, before they are energized. Bearings, slip rings commutators and other exposed parts shall be protected against moisture ingress and corrosion during storage and periodically inspected.

41.42 The contractor shall completely erect and test all the piping systems, covered in the specification including sampling lines up to and including sample coolers, hangers & supports, valves and accessories in accordance with the drawings furnished. This includes all necessary

bolting, welding, pre-heating, stress relieving, testing, cleaning and painting. System shall be demonstrated in condition to operate continuously in a manner acceptable to the Engineer. Welding shall be used throughout for joining pipes except where flanged, screwed or other type joints are specified or sown on the drawings. All piping shall be erected true to the lines and elevation as indicated in the drawings.

41.43 Pipes sent in standard length shall be cut to suit the site conditions and the layouts. Tubes or pipes wherever deemed to be convenient will be sent in running lengths with sufficient bends. Bends up to 65-mm nominal bore will have to be fabricated at site.

41.44 The contractor shall ensure lowering of pipes in position with adequate precautions as to avoid any damage to either material or men. Only the anchoring points earmarked for the purpose of lowering the pipes are to be used.

41.45 It is possible that a few flanges may not be matching. The contractor shall be required to cut and re-weld the same as and when required without any additional cost.

41.46 Wherever piping erected by the contractor is connected to equipment / piping erected by the other agencies the joint at the connecting point shall be the responsibility of the contractor who is erecting the piping under this specifications.

41.47 Normally the high-pressure valves will have prepared edges for welding. But, if it becomes necessary, the contractor will prepare new edges or recondition the edges by grinding or chamfering to match the corresponding tubes and pipes within the scope of the work.

41.48 All fittings like `T'-pieces, weld neck flanges, reducers etc., shall be suitably matched with pipes for welding. The valves will have to be checked, cleaned or overhauled in full or in part before erection after chemical cleaning and during commissioning.

41.49 The contractor shall be responsible for correct orientation of all valves so that seats, stems and hand wheels will be in desired location. It is the responsibility of the contractor to obtain the information regarding orientation of valves not fully located on drawings before the same are installed.

41.50 Suspension for piping, etc., will be supplied in running lengths, which shall be cut to suitable sizes and adjusted as required.

41.51 The adjustment of all hangers & supports erected in both cold & hot conditions for maintaining the proper slopes towards the drain pots and application of cold pull in the piping wherever required is also included in the scope of the contractor.

41.52 No temporary supports should be welded on the pressure parts and piping. In case of absolute necessity prior approval should be taken from BHEL Engineer. In such cases the contractor if required, shall carry out heat treatment.

41.53 Spring suspensions / constant load hangers have to be pre-assembled for required load and erection carried out as per instructions of BHEL. Any

adjustments, removal of temporary arrests / locks etc., have to be carried out as and when required.

41.54 Contractor shall install piping in such a way that no excessive or destructive expansion forces exists in either the cold condition or under conditions of maximum temperature and pressure. All bends, expansion joints and any other special fittings necessary to take care of proper expansion shall be incorporated as per the advice of Engineer. During installation of expansion joints, anchors, care must be taken to see that full design movement is available at all times from maximum and minimum temperature.

41.55 The hanger assemblies shall not be used for attachment of rigging to hoist the pipes into position. Other means shall be used to securely hold the pipe in position till pipe supports are completely assembled and attached to the pipe and building structure.

41.56 Layout of small-bore piping in boiler, oil systems etc. as required 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 pipelines even after completion of erection or from aesthetic point of view. Contractor at no extra cost should carry this out.

41.57 All the valves, including motorized valves, flap valves, dampers, actuators, etc. shall be serviced and lubricated to the satisfaction of Engineer before erecting the same and during pre-commissioning also. Welding or jointing of extension spindle for valves to suit the site conditions and operational facility shall be part of erection work within the quoted rates.

41.58 Erection and welding of necessary instrumentation tapping points, thermocouple pads, thermo-wells, valves, battery of first root valves, condensing vessels, flow nozzles, orifices, bellows / expansion joints and control valves etc. to be provided on auxiliaries and pipe lines are covered within the scope of this specification. This will be the responsibility of the contractor and will be done as per the instructions of BHEL Engineer. The welding of all the above items will be contractor's responsibility even if the:

a Product groups, under which these items are released, are not covered in the scope of this tender.

b Items are supplied by any agency other than BHEL.

41.59 The contractor shall carry out the tightening of the field bolts on the equipment and piping covered under this specification by using either the calibrated torque wrench method or the turn of part method. The methods used the tools and the equipment deployed shall be subject to the approval of Engineer. The competent technicians shall carry out the bolting work.

41.60 The contractor shall assist BHEL in preparation of as built piping drawing.

41.61 The commissioning of all pneumatic actuators is excluded from the scope of this contract. The contractor will however be responsible for drawing the materials from the stores and handing over to the agency that is to commission these. Any damage / loss in their custody will be the contractors account.

41.62 The erection and commissioning of all pneumatic power cylinders for the burner-tilt mechanism and SADC is excluded from the scope of this contract.

41.63 The Erection, testing and commissioning of all electrically operated valves, actuators and dampers is covered within the scope of this specification.

41.64 The Erection, testing and commissioning of bed material filling arrangement is covered within the scope of this specification.

42.0 WELDING HEAT TREATMENT, RADIOGRAPHY AND NON-DESTRUCTIVE TESTING

42.1 The pressure parts, equipment and piping shall be erected in conformity with the provisions of Indian Boiler Regulation and as may be directed by BHEL as per any standard / specification in practice in BHEL. The method of welding (arc, gas, TIG or other method) may be indicated in the detailed drawings / schedules. BHEL Engineer will have the option of changing the method of welding as per site requirements.

42.2 Welding of pressure parts, equipment, piping, high tensile structural steel shall be done by certified high pressure welders who posses valid certificate of CIB of the State in which the equipment is erected as per provision of IBR. The H.P. welder who possesses necessary certificate shall ensure re-validation as per relevant provisions of IBR and keep the certificate valid till the completion of work. The services of such welders, the validity of whose certificates have expired shall not be utilized for high-pressure works.

42.3 All welders including tack welders, structural and high pressure welder shall be tested as per ASME section IX / IBR and approved by BHEL Engineer before they are actually engaged on work even though they may possess a valid IBR certificate. BHEL reserves the right to reject any welder if the welder's performance is not found to be satisfactory. The contractor shall maintain the records of qualification AND performance of welders. BHEL Engineer will issue all the welders qualified for the work, an identity card. The welder will keep the same with him at work place at all times. He may be stopped from work if he is not found in possession of the same.

42.4 Engineer may stop any welder from the work if his performance is unsatisfactory for any technical reason or if there is a high percentage of rejection in the joints welded by him. The welders having passed qualification tests does not absolve the contractor of contractual obligation to continuously check the welder's performance.

42.5 Faulty welds caused by the poor workmanship shall be cut and re-welded at the contractor’s expense. The Engineer prior to any repair being made shall approve the procedure for the repair of defective welds. After the repair has been carried out, the compliance shall be submitted to the quality engineer.

42.6 The contractor shall carry out the root run welding of all HP / LP piping, valves by TIG welding method only. The contractor shall have to carry out

full TIG welding of butt weld joints of tubes / pipes of lesser thickness if required. During the root runs of stainless steel joints, the contractor shall before and during welding have to purge the pipes with inert gas. All welded joints for temporary piping required for alkali flushing, acid cleaning and steam blowing should be got done by HP welders only. The root run should be done by TIG welding. All arrangements required for the above shall be the responsibility of the contractor at no additional cost.

42.7 All expenses for testing of contractor's welders including destructive and nondestructive tests conducted by BHEL at site or at laboratory shall have to be borne by the contractor only. Limited quantity of tube and pipe material required for making test pieces will be supplied by BHEL free of cost.

42.8 The regulators used on welding machines shall be calibrated before putting these into use for work. The Contractor at his cost shall also arrange periodic calibration for the same.

42.9 Only BHEL approved electrodes and filler wire will be used. All electrodes shall be baked and dried in the electric electrode-drying oven to the required temperature for the period specified by the Engineer before these are used in erection work. All welders shall have electrodes drying portable oven at the work spot. The electrodes brought to the site will have valid manufacturing test certificate. The test certificate should have a co-relation with the lot number / batch number given on electrode packets. No electrodes will be used in the absence of above requirement. The thermostat and thermometer of electrode drying oven will be also calibrated and test certificate from Govt. approved / accredited test house traceable to National / International standards will be submitted to BHEL before putting the oven in use. The contractor shall also arrange periodical calibration for the same.

42.10 All butt / fillet welds shall be subject to dye penetration test as per the instructions of the engineer at no additional cost.

42.11 The contractor shall maintain a record in the form as prescribed by BHEL of all operations carried out on each weld. He has to maintain a record indicating the number of welds, the names of welders who welded the same, date and time of start and completion, preheat temperature, radiographic results, rejection if any, percentage of rejection etc. and submit copies of the same to the BHEL Engineer as required. Interpretation of the BHEL Engineer regarding acceptability or other wise of the welds shall be final.

42.12 The contractor shall carry out the edge preparation of weld joints at site in accordance with the details acceptable to BHEL Engineer. Wherever possible machining or automatic flame cutting should be done. Gas cutting will be allowed only wherever edge preparation otherwise is impractical. All slag / burrs shall be removed from the edge and all the hand cuts shall be ground smooth to the satisfaction of engineer.

42.13 All welds shall be painted with anticorrosive red oxide paint once radiography and stress reliving works are over. Necessary consumables and scaffolding etc including paints shall be provided by contractor at his

own cost.

42.14 Pre-heating, radiography and other NDT tests, post heating and stress relieving after welding of tubes, pipes, including attachment welding wherever necessary, are part of erection work and shall be carried out by the contractor in accordance with the instructions of the Engineer. Contractor at his cost shall arrange all equipment and consumables essential for carrying out the above process.

42.15 Contractor shall arrange all necessary stress relieving equipment with automatic recording devices. The contractor shall arrange for labour, heating elements, thermocouples, thermo-chalks, temperature recorders, thermocouple attachment units, graphs, sheets insulating materials like asbestos cloth, ceramic beads, asbestos ropes etc. required for heat treatment/ stress-relieving operations. The contractor should take a note of the following,

- Temperature shall be measured by thermocouple and recorded on a continuous printing type recorder. All the recorded graphs for heat treatment works shall be the property of BHEL.
- All stress relieving equipment will be used after due calibration and submission of test certificate to BHEL. Periodic calibration from Govt. Approved / accredited Test Houses traceable to National / International standards will also be arranged by the contractor for such equipment at his cost.
- The contractor shall obtain the signature of Engineer or his representative on the strip chart of the recorder prior to the starting of SR operations.

42.16 The contractor shall also be equipped for carrying out other NDT like LPI / MPI / Hardness test etc. as required as per welding schedules / drawings within the finally accepted price / rates. Ultrasonic testing, wherever required, will be arranged by BHEL. Necessary help in conducting the UT shall however be rendered by contractor.

42.17 The technical particulars, specification and other general details for radiography work shall be in accordance with ASME, IBR or ISO as specified by BHEL.

42.18 The contractor for radiography work shall use iridium-192. The geometric un-sharpness shall not exceed 1.5 mm. The contractor should take adequate safety precautions while carrying out radiography. Contractor at his cost shall arrange necessary safe guards required for radiography (including personnel from BARC).

42.19 Low speed high contrasts, fine grain films (D-7 or equivalent) in 10 cm width only be used for weld joint radiography. Film density shall be between1.5 to 2.0.

42.20 All radiographs shall be free from mechanical, chemical or process marks, to the extent they should not confuse the radiographic image and defect finding. Penetrameter as per ASME or ISO must be used for each exposure.

42.21 Lead numbers and letters are to be used (generally 6mm size) for identification of radiographs. Contract number, joint identification, source used, welder's identification and SFD are to be noted down on paper cover of radiograph.

42.22 Lead intensifying screens for front and back of the film should be used as per the above-referred ASME specification.

42.23 The joint is to be marked with permanent mark A, B, C to identify the segments. For this a low stress stamp shall be used to stamp the pipe on the down streamside of the weld.

42.24 For multiple exposures on pipes, an overlap of about 25-mm of film should be provided.

42.25 Radiography personnel with sufficient experience and certified by M/s BARC for conducting radiographic tests in accordance with safety rules laid down by Division of Radiological protection only have to be deployed. These personnel should also be registered with DRP / BARC for film badge service.

42.26 All arrangements for carrying out radiography work including dark room and air conditioner and other accessories shall be provided by contractor within the space allotted for office at his cost. As an alternative the contractor may deploy an agency having all above facilities and who are duly approved / accredited by BARC and / or other Regulatory authorities. Detailed particulars of such agencies will be submitted and got approved by BHEL Engineer before the actual deployment of agency for radiography work.

42.27 The contractor shall have a dark room fully equipped with radiography equipment, film (un-exposed), chemicals and any other dark room accessories.

42.28 Contractor shall note that 100% radiography will be done at the initial stages on all the piping welding joints. Subsequently radiographic inspection will be done on the basis of quality of welding. However minimum percentage of joints to be radiographed shall not be less than the requirement of BHEL welding schedule / IBR / Customer's requirements. The percentage may be increased depending upon the quality of joints and at the discretion of BHEL. Radiography on LP piping joints is not envisaged. However other NDT test as called for in the FQP including LPI, MPI and HT will have to be carried out.

42.29 All the Radiographs shall be properly preserved and shall become the property of BHEL. They are to be reconciled with the work done, joints radiographed and submitted to BHEL / customer.

42.30 Since radioisotopes are being used, all precautions and safety rules as prescribed by BHEL/BARC/ Customer shall be strictly followed. BARC / DRP certificate to be provided before taking up the work.

42.31 Radiography of joints shall be so planned after welding, that the same is done either on the same day or next day of the welding to assess the performance of HP welders. If the performance of welder is unsatisfactory, he is to be replaced immediately.

42.32 Wherever radiographs are not accepted, on account of bad shot, joints shall be re-radiographed and re- submitted for evaluation.

42.33 However, if the defect persists after first repair, further repair work followed with radiography shall be repeated till the joint is made acceptable. In case the joint is not repairable, the same shall be cut, re-welded and re-radiographed at contractor's cost.

42.34 If the contractor does not carry out radiography work due to non-availability of source / film / chemical / operator etc., BHEL will get the work done departmentally or through some other agency at the risk and cost of the contractor.

42.35 Heat treatment and radiography may be required to be carried out at any time (day and night) to ensure the continuity of the progress. The contractor shall make all necessary arrangements including labour, supervisors/ Engineer required for the work as per directions of BHEL.

42.36 The contractor shall assist BHEL Engineer in preparing complete field welding schedule for all the field welding activities to be carried out in respect of piping and equipment erected by him involving high pressure welding at least 30 days prior to the scheduled start of erection work at site. The contractor shall strictly adhere to such schedules.

43.0 APPLICATION OF REFRACTORY AND INSULATION

43.1 All attachment welding, including welding of hooks / supports as per pitch both on equipment and piping shall be done as directed by Engineer. Attachment welding shall have to be done by certified welders. If necessary contractor may have to cut the hooks to correct length without any extra cost to BHEL.

43.2 Contractor has to supply and apply red oxide paint on welded portions before application of insulation.

43.3 The mineral wool mattresses (bonded / un-bonded) / LRB mattresses are received at site in standard sizes. These are to be dressed / cut to suit site requirements by the contractor.

43.4 The number of layers / thickness of mineral wool / LRB mattresses for auxiliaries, pipe lines, valves and other vessels shall be as per various drawings and as directed by Engineer. For applying the mineral wool mattress, the required holding materials, if necessary by fabrication of rings/ hooks shall be fixed as directed and as per drawings and spec.

43.5 The contractor should ensure, proper finishing of surface of the insulation, sheeting and cementing

43.6 The contractor should ensure that the finished surface of the insulation works conforms to the dimensions and tolerances given in the drawings. Aesthetic finish and accuracy of work are most important.

43.7 It is the responsibility of the contractor to ensure that the insulation materials and sheet metal covering issued to him for application are well protected against loss or damage from weather conditions. Closed / semi

closed sheds or any other arrangements required for this will by him at his cost. If any damage occur to the material due to improper storage or due to any causes attributable to the contractor except for normal breakage or damages allowed in such cases, the cost of such damaged material shall be to the account of the contractor.

43.8 Aluminum sheet cladding will be fabricated to the sizes and shapes specified in drawings. Beading, swaging, beveling of sheets, crowning the sheets if necessary will be carried out by him. Two coats of anti-corrosive black bituminous paint are to be applied on inner surfaces of the cladding. Bitumen sealing compound on the joints if necessary is included in the scope of this work. **Contractor may note that they will also supply anti-corrosive black bituminous paint and bituminous sealing compound required for above works at his cost.**

43.9 Aluminum sheet metal cladding over insulation will consists of plain / ribbed / corrugated sheets. The sheets will be supplied in standard sizes. Cutting them to required size, grooving, fabricating bends, boxes etc., for proper covering is contractor's responsibility. Any cutting / bending / welding of fabricated skin casing sheets if required will also be covered within the scope of this contract.

43.10 A logbook shall be maintained by the contractor to obtain clearance for application of insulation. If the contractor does the work on his own accord without prior permission the area may have to be redone at his cost.

43.11 Contractor is liable for the exact accounting of the material issued to him and he shall make any unaccountable losses good. Wastage allowance for the material issued are as below:

1. Wool / LRB mattresses and cladding sheets..... 2%
2. Insulation bricks and mortar 2%
3. Castable refractory 1%

43.12 The entire surplus, unused materials etc., supplied by BHEL shall be returned to BHEL after the work is over. Materials like gunny bags and packing materials, empty containers may be returned at periodical intervals.

43.13 The contractor shall leave certain gaps and opening while doing the work as per instructions of BHEL engineer to facilitate inspection during commissioning and to fix gauges, fittings and instruments. The gaps will have to be finished as per drawings at a later date by the contractor at his cost.

43.14 If during erection and commissioning any of the parts are to be temporarily fixed and then replaced by permanent ones at a later date or if any of the parts are to be removed for modification, rectification, adjustment and then refitted or if some parts are to be opened for inspection and checking and for measurement of metal surface temperature the same may necessitate removal and re-application of insulation and sheet metal cladding, which shall be done by the contractor and the erection rate quoted shall be inclusive of such contingencies.

43.15 Removable type of insulation shall be provided for valves, fittings, expansion joints etc as per the drawings or as directed by BHEL Engineer.

43.16 All temporary pipelines required during testing, pre-commissioning and commissioning should be insulated as directed by BHEL at no extra cost to BHEL. However required insulation material shall be issued by BHEL free of cost.

43.17 Insulation of expansion joints, dampers, etc shall be carried out after NDT / gas tightness test is completed.

43.18 Special type of Insulation wool used in pent house shall not be cut indiscriminately.

43.19 Castable / Pourable refractory approximately up to **16 MT** is in the scope of contract as and when required for enhancing the progress. It is totally at the discretions of site engineer. Contractor shall mix and apply the refractory / insulation as per the instructions of BHEL Engineer. Castable refractory / insulation after application shall be cured as per the instructions of BHEL Engineer. The contractor shall provide the required quantity of wire nails, planks for formwork and other materials for centering and grouting work.

43.20 Application of castable refractory between tubes, around burners, on ceiling and as directed by Engineer and as per detailed drawings and specifications.

43.21 Dressing of insulation brick to suit site conditions, curing refractory concrete applied/sheet cladding over insulation forms a part of this work.

43.22 Contractor shall observe all precautions for laying / curing of castable refractory. Any defective works found shall be re-laid by contractor at his cost.

43.23 Making structural supporting work for pourable insulation, laying pourable insulation, adhering to all specifications and instructions during application forms a part of this work.

44.0 TESTING, PRE-COMMISSIONING, COMMISSIONING AND POST-COMMISSIONING.

44.1 The contractor shall carry out all the required tests and pre-commissioning and commissioning activities required for their successful and reliable operation. These would include hydraulic test of boiler, land flow test, clean air flow test, chemical cleaning of piping and boiler, water washing, oil flushing of oil system etc. as instructed by BHEL using contractors own consumables, labour and scaffoldings etc. Air leak test on pressure parts preliminary to hydraulic test by compressed air shall also be carried out to check and rectify the various leakage and defects etc.

All the chemicals required for carrying out these activities will be supplied by BHEL free of cost.

All required tests (Mechanical and electrical) indicated by BHEL and their clients for successful commissioning are included in the scope of these

specifications. These tests / activities may not have been listed in these specifications.

Specialized test equipment, if any, shall be provided by BHEL / its client free of hire charges. However contractor has to take proper care of the equipment issued to him.

44.2 Commissioning of ESP shall involve required tests such as air leak test, gas distribution test, motor no load test, rapping mechanism trial runs, interlock tests, charging of transformer fields, commissioning of all electrical equipment / panels, heaters and their proper tuning etc. The contractor shall provide all consumables, labour, scaffoldings and items required for satisfactory testing.

44.3 After completion of erection of furnace, ducts and air heaters, a test shall be performed on the steam generator by the contractor to establish the tightness of the erected equipment from the outlet of FD fan through the steam generator up to stack.

44.4 All the tests may have to be repeated till all the equipment satisfy the requirement / obligation of BHEL at various stages. The contractor shall do all the repairs for site-welded joints arising out of the failure during testing.

44.5 The scope of pre-commissioning activities cover installation of all necessary equipment including temporary piping, supports, valves, blanking, pumps, tanks, with access platforms valves, along with accessories required for hydro test, chemical cleaning, steam blowing or for any other tests. The scope also covers the off site disposal of effluents. **However, erection / dismantling of equipments, required for chemical cleaning, alkali boil out, acid cleaning and passivation activities, remains beyond the scope of this contract.**

44.6 All items / material required for conducting hydraulic test, alkali boil out, acid cleaning, steam blowing etc., will be supplied by BHEL / its customer. However, servicing, dismantling and returning of the same to stores is the responsibility of the contractor who is erecting the equipment / piping. The contractor may note that **no separate payment shall be released for any temporary works** that are to be carried out for conducting pre-commissioning and commissioning tests. Bidders are advised to include expenses on temporary works along with the rates being quoted by them. Broadly the work on temporary systems will be as under:

- Erection etc. of all temporary piping along with insulation and supports for steam blowing; chemical cleaning and affluent disposal are to be carried out as part of work. However all equipment including tanks and electrical switchgear along with their accessories shall be erected by **another agency**. Contractor will be responsible for their operation and any servicing required till completion of his commissioning activities. He will also service the equipment and handover the equipment to the other agency for further erection / commissioning activities.
- Erection etc. of blowers and blanks and putty required for

conducting air tightness test and GD Test are to be installed. (Putty to be procured by the contractor).

The above is only a broad breakup of the temporary works. The engineer at site will make final break up. His decision will be final and binding by all the parties.

Dismantling of the temporary equipment and piping will be done by the agency that has erected the equipment. He will also return the equipment to the stores.

44.7 Drum will be dispatched without fixing internals and internals will be sent separately. The internals have to be fixed as and when required. Dismantling and re-assembly to be done to suit various commissioning requirements.

44.8 Commissioning of the boiler will involve trial run of all the equipment erected. The boiler has to be lighted up for refractory drying, alkali boil out, acid cleaning, passivation, preservation, steam blowing and floating of safety valves. Flushing of all the lines by air, oil or steam as the case may be, trial run of the boiler, servicing of valves and any other works incidental to commissioning are to be carried out. Contractor shall supply manpower round the clock.

44.9 It shall be the responsibility of the contractor to preserve the boiler as per BHEL's requirement.

44.10 It shall be the responsibility of the contractor to provide various category of workers in sufficient numbers along with Supervisors during Pre-commissioning, commissioning and post commissioning of equipment and attending any problem in the equipment erected by the contractor till handing over. The contractor will provide necessary consumables, T&Ps, IMTEs etc., and any other assistance required during this period. Association of BHEL's / Client's staff during above period will not absolve contractor from above responsibilities.

44.11 It shall be specifically noted that the above employees of the contractor may have to work round the clock along with BHEL Engineers and hence overtime payment by the contractor to his employees may be involved. The contractors finally accepted rates should be inclusive of all these factors also.

44.12 In case, any rework is required because of contractor's faulty erection, which is noticed during pre-commissioning and commissioning, the same has to be rectified by the contractor at his cost. If any equipment / part is required to be inspected during pre-commissioning and commissioning, the contractor will dismantle / open up the equipment / part and reassemble / redo the work without any extra claim.

44.13 During commissioning, opening / closing of valves, changing of gaskets, realignment of rotating and other equipment, attending to leakage and adjustments of erected equipment may arise. The finally accepted price / rates shall also include all such work.

44.14 The contractor shall make all necessary arrangements including making of temporary closures on piping / equipment for carrying out the hydro-static

testing on all piping, equipment covered in the specification at no extra cost.

44.15 The valves will have to be checked, cleaned or overhauled in full or in part before erection, after acid cleaning, steam blowing and during commissioning as may be necessary.

44.16 In case any defect is noticed during tests, trial runs and commissioning such as loose components, undue noise or vibration, strain on connected equipment etc., the contractor shall immediately attend to these defects and take necessary corrective measures. If any readjustment and realignment are necessary, the contractor at his cost shall do the same as per Engineer's instructions including repair, rectification and replacement work. The parts to be replaced shall be provided by BHEL.

44.17 All temporary supports shall be removed in such ways that pipe supports are not subjected to any sudden load. During hydraulic testing of pipes, all piping having variable spring type supports shall be held securely in place by temporary means while constant spring type support hangers shall be pinned or blocked solid during the test.

44.18 The contractor shall carry out cleaning and servicing of valves and valve actuators prior to pre-commissioning tests and / or trial operations of the plant. A system for recording of such servicing operations shall be developed and maintained in a manner acceptable to BHEL Engineer to ensure that no valves and valve actuators are left un-serviced. Wherever necessary as required by BHEL Engineer, the contractor shall arrange to lap / grind valve seats.

44.19 Cleaning and servicing of all the filters / strainers, toppings of oils coming in the system shall be done by the contractor within the accepted price.

44.20 At the time of each inspection, the contractor shall take note of the decisions / changes proposed by the Engineer and incorporate the same at no additional cost.

45.0 FINISH PAINTING

45.1 All exposed metal parts of the equipment, structure, auxiliaries, piping, and other items (covered within the scope of this contract) after installations are to be painted. The surfaces are to be thoroughly cleaned of all dirt, rust, scales, grease, oils and other foreign materials by wire brushing, scrapping, any other method as per requirement of BHEL. The same will be inspected and approved by the engineer before painting.

45.2 Mostly the equipment / items/ components will be supplied with one coat of primer paint and one coat of finish paint. However during storage and handling, the same may get peeled off / deteriorate. All such surfaces are to be thoroughly cleaned and to be touch up painted with suitable approved primer and finish paint matching with shop paint / approved final colour. Besides above two coats of approved primer paint is to be applied on all the bare / unpainted surfaces. The gas cut stubs would require being ground and rounded.

45.3 After applying the primer paints, wherever required, all structure / equipment / items, shall be finish painted with paints as specified by BHEL engineer. The number of coats / paint thickness shall be as indicted in the drawing / documents. However at least two coats of finish painting is to be applied. In case proper finish is not obtained in two coats, the contractor shall apply additional coat (s) till proper finish / paint thickness is achieved. Certain equipment / Items are required to be painted with approved quality heat resistant paint. After completion of painting all bright spots shall be cleaned to the satisfaction of Engineer.

45.4 Certain equipment like control panels, valves etc. shall require spray painting. The contractor shall make arrangements of the required equipment for spray painting. Spray painting at the job site shall be permitted only at times and locations approved by Engineer.

45.5 **Contractor at no extra cost to BHEL shall supply all paints; primers, tools and other consumables including scaffolding materials required for finish painting.** Paint is to be BHEL approved make only and painting should be as per colour scheme and quality approved / specified by Engineer. Valid Test Certificate for the paint so supplied shall be made available before use of the same on work.

45.6 The contractor may be required to fill up dents / marks by applying putty before final painting of equipment. All materials and arrangements have to be made within quoted lumpsum price/rates.

45.7 The contractor shall provide legends with direction of flow on equipment and piping in size specified by Engineer. Letter writing shall be done in Hindi / English or in both languages.

45.8 The painters have to under go test and only qualified painters will be allowed to work.

46.0 PROGRESS REPORTING

46.1 Contractor is required to draw mutually agreed monthly erection programs in consultation with BHEL well in advance. Contractor shall ensure achievement of agreed program and shall also timely arrange additional resources considered necessary at no extra cost to BHEL.

46.2 Weekly progress review meetings will be held at site during which actual progress during the week vis-a-vis scheduled program shall be discussed for actions to be taken for achieving targets. Contractor shall also present the program for subsequent week. The contractor shall constantly update / revise his work program to meet the overall requirement. All quality problems shall also be discussed during above review meetings. Necessary preventive and corrective action shall be discussed and decided upon in such review meetings and shall be implemented by the contractor in time bound manner so as to eliminate the cause of non-conformities.

46.3 The contractor shall submit daily, weekly and monthly progress reports, manpower reports, materials reports, consumables (gases / electrodes) report and other reports as per Performa considered necessary by the Engineer.

46.4 The progress report shall indicate the progress achieved against planned, with reasons indicating delays, if any. This should give the remedial actions which the contractor intends to take to make good the slippage or lost time, so that further works again proceed as per the original program and the slippage do not accumulate and effect the overall program.

46.5 The daily manpower reports shall clearly indicate the manpower deployed, category wise specifying also the activities in which they are engaged.

47.0 DRAWINGS AND DOCUMENTS

47.1 The detailed drawings, specifications available with BHEL engineers will form part of this tender specification. These documents will be made available to the contractor during execution of work at site. The contractor will also ensure availability of all drawings / documents at work place.

47.2 Necessary drawings to carry out the erection work will be furnished to the contractor by BHEL on loan, which shall be returned to BHEL Engineer at site after completion of work. Contractor shall ensure safe storage and quick retrieval of these documents.

47.3 The contractor shall maintain a record of all drawings and documents available with him in a register as per format given by BHEL Engineer. Contractor shall ensure use of pertinent drawings / data / documents and removal of obsolete ones from work place and returning to BHEL.

47.4 The data furnished in various annexure enclosed with this tender specification are only approximate and for guidance. However, the change in the design and in the quantity may occur as is usual in any such large scale of work.

47.5 Should any error or ambiguity be discovered in the specification or information the contractor shall forthwith bring the same to the notice of BHEL before commencement of work. BHEL's interpretation in such cases shall be final and binding on the contractor.

47.6 Deviation from design dimensions should not exceed permissible limit. The contractor shall not correct or alter any dimension / details, without specific approval of BHEL.

48.0 TAXES & DUTIES

48.1 **TDS under Income Tax, Sales Tax, VAT etc,** if any, shall be deducted at prevailing rates on gross invoice value from the running bills unless Exemption Certificate from appropriate Authority / Authorities is furnished.

48.2 **Price quoted shall be inclusive of all taxes except service tax.** The service tax, as legally leviable & payable by the contractor under the provisions of applicable law/act, shall be paid by BHEL as per contractor's bill. However, contractor shall have to submit proof of service tax deposited by them immediately after the deposit but not later than the next bill submitted after the due date of deposit. The contractor shall furnish proof of Service Tax registration with Central Excise Division covering the services covered under this contract. Registration should also bear endorsement for the premises from where the billing shall be done by contractor on BHEL for this project The contractor shall obtain prior approval of BHEL before billing the service tax amount.

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 used for providing the output service and service tax paid on input service can be taken credit of against the service tax payable on output service. **As such, while offering the rates, the contractors may take into account the benefit of above provisions as the cost of input to contractors will be the cost net of excise duty and service tax and adjust their offer price accordingly to make it more competitive**.

48.3 In VAT applicable States, "Tax Invoice" if required under the relevant State VAT law shall be submitted alongwith other compliances as per concerned VAT Act.

48.4 Contractor shall get his organization registered with concerned sales tax/VAT authorities within 15 days of award of this contract, if applicable. The delay on this account and delay in bringing the material shall be to contractor's account and no extension of time shall be allowed on this account. The sales tax/VAT registration for this contractor shall be forwarded to BHEL within 30 days from the date of LOI. In case the contractor is already registered for sales tax/VAT with Govt. Authorities he must quote his registration no, while submitting their tender.

48.5 **OCTROI**, if any, payable on the consignments will have to be initially paid by the contractor and necessary reimbursement claimed from BHEL duly supported by documentary proof. Whenever the amount payable in one particular case is more than Rs. 5000/-, the contractor may request BHEL well in time to issue cheque / draft in favor of authorities.

48.6 Contractor has to make his own arrangement at his cost for completing the formalities, if required, with Sales Tax/VAT Authorities, for bringing their materials, plants, and equipment at site for the execution of the work under this contract.

49.0 **EXTRA WORK**:

49.1 BHEL may consider for payment of extra works on man hour basis @ **Rs.30/-** (Rupees thirty only) per man hour only for such of those works which:

A Require major revamping or rework and which are totally unusual to normal erection work.

B Require rectification / modification for improvement in the design during commissioning,

C Requiring fresh fabrication of components in place of rejected / replaced components.

49.2 The rates indicated as above, shall include over time, if any, consumables, supervision, use of tools and tackles and other site expenses and incidentals.

49.3 The extra works, if any, shall be carried out by a separate gang, which will be identified for certification of man-hours. This gang will not be utilized for any other work during the period that they are engaged in the extra-work. Logbook should be maintained and should be signed jointly by the contractor's representative and BHEL Engineer on day-to-day basis. However, signing of the logbook does not necessarily mean acceptance of the extra works, which would be identified by Engineer, whether work is covered in one of the above categories. Only those works and man-hours that are certified by the BHEL Engineer-in-charge will be considered for payment. The decision of BHEL in this regard shall be final and binding on the contractor.

50.0 PRICE VARIATION

50.1 The finally accepted rates for scope of work as defined in this tender are subjected to price variation provisions as per following formula:

$$P1 = \frac{0.75 \times P0 \,(F1 - F0)}{F0}$$

P1 = Increase in billing amount (variation) for the particular month of billing.

P0 = Gross billed amount for the month as per contract provisions.

F1 = All India CPI published by Labour bureau, Simla, Govt. of India, for Industrial workers (Base 1982 =100) applicable for the month under consideration i.e. for which bill has been raised.

F0 = All India CPI published by Labour bureau, Simla, Govt. of India, for Industrial workers (Base 1982 =100) applicable for the month of opening of technical bid.

50.2 The contractor will be required to raise the bills for price variation payments on a monthly basis irrespective of the facts whether any increase or decrease in CPI. Price variation as per above formula will be calculated and paid / deducted on the total contract value on month-to-month basis from the date of award. BHEL however reserves the rights to freeze variation for that much of duration of delays, from time to time, which are entirely attributable to the contractor. Average of applicable index of PVC paid shall be taken as index for PVC FOR final 5% amount.

50.3 With the provision of price variation as above **NO CLAIM / COMPENSATION** on account of any increase whatsoever, (irrespective of whether variation are steep / unanticipated or not compensated by the above escalation provisions in full towards minimum wages, consumables, electrodes, gases or any other item / reason) **will be payable** during the entire period of execution including extended period, if any.

51.0 RATE SCHEDULE

51.1 Contractor shall fully understand equipment description and scope of work before quoting. The scope of work and responsibility of the contractor as mentioned under these specifications shall be covered within the quoted rates.

51.2 The tenderer shall quote the rates as per the rate schedule only, in part II price bid (Original). Conditional price bids or price bids with any deviation / clarification etc. are liable to be rejected. No cutting / erasing / over writing shall be done.

51.3 Contractor's total quoted price as per rate schedule will be taken as tentative only. The contractor undertakes to erect / commission actual quantities as per advice of BHEL Engineer and accordingly **the final contract price shall be worked out on the basis of quantities actually erected at site** and payments will also be regulated for the same. The quantities may vary to any extent and no compensation will be payable in variation of quantity. However, in case of over all variation in Contract value (as indicted in LOI), **beyond (minus) 30%, the contractor will be eligible for compensation** as per the following provision:

"The total executed value shall be raised by 10 % subject to the condition that the total value of work executed plus increase as above shall be limited to 70 % of the awarded contract value"

Contractors are requested to take above into account while quoting. The contractor confirms that the rate quoted above takes care of such variation during execution stage.

51.4 The tenderer is also required to quote for all OPTIONAL items of the rate schedule as the same may be operated according to site conditions and entirely at the discretion of BHEL during the execution of contract. No compensation for non-operation of these OPTIONAL items and getting work done through other agency for optional items, shall be payable to the contractor.

52.0 INSTRUCTIONS TO TENDERER

52.1 Offers received without data / information, required under tender clauses-11.1 to 11.11, is liable to be rejected. All these data / information should be duly supported by documentary evidences (Refer note below clause-11)

52.2 No deviations to the tender conditions will normally be accepted.

52.3 The tenderers are advised to actually visit the site and fully acquaint themselves with site conditions, location of stores, transportation routes, quantum of work etc. before quoting their rates for this work. BHEL shall not be responsible in any way for non-familiarization of the site conditions. Once the tenderer has quoted for the work, it is implied that he has ascertained various site conditions and NO CLAIM whatsoever will be

entertained by BHEL on any such account.

52.4 The contractor in the event of this work being awarded to him shall establish a site office at site and keep posted an authorized responsible officer who should hold a valid power of attorney for the purpose of the contract. Any order or instruction of the Engineer or his duly authorized representative communicated to the contractor's representative at site office, will be deemed to have been communicated to the contractor at his legal address.

SECTION - III B

SPECIAL CONDITIONS OF CONTRACT

CLAUSE NUMBER	DESCRIPTION
53	SCOPE OF WORK
54	DRUM LIFTING
55	FACILITIES TO BE PROVIDED BY BHEL / CONTRACTOR
56	TIME SCHEDULE
57	OVER RUN
58	TERMS OF PAYMENT
59	LIQUIDATED DAMAGES (LD)
60	SECURITY DEPOSIT
61	OTHERS

SECTION - III B

SPECIAL CONDITIONS OF CONTRACT

53.0 SCOPE OF WORK FOR ETC OF CFBC BOILERS PACKAGE AND MATERIAL HANDLING FOR ALL THE MATERIAL COVERED UNDER THE SCOPE OF SUPPLY OF BHEL.

53.1 BHEL has been awarded the work of Design, Manufacture, supply, installation, erection, testing & commissioning of 2X125 MW units including Civil and Structural works at Barsingsar, Distt. Bikaner, Rajasthan by M/s Neyveli Lignite Corporation Ltd., Neyveli, a Govt of India Enterprise. The main equipment consists of boiler, Electro-static precipitator, fans, steam turbines, generators, boilers feed pumps, piping ,associated auxiliaries supports , controls and BOP packages.

The scope in this tender **is Erection, Testing and Commissioning of 2 x 405 t/h, 132-kg/ cm^2 (a), 540 ^oC Steam generators with 335.9 t/h of 32.15 kg / cm^2 (a), 540 ^oC reheat, lignite firing, based on atmospheric circulating fluidised bed combustion (CFBC) technology** and **Material Handling** of packages supplied by BHEL to M/s Neyveli Lignite Corporation Limited (NLCL).

The scope of work under this tender consists of :-

- Taking delivery of the materials from transporters, unloading shifting / reshifting to their designated locations, verification & stacking preservation, conservation etc. under Material handling scope of work.
- Taking delivery of the boiler materials from the project storage yard / stores / sheds to erection site.
- Their preservation, safe keeping, watch and ward.
- Checking, dressing, chipping and leveling of foundations.
- Pre-assembly, erection, alignment of various equipment, machining and grouting.
- Welding, heat treatment, radiography and other non-destructive tests wherever required
- Hydraulic testing, air leak test, land flow test and other pre commissioning tests,
- Insulation and finish painting including supply of paints etc.,
- Steam blowing and safety valve floating including erection and dismantling of all temporary piping, valves, pumps, tanks etc. required for above operations and other commissioning activities including post commissioning operations

and stabilisation of the unit,

- Unit trial operation, resolving any deficiencies observed and handing over of 2 X 125 MW Steam Generator units at BARSINGSAR TPS, BIKANER, Rajasthan

SCOPE OF EQUIPMENTS FOR EACH UNIT

- Complete boiler pressure parts system comprising of:
  Steam drum with internals.
  Water-cooled welded wall furnace system with headers.
  Erection of Fluidised bed heat exchanger system.
  Complete circulation system including connecting piping and down comers.
  Super heater / reheater system including headers, connecting pipes.
  Economiser system including connecting pipes, headers and recirculation system.
  Desuperheater for superheater system and emergency Desuperheater for Reheater system including spray control valve and piping.
- Fludised Bed Heat Exchanger (FBHE)

- Complete boiler integral piping, valves and fittings including the drain and vent piping, safety valve exhaust piping, drain pans, drain piping to ground level, silencers for first spring loaded safety valve at drum and Superheater outlet and Reheater, electromagnetic safety valves and start up vent of SH. Silencers for first spring loaded safety valves and ERV at Reheater. Safety valves for MS and RH lines. Sample coolers and sampling pipes for feed water, boiler water, saturated steam and superheated steam. Valves for IBD, CBD and chemical feed connection. The motorized EBD valves and piping for SG. Motorized startup vent isolation and startup valves
- Complete scope of piping systems listed for ETC of SG package.
- Fuel feeding system (two trains) from crushed lignite bunker outlet, gate at outlet of bunker, drag chain conveyors, self-cleaning rotary valves and master fuel trip valves.
- 2 limestone bunkers with s s lining. Limestone feeding system including Limestone Lime stone rotary feeders.
- 2 Nos. Radial PA Fans with drives, inlet guide vane control and silencers.
- 2 Nos. Radial SA fans with drive, Inlet guide vane control and silencers.
- 2 Nos. Radial ID Fans and drive motors with VFD.
- Tubular Air Preheater for Primary, Secondary and FBHE air.
- Complete set of Emergency BFP.
- Complete sets of Cooling Water Pumps.
- Refractory and Insulation materials wherever required.
- Cyclone separator, with supports, non-mechanical seals and necessary ducting between cyclone and combustion chamber and cyclone and back-pass.
- 2 Crushed fuel Bunkers including Bunker way structure with lining
- Bed material bunker filling and feeding system.
- Initial fill of bed material.
- Initial fill of lubricants
- 3 Seal pot blowers
- 8 FBHE blowers)

- 2 ash coolers
- 2 seal and purge air blowers
- Boiler steam soot blowing system complete with soot blowers, piping, valves and fittings.
- Electrically operated lifting arrangement with monorails for flans and blowers.
  Complete Boiler and auxiliaries supporting structural steel, stairways, platforms and walkways, handrails, complete foundation bolts, anchor channels for all the equipments and columns. Structural steel materials and purlines for Boiler roof, Drum level and operating floor. Staircases on both sides of the boiler with proper approach for either side of operating floor on the front side of the boiler, inter connecting platform between both the SG at elevator landings, boiler to lift, boiler to fuel feeder floor level, bunker floor level.
  - Boiler roof covering with colour coated sheets (base metal thk 0.8 mm), up to drum level and two sides from drum floor to feeder floor (0.6 mm thk) and corrugated Al side cladding sheet (t=1.0 mm) for Boiler area.
- Necessary access platforms, walkways for approach to dampers / gates and other boiler auxiliaries.
- Complete Buck stays and tie-bars for the boiler
- Complete aluminium (t = 1.0 mm) ribbed casing for boiler and plain aluminium sheet casing of 1.0 mm thick for equipment and ductwork & Boiler inner casing wherever necessary.
- Complete air (t = 5 mm) gas (t = 6mm min, 10 mm at bottom) ducts with necessary expansion joints, damper / gates access doors and supports up to stack including chimney inlet frame.
- Boiler rough mountings including access doors, inspection doors and peepholes.
- Mating flanges and connecting materials for hoppers at terminal points.
- Sample coolers for feed water, boiler water, saturated steam and superheated steam.
- Complete electrostatic precipitator dust collecting system as detailed out in section ‘Electrostatic Precipitator’.
- Special tools required for boiler and auxiliaries maintenance covered under scope.
- 2 Pent house cooling fans with drive
- Furnace maintenance cradle-two nos.
- TIG welding wires for root run required for welding of pressure parts during erection.
- Instruments for guarantee / performance testing (on loan basis).

- **Fuel oil system as detailed below:**

- Start-up burner (LDO/ FURNACE OIL) consisting of oil atomizer & gun assembly, diffuser, air register, gas igniters, ignition transformer and retract assembly, wind box for mounting burner with provision for auto closing of burner opening on burner removal etc. complete.
- Bed lance (furnace Oil) consisting of oil atomiser lances assembly with provision for auto closing of opening on removal of lance etc. complete per boiler.
- 3 LDO Pumping unit (3 sets of pumps with other parts) on a common frame

for both the boilers (one pump cater for one boiler)
- 3 FO Pumping unit (3 sets of pumps with other parts) on a common frame for both the boilers (one pump cater for one boiler)
- 3 FO Heating units on a common frame for both the boilers (I heater unit cater for one boiler).
- Boiler front piping for HFO/LDO & AUTOMISING STEAM / AIR etc complete.
- Steam tracing for pumping unit, heater, boiler front piping, drain oil line and drain oil system except main line.
- drain oil Tank in boiler area.
- 01 drain oil pump common for pumping and heating unit for both boilers and one no for each boiler.
- 4 pilot gas bottles.
- Two pent house cooling fans with motors

53.2 The PG wise break up of boiler is tentatively as indicated under Annexure-1-A, 1-B AND 1-C. The details of terminal points are shown in Annexure- I-D.

Approx. weight to be erected shall be 24000 MT for Boiler work as indicated in Annexure-1-A, 1-B AND 1-C. But the contractor is required to erect actual tonnage which may be necessary to complete their work and commission above boiler and complete the work in all respects as detailed in tender specifications, for which payments shall be released on finally accepted tonnage rates.

53.3 Approximately **28000 MT** materials for main plant and approximately **12000 MT** reinforcement and structural steel for civil works will be supplied from our manufacturing units located all over the country as well as our vendors located both in the country and abroad. **The scope of work for material handling** under this tender consists of taking delivery of the materials from transporters, unloading shifting to their designated locations, verification & stacking. Rechecking and verification of consignment weights of reinforcement steel and structural steel supplied to Barsingsar TPS shall be under the scope of contractor. The delivery of these materials will mostly be inside the project campus by road transport. However, delivery of some items may also have to be taken from Godowns of transporters and ways. All material entering the project premises shall have to go through security checks at entry gate. Contractor has to co-ordinate / make all arrangements for entry of vehicles carrying material inside project premises, including initiating request for entry of material / vehicle within the finally quoted rates.

53.4 Brief descriptions of items; their unit weight and size are indicated under Annexure-I A. The contractor has to handle whatever actual materials are dispatched for the project irrespective of any variations and payments shall be released for the actual gross tonnage handled. Though most of the material is being planned to be made available at site well in time for erection requiring proper handling, verification and storage, however certain items may be delayed, requiring direct delivery at site for erection. In such cases where material is received, unloaded and verified by erection agency, contractor for subject work will not be eligible for any payment. Besides above BHEL, entirely at its discretion may get unloaded / handled items like, BOILER DRUM, HP-IP Module, LP Rotor, Generator stator, Generator rotor, Feed storage tank, water wall panels, headers, Air Pre heater and any other materials. Quantities mentioned in the rate schedules are approximate only and liable for variation due to change of scope of work / variation in schedule of quantities, changes in design etc. the contractor will be eligible for compensation as per provision mentioned at cl 53.2.

53.5 The weights and dimensions of material shown are approximate and are liable to vary. No increase in quoted / accepted rates /prices shall be allowed due to change in weights and dimensions of the equipment / materials.

53.6 The HP-IP MODULE and LP Rotor shall be transported to site by road. Unloading of this module is to be carried out manually/EOT Crane and is to be placed at a suitable location.

53.7 The Boiler drum will be transported to site by road. It is to be unloaded at the site near boiler area as directed by BHEL Suitable mobile crane can be provided at site, free of hire charges, subject to availability.

53.8 The Generator Stator and Rotor shall be transported to site by road and are to be unloaded near respective area as directed by BHEL. Suitable crane can be provided at site, free of hire charges, subject to availability.

53.9 Some consignments mainly smalls / parcels may also be received at Bikaner town. The contractor shall have to handle such consignments also as per rates quoted / accepted.

53.10 BHEL will provide free of cost all necessary preservatives, paints, thinners, rust preventives, grease, lubricants and end caps to contractor for preservation of components. All tools & tackles and other consumables required for preservation of components including supervision shall however be provided by contractor at his own cost. Preservation of components includes applying preservatives, paints, rust preventives, greasing of threaded portions, fixing of end caps in position for pressure parts, repainting of work order / DU numbers, component codes etc. After preservation wherever necessary, components will be stacked properly as per original stacking for which no additional payment shall be made.

53.11 The contractor has to mainly use his own equipment like suitable cranes / trucks / tractor-trailers & other material handling equipment including all necessary small / major T & P required for subject work.

53.12 It shall be the responsibility of the contractor to keep in touch with Engineer at site and find out arrival of consignments. The Contractor shall collect all the way receipts, parcel way bills / lorry waybills from BHEL site office either personally or

through an authorized representative. The contractor or his authorized representative shall, for the purpose, visit the said office every day and collect available GR, LWB etc. While collecting the GR, LWB, contractor or his authorized representative will sign the register maintained for the purpose indicating date and time of collection. The contractor shall keep in touch with way authorities, carriers and arrange to effect delivery of consignments immediately on their receipts. Delay may cause deterioration of goods apart from attracting demurrage charges. Contractor shall also maintain a register indicating date of RR, LWB, date of collection of the materials from road transport agencies / lorries and date of stacking them at storage yard of BHEL.

53.13 It is possible that in certain cases, dispatch documents may not be received in time but BHEL may receive Photostat copies of the same. It is, therefore, the responsibility of the contractor to collect these Photostat copies while obtaining indemnity bond from BHEL authorities at site.

53.14 Payment of all demurrage / wharfages that are due to contractor's fault, would be the responsibility of contractor and to his account. If BHEL has to make payment of demurrage / wharfages along with freight, the amount so paid as demurrage / wharfages, for the reasons stated above, shall be paid by the contractor forthwith or would be recovered from bills of the contractor.

53.15 In any case contractor will pursue with concerned Carrier authorities at all level (local/HQ etc.) for waiver / reduction to the minimum of such demurrage/ wharfages charges. Whenever such demurrages/ wharfages become payable due to reasons not attributable to contractor, contractor will immediately bring it to the notice of BHEL with specific request to bear such charges. The decision of the Engineer in such case will be final and binding on the contractor.

53.16 Any discrepancy / shortage / damage found in the consignment after taking delivery from the carriers after giving clear receipt would be the responsibility of the contractor and the amount liable to be lost by BHEL on such accounts is recoverable from the contractor.

53.17 In case of apparent damages / shortages in consignments /packing noticed by the contractor, such cases shall be brought to the notice of BHEL and cleared only with their consent/approval.

53.18 It would be responsibility of the contractor to examine the packages, consignments, etc. on arrival and bring to the notice of carriers and BHEL Authorities regarding loss / damages, if any, observed in the consignments proposed to be taken delivery of. Before taking delivery, particularly of consignments in 'smalls', the weight of the package shall be checked with the invoiced weight / contents of the packages and any discrepancy shall be reported immediately to BHEL/ carriers. In all the cases of loss / damages the contractor will take open delivery from the carriers. They shall forward such Open Delivery Certificates (ODC) to the Engineer within **7 days** of retiring such consignments. All expenses connected therewith shall be to the account of contractor. BHEL reserves right to claim losses, if any, accrued to BHEL in the event of contractor's non-compliance to above.

53.19 In case of short delivery and non-delivery, immediate notice of loss shall be filed with the carriers at places of dispatch and destination as also at any intermediate station, if it is a different one, under intimation to BHEL authorities at site.

53.20 BHEL reserves the right to recover from the contractor any loss which arises out of undue delay / discrepancy / shortage / damage or any other cause during stacking, when the custody of the equipment is with the contractor.

53.21 Unloading from trailer at storage area / work site stacking and re-stacking of heavy sophisticated equipment like boiler drums, water wall panels, heavy motors, heavy bearings, generators, rotors electrical panels turbine components, pumps, panels etc. Shall be done in the presence of or as per the directions of BHEL representative. Certain items may be dispatched with tie rods/ strips welded with frame carrying items and with trailer. These tie rods / strips are required to cut by using Gas flame or by other method as directed by Engineer for unloading of materials without any extra cost within the scope of material handling work.

53.22 Since, the trucks / trailers are expected to arrive during any time of the day / night, the contractor shall have his workmen round the clock at site as well as other places as required to unload the materials.

53.23 Wagons / Consignments coming on Sundays and Holidays are also required to be handled by the contractor promptly. It will be the responsibility of the contractor to contact the site Engineer / his authorized representative of BHEL at their residence, if required, and obtain instructions to make suitable arrangements.

53.24 The detention charges, if any, in the event of delay in unloading from the carrier, will be to contractor's account.

53.25 It shall be the responsibility of the contractor, to provide all necessary facilities and tools to open the packages, in the presence of the Engineer, verifying their contents, re-packing wherever and whenever necessary, properly stacking them as may be directed by the Engineer. These works should be so done so as to facilitate proper handling, periodical verification of materials, receipt position, stock taking etc. The contractor shall have experienced persons at site who can maintain the records of dispatch / receipt/ stacking / verification / shortage / damage / missing items etc. **The verification of materials shall be carried out within 10 days** and report shall be submitted as a documentary proof.

53.26 All materials shall be stored at least 6" above ground level by use of concrete / wooden sleepers or on steel frames. No material shall be left to remain on ground at any time. Materials shall not be stacked in low-lying areas, where they are likely to get flooded during rains. Wooden sleepers / concrete blocks / steel frames and tarpaulins for this purpose wherever deemed necessary shall be issued by BHEL free of charges. However these items shall be stacked / stored properly at a location(s) specified by BHEL when not in use. The contractor is expected to use these most judiciously. In case it is observed that the contractor is not utilizing these optimally, he could be asked to re-stack the same at his cost.

53.27 It is possible that certain heavy items / consignments will require fabrication of a suitable shed over it. These sheds will be covered with suitable sheets or tarpaulin. The contractor will be required to fabricate such sheds. All materials required for this will be provided by BHEL. However all expenses towards manpower, T&P, consumables etc will be borne by the contractor. After the completion of the work the contractor will dismantle the same and return these materials back to the stores. The contractor will be paid @ Rs. 3500/- per MT for such works.

53.28 The material / equipment requiring indoor storage will be handled and stacked inside the storage shed (provided by BHEL) by the contractor using own material handling equipment like Hydra crane, Fork Lift etc.

53.29 For checking / verification of the components / packages with packing slips GR/ LWB/ RR /etc., sufficient experienced persons and other facilities shall be provided by the contractor as and when required by the Engineer.

53.30 Stacking of the material shall be done as per the instructions and to the satisfaction of the Engineer. The materials shall be so stacked that the same should facilitate easy handling. In the event of any improper stacking BHEL may ask the contractor to re-stock the material properly or failing which BHEL may get the job done by any other agency at the risk and cost of the Contractor.

53.31 The contractor shall execute the work in the most substantial and workman like manner. The stores shall be handled with care and diligence. Any loss to BHEL due to contractor's lapse / negligence shall have to be made good by the contractor.

53.32 In case contractor is not able to unload, transport, stack the material at a pre-determined area, as per direction of the Engineer for any reason whatsoever (including non-availability of crane, tractor-trailer and other T&P etc.), BHEL shall be at liberty to get the work done by engaging other agency / equipment / T&P etc. at the risk and cost of the contractor.

53.33 If the contractor or his workmen shall break, deface injure or destroy any part of a building, road, kerb, fenced enclosures, water pipes, cables, drains, electric or telephone posts or wires, trees, stored components or any other property or to any part of erected equipment etc., the contractor shall make the same good at his cost or in default the Engineer may cause the same to be made good by other workmen/agency or by other means and deduct the expense (of which the BHEL Engineer's decision is final) from any sum that may be then or at any time thereafter become due to the contractor or from his security deposit or any other money due.

53.34 It shall be the responsibility of the contractor to keep the storage areas (closed / semi-closed / open) in neat and tidy conditions. Any vegetation like grass, bushes, Sarkandas etc. shall be cut periodically in open storage area & removed as per requirement & instructions of BHEL Engineer within the contractual value. All surplus / unusable packing materials shall be removed and deposited at location(s) specified by BHEL within the project premises (including weighing of the same within the project premises if required).

53.35 Normally the consignments from BHEL's' manufacturing units / their sub-suppliers are sent on freight paid basis. In case any consignment is received at any place on freight to pay basis, it will be the responsibility of the contractor to pay the freight and take delivery of such consignments. The amount of freight paid by the contractor at any point of time in such cases will be limited to Rs. 5,000/-. However, the freight paid by the Contractor will be reimbursed by BHEL within a week's time on production of relevant receipts.

In case of freight amounts exceeds Rs. 5,000/- contractor may request BHEL well in time to issue cheque /draft for such amounts in favor of carriers towards freight charges.

Delay in issuance of cheque / drafts as above shall not in any case be taken as a cause of delay in taking delivery of consignment resulting in wharfages / demurrage leviable by carriers.

Receipt of payment and proof of taking delivery of consignment shall be submitted to BHEL by the contractor.

53.36 In case some materials are required to be dispatched from Barsingsar site to manufacturing units, other sites or any other place, the contractor may be asked by the Engineer to get the same packed, transport it to nearest way Station / Carrier's godowns and get the same booked. The contractors are therefore, requested to quote their rate for this work in Rate schedule. In case of material is required to be booked as freight paid, the freight for the consignment limited to Rs.5,000/- shall be paid by the contractor. However, it shall be reimbursed by BHEL on submission of receipt within a week's time. The funds for freight charges exceeding Rs. 5,000/- shall be arranged by BHEL. Packing material required shall be provided by BHEL free of cost.

53.37 In case some of consignments are to be dispatched on full truck /trailer load basis, where the carriers will place their fleet inside the plant for loading, the contractor may be asked to collect them from different locations of store sheds/yard and load by using his crane and labour. Tenderer are required to quote rates for the work in rate schedule.

53.38 Some of the plant, structural and reinforcement material is already received at Barsingsar project site before start of this contract. The contractor as per the instruction of MM-Incharge BHEL may have to shift/reshift this material. Entire scope of material handling shall be applicable to this material except its unloading work (as it has already been done at the time of its receipt) at the rates applicable to this category of work.

53.39 For any exigencies during execution of the contract, the contractor shall have to depute his personnel for collection/delivery of any material meant for site from/to out station if desired and instructed by the Engineer. The contractor will however be reimbursed expenses incurred for such work for person deputed, as below:-

Second class train fare with reservation / supplementary charges/bus fare subject to furnishing details regarding ticket numbers, journey details, amount of fare etc.

Local conveyance charges (Actual bus / cycle rickshaw/ auto rickshaw fare for local journeys at out station) as permitted by the Engineer.

Daily allowances @ Rs.100/- per day and @ Rs.150/- per day for lodging.

Postal / telegraphic / telephones charges, if any, subject to production of proof of having incurred such expenditure.

Freight and other charges, if any, paid on production of actual receipts.

Payment for the above will be made by BHEL within a month from the date of submission of bill along with details / desired documents by the contractor subject to completion of work assigned to contractor personnel and to the entire satisfaction of the Engineer.

53.40 Tenderer may note that as the place of work is inside the POWER PROJECT and being manned by Security Force of NLCL, all necessary system related to entry of men, vehicle & material, safety & security systems, work permit system etc. as applicable will have to be followed by the contractor.

53.41 The contractor under this contract shall also provide free of cost services of

- **Qualified computer operators (minimum 'O' level qualified) capable of operating the material management/Billing /Progress software package / other packages available at site or for office work for total 54 manmonths,**
- **Qualified experienced engineer for assisting site work total 54**

manmonths

- **Qualified workers for maintaining store record and posting stock ledgers for a total 81 manmonths**
- **Skilled workers for working in store, colony and in maintenance of office for a total 54 manmonths and**
- **Unskilled workers for working in office for a total 54 manmonths.**

Persons so deployed shall have to work in extended hours whenever required. Workmen provided as per the above provisions shall be fully trained and experienced in the nature of work for which they are deployed.

In case contractor fails to provide above-mentioned manpower as desired by BHEL, the latter shall have the right to hire such services from other agencies at the risk and cost of the contractor. However, if BHEL does not utilize the manmonths as per above provision, fully or partly, recovery at the rate of the prevailing minimum wages at Site for the workers categories stated above plus 10% and Rs.10000/- plus 10% against each engineer's man-months will be made from the final bill of the contractor.

54.0 DRUM LIFTING

54.1 Boiler drum shall be transported and placed near the boiler structure by another agency. Positioning of the drum below the structure and its alignment is to be carried out by the contractor under this contract.

54.2 The contractor at site will fabricate drum-lifting structures. The contractor at his cost shall arrange necessary steel and other consumable for the same. The contractor, at his own cost, shall carry out fabrication, erection and complete installation of drum lifting structure. After completion of drum erection and alignment, the contractor shall dismantle the drum lifting arrangements. T&P given to contractor for drum lifting shall be returned to BHEL stores in good condition and to the satisfaction of the Engineer.

54.3 Overhauling of drum lifting winches, both mechanical and electrical parts including application of preservative coating on wire ropes and servicing, lubricating and greasing is in contractor's scope of work. Spare parts for the same will be issued by BHEL free of cost.

54.4 Lashing of wire ropes on the drum with suitable wire ropes has to be done before fixing the lifting arrangement. Contractor has to provide suitable size and quality of wire ropes and clamps for lashing and other purposes. Certificate for the wire ropes and clamps are to be submitted to BHEL Engineer at site for approval.

54.5 Drum lifting shall be allowed after completion of main structural work and all the bracing including the bracing for all the columns and horizontal boiler level platforms. Contractor shall carry out the drum lifting as per the instructions of BHEL Engineer.

54.6 For drum lifting, certain temporary bracings (to be supplied by BHEL) have to be erected to obtain proper rigidity of structure in place of permanent bracing. The same has to be removed and replaced with permanent bracing. No payment shall be made for erection and dismantling of temporary bracing.

54.7 HSFG Bolts are to be tightened by torque wrench as per the instructions of the Engineer. These should be check tightened / re-tightened by torque wrenches

Engineer. These should be check tightened / re-tightened by torque wrenches before drum lifting as instructed by the Engineer.

55.0 FACILITIES TO BE PROVIDED BY BHEL/ CONTRACTOR

55.1 BHEL shall provide limited open space for office and store/ workshop at site free of rental charge. It is the responsibility of the contractor to develop the space for construction of office sheds, to provide all utilities like electricity, drinking water etc., as a part of his scope of work within the accepted rates. Contractor shall make water arrangement from the water pipe line of local network area.

Electric power for office and workshop will be provided free of rental charge by NLCL/BHEL at one point as decided by BHEL. Further distribution will have to be made by contractor.

Construction power, for construction purposes will be provided free at one point near erection site from supply point. Further distribution will have to be made by contractor. All wiring must comply with local regulations and will be subject to Engineer's inspection and approval before connecting supply. Required calibrated energy meter for measurement of power consumed has to be arranged / installed by Contractor at his cost.

Contractors are requested to take above into account while quoting. The contractor confirms that unit rates quoted above take care of such variation during execution stage.

55.2 **The land for labour colony** shall be allotted by NLCL/BHEL. Limited open space for labour colony shall be provided **on nominal rent of Rs.1.00 (Rs. One only) per month for every five cent of land or part thereof** within a distance of five KMs from the site. The Contractor may build only temporary structure on the land for the purpose it is allotted. The land is not transferable in any manner either in whole or in part nor it can be utilized for the purpose of any other Contract. Contractor shall be responsible for providing all necessary facilities like residential accommodation, transport, electricity, water, medical facilities etc. as required under various labour laws and statutory rules and regulations framed there under to the personnel employed by him.

On completion / termination of the work, the Contractor shall remove all temporary structure built by him and restore the land in its original condition and the land shall be handed over to NLCL. The Contractor at his cost shall remove debris generated from demolition of temporary structure. If the contractor fails to give vacant possession of the land as aforesaid in the original condition BHEL/ NLCL reserves the right to withhold payment of Contractors bill till handing over of the vacant possession of the land and contractor shall be liable to pay compensation determined by BHEL/ NLCL for such unauthorised occupation of land. The compensation shall be recovered from the bills of contractor, without any notice.

55.3 The Contractor shall be provided with **Electric Power on chargeable basis at one place only as decided by the BHEL in the labour colony**. The Contractor at his own cost will do further distribution. The Contractor at his own cost shall install the calibrated Energy meter for the electricity metering.

Free water supply at one point in the labour colony shall be provided. The Contractor at his own cost shall do further distribution.

The contractor shall submit to the Engineer his electrical power requirements. Construction power shall be provided free of charge at one point near erection site as required and to be decided by Engineer. Contractor at his cost shall do further distribution.

55.4 **Water for construction purposes shall be provided free of charge** at a one point within erection site. Contractor shall arrange further distribution of water for construction purposes.

55.5 Permanent lighting inside the powerhouse will be provided at a later stage. Till such time such arrangements are made, the contractor at his cost should arrange for temporary lighting in and around his work area.

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

55.7 Provision of distribution lines of both electrical power and water from the central points to the required place with proper distribution boards observing the safety rules laid down by the electrical authorities of the state shall be done by the contractor, supplying all the materials like cables, distribution board, switch boards, TPN, CBS, ELCBS/ MCCBS/ Copper / Brass clamps, copper conductor, change over switches pipes etc. If any failure is caused in supply of the power and water, it is the responsibility of the contractor to make alternate arrangements at his own cost. The contractor shall adjust his working shifts / hours accordingly and deploy additional manpower if necessary so as to achieve the targets.

55.8 The contractor while drawing construction power supply from Distribution Board should strictly adhere to following points.

a) All electrical installations should be as per Indian Electricity rules.

b) All distribution Boards installed by the contractor should be constructed with fireproof materials viz. Steel frames, Bakelite sheets etc.

c) Connection for single phase should be taken from phase and neutral. Nowhere the connection should be taken with earth as neutral.

d) Contractors have to make their own arrangement for their equipment/ DB earthing

e) All electrical connections should be made through connectors, nuts and bolts, switches, plug and sockets. Loose connections or hooking up of wires shall not be permitted.

f) All electrical equipment / tools and plants should be properly earthed. DBs to be earthed diagonally opposite at two points.

g) Contractor should use "MCCB" and "ELCB" either on incoming or outgoing connections to the DBs.

h) Contractor should ensure that all the CBs / TPNs/ Fuses/ MCCB / ELCB

cables etc. should be of adequate rating/ capacity.

For permission of supply connections contractor has to submit a test report of their installations with a single line diagram of connected/ proposed loads.

55.9 ELCB will be tested once in a week or as directed by BHEL by actually simulating the earth leakage for all installations and the same shall be recorded in the logbook to be maintained by the contractor.

55.10 In case of power cuts / load shedding no compensation for idle labour or extension of time for completion of work will be given to contractor.

55.11 Adequate lighting facilities such as floodlights, hand lamps and area lighting shall be arranged by the contractor at the site of construction, contractor's material storage area etc.

55.12 On completion of work or as and when required by BHEL, all the temporary buildings, structures, pipe lines, cables etc shall be dismantled and levelled and debris shall be removed, as per instructions of BHEL, by the contractor at his cost. In the event of his failure to do so, the Engineer will get it done and expanses incurred shall be recovered from the contractor along with prevailing overheads. The decision of BHEL Engineer in this regard shall be final.

55.13 Contractor shall install a computer with modem to connect with BHEL server (LAN) AT SITE.

55.14 Erection of-construction elevator including any civil works is in the scope of the contactor. However BHEL will assist in commissioning of the same.

56.0 TIME SCHEDULE

56.1 The contractor is required to commence the work within 15 days from the date of issue of letter of indent unless BHEL decided to fix any other later date. **However, BHEL Engineer will certify the actual date of start of work after adequate mobilisation of manpower and T&P by the contractor.**

56.2 Entire work as detailed in the tender specifications **for both the units** shall be completed within **27 months** from the date of start of erection work. The various milestones for first unit are to be achieved as under: **Second unit shall have a phase shift of four months from unit – I for these milestones.**

Mile Stones (Unit – 1)	Period
1. Erection Start	Within 15 days From date of issue of LOI
2. Drum lifting	Four months
3. Hydro Test	Thirteen months
4. Charging of ESP	Eighteen months
5. Boiler Light-up	Eighteen months
6. Alkali boil out of boiler	Nineteen months
7. Steam Blowing & SVF	Twentieth months
8. Coal firing	Twenty one months
9. Full loading	Twenty Two months
10. Trial operation & handing over	Twenty Three months

56.3 The work under the scope of this contract is deemed to be completed in all respects, only when the contractor has discharged all the responsibilities laid down in the contract. The decision of BHEL on completion date shall be final and binding on the contractor.

57.0 OVERRUN

57.1 In case due to reasons not attributable to the contractor, the work gets delayed and the scheduled completion gets extended, the contractor shall not be entitled for any overrun compensation for a period of first **3 (Three)** months after the contractual completion date. In case the scheduled completion time gets extended beyond **3 (Three)** months as stated above, the contractor shall be considered for payment of fixed overrun charges **@ Rs.1,00,000/- per month (Rupees one lacs only)** on receipt of advance notice intending to claim overrun and on fulfillment of following conditions: -

(a) The reasons for delay in completion of work are not attributable to contractor but however subject to the provisions of clause – 31.

(b) Contractor achieves the targets fixed during the overrun period.

57.2 Once the claim of over run charges is admitted no other compensation whatsoever (like for delays in receipt of materials, availability of fronts etc.) will be entertained.

57.3 The contractor shall maintain sufficient workforce and other resources required for completion of the job expeditiously for the entire contractual period including total extended period.

58.0 TERMS OF PAYMENT

58.1 The 'Engineer' will certify regarding the actual work executed in the measurement books and bills, which shall be accepted by the contractor in measurement book.

58.2 Contractor shall submit bills for the work completed under the specification, once in a month detailing work done during the month. The format for billing shall be approved by BHEL before raising invoices.

58.3 Contractor shall submit shortage / damage reports on BHEL's standard materials management forms. No payment shall be released till the contractor submits these reports and are verified by the Engineer.

58.4 Subject to any deduction that BHEL may be authorised to make under the contract, the contractor on the certificate of the Engineer at site be entitled for payment as explained hereunder.

I. PROGRESSIVE PAYMENT on pro-rata basis for Sl. No. 1 of rate schedule I shall be as follows

I.A 80% of unit rates for Erection Testing & Commissioning Of Boiler, ESP & Piping etc. except INSULATION AND REFRACTORY work

a 35% of the contract rate on pro-rata basis on placement in position and rough alignment for the items.

b 45% of the contract rate on pro-rata basis on completion of final alignment / fastening / welding / grouting along with proper supports including radiography / NDT / stress relieving wherever involved.

I.B 80% of unit rates for INSULATION AND REFRACTORY work

a 55% of the contract unit rate on fabrication/fixing of retainers, lagging & stitching of mattresses and welding of retainers, fixing of casing supports, fabrication, beading, sealing, bitumen painting, installation and screw fixing of cladding & completion of all jobs as per specifications. The above work includes transportation of required material on location and its proper protection

b 25% of the contract unit rate payable on system completion and area cleaning.

II PROGRESSIVE PAYMENT ON PRO-RATA BASIS FOR MATERIAL HANDLING WORKS SHALL BE AS FOLLOWS:

II. A **FOR Sl. No. 2 & 4 OF RATE SCHEDULE II (FOR MATERIAL HANDLING WORK) MAIN RATES**

1 **50 %** of the rate shall be paid after the materials are unloaded and verified as per RR / LWB / loading advice / box packing slip subject to furnishing of following information along with the bills as per above clause.

2 Material transporting vouchers stating work order and quantity of material for each consignment. Shortage report / open delivery taken w.r.t LWB, if any and acceptance thereof by way authorities/ transporters.

3 Proof of claim lodged with ways/ transporters in respect of above shortage / open delivery.

4 Material management forms duly filled and certified by the Engineer.

5 **30%** of the rate shall be paid as soon as the materials are duly shifted to desired location, stacked and verified by opening of cases / re-packing, wherever necessary (with contractor's own labour and T&P).

Payment will be released on submission of the information, as per material management forms by the contractor immediately after verification of materials as certified by the Engineer. The Engineer at site would supply the requisite Performa.

Contractor must ensure the stacking and verification of materials within 15 (fifteen) days from the date of unloading the materials in store, otherwise the same shall be done by engaging other agency on the risk and cost of contractor and decision of Engineer in this regard shall be final and binding on the contractor.

II.B **FOR Sl. No. 3 & 5 OF RATE SCHEDULE II (FOR MATERIAL HANDLING WORK) MAIN RATES**

80% of the rate shall be paid as soon as the materials are duly shifted to desired location, stacked and verified as per RR / LWB / loading advice / box packing slip by opening of cases / re-packing, wherever necessary (with contractor's own labour and T&P).

Payment will be released on submission of the information, as per material management forms by the contractor immediately after fulfilment of above scope of work for materials as certified by the Engineer.

II. C **FOR Sl. No. 6.1, 6.2 & 6.3 OF RATE SCHEDULE II (FOR MATERIAL HANDLING WORK) MAIN RATES**

1 **80 %** of the rate shall be paid after the materials are unloaded and verified as per RR / LWB / loading advice / box packing slip subject to furnishing of following information along with the bills as per above clause.

2 Material transporting vouchers stating work order and quantity of material for each consignment. Shortage report / open delivery taken w.r.t. LWB, if any and acceptance thereof by way authorities/ transporters.

3 Proof of claim lodged with ways/ transporters in respect of above shortage / open delivery.

4 Material management forms duly filled and certified by the Engineer.

II. D FOR SL NO. 7, 8 AND 9 OF RATE SCHEDULE B, OPTIONAL ITEMS RATE FOR MATERIAL HANDLING WORK

1 **80%** of the unit rate shall be paid on completion of particular item.

NOTE: BHEL site incharge, at his discretion can split / regroup above payment schedule, to facilitate site operations.

III MILESTONE PAYMENTS for BOILER (13% of CV)

1 1.25% of CV on successful completion of hydro- test of the each boiler i. e. 2X1.25%=2.5%

2 0.75% of CV on successful charging of each ESP i. e. 2x0.75%=1.5%

3 0.75% of CV on successful completion of alkali boil out of each unit i. e. 2x0.75%=1.5% .

4 1.5% of CV value on successful completion of steam blowing and SVF each unit i. e. 2x1.5%=3% ..

5 0.75% of CV on coal firing operation of each unit i. e. 2x0.75%=1.5%.

6 0.5 % of` CV on full loading of each unit i. e. 2x0.5%=1% .

7 1.0% of CV on successful completion of trial operations and handing over of each unit i. e. 2x1%=2%.

NOTE:

If the commissioning activities could not be carried out due to no fault of contractor, BHEL Site Incharge, at his discretion, after recording reasons for exercising such option, can split and release payment up to 50% of milestone payment on completion of work, to the extent possible, required for carrying out that particular milestone / commissioning activity.

IV FINAL PAINTING- (2% of CV)

2x1%=2% of CV on successful completion of final finish painting including supply of paint (BHEL Site in charge at his discretion may split above and release payment on prorata basis for supply as well as for application of paints)

V **2.5%** of Contract Value will be payable on handing over of the boiler to BHEL's Customer or 3 months after contractor has discharged his responsibilities as stipulated in this contract, whichever is earlier, if delay in handing over is not attributable to contractor. The boiler shall be considered as handed over on completion of trial operation.

VI **2.5% CV** shall be payable on completion of all pending work, rework wherever required, area cleaning, reconciliation of materials, fulfillment of contractual obligations, and on submission and passing of Final Bill.

NOTE: No payment shall be made for handling of sleepers, blocks and other items issued from BHEL stores for storing, stacking of materials and their return for material handling work.

NOTE**: Payments at V & VI shall be released after adjustment of the CV based on actual contract value / work carried out.**

59.0 LIQUIDATED DAMAGES (LD)

59.1 For delay in completion of work attributable to the contractor, the LD shall be applicable at the rate of ½% of the contract value per week of delay or part thereof limited to a ceiling of 10% of the contract value as mentioned under clause no.25.5 of the GCC of the tender.

60.0 SECURITY DEPOSIT

60.1 The contractor shall submit Security Deposit within 15 days from the date of issue of LOI as per clause no. 16.2 of the General Conditions of Contract (GCC). In case the contractor opts to furnish Bank Guarantee as a part of Security Deposit, the BG shall be issued as per the Performa enclosed as per Annexure-H of the GCC and also that the BG should be issued preferably through any of the Member Banks listed on Page No. 34(a) of the GCC;

For BG through any other Nationalized Bank (Not covered in the list of Member Banks of GCC), the discretion of its acceptance shall lie solely with BHEL.

61.0 OTHERS

61.1 In case of any contradiction between General Conditions of Contract(GCC) and Special Conditions of Contract (SCC), the latter shall prevail.

61.2 The tenderer shall specifically confirm he has inspected the site of work and is fully conversant with the prevailing conditions under which work is to be executed and will not raise claim of any nature due to lack of knowledge of site condition. He will also confirm that local taxation laws at the site have been clearly understood by him.

61.3 The Price Bids of only those bidders will be opened who will be qualified for the subject job on the basis of pre-qualification evaluation / Techno-commercial bids and acceptance of customer. BHEL reserves the right to reject the bidders with unsatisfactory past performance in the execution of a contract. BHEL's decision in this regard shall be final & binding.

ANNEXURE-1A

GENERAL IDEA OF WEIGHTS TO BE HANDLED

The information given below is very tentative and not complete. Only a few of the typical components are listed below to give a general idea to the bidder. The weights and sizes indicated below are only approximate and are liable to vary.

A WEIGHTS

Approximate weight of materials is to be handled

A 1	Main BTG package	28,000MT
A 2	Reinforcement and Structural steel	12,000MT
	Appx Weight	**40,000 MT**

A 3 **Approximate weights for ETC of 2 SG units = 24,000 MT**

B. General idea of some major components to be handled under this contract are (for each unit):

B-1

S N	DESCRIPTION	WEIGHT (MT)
1	Boiler Structures	2500
2	Boiler Pressure parts	2500
3	Ducts	1400
4	Platform /handrails	500
5	ESP	1650
6	Airpreheater	640
7	Fans	200
8	Power cycle Piping	400
9	Refractory	1800
10	Insulation	500
11	Boiler drum size 12500 x 2500 x 2500	62
12	Air heater size 8000 x 3500 x 2000	25
13	Left side water wall inlet header length 15000	
14	Right side water wall inlet header length 15000	

PRODUCT GROUP(PG) WISE INDICATIVE WEIGHT

B-2 SCHEDULE OF BOILER

B-2A SG PKG

PG	DESCRIPTION	WT. IN KG
04	BOILER DRUM	78,424

05	WATER WALL HEADERS AND LOWER DRUMS	115,793
06	WATER WALL PANELS	315,178
07	CIRCULATION SYSTEM COMPONENTS	399,255
08	BUCKSTAYS & FRAMING	242,894
09	SEAL BOXES	20,340
10	SUPER HEATER HEADERS	80,927
11	SUPER HEATER COILS AND WALLS	293,127
12	SUPER HEATER COMPONENTS	169,335
15	REHEATER HEADER	24,175
16	REHEATER AND COILS AND WALLS	156,755
17	REHEATER COMPONENTS	28,977
18	ROOF SKIN CASING	1,138
19	ECONOMISER HEADERS, COILS & SUPPORTS	447,581
20	SOOT BLOWERS	14,060
21	SOOT BLOWERS & SOOT BLOWING SYSTEM	10,263
24	BLR INTEGRAL TRIM PIPING	140,666
28	MANHOLES & FURNACE OPENINGS	3,782
30	FIXING COMPON.FOR MAIN BOILER LINING & INSUL.	24,800
31	BOILER SKIN CASING	13,510
32	FIXING COMPONENTS FOR BOILER AUX. INSULATION	89,602
33	LINING AND INSULATION MATERIAL	568,020
34	MISC.STRUCTURE	749,765
35	BOILER SUPPORTING STRUCTURE	1,708,032
36	BOILER GALLERIES & STAIRWAYS	398,062
37	BOILER OUTER CASING	84,637
38	LIFT	105,000
39	EXTERNAL STRUCTURE	140,902
41	OIL SYSTEM COMPONENTS	3,600
42	OIL PIPING, PUMP & FILTER (EXCLUDING C&I ITEMS)	35,950
43	SCANNER FAN AND PPG	9,600
44	WIND BOX	88,034
47	PULVERISED FUEL PIPING	131,182
48	DUCTS DAMPERS & EXPANSION JOINTS	1,349,400
50	Horizontal Tubular Air Preheater	640,000
56	FANS	177,000
66	COAL BUNKERS	653,359
78	ELECTROSTATIC PRECIPITATOR	1,615,000
80	PIPING DETAILED BELOW ***	527,901
81	MISC EQUIPMENTS & ITEMS DETAILED BELOW ***	54,290
89	GALLARIES & STAIRS FOR ESP	29,501
97	STRUCTURAL MATERIAL	51,050
99	LIFTING TACKES & OTHER HANDLING EQUIPMENT AND MISC ITEMS	5,500
	WT FOR UNIT 1	11,796,367

TOTAL WEIGHT (appx) FOR TWO UNITS OF SG PACKAGE **23,543,234**

*** APPROXIMATE PIPING AND MISC ITEMS WEIGHTS FOR THE ETC OF SG PACKAGE

PGMA	DESCRIPTION	APPROX WT IN KG
80300	MS FROM SUPERHEATER TO BOILER STOP VALVE	6,500
80301	MS FROM BOILER STOP VALVE TO ESV	30,000
80303	MS HEADER TO AUX PRDS	6,300
80304	MS HEADER TO HPBP VALVE	4,200
80307	HP & LP BYPASS WARM UP	650
80310	HRH FROM REHEATER TO INTERCEPTOR VALVE	64,900
80312	LPBP VALVE UPSTREAM & DOWNSTREAM	15,900
80320	CRH FROM TURBINE TO REHEATER	19,600
80321	HPBP VALVE TO CRH PIPING	7,100
80340	AUX STEAM HEADER	2,300
80344	AUX STEAM TO FO SYSTEM TP #	16,000
80345	AUX STEAM TO DEAERATING HEATER	16,000
80349	AUX STEAM TO GLAND S	1,300
80355	STEAM TRACING PIPING #	2,800
80364	CBD TANK VENT TO SYSTEM	370
80365	CBD TANK VENT/SV EXHAUST TO ATMOSPHERE	780
80366	IBD TANK VENT TO ATMOSPHERE	4,200
80373	AUX STEAM HEADER SV EXHAUST	1,200
80395	AUX STEAM TO FUEL OIL ATOMISING	840
80417	BOILER FEED DISCHARGE PIPING	3,500
80418	ERECTION MATERIALS FOR INSTRUMENTS	1,800
80423	BOILER FEED PUMP TO HPH INCLUDING BYPASS	25,600
80424	BFD BETWEEN HTRS & GROUP PROTECTION VLV	8,900
80425	BFD FROM FINAL HPH TO SG TP	24,400
80429	BOILER FILLING PIPING	1,200
80430	SPRAY WATER TO HPBP	1,400
80431	SPRAY WATER TO AUX PRDS	2,500
80432	SPRAY WATER TO BOILER DESH UPTO SG TP	4,500
80450	CBD AND EMERGENCY DRUM DRAIN	2,800
80451	BOILER INTEGRAL PIPING DRAINS	2,100
80452	HP PIPING DRAINS - SG SCOPE	6,400
80453	LP PIPING DRAINS - SG SCOPE	4,800
80460	SG AUX COOLING WATER UNIT SYSTEM	35,200
80600	HIGH PRESSURE DOSING PIPING	480
80601	LOW PRESSURE DOSING PIPING	540
80612	SERVICE AIR FOR INDIVIDUAL UNITS	18,200
80616	INSTRUMENT AIR FOR INDIVIDUAL UNIT	20,700

80650	FUEL OIL SUPPLY AND RETURN PIPING #	28,000
80673	LUBE OIL PIPING SYSTEM #	1,400
80901	SUB DELIVERY VALVES FOR LIGHT UP	850
80905	BHEL VALVES FOR LIGHT UP	7,800
80907	BHEL VALVES FOR ST	100
80920	H&S FOR HYDRO TEST	1,500
80921	H&S FOR LIGHT UP STEAM LINE	6,961
80922	H&S FOR LIGHT UP - NON STEAM LINES	38,921
80923	H&S FOR STEAM BLOWING	30,000
80924	H&S FOR SYNCHRONISATION-STEAM LINES	3,643
80925	H&S FOR SYNCHRONISATION-NON STEAM LINES	12,466
80933	H & S FOR LP PIPING	30,000
80992	IMPORTED ELECTRODES	300
	sub total of PG 80 for unit 1	**527,901**
81-003	CONTINUOUS BLOW DOWN EXPANDER-D1500 MM	2,400
81-008	INTERMITTENT BLOW DOWN EXPANDER-D2000 MM	4,300
81- 018	MIXING TANK FOR CHEMICAL DOSING	1,000
81- 041	IMPURE CONDENSATE TANK	3,000
81- 104	EMERGENCY BOILER FEED PUMP	20,300
81- 110	COOLING WATER PUMP #	1,300
81-120	HIGH PRESSURE DOSING PUMP	750
81- 318	FIX COM FOR MISCELLANEOUS PPG INSULATION	1,700
81- 327	MINERAL WOOL BONDED	8,500
81- 333	ASBESTOS MATL FOR INSULATION	2,200
81- 341	SEALING COMPOUND FOR INSL	150
81- 350	ALUMINIUM CLADDING FOR INSULATION	6,300
81- 411	DIRECT GAUGES FOR STEAM LINES	30
81- 412	DIRECT GAUGES FOR NON-STEAM LINES	1,200
81- 414	LOCAL CONTROL EQPT FOR NON-STEAM LINES	510
81- 415	TEST THERMOWELLS	150
81- 432	CONSUMABLES AND ERECTION MATERIALS	10
81- 435	JUNCTION BOXES	60
81- 436	LOW TENSION CABLES	180
81- 437	SUPERVISORY CONTROL PANEL	250
	sub total of PG 81 for unit 1	**54,290**

TOTAL WT OF PG 80 & 81 FOR UNIT 1 **582,191**

Total weight of PG 80 &81 for two units **1,114,882**

NOTES:

COMMON FOR BOTH THE UNITS

B-2B : APPX WEIGHTS FOR MATERIAL HANDLING, NOT FOR THE ETC OF SG PKG

PGMA	DESCRIPTION	APPROX WT IN KG
80- 302	MS- ESV TO TURBINE	6,100
80- 311	HRH DOWNSTREAM OF INTERCEPTOR VALVE	7,900
80- 322	CRH PIPING TO DEAERA	6,900
80- 331	EXTRACTION STEAM TO	3,200
80- 332	EXTRACTION STEAM TO	1,300
80- 335	EXTRACTION STEAM TO	4,900
80- 336	EXTRACTION STEAM TO	1,100
80- 337	EXTRACTION STEAM TO	880
80- 371	DRAIN FLASH TANK VEN	860
80- 375	UNLISTED SV EXHAUSTS	6,600
80- 381	HP HEATER VENTS - TG	970
80- 382	LP HEATER VENTS	2,000
80- 388	CONDENSER AIR EVACUA	1,800
80- 400	CONDENSATE SUCTION	1,900
80- 401	CD FROM PUMP TO LPH1	10,500
80- 403	CD FROM TG TP TO DEA	4,900
80- 407	CONDENSATE FOR SEALI	2,600
80- 408	CONDENSATE DUMP FROM	1,700
80- 419	DEAERATOR SAFETY VAL	540
80- 420	BOILER FEED PUMP SUC	4,900
80- 421	BOILER FEED PUMP REC	5,200
80- 439	TURBINE FLASH TANK D	1,200
80- 442	GLAND STEAM COOLER D	400
80- 444	LP HEATER-2/3/4/5 DR	2,800
80- 446	DEAERATING HEATER OV	4,000
80- 447	HP HEATER DRAINS	3,300
80- 449	TG CYCLE PIPING DRAI	7,300
80- 463	TG AUX COOLING WATER	153,000
80- 468	MAIN CIRCULATION WATER PIPING	360,000
80- 473	DEMINERALISED WATER SYSTEM	5,500
80- 478	DRINKING WATER PIPING	6,500
80- 496	DRAIN FLASH TANK VEN	4,300
80- 928	H&S FOR BOILER LIGHTUP **	45,000
80- 930	H&S FOR SYNCHRONISATION **	30,000
		700,050

SUB TOTAL

Weight for two units **1,400,100**

COMMON FOR BOTH THE UNITS

B-3 STEAM TURBINE

SLNo.	DESCRIPTION	dc	QTY	WT
1	Steam Turbine Oil Cooler	CD	2	10,220
2	L.P.Sidewall (Ts)	MT	1	11,554
3	L P Front Bearing Pedestal	MT	1	12,476
4	L.P.Inner Casing-Ii Top	MT	1	22,000
5	L.P.Inner Casing Bottom	MT	1	14,501

6	L.P Outer Casing Upper Part(T.S)	MD	1	12,215
7	L.P Outer Casing Upper Part(G.S)	MD	1	12,460
8	L.P.Rotor	MT	1	27,935
9	Hp-Ip Turbine Assly	MT	1	113,603
10	I.P Valve Casing Exec-Ii	MT	1	10,717
	HEAT EXCHANGERS			
13	Support Plate	MD	22	20,900
14	Front Water Box Assly.	MD	2	18,000
15	Rear Water Box Assly.	MD	2	13,500
16	Condenser Spring As per Kf2-5600/160	DS	24	12,000
17	Air Exhauster With Induction Motor	DS	2	11,200
18	Hp Heater No 5	MD	1	18,000
19	Hp Heater No 6	MD	1	23,738
20	Storage Tank Assly	CD	1	24,524
21	Header Assenbly	CD	1	10,365
	APPX WEIGHT FOR TWO UNITS			**799,813**

B-4 SIZE & WEIGHT SCHEDULE OF MAJOR COMPONENTS OF BFP, BP & CEP

(A) Boiler Feed Pump (BFP) & Booster Pump (BP)

Sl. No.	Description of Equipment	Dimensions (mm) Length x Breadth x Height	Unit Weight (kg)	Total Qty. (Nos.)	Total Weight (kg)
1	BFP Skid (Pump Assly. + Base Plate + Tubing + Seal Coolers)	2250 x 1000 x 1050	5770	2	11,540
2	BP Skid (Pump Assly. + Base Plate + Tubing)	1650 x 1200 x 950	2511	2	5,022
3	Hydraulic Coupling	1800 x 1700 x 1800	3000	2	6,000
4	Hydraulic Coupling Working Oil Cooler	3700 x 1500 x 500	1700	2	3,400
5	Hydraulic Coupling Lube Oil Cooler	3100 x 1300 x 450	1000	2	2,000
6	BFP Suction Strainer at BP suction	900 x 800 x 1400	725	2	1,450
7	BFP Recirculation Valve	1800 x 550 x 1400	300	2	600
8	Local Gauge Boards with instruments	2000 x 300 x 1800	400	4	1,600
	APPX WEIGHT FOR TWO UNITS				63,224

(B) Condensate Extraction Pump (CEP)

Sl. No.	Description of Equipment	Dimensions (mm) Length x Breadth x Height	Unit Weight (kg)	Total Qty. (Nos.)	Total Weight (kg)
1	CEP Assembly with Canister	ϕ 1100 x 4500	3450	2	6,900
2	CEP Foundation Ring	1100 x 1100 x 150	185	2	370
3	CEP Suction Strainer	900 x 800 x 1400	650	2	1,300
4	Local Gauge Board with instruments	2000 x 300 x 1800	400	1	400
	Appx Weight For Two Units				17,940

B-5 Major dimensions & weights of items of KN turbine (For turbine portion only)

Turbine type: K30-16+N30-2X3.2

S. No	Item description	Dimensions of item (L x B x H) mm	Qty.	Wt./ Piece (Tons)	Total weight (tons)
1	Combined HP-IP (K)-module	6370x4360x3120	1	113	113
2	HP exhaust insert	1150x1100x1100	1	2	2
3	HP valve	3915x3350x1300	2	5.8	12
4	HP overload bypass valve	1500x1300x680	1	5	5
5	IP valve	4230x1350x4360	2	9.3	19
6	Valve actuators*	1500x400x400	9	1	9
7	Front bearing pedestal (K-turbine)	1700x2500x1435	1	9	9
8	Rear bearing pedestal (K-turbine)	1600x3100x1610	1	9.6	10
9	Rear bearing pedestal (LP turbine)	1350x2600x1430	1	6.2	6
10	Bearing pedestal loose parts	1000x1000x1000	1	1.1	1
11	LP rotor	5510x2240x2240	1	26.4	26
12	Upper LP inner casing-I	1070x2690x1280	1	4.2	4
13	Upper LP inner casing-II (incl. Guide wheels)	2550x4960x1500	1	13	13
14	Lower LP inner casing-II (incl. Lower LP inner casing-I & guide wheels)	2550x4960x1720	1	18.5	19
15	Diffuser (LP)	450x3025x3025	2	1.4	3
16	LP longitudinal girder	5280x1050x1210	2	7	14
17	LP side wall	760x4960x2750	2	5.3	11
18	LP outer casing	2400x5200x2150	2	6.5	13
19	LP turbine loose parts	2000x2000x2000	1	7.3	7
20	Cross around piping**	1500x1200x962	2	0.9	2

21	Cross around piping**	2750x1200x962	2	1.5	3
22	Cross around piping loose parts**	1000x1000x1000	2	0.5	1
23	LP bypass valve**	850x1100x5500	2	3	6
24	LP base plates	500x500x600	1	2.2	2
25	LP extraction piping	4500x3000x3500	1	5.3	5
26	MS steam strainer	1400x685x960	2	1.5	3
27	HRH steam strainer	2075x860x1260	2	2.5	5
28	Foundation bolts	4500x3000x2000	1	4.6	5
29	Inter connecting piping bet. HP valve & HP overload valve	4500x3000x3000	2	2	4
30	HP oil supply unit**	2900x1300x2350	1	3	3
	Appx Weight For Two Units				668

*: DS item **: DD item

B-6 TURBO GENERATOR

Sl. No.	DESCRIPTION OF EQUIPMENT	OVERALL DIMENSIONS IN MM			WEIGHT (M.T)
		LENGTH	BREADTH	HEIGHT	
1	Generator Stator	8200	4020	3966	163
2	Generator Rotor	8900	1200	1200	37
3	Foundation Itmes	LOOSE ITEMS			8
4	Bearings	1810	540	1228	6
5	Aircooler Unit	6600	1900	3500	7
6	Exciter	4600	2020	1803	7
7	Co2 Equipment	-	-	-	3
	Appx Weight For Two Units				461

B-7

SUMMARY OF TURBINE WT

S. No.	ITEMS	FACTORY	VENDOR		TOTAL WT
1	Steam Turbine	455049	48350		503,399
2	Generator	228266	12122		240,388
3	Heat Exchanger	517914	501		518,415
4	Pumps	12351	0		12,351
	Appx Weight For Two Units				2,549,106

NOTES:

1. Entire material indicated above & supplied by BHEL or its associates for BARSINGSAR Project shall form the scope of Material Handling work.

2. Approximate Weights and PG's indicated above at B2A shall be treated for Erection Testing and Commissioning scope in addition to scope of material handling. Besides PGs indicated above for SG package, there is likely hood of addition of new PGs for release of some items integral to Boiler. Contractor's finally accepted rates shall be applicable for such PGs also. Similarly some PGMA's listed above for piping are indicative showing different systems of piping to be erected. It is possible that some PGMAs may be added to this list during the course of execution. The contractor shall have to complete the same at the same rate.

3. Erection and dismantling of all temporary piping valves, pumps tanks etc. for carrying out hydraulic test, chemical cleaning, steam blowing and other tests as stated elsewhere in tender document. However **erection / dismantling of equipments required for chemical cleaning remains beyond the scope of this contract**, No additional payment will be made on account of erection / dismantling of any temporary systems.

4. Final painting of all PGs is included in the scope. Paints required for the purposes as per specifications and shades specified by the engineer are to be arranged by the contractor at his cost.

TENTATIVE LIST OF PP WELD JOINTS FOR BARSINGSAR THERMAL POWER PLANT

SN	SYSTEM	NO OF JOINTS	NO OF EQVLNT JOINTS of standard size of 57X8
1	COMBUSTOR	3100	5800
2	FBHE	6300	8600
3	SUPERHEATER	7500	7800
4	REHEATER SYSTEM	4700	2900
5	ECO SYSTEM	1500	1000
6	DRAINS AND VENTS	1800	1600
7	OTHERS	100	300

Note:

1 The weld joint shall be of outer diameter 21.3mm to 609.6mm of any of material specifications AP 15 LGrB(A), SA 209 T1, SA 210 Gr A1, SA 210 Gr A2, SA 210 Gr A3, SA 213 T 12, SA 213 T 22, SA 234 WP91(A), SA 106 Gr B, SA 106 Gr C, SA 335 P12, SA 312 TP304H and SA 335 P22 or of other specifications. Approximate number of welds joints and equivalent weld joints shall be **25000** and **28000** respectively for each unit.

2 This is a preliminary list of erection weld joints of pressure parts. Contractor may note that no. of weld joints and equivalent joints indicated above are only approximate and for ready reference. The no. of joints may very according to site conditions and as per design considerations of manufacturing Units. No claim shall be considered for any extra joints what so ever.

3 The joints indicated above do not include joints for fine fittings / trim piping, suit blower, oil system etc which shall be supplied in running meters and the same are to be erected as per layout at site.

4 Welding of Oil system joints shall be as per welding schedules.

5 Radiography and Stress Relieving shall be done as per weld schedules/ drawings or the instruction of BHEL site engineer.

6 Material specification, sizes and no of weld joints may very as per detailed specifications or site conditions.

LIST OF TERMINAL POINTS

All terminal points are as shown in BHEL drawings and also depend on site condition and mutually agreed with BHEL Site engineer. However some major points are listed below for reference:

SN	System	Terminal point
1	Lignite	Outlet flange of crushed lignite bunker
2	LDO	From outlet of fuel oil unloading lorry nozzle connection.
3	Fuel oil HSD/HFO	From outlet of fuel oil unloading lorry nozzle connection.
4	Limestone	Outlet of crushed limestone bunker
5	Bed material	Inlet of bed material bunker near boiler.
6	Flue gas	Inlet flange of chimney.
7	Bottom Ash	Outlet flange of Ash Grinder
8	Fly Ash	Outlet flange of economiser bottom hopper. Outlet flange of hoppers below AH. Outlet flange of hoppers below ESP.
9	M S piping	ESV Inlet
10	HRH Piping	IV Inlet
11	CRH Piping	Turbine outlet flange (Excluding CRH NRV)
12	LP BY Pass	Inlet of LP BY Pass Valves.
13	Auxiliary steam line	Up to Main Plant Crusher house of Lignite Handling system

Note: Final connection for the terminal points shall be in the scope of this tender

ANNEXURE –II (A)

LIST OF T&P BEING PROVIDED BY BHEL ON FREE OF HIRE CHARGES AND ON SHARING BASIS

AA) FOR STG WORK:

Sl.No.	Equipment	Capacity	Quantity
1	Crawler crane	100/150 MT	1
2	Crawler crane	75 MT	1
3	Mobile Crane	15/20 MT	1
4	EOT crane		1
5	Motor operated Hydraulic test pump	450 kg / cm^2	1
6	Construction Elevator		1
7	Huck Bolting machine		1
8	Drum Lifting Winches with wire ropes and sheave blocks.		1 set

Notes:

1. Any other special T&P if supplied by the manufacturer will also be provided to the contractor free of hire charges as and when made available. Special tools and tackles are to be used only for the purpose for which these are meant and to be returned in good condition.

2. The above mentioned suitable capacity crane without slings & lifting tackles will be provided by BHEL on sharing basis for unloading of heavy consignments only (mainly boiler drums, deaerator & feed storage tank) which can not be unloaded / handled by lower capacity crane to be provided by contractor.

3. EOT cranes, erected / commissioned by another agency if available will also be provided by BHEL free of hire charges & on sharing basis for subject work. The maintenance of EOT cranes will be carried out by BHEL / its client. However contractor will not be entitled for any compensation due to non-availability of EOT cranes.

4. Other terms and conditions regarding above items shall be as per Clause No.37 (T&P / IMTEs).

Annexure-II (B)

LIST OF IMTEs BEING PROVIDED BY BHEL ON FREE OF HIRE CHARGES AND ON SHARING BASIS

S.No.	Description	Range	Quantity
1	ANEMOMETER	0- 15 M /SEC	01 No.
2	PITOT TUBE		01 No.
3	mV / mA SOURCE	0-200 mV, mA	01 No.

Notes:

1. The above list of testing instruments / equipments required for testing / commissioning is only for guidance to contractor and not complete. Any other / additional testing instruments / equipment required for timely and satisfactory completion of job will also be arranged by contractor at his own cost.
2. Contractor must reascertain / recheck range and accuracy of each IMTE from BHEL Engineer well in advance before arranging calibration / deployment.
3. Other terms and conditions regarding above items shall be as per clause No.37 (Tools & Plants / IMTEs).

ANNEXURE-III (A)

INDICATIVE LIST OF MAJOR T&P TO BE PROVIDED BY CONTRACTOR FOR EXECUTION OF TENDERED WORKS FOR MOST DURATION OF THE CONTRACT

S.NO.	EQUIPMENT	CAPACITY	QTY
1.	Mobile Crane	36/40 MT	1
2.	Mobile Crane	18 MT	1
3.	Hydra	8/10 MT	2
4.	Trailer with pulling unit	20/25 MT	2
5.	Trailor with tractor	10/15 MT	1
6.	Electric Winch	2/3/5 MT	As per requirement
7.	Welding set with accessories		As per requirement
8.	Power drill m/c for platform & roof		As per requirement
9.	Heavy duty Hydraulic Jacks for releasing of roof hangers		As per requirement

NOTES.

1. The above list specifies only major T&P (may not be complete) to be deployed by the contractor and is based on minimum requirement. All additional / other tools and plants including suitable capacity D shackles, slings, rails sleepers hydraulic / mechanical jacks etc which are required for satisfactory & timely completion of work shall also be deployed by the contractor within finally accepted rate / price.

2. Tyre mounted 18T crane must be with 360 degree rotational swing mechanism to facilitate unloading and placement of material at identified locations.

3. Consignments which cannot be handled by above cranes of contractor, can be unloaded / handled by sleeper jack method. Alternatively suitable capacity crane is to be arranged by contractor for handling such consignments. The bidders are required to take note of it while submitting their offer.

4. Suitable capacity crane without slings & lifting tackles will be provided by BHEL on sharing basis for unloading of heavy consignments (mainly boiler drums, HP-IP Module, Deaerator & Feed storage tank) which can not be unloaded / handled by 36/40 MT crane to be provided by contractor. All other terms & conditions shall be as per tender clause no. 37(Tools &Plants/IMTE).

Annexure-III (B)

Tentative list of major IMTEs to be arranged by CONTRACTOR at his own cost.

S.NO.	DESCRIPTION	RANGE	ACCURACY	QUANTITY
				PART-A
1	Hand operated Megger 500V/1000V	Upto 200M Ohms	+/- 5% at centre scale +/- 10% at end of scale.	AS REQD
2	Tong tester	10,20 or 50 Amp. AC/DC	+/- 3%	AS REQD
3	Digital Multimeter			AS REQD
4	Multimeter analogue			AS REQD
5	Temperature recorder for 0-1000 C 6/12 Points with			4
6	Stress reliving thermocouples / rods and compensating cable			4
7	U tube manometer (water) 0-2000 mm water column with steel scale			2
8	Inclined Manometer (water) 0-50 mm			1
9	Bolt Tension Calibrator (for Boiler work)			2

Annexure—IV

CERTIFICATE OF DECLARATION FOR CONFIRMING THE KNOWLEDGE OF SITE CONDITIONS

We,…… …… Hereby declare and confirm that we have visited the project site under the subject namely, ……and acquired full knowledge and information about the ***site conditions, wage structure, Industrial climate and total work involved***. We further confirm that the above information is true and correct and we will not raise any claim of any nature due to lack of knowledge of site condition.

Tenderers Name and Address

Place: (Signature of the Tenderers with stamp)

Date:

ANNEXURE-V

NON DISCLOSURE AGREEMENT
Memorandum of Understanding

BHEL PSNR is committed to Information Security Management System as per Information Security Policy.

M/s……, providing……..service to BHEL PSNR, Noida hereby undertake to comply with the following in line with Information Security Policy of BHEL PSNR;

- To maintain confidentiality of documents & information which shall be used during the execution of the Contract.
- The documents & information shall not be revealed to or shared with third party which shall not be in the business interest of BHEL PSNR.

( )	( )
M/s. BHEL, PSNR	M/s……..