

TENDER SPECIFICATION

Tender Specification Number: BHE/PW/PUR/HONGI-HRSG/1601

COLLECTION / TRANSPORTATION OF MATERIALS FROM BHEL / CLIENT'S STORES / STORAGE YARD TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING, APPLICATION OF THERMAL INSULATION, SUPPLY OF PRIMER / PAINTS AND APPLICATION OF PRIMER / PAINTS FOR FINAL PAINTING, COMBINED CYCLE TRIAL OPERATION / PERFORMANCE TEST & HANDING OVER OF 1 UNIT OF 55 TPH HEAT RECOVERY STEAM GENERATOR ALONG WITH ITS AUXILIARIES, STEEL CHIMNEY WITH PLATFORMS INCLUDING ELECTRICAL WORK OF CHIMNEY, ALL PIPING INCLUDING INTERNAL, EXTERNAL, FIELD PIPING (IBR, NON IBR INCLUDING CW), BALANCE OF PLANT SYSTEMS LIKE FIRE PROTECTION & DETECTION SYSTEM , MISC. EQUIPMENTS OF 1X51 MW COMBINED CYCLE POWER PLANT (1X19MW STG + 1X32 MW FR 6B GTG + 1X55 TPH HRSG+ PIPING + BOP)

AT

ONGC COMPLEX, HAZIRA, SURAT, GUJARAT .

TECHNICAL BID - VOLUME- I



TENDER SPECIFICATIONS CONSISTS OF:

- Notice Inviting Tender
- Volume 1 A - Technical Conditions of Contract,
- Volume 1 B - Special conditions of Contract,
- Volume 1 C - General conditions of Contract
- Volume 1 D - Forms & Procedures

Bharat Heavy Electricals Limited
(A Government of India Undertaking)
Power Sector - Western Region
345-Kingsway, Nagpur-440001

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TENDER SPECIFICATION

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COLLECTION / TRANSPORTATION OF MATERIALS FROM BHEL / CLIENT'S STORES / STORAGE YARD TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING, APPLICATION OF THERMAL INSULATION, SUPPLY OF PRIMER / PAINTS AND APPLICATION OF PRIMER / PAINTS FOR FINAL PAINTING, COMBINED CYCLE TRIAL OPERATION / PERFORMANCE TEST & HANDING OVER OF 1 UNIT OF 55 TPH HEAT RECOVERY STEAM GENERATOR ALONG WITH ITS AUXILIARIES, STEEL CHIMNEY WITH PLATFORMS INCLUDING ELECTRICAL WORK OF CHIMNEY, ALL PIPING INCLUDING INTERNAL, EXTERNAL, FIELD PIPING (IBR, NON IBR INCLUDING CW), BALANCE OF PLANT SYSTEMS LIKE FIRE PROTECTION & DETECTION SYSTEM , MISC. EQUIPMENTS OF 1X51 MW COMBINED CYCLE POWER PLANT (1X19MW STG + 1X32 MW FR 6B GTG + 1X55 TPH HRSG+ PIPING + BOP)

AT

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TECHNICAL BID - VOLUME- I

EARNEST MONEY DEPOSIT: Refer Notice Inviting Tender
LAST DATE FOR Refer Notice Inviting Tender
TENDER SUBMISSION .

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

M/s.

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PLEASE NOTE:
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

ADDL GENERAL MANAGER (Purchase)

Place: Nagpur

Date :

1601

NOTICE INVITING TENDER

Bharat Heavy Electricals Limited



Ref: No: BHE/PW/PUR/HONGI-HRSG/1601

Date: 02/03/2015

NOTICE INVITING TENDER (NIT)

NOTE: BIDDER MAY DOWNLOAD FROM WEB SITES OR PURCHASE TENDERS FROM THIS OFFICE ALSO

To

Dear Sir/Madam

Sub : NOTICE INVITING TENDER

Sealed offers in two part bid system are invited from reputed & experienced bidders (meeting PRE QUALIFICATION CRITERIA as mentioned in Annexure-I) for the subject job by the undersigned on the behalf of BHARAT HEAVY ELECTRICALS LIMITED as per the tender document. Following points relevant to the tender may please be noted and complied with.

1.0 Salient Features of NIT

| SL NO | ISSUE | DESCRIPTION |
|-------|-----------------------------------|--|
| i | TENDER NUMBER | Tender Specification No. BHE/PW/PUR/HONGI-HRSG/1601 |
| ii | Broad Scope of job | COLLECTION / TRANSPORTATION OF MATERIALS FROM BHEL / CLIENT'S STORES / STORAGE YARD TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING, APPLICATION OF THERMAL INSULATION, SUPPLY OF PRIMER / PAINTS AND APPLICATION OF PRIMER / PAINTS FOR FINAL PAINTING, COMBINED CYCLE TRIAL OPERATION / PERFORMANCE TEST & HANDING OVER OF 1 UNIT OF 55 TPH HEAT RECOVERY STEAM GENERATOR ALONG WITH ITS AUXILIARIES, STEEL CHIMNEY WITH PLATFORMS INCLUDING ELECTRICAL WORK OF CHIMNEY, ALL PIPING INCLUDING INTERNAL, EXTERNAL, FIELD PIPING (IBR, NON IBR INCLUDING CW), BALANCE OF PLANT SYSTEMS LIKE FIRE PROTECTION & DETECTION SYSTEM , MISC. EQUIPMENTS OF 1X51 MW COMBINED CYCLE POWER PLANT (1X19MW STG + 1X32 MW FR 6B GTG + 1X55 TPH HRSG+ PIPING + BOP) AT ONGC COMPLEX, HAZIRA, SURAT, GUJARAT . |
| iii | DETAILS OF TENDER DOCUMENT | |
| a | Volume-IA | <i>Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc</i> <i>Applicable</i> |
| b | Volume-IB | <i>Special Conditions of Contract (SCC)</i> <i>Applicable</i> |
| c | Volume-IC | <i>General Conditions of Contract (GCC)</i> <i>Applicable</i> |
| d | Volume-ID | <i>Forms and Procedures</i> |
| e | Volume-II | <i>Price Schedule (Absolute value).</i> <i>Applicable</i> |

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| | | | |
|------|--|--|-------------------------------|
| iv | Issue of Tender Documents | <p>1. Sale from BHEL PS Regional office at : Start : 02/03/2016 , Closes: 28/03/2016 , Time : 16.00 Hrs</p> <p>2. From BHEL website (www.BHEL.com) Tender documents will be available for downloading from website till due date of submission</p> | Applicable/ Not applicable |
| v | DUE DATE & TIME OF OFFER SUBMISSION | <p>Date : 29/03/2016, Time 15.00 Hrs Place : <u>BHEL PS Regional office at :Nagpur</u></p> <p>Tenders being submitted through representative shall be submitted at dispatch section of of PSWR HQ Office after making entry/registration at the reception. For any assistance on the matter kindly contact following officials:</p> <ul style="list-style-type: none"> • Pratish Gee Varghese/Sr Engineer(Purchase) • Shivkesh Meena / Engineer (Purchase) • Shubhangi Tembhrne / Engineer (Purchase) | Applicable |
| vi | OPENING OF TENDER | <p>1 hours after the latest due date and time of Offer submission</p> <p>Notes: (1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day. (2) Bidder may depute representative to witness the opening of tender</p> | Applicable |
| vii | EMD AMOUNT | Rs 2,00,000/- (Rupees Two Lakhs Only) | Applicable |
| viii | COST OF TENDER | Rs 2000/-. | Applicable |
| ix | LAST DATE FOR SEEKING CLARIFICATION | 7 days before the due date of offer submission. Along with soft version also, addressing to undersigned & to others as per contact address given below | Applicable |
| x | SCHEDULE OF Pre Bid Discussion (PBD) | Date : | Not applicable. |
| xi | INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM) | Shri V.V.R. Sastry, Ex-CMD/ BEL 957, 9th Main 3 Stage, 3 Block Basaveswaranagar Bangalore- 560079 Email: sastryvvr@gmail.com | Applicable |
| xii | Latest updates | Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.BHEL.com -->Tender Notifications →View Corrigendums) and not in the newspapers . Bidders to keep themselves updated with all such information | |

2.0 The offer shall be submitted as per the instructions of tender document and as detailed in this NIT. Bidders to note specifically that all pages of tender document, including these NIT pages of this particular tender together with subsequent correspondences shall be submitted by them, duly signed & stamped on each page, as part of offer. **Rates/Price including**

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discounts/rebates, if any, mentioned anywhere/in any form in the techno-commercial offer other than the Price Bid, shall not be entertained.

- 3.0 Unless specifically stated otherwise, bidder shall remit cost of tender and courier charges if applicable, in the form of Demand Draft drawn in favour of Bharat Heavy Electricals Ltd, payable at Power Sector Regional HQ at Nagpur issuing the Tender, along with techno-commercial offer. Bidder may also choose to deposit the Tender document cost by cash at the Cash Office as stated above against sl no iv of 1, on any working day; and in such case copy of Cash receipt is to be enclosed with the Techno Commercial offer. Sale of tender Documents shall not take place on National Holidays, holidays declared by Central or State Governments and BHEL PS HQ at Nagpur, Sundays and second/ last Saturdays.
- 4.0 Unless specifically stated otherwise, bidder shall deposit EMD through Demand Draft/Pay Order in favour of Bharat Heavy Electricals Ltd, payable at Nagpur. For other details and for 'One Time EMD' please refer General Conditions of Contract.
- 5.0 **Procedure for Submission of Tenders:** The Tenderers must submit their Tenders to Officer inviting Tender, as detailed below:
- PART-I consisting of 'PART-I A (Techno Commercial Bid)' & 'PART-I B (EMD/COST of TENDER)' in two separate sealed and superscribed envelopes (ENVELOPE-I & ENVELOPE-II)
 - PART-II (Price Bid) – in sealed and superscribed envelope (ENVELOPE-III)
 - One set of tender documents shall be retained by the bidder for their reference
- 6.0 The contents for ENVELOPES and the superscription for each sealed cover/Envelope are as given below. **(All pages to be signed and stamped).**

| Sl no | Description | Remarks |
|-------|--|---------|
| | Part-I A | |
| | <p>ENVELOPE – I superscribed as : PART-I (TECHNO COMMERCIAL BID) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION:</p> <p>CONTAINING THE FOLLOWING:-</p> | |
| i. | Covering letter/Offer forwarding letter of Tenderer. | |
| ii. | <p>Duly filled-in 'No Deviation Certificate' as per prescribed format to be placed after document under sl no (i) above.</p> <p>Note:</p> <p>a. In case of any deviation, the same should be submitted separately for technical & commercial parts, indicating respective clauses of tender against which deviation is taken by bidder. The list of such deviation shall be placed after document under sl no (i) above. It shall be specifically noted that deviation recorded elsewhere shall not be entertained.</p> <p>b. BHEL reserves the right to accept/reject the deviations without assigning any reasons, and BHEL decision is final and binding.</p> <p style="margin-left: 40px;">i). In case of acceptance of the deviations, appropriate loading shall be done by BHEL</p> <p style="margin-left: 40px;">ii). In case of unacceptable deviations, BHEL reserves the right to reject the tender</p> | |
| iii. | <p>Supporting documents/ annexure/ schedules/ drawing etc as required in line with Pre-Qualification criteria.</p> <p>It shall be specifically noted that all documents as per above shall be indexed properly and credential certificates issued by clients shall distinctly bear the name of organization, contact ph no, FAX no, etc.</p> | |
| iv. | All Amendments/Correspondences/Corrigenda/Clarifications/Changes/ Errata etc pertinent to this NIT. | |

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| | | |
|-------|--|---------------|
| v. | Integrity Pact Agreement (Duly signed by the authorized signatory) | If applicable |
| vi. | Duly filled-in annexures, formats etc as required under this Tender Specification/NIT | |
| vii. | Notice inviting Tender (NIT) | |
| viii. | Volume – I A : <u>Technical</u> Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc | |
| ix. | Volume – I B : Special Conditions of Contract (SCC) | |
| x. | Volume – I C : General Conditions of Contract (GCC) | |
| xi. | Volume – I D : Forms & Procedures | |
| xii. | Volume – II (UNPRICED – without disclosing rates/price, but mentioning only 'QUOTED' or 'UNQUOTED' against each item | |
| xiii. | Any other details preferred by bidder with proper indexing. | |

| | | |
|----|--|--|
| | PART-I B | |
| | <p>ENVELOPE – II superscribed as: PART-I (EMD/COST of TENDER) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION:</p> <p>CONTAINING THE FOLLOWING:-</p> | |
| i. | <p>1. Earnest Money Deposit (EMD) in the form as indicated in this Tender OR Documentary evidence for 'One Time EMD' with the Power Sector Region of BHEL floating the Tender</p> <p>2. Cost of Tender (Demand Draft or copy of Cash Receipt as the case may be)</p> | |

| | | |
|----|--|--|
| | PART-II | |
| | <p>PRICE BID consisting of the following shall be enclosed</p> <p>ENVELOPE-III superscribed as: PART-II (PRICE BID) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION:</p> <p>CONTAINING THE FOLLOWING</p> | |
| i | Covering letter/Offer forwarding letter of Tenderer enclosed in Part-I | |
| ii | Volume II – PRICE BID (Duly Filled in Schedule of Rates – rate/price to be entered in words as well as figures) | |

| | | |
|--|--|--|
| | OUTER COVER | |
| | <p>ENVELOPE-IV (MAIN ENVELOPE / OUTER ENVELOPE) superscribed as: TECHNO-COMMERCIAL BID, PRICE BID & EMD TENDER NO: NAME OF WORK: PROJECT: DUE DATE OF SUBMISSION:</p> | |

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| CONTAINING THE FOLLOWING: | |
|---------------------------|--|
| i | <ul style="list-style-type: none">○ Envelopes I○ Envelopes II○ Envelopes III |

SPECIAL NOTE : All documents/ annexures submitted with the offer shall be properly annexed and placed in respective places of the offer as per enclosure list mentioned in the covering letter. BHEL shall not be responsible for any missing documents.

7.0 Deviation with respect to tender clauses and additional clauses/suggestions in Techno-commercial bid / Price bid shall NOT be considered by BHEL. Bidders are requested to positively comply with the same.

8.0 BHEL reserves the right to accept or reject any or all Offers without assigning any reasons thereof. BHEL also reserves the right to cancel the Tender wholly or partly without assigning any reason thereof. Also BHEL shall not entertain any correspondence from bidders in this matter (except for the refund of EMD).

9.0 **Assessment of Capacity of Bidders:**
Bidders capacity for executing the job under tender shall be assessed 'LOAD' wise and 'PERFORMANCE' wise as per the following:

I. **LOAD**: Load takes into consideration **ALL** the contracts of the Bidder under execution with BHEL Regions, irrespective of whether they are similar to the tendered scope or not. The 'Load' is the sum of the unit wise identified packages (refer Table-1) for contracts with BHEL Regions. The cut off month for reckoning 'Load' shall be the month, two (2) months preceding the month corresponding to the 'latest date of bid submission', in the following manner:

(Note: For example if latest bid submission is in Aug 2011, then the 'load' shall be calculated upto and inclusive of June 2011)

i). **Total number of Packages**

Total number of Packages in hand = P

Where

- 'P' is the sum of all unit wise identified packages under execution with BHEL Regions as of the cut off month defined above, including packages yet to be commenced, excepting packages which are on HOLD due to reasons not attributable to Bidder..

II. **PERFORMANCE**: Here 'Monthly Performance' of the bidder for all the packages (**under execution/** executed during the 'Period of Assessment' in all the Power Sector Regions of BHEL) **SIMILAR** to the packages covered under the tendered scope, excepting packages not commenced shall be taken into consideration. The 'Period of Assessment' shall be 6 months preceding the cut off month. The cut off month for reckoning 'Period of Assessment' shall be the month two (2) months preceding the month corresponding to the 'latest date of bid submission', in the following manner:

Note: For example if 'latest date of bid submission' is in Aug 2011, then the 'performance' shall be assessed for a 6 month period upto and inclusive of June 2011, for all the unit wise identified packages (refer Table I)

i). **Calculation of Overall 'Performance Rating' for 'similar Package/Packages' for the tendered scope under execution at Power Sector Regions for the 'Period of Assessment'**:

This shall be obtained by summing up the 'Monthly Performance Evaluation' scores obtained by the bidder in all Regions for all the similar Package/packages', divided by the total number of Package months for which evaluation should have been done, as per procedure below:

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- a) $P_1, P_2, P_3, P_4, P_5, \dots P_N$ etc be the packages (**under execution/** executed during the 'Period of Assessment' in all Regions) **SIMILAR** to the packages covered under the tendered scope, excepting packages not commenced. Total number of similar packages for all Regions = P_T (ie $P_T = P_1 + P_2 + P_3 + P_4 + \dots P_N$)
- b) Number of Months ' T_1 ' for which 'Monthly Performance Evaluation' as per relevant formats, should have been done in the 'Period of Assessment' for the corresponding similar package P_1 . Similarly T_2 for package P_2 , T_3 for package P_3 , etc for the tendered scope. Now calculate cumulative total months ' T_T ' for total similar Packages ' P_T ' for all Regions (ie $T_T = T_1 + T_2 + T_3 + T_4 + \dots T_N$)
- c) Sum ' S_1 ' of 'Monthly Performance Evaluation' Scores ($S_{1-1}, S_{1-2}, S_{1-3}, S_{1-4}, S_{1-5}, \dots S_{1-N}$) for similar package P_1 , for the 'period of assessment' ' T_1 ' (ie $S_1 = S_{1-1} + S_{1-2} + S_{1-3} + S_{1-4} + S_{1-5} + \dots S_{1-N}$). Similarly S_2 for package P_2 for period T_2 , S_3 for package P_3 for period T_3 , etc for the tendered scope for all Regions. Now calculate cumulative sum ' S_T ' of 'Monthly Performance Evaluation' Scores for total similar Packages ' P_T ' for all Regions (ie ' $S_T = S_1 + S_2 + S_3 + S_4 + S_5 + \dots S_N$ ')
- d) **Overall Performance Rating ' R_{BHEL} ' for the similar Package/Packages (under execution/** executed during the 'Period of Assessment') in all the Power Sector Regions of BHEL):

$$= \frac{\text{Aggregate of Performance scores for all similar packages in all the Regions}}{\text{Aggregate of months for each of the similar package for which performance should have been evaluated in all the Regions}}$$

$$= \frac{S_T}{T_T}$$

- e) Bidders to note that the risk of non evaluation or non availability of the 'Monthly Performance Evaluation' reports as per relevant formats is to be borne by the Bidder

f) **Table showing methodology for calculating 'a', 'b' and 'c' above**

| Sl no | Item Description | Details for all Regions | | | | | | | Total |
|-------|---|-------------------------|-------|-------|-------|-------|--------|-------|--|
| | | (iii) | (iv) | (v) | (vi) | (vii) | (viii) | (ix) | |
| (i) | (ii) | | | | | | | | (x) |
| 1 | Similar Packages for all Regions → (under execution/ executed during period of assessment) | P_1 | P_2 | P_3 | P_4 | P_5 | ... | P_N | Total No of similar packages for all Regions = P_T ie Sum (Σ) of columns (iii) to (ix) |
| 2 | Number of Months for which 'Monthly Performance Evaluation' as per relevant formats should have been done in the 'period of assessment' for corresponding similar | T_1 | T_2 | T_3 | T_4 | T_5 | ... | T_N | Sum (Σ) of columns (iii) to (ix) = T_T |

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| | Package (as in row 1) | | | | | | | | |
|---|---|--|--|--|--|--|------------------|--|--|
| 3 | Monthly performance scores for the corresponding period (as in Row 2) | S ₁₋₁ , S ₁₋₂ , S ₁₋₃ , S ₁₋₄ , ... S _{1-T1} | S ₂₋₁ , S ₂₋₂ , S ₂₋₃ , S ₂₋₄ , ... S _{2-T2} | S ₃₋₁ , S ₃₋₂ , S ₃₋₃ , S ₃₋₄ , ... S _{3-T3} | S ₄₋₁ , S ₄₋₂ , S ₄₋₃ , S ₄₋₄ , ... S _{4-T4} | S ₅₋₁ , S ₅₋₂ , S ₅₋₃ , S ₅₋₄ , ... S _{5-T5} | | S _{N-1} , S _{N-2} , S _{N-3} , S _{N-4} , ... S _{N-TN} | ----- |
| 4 | Sum of Monthly Performance scores of the corresponding Package for the corresponding period (as in row-3) | S ₁ | S ₂ | S ₃ | S ₄ | S ₅ | ... | S _N | Sum (Σ) of columns (iii) to (ix) = S _T |

- ii) Calculation of Overall 'Performance Rating' (R_{BHEL}) in case 'similar Package/Packages' for the tendered scope ARE NOT AVAILABLE, during the 'Period of Assessment':

This shall be obtained by summing up the 'Monthly Performance Evaluation' scores obtained by the bidder in all Regions for ALL the packages, divided by the total number of Package months for which evaluation should have been done. 'R_{BHEL}' shall be calculated subject to availability of 'performance scores' for at least 6 'package months' in the order of precedence below:

- 'Period of Assessment.
- 12 months preceding the cut-off month
- 24 months preceding the cut-off month
- 36 months preceding the cut-off month

In case, R_{BHEL} cannot be calculated as above, then Bidder shall be treated as 'NEW VENDOR'. Further eligibility and qualification of this bidder shall be as per definition of 'NEW VENDOR' described in 'Explanatory Notes'

- iii) Factor "L" assigned based on Overall Performance Rating (R_{BHEL}) at Power Sector Regions.:

| Sl no | Overall Performance Rating (R _{BHEL}) | Corresponding value of 'L' |
|-------|---|----------------------------|
| 1 | =60 | NA |
| 2 | > 60 and ≤ 65 | 0.4 |
| 3 | > 65 and ≤ 70 | 0.35 |
| 4 | > 70 and ≤ 75 | 0.25 |
| 5 | > 75 and < 80 | 0.2 |
| 6 | ≥ 80 | NA |

III. 'Assessment of Capacity of Bidder':

'Assessment of Capacity of Bidder' is based on the Maximum number of packages for which a vendor is eligible, considering the performance scores of similar packages, as below:

Max number of packages P_{Max} = (R_{BHEL} - 60) divided by corresponding value of 'L'
i.e. (R_{BHEL} - 60)/L

Note:

- In case the value of P_{Max} results in a fraction, the value of P_{Max} is to be rounded off to next whole number

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- ii. For $R_{BHEL} = 60$, $P_{Max} = '1'$
- iii. For $R_{BHEL} \geq 80$, there will be no upper limit on P_{Max}

The Bidder shall be considered 'Qualified' as per 'Assessment of Capacity of Bidder' for the subject Tender if $P \leq P_{Max}$
(where P is calculated as per clause 9.I)

IV. Explanatory note:

- a) Similar package means Boiler or ESP or Piping or Turbine or Civil or Structure or Electrical or CI, etc at the individual level irrespective of rating of Plant, and irrespective of whether the subject tender is a single package or as part of combined/composite packages. Normally Boiler, ESP, Piping, Turbine, Electrical, CI, Civil, Structure, etc is considered individual level of package. For example in case the tendered scope is a Boiler Vertical Package comprising of Boiler, ESP and Power Cycle Piping (i.e the 'identified packages as per Table-1 below), the 'PERFORMANCE' part against sl no II above, needs to be evaluated considering all the identified packages (ie Boiler, ESP and Power Cycle Piping) and finally the Bidder's capacity to execute the tendered scope is assessed in line with III above
- b) Identified Packages (Unit wise)

Table-1

| Civil | Electrical & CI | Mechanical |
|--|--------------------------|--|
| i). Enabling works | i). Electrical | i). Boiler & Aux (All types including CW Piping if applicable) |
| ii). Pile and Pile Caps | ii). CI | ii). Power Cycle Piping/Critical Piping |
| iii). Civil Works including foundations | iii). Others (Elec & CI) | iii). LP Piping |
| iv). Structural Steel Fabrication & Erection | | iv). ESP |
| v). Chimney | | v). Steam Turbine |
| vi). Cooling Tower | | Generator set & Aux |
| vii). Others (Civil) | | vi). Gas Turbine |
| | | Generator set & Aux |
| | | vii). Hydro Turbine |
| | | Generator set & Aux |
| | | viii). Turbo Blower (including Steam Turbine) |
| | | ix). Material Handling |
| | | x). Material Management |
| | | xi). Material Handling & Material Management |
| | | xii). Others (Mechanical) |

- c) Bidders who have not been evaluated for at least six package months in the last 36 months in the online BHEL system for contractor performance evaluation in BHEL PS Regions, wef July'2010 shall be considered "NEW VENDOR".

A 'NEW VENDOR' shall be considered qualified subject to satisfying all other tender conditions

A 'NEW VENDOR' if awarded a job (of package/packages identified under this clause) shall be tagged as "FIRST TIMER" on the date of first LOI from BHEL.

The "FIRST TIMER" tag shall remain till execution of work for a period of not less than 09 months, from the commencement of work of first package

.....
A Bidder shall not be eligible for the next job as long as the Bidder is tagged as "FIRST TIMER" excepting for the Tenders which have been opened on or before the date of the bidder being tagged as 'FIRST TIMER'.

After removal of 'FIRST TIMER' tag, the Bidder shall be considered 'QUALIFIED' for the future tenders subject to satisfying all other tender conditions including 'Capacity Evaluation of Bidders'.

d) In the unlikely event of all bidders shortlisted against Technical and Financial Qualification criteria not meeting the criteria on 'Assessment of Capacity of Bidders' detailed above, OR leads to a single tender response on applying the criteria of 'Assessment of Capacity of Bidders' or due to non-approval by Customer, then BHEL at its discretion reserves the right to consider the further processing of the Tender based on the **Overall Performance Rating 'R_{BHEL}'** only, starting from the upper band.

e) 'Under execution' shall mean works in progress as per the following:

i. up to Boiler Steam Blowing in case of Steam Generator and Auxiliaries

ii. upto Synchronisation in case of all other works excepting sl no (i) and (iii)

iii. Upto execution of at least 90% of anticipated contract value in case of Civil & Structures (unit wise), Enabling works and upto 90% of material unloading (in tonnage) as per the original contract in case of MM Package.

Note : BHEL at its discretion can extend (or reduce in exceptional cases in line with Contract conditions) the period defined against (i), (ii) and (iii) above, depending upon the balance scope of work to be completed.

f) Performance evaluation in CL 9 above is applicable to Prime bidder and consortium partner (or Technical tie up partner) for their respective scope of work

10.0 Since the job shall be executed at site, bidders must visit site/ work area and study the job content, facilities available, availability of materials, prevailing site conditions including law & order situation, applicable wage structure, wage rules, etc before quoting for this tender. They may also consult this office before submitting their offers, for any clarifications regarding scope of work, facilities available at sites or on terms and conditions.

11.0 For any clarification on the tender document, the bidder may seek the same in writing or through e-mail, as per specified format, within the scheduled date for seeking clarification, from the office of the undersigned. BHEL shall not be responsible for receipt of queries after due date of seeking clarification due to postal delay or any other delays. Any clarification / query received after last date for seeking clarification may not be normally entertained by BHEL and no time extension will be given.

12.0 BHEL may decide holding of pre-bid discussion [PBD] with all intending bidders as per date indicated in the NIT. The bidder shall ensure participation for the same at the appointed time, date and place as may be decided by BHEL. Bidders shall plan their visit accordingly. The outcome of pre-bid discussion (PBD) shall also form part of tender.

13.0 In the event of any conflict between requirement of any clause of this specification/ documents/drawings/data sheets etc or requirements of different codes/standards specified, the same to be brought to the knowledge of BHEL in writing for clarification before due date of seeking clarification (whichever is applicable), otherwise, interpretation by BHEL shall prevail. Any typing error/missing pages/ other clerical errors in the tender documents, noticed must be pointed out before pre-bid meeting/submission of offer; else BHEL's interpretation shall prevail.

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- 14.0 Unless specifically mentioned otherwise, bidder's quoted price shall be deemed to be in compliance with tender including PBD.
- 15.0 Bidders shall submit Integrity Pact Agreement (Duly signed by authorized signatory who signs in the offer), **if applicable**, along with techno-commercial bid. This pact shall be considered as a preliminary qualification for further participation. **The names and other details of Independent External Monitor (IEM) for the subject tender is as given at point (1) above.**
- 16.0 The Bidder has to satisfy the Pre Qualifying Requirements stipulated for this Tender in order to be qualified. The Price Bids of only those bidders will be opened who will be qualified for the subject job on the basis of satisfying the Pre Qualification Criteria specified in this NIT as per Annexure-I (as applicable), past performance etc. and date of opening of price bids shall be intimated to only such bidders. BHEL reserves the right not to consider offers of parties under HOLD.
- 17.0 In case BHEL decides on a 'Public Opening', the date & time of opening of the sealed PRICE BID shall be intimated to the qualified bidders and in such a case, bidder may depute one authorised representative to witness the price bid opening. BHEL reserves the right to open 'in-camera' the 'PRICE BID' of any or all Unsuccessful/Disqualified bidders under intimation to the respective bidders.
- 18.0 Validity of the offer shall be for **six months** from the latest due date of offer submission (including extension, if any) unless specified otherwise.
- 19.0 BHEL reserves the right to decide the successful bidder on the basis of Reverse Auction process. In such case all qualified bidders will be intimated regarding procedure/ modality for Reverse Auction process prior to Reverse Auction and price will be decided as per the rules for Reverse Auction. .
- However, if reverse auction process is unsuccessful as defined in the RA rules/procedures, or for whatsoever reason, then the sealed 'PRICE BIDS' will be opened for deciding the successful bidder. BHEL's decision in this regard will be final and binding on bidder.
- 20.0 On submission of offer, further consideration will be subject to compliance to tender & qualifying requirement and customer's acceptance, as applicable.
- 21.0 In case the bidder is an "Indian Agent of Foreign Principals", 'Agency agreement has to be submitted along with Bid, detailing the role of the agent along with the terms of payment for agency commission in INR, along with supporting documents.
- 22.0 The bidders shall not enter into any undisclosed M.O.U. or any understanding amongst themselves with respect to tender.
- 23.0 Consortium Bidding (or Technical Tie up) shall be allowed only if specified in Pre Qualifying Requirement (PQR) criteria, and in such a case the following shall be complied with:
- 23.1 Prime Bidder and Consortium Partner or partners are required to enter into a consortium agreement with a validity period of six months initially. In case the consortium is awarded the contract, then the Consortium Agreement between the Prime Bidder and Consortium Partner or partners shall be extended till contractual completion period including extension periods if any applicable.
- 23.2 'Stand alone' bidder cannot become a '**Prime Bidder' or a 'Consortium bidder' or 'Technical Tie up bidder' in a consortium (or Technical Tie up) bidding**. Prime bidder shall neither be a consortium partner to other prime bidder nor take any other consortium partners. However, consortium partner may enter into consortium agreement with other prime bidders. In case of non compliance, consortium bids of such Prime bidders will be rejected.
- 23.3 Number of partners for a consortium Bidding (or Technical Tie up) shall be as specified in the PQR.
- 23.4 Prime Bidder shall be as specified in the Pre Qualification Requirement, else the bidder who has the major share of work.

-
- 23.5 In order to be qualified for the tender, Prime Bidder and Consortium partner or partners shall satisfy (i) the Technical 'Pre Qualifying Requirements' specified for the respective package, (ii) "Assessment of Capacity of Bidder" as specified in clause 9.0.
- 23.6 Prime Bidder shall comply with additional 'Technical' criteria of PQR as defined in 'Explanatory Notes for the PQR'.
- 23.7 Prime Bidder shall comply with all other Pre Qualifying criteria for the Tender unless otherwise specified.
- 23.8 In case customer approval is required, then Prime Bidder and Consortium Partner or partners shall have to be individually approved by Customer for being considered for the tender.
- 23.9 Prime Bidder shall be responsible for the overall execution of the contract.
- 23.10 In case of award of job, Performance shall be evaluated for Prime Bidder and Consortium Partner or partners for their respective scope of work(s) as per prescribed formats.
- 23.11 In case the Consortium partner or partners back out, their SDs shall be encashed by BHEL. In such a case, other consortium partner or partners meeting the PQR have to be engaged by the Prime Bidder, and if not, the respective work will be withdrawn and executed on risk and cost basis of the Prime Bidder. The new consortium partner or partners shall submit fresh SDs as applicable.
- 23.12 In case the prime Bidder withdraws, the whole contract shall be considered cancelled and short closed.
- 23.13 After execution of work, the work experience shall be assigned to the Prime Bidder and the consortium partner or partners for their respective scope of work. After successful execution of two similar works with the same consortium partner or partners under direct orders of BHEL, the Prime Bidder shall be eligible for becoming a 'stand alone' bidder for similar works, subject to certification from BHEL about the active involvement of the Prime Bidder for satisfactory execution of the works.
- 23.14 The consortium partner shall submit SD equivalent to 2% of the total contract value in addition to the SD to be submitted by the prime Bidder for the total contract value. In case there are two consortium partners, then each partner shall submit SD equivalent to 1% of the total contract value in addition to the SD to be submitted by the prime Bidder for the total contract value.
- 23.15 In case of a Technical Tie up, all the clauses applicable for the Consortium partner shall be applicable for the Technical Tie up partner also
- 23.16 The bidder shall submit documents in support of possession of 'Qualifying Requirements' duly self certified and stamped by the authorized signatory, indexed and properly linked in the format for PQR. In case BHEL requires any other documents/proofs, these shall be submitted immediately.
- 23.17 The bidder may have to produce original document for verification if so decided by BHEL.
- 24.0 Order of Precedence
In the event of any ambiguity or conflict between the Tender Documents, the order of precedence shall be in the order below:
- a. Amendments/Clarifications/Corrigenda/Errata etc issued in respect of the tender documents by BHEL
 - b. Notice Inviting Tender (NIT)
 - c. Price Bid
 - d. Technical Conditions of Contract (TCC)—Volume-1A
 - e. Special Conditions of Contract (SCC) —Volume-1B
 - f. General Conditions of Contract (GCC) —Volume-1C
 - g. Forms and Procedures —Volume-1D

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It may please be noted that guidelines/rules in respect of suspension of business dealings', 'Vendor evaluation format', 'Quality, Safety & HSE guidelines', etc may undergo change from time to time and the latest one shall be followed

for BHARAT HEAVY ELECTRICALS LTD

AGM Pur

Enclosure

01. Annexure-1: Pre Qualifying criteria.
02. Annexure-2: Check List.
03. Annexure-3: Integrity Pact.
04. Annexure-4: Important Information.
05. Other Tender documents as per this NIT.

PRE QUALIFYING CRITERIA

| | |
|------------------|---|
| JOB | COLLECTION / TRANSPORTATION OF MATERIALS FROM BHEL / CLIENT'S STORES / STORAGE YARD TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING, APPLICATION OF THERMAL INSULATION, SUPPLY OF PRIMER / PAINTS AND APPLICATION OF PRIMER / PAINTS FOR FINAL PAINTING, COMBINED CYCLE TRIAL OPERATION / PERFORMANCE TEST & HANDING OVER OF 1 UNIT OF 55 TPH HEAT RECOVERY STEAM GENERATOR ALONG WITH ITS AUXILIARIES, STEEL CHIMNEY WITH PLATFORMS INCLUDING ELECTRICAL WORK OF CHIMNEY, ALL PIPING INCLUDING INTERNAL, EXTERNAL, FIELD PIPING (IBR, NON IBR INCLUDING CW), BALANCE OF PLANT SYSTEMS LIKE FIRE PROTECTION & DETECTION SYSTEM , MISC. EQUIPMENTS OF 1X51 MW COMBINED CYCLE POWER PLANT (1X19MW STG + 1X32 MW FR 6B GTG + 1X55 TPH HRSG+ PIPING + BOP) AT ONGC COMPLEX, HAZIRA, SURAT, GUJARAT |
| TENDER NO | BHE/PW/PUR/HONGI-HRSG/1601 |

| SL NO | PRE QUALIFICATION CRITERIA | Bidders claim in respect of fulfilling the PQR Criteria | |
|-------|--|---|--|
| | | Name and Description of qualifying criteria | Page no of supporting document. Bidder must fill up this column as per applicability |
| A | Submission of Integrity Pact duly signed (if applicable) (Note: To be submitted by Prime Bidder & Consortium/Technical Tie up partner jointly in case Consortium bidding is permitted, otherwise by the sole bidder) | APPLICABLE | |
| B | <u>Technical</u> | APPLICABLE | |
| | <p><u>Bidder must have achieved B.1 or B.2 or B.3 or B.4 in last 7 years as on latest date of offer submission:</u></p> <p>B.1 Erection Testing & Commissioning (E T & C) of Atleast One Boiler (Consisting of Pressure Parts, Structures/ESP and IBR/Power Cycle Piping, of the same Unit as a Stand alone bidder) of rating 30 TPH or above. OR</p> <p>B.2 Erection Testing & Commissioning (E T & C) of Atleast One Boiler/Steam Generator of rating 30 TPH or above comprising of 100 MT Pressure Parts/power cycle piping (IBR), and 200 MT Structures with his own T&Ps and consumables. OR</p> <p>B.3 Two jobs of Renovation and modernization or Capital Overhaul of a Boiler of rating 100 TPH or higher, each of value Rs 100 Lakhs or above, under direct order of BHEL. OR</p> <p>B.4 E T & C of Atleast One STG of 60 MW or higher, under direct order of BHEL</p> | APPLICABLE | |

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| C-1 | Financial Bidders must have achieved an average annual financial turnover (Audited) of Rs 210 Lakhs or more over last three Financial Years (FY) i.e., 2012-13, 2013-14 & 2014-15 | APPLICABLE | |
| C-2 | NETWORTH (only in case of Companies) Net worth of the Bidder based on the latest Audited Accounts as furnished for 'C-1' above should be positive | APPLICABLE | |
| C-3 | PROFIT Bidder must have earned cash profit in any one of the three Financial Years as applicable in the last three Financial Years defined in 'C-1' above based on latest Audited Accounts. | APPLICABLE | |
| D | Assessment of Capacity of Bidder to execute the work as per sl no 9 of NIT (if applicable) | APPLICABLE | By BHEL |
| E | Price Bid Opening Note: Price Bids of only those bidders shall be opened who stand qualified after compliance of criteria A to D | | BY BHEL |
| F | Approval of Customer (if applicable) Note: Name and Credentials of L-1 "Accepted" bidder shall be sent to customer for their approval. Order on L-Accepted bidder shall be placed only subject to the approval of customer. | APPLICABLE | BY BHEL |
| G | Technical Tie up criteria (if applicable) | NOT APPLICABLE | |
| <p><u>Explanatory Notes for the PQR (unless otherwise specified in the PQR):</u></p> <ol style="list-style-type: none"> Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as indicated against C-1 above along with all annexures. In case audited Financial statements have not been submitted for all the three years as indicated against C-1 above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years i.e total divided by three. If financial statements are not required to be audited statutorily, then instead of audited financial statements, financial statements are required to be certified by Chartered Accountant. C-2:-NETWORTH : Shall be calculated based on the latest Audited Accounts as furnished for C-1 above. Net worth = Paid up share capital + Reserves. (Net worth is required to be evaluated in case of companies) C-3:- PROFIT : shall be NET profit (PAT + Non cash expenditure viz depreciation) earned during any one of the three financial years as in C-1 above Additional Criteria in respect of 'Technical' criteria of PQR (as in 'B' above) for Civil, Electrical, CI, unless otherwise specified :- <ol style="list-style-type: none"> _____ Bidder should have executed similar work of any one of the following: <ol style="list-style-type: none"> _____ One (1) work of value not less than Rs XXX _____OR _____ Two (2) works of not less than Rs YYY _____OR _____ Three (3) works of not less than Rs ZZZ (Value XXX, YYY, ZZZ shall be as indicated by BHEL _____ 'Similar' work for criteria 5 above means | | | |

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|--|--|
| | <p style="text-align: center;">a. Civil or Structures or Civil & Structures or Chimney respectively as applicable to the tendered scope in respect of 'CIVIL' Works</p> <p style="text-align: center;">b. Electrical works in respect of 'ELECTRICAL'</p> <p style="text-align: center;">c. CI works in respect of 'CI' Works</p> <p style="text-align: center;">d. Material Handling and/or Management works in respect of 'MM' works</p> <p>7. Time period for achievement of the 'Technical' criteria of PQR (as in 'B' above) will be the last 7 years ending on the 'latest date' of Bid submission.</p> <p>8. 'EXECUTED' means the Vendor should have achieved the criteria specified in the Technical criteria of PQR (as in 'B' above) even if the Contract has not been completed or closed.</p> <p>9. Unless otherwise specified, for the purpose of 'Technical' criteria of PQR (as in 'B' above), the word 'EXECUTED' means:</p> <ol style="list-style-type: none">1. Term 'Commissioning' indicated in PQR refers to 'assistance to commissioning' / 'commissioning'2. "BOILER LIGHT UP" in respect of Boiler & Aux and ESP3. "SYNCHRONISATION" in respect of STG/GTG and 'SPINNING' in case of HTG4. "STEAM BLOWING COMPLETION" in respect of at least Main Steam Line of Power Cycle Piping5. "HYDRAULIC TEST" of the system in respect of Structures, Pressure parts/IBR Piping6. "CHARGING" in respect of power Transformers, Bus ducts, HT/LT switchgears7. "Completion of RCC Shell and liner (steel or brick as per tendered scope) up to the HEIGHT specified using slip form" in case of RCC Chimney.8. Achievement of physical Quantities as per respective PQRs in respect of Civil & Structures and Piling Works9. 'Readiness for coal Filling' in respect of Bunker Structure Work. <p>10. Boiler means HRSG or WHRB or any other types of Steam Generator.</p> <p>11. Critical/Power Cycle piping means Main Steam, Hot Reheat, Cold Reheat, HP Bypass, LP Bypass lines.</p> <p>12. For the purpose of evaluation of the PQR, one MW shall be considered equivalent to 3.5TPH where ever rating of HRSG/BOILER is mentioned in MW. Similarly, where ever rating of Gas Turbine is mentioned in terms of Frame size, ISO rating in terms of MW shall be considered for evaluation.</p> <p>13. In case the experience/PO/WO certificate enclosed by bidders do not have separate break up prices for the E&C portion of Electrical and CI Works, (i.e. the certificates enclosed are for composite order for supply and erection of Electrical & CI and other works if any), then value of Erection and Commissioning for the Electrical & CI portion shall be considered as 15% of the supply & erection of Electrical & CI, unless otherwise specifically indicated in the PQR.</p> <p>14. Scope for capital overhaul of STG shall cover Bearing Inspection work and overhauling of all cylinders of the Turbine unless otherwise specifically indicated in the PQR.</p> <p>15. In case the tendered scope is not a Pulverized Fuel Boiler, experience of Oil/Gas Fired Boilers also can be considered unless otherwise specifically indicated in the PQR.</p> <p>16. The value of work (Experience submitted against PQR B) shall be updated as per the PVC indices for "All India Avg. Consumer Price Index for Industrial Workers" with base month as date of execution (completion of contract/work) and indexed upto two months prior to bid opening month.</p> |
|--|--|

BIDDER SHALL SUBMIT ABOVE PRE-QUALIFICATION CRITERIA FORMAT, DULY FILLED-IN, SPECIFYING RESPECTIVE ANNEXURE NUMBER AGAINST EACH CRITERIA AND FURNISH RELEVANT DOCUMENT IN THE RESPECTIVE ANNEXURES IN THEIR OFFER.

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ANNEXURE - 2

CHECK LIST

NOTE:- Tenderers are required to fill in the following details and no column should be left blank

| | | | |
|----|--|---|-----------------|
| 1 | Name and Address of the Tenderer | | |
| 2 | Details about type of the Firm/Company | | |
| 3 | Details of Contact person for this Tender | Name : Mr/Ms Designation: Telephone No: Mobile No: Fax No: | |
| 4 | EMD DETAILS | DD No: Date : Bank : Amount: <u>Please tick (√) whichever applicable:-</u> ONE TIME EMD / ONLY FOR THIS TENDER | |
| | | APPLICABILITY | BIDDER REPLY |
| 6 | Whether the format for compliance with PRE QUALIFICATION CRITERIA (ANNEXURE-I) is understood and filled with proper supporting documents referenced in the specified format | Applicable | YES / NO |
| 7 | Audited profit and Loss Account for the last three years submitted | Applicable | YES/NO |
| 8 | Copy of PAN Card submitted | Applicable | YES/NO |
| 9 | Whether all pages of the Tender documents including annexures, appendices etc are read understood and signed | Applicable | YES/NO |
| 10 | Integrity Pact | Applicable | YES/NO |
| 11 | Declaration by Authorised Signatory submitted | Applicable | YES/NO |
| 12 | No Deviation Certificate submitted | Applicable | YES/NO |
| 13 | Declaration confirming knowledge about Site Conditions submitted | Applicable | YES/NO |
| 14 | Declaration for relation in BHEL submitted | Applicable | YES/NO |
| 15 | Non Disclosure Certificate submitted | Applicable | YES/NO |
| 16 | Bank Account Details for E-Payment submitted | Applicable | YES/NO |

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| | | | |
|----|---|----------------|--------|
| 17 | Capacity Evaluation of Bidder for current Tender | Applicable | ----- |
| 18 | Consortium Agreement against this tender | Not Applicable | |
| 19 | Power of Attorney for Submission of Tender/Signing Contract Agreement submitted | Applicable | YES/NO |
| 20 | Analysis of Unit rates submitted | Applicable | YES/NO |

NOTE : STRIKE OFF 'YES' OR 'NO', AS APPLICABLE

DATE :

AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

INTEGRITY PACT

Between

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

And

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

Preamble

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

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

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

Section 1 - Commitments of the Principal

- 1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-
 - 1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for itself or third person, any material or immaterial benefit which the person is not legally entitled to.

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- 1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
- 1.1.3 The Principal will exclude from the process all known prejudiced persons.
- 1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

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

- 2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.
- 2.1.1 the Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he / she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
- 2.1.2 The bidder(s)/ Contractors(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
- 2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant IPC/PC Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- 2.1.4 The Bidders (s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

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

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

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

Section 4 – Compensation for Damages

- 4.1 If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.
- 4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher.

Section 5 – Previous Transgression

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
- 5.2 If the Bidder makes incorrect statement on his subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

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

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

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- b. The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.
 - c. The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

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

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

Section – 8 Independent External Monitor(s)

- 8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.
- 8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s)/ Sib-contractor(s) with confidentiality.
- 8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meeting could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.
- 8.5 As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or heal the situation, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

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- 8.6 The Monitor will submit a written report to the CMD, BHEL within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.
- 8.7 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.
- 8.8 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant IPC/PC Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- 8.9 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.
- 8.10 The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

- 9.1 This Pact begins and shall be binding on and from the submission of bid(s) by bidder(s). It expires for the Contractor 12 months after the last payment under the respective contract and for all other Bidders 6 months after the contract has been awarded.
- 9.2 If any claim is made/ lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified as above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 – Other Provisions

- 10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.
- 10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

-
- 10.3 If the contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.
- 10.4 Should one or several provisions of this agreement turn out to be invalid, the reminder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- 10.5 Only those Bidders/ Contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

For & On Behalf of the Principal
(Office Seal)

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

ANNEXURE 4: **IMPORTANT INFORMATION**

Sealed Tenders shall be submitted at following address to AGM /Purchase BHEL PSWR NAGPUR:

BHEL PSWR, SRIMOHINI COMPLEX , 345 KINGSWAY, NAGPUR 440001, INDIA

All correspondences regarding this tender shall be addressed to AGM / PURCHASE BHEL PSWR at above address. Bidders may also opt to correspond with following BHEL officials regarding this tender through email at following email ids . However please be informed that sealed tenders shall necessarily be submitted in original at above address:

AGM Purchase, Email id: rajeebc@BHELpswr.co.in. Ph: +91 – 712 – 3048633

Sr Engineer Purchase, Email: pgv@BHELpswr.co.in, Ph: +91 – 712 – 3048713

Engineer Purchase, Email id: svm@BHELpswr.co.in , Ph: +91 – 712 – 3048715

Engineer Purchase, Email id: shub@BHELpswr.co.in , Ph: +91 – 712 – 3048742

- 1. The offers of the bidders who are on the banned list as also the offer of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site (www.bhel.com ---> Tender Notification -> List of Banned Firms)**
- 2. Refer Chapter XII of Volume IB Special Conditions of Contract regarding Suspension of Business Dealings: The abridged version of extant ‘Guidelines for suspension of business dealings with suppliers/ contractors’ has now been uploaded on www.bhel.com on “supplier registration page” at the following link: http://www.bhel.com/vender_registration/pdf/Suspension-of-Business-Dealings-with-Supplier-issued-Sept13_abridged.pdf**
- 3. All Statutory Requirements as applicable for this project shall be complied with.**
- 4. BHEL Fraud Prevention Policy, "The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendors/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website <http://www.bhel.com> and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice."**
- 5. Following clause shall form part of the HSE documents issued under Chapter IX of Volume IB ‘Special Conditions of Contract’**

“In case of any financial deduction made by Customer for lapses of safety other than what is provided elsewhere in the contract, the same shall be charged on back-to-back

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basis on the defaulting contractor without prejudice to any other right spelt anywhere in the tender /contract”

6. Please take note of following Revised Tender Clauses:

- i. Notice Inviting Tender: SI No 9
- ii. General conditions of Contract: Clause 2.12, 2.14, 2.17, Clause No 1.15.13 (New), Clause No 2.8.3, 2.8.4 and 2.8.5
- iii. Special Conditions of Contract: Clause No 4.2.1.7

7. Following Notes are added to Form F- 15 of Volume I D ‘Forms & procedures’

- i. It is only indicative and shall be as per the online format issued by BHEL time to time.
- ii. No request will be entertained after specified date of the current month w.r.t the changes requested in the scores of immediate previous month.

8. PRICE VARIATION CLAUSE

Revision in Price Variation Compensation Clause no. 2.17 of Vol I C GCC:

Clause No. 2.17.9 of Vol IC GCC is revised as below:-

PVC shall be applicable only during the extended period of contract (if any) after the schedule completion date for the portion of work delayed / backlog for the reasons not attributable to Contractor. However total quantum of Price Variation amount payable/recoverable shall be regulated as follows:

- i. For the portion of backlog attributable to the contractor and for the portion of backlog due to force majeure condition during contract period, PVC shall not be paid.
- ii. For the period of force Majeure during extended contract period, PVC will be as per the indices applicable at the beginning of the force majeure period.
- iii. void
- iv. The total amount of PVC shall not exceed 20% of the cumulatively executed contract value during the extended contract period. Executed contract value for this purpose is exclusive of PVC, ORC, Supplementary/Additional Items and Extra works.

Clause No. 2.17.5 of is modified as below:-

Base date shall be the calendar month of the (schedule completion date of the contract).
Schedule Completion date shall be the actual start date plus contract period as defined in Chapter VI ‘Vol IA TCC’

9. Acceptance of Bank Guarantee (BG)

Revision in Acceptance of Bank Guarantee (BG) Clause no. 1.10.3 (V) of Vol I C GCC:

Clause No. 1.10.3 (V) of Vol IC GCC is revised as below:-

“Bank Guarantee issued by:

- a. Any of the BHEL consortium bank listed below :

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

- b. Any public sector Bank (other than consortium banks) with a clause in the text of Bank Guarantee that it is enforceable at Nagpur, Maharashtra
- c. Any private sector banks, with a clause in the text of Bank Guarantee that it is enforceable by being presented at any branch of the bank

Note: “Bank Guarantees issued by Co-operative Banks are not acceptable”.

10. Broad Terms & Conditions of Reverse Auction

In continuation to Clause 19.0 of NIT (Notice Inviting Tender) following are the broad terms and conditions of Reverse Auction is given in Annexure V of NIT:

- 10.1. Against this enquiry for the subject item/ system with detailed scope of supply as per enquiry specifications, BHEL may resort to “REVERSE AUCTION PROCEDURE” i.e., ON LINE BIDDING (THROUGH A SERVICE PROVIDER). The philosophy followed for reverse auction shall be English Reverse (No ties).
- 10.2. BHEL reserves the right to go for Reverse Auction (RA) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. All bidders

.....
to give their acceptance for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids. In case BHEL decides to go for Reverse Auction, only those bidders who have given their acceptance to participate in RA will be allowed to participate in the Reverse Auction. Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit „online sealed bid“ in the Reverse Auction. Non-submission of „online sealed bid“ by the bidder will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.

- 10.3. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
- 10.4. Those bidders who have given their acceptance for Reverse Auction (quoted against this tender enquiry) will have to necessarily submit ‘online sealed bid’ in the Reverse Auction. Non-submission of ‘online sealed bid’ by the bidder for any of the eligible items for which techno-commercially qualified, will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.
- 10.5. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.
- 10.6. In case of reverse auction, BHEL will inform the bidders the details of Service Provider to enable them to contact & get trained.
- 10.7. Business rules like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.
- 10.8. Bidders have to fax the Compliance form (annexure IV) before start of Reverse auction. Without this, the bidder will not be eligible to participate in the event.
- 10.9. In line with the NIT terms, BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at “Total Cost to BHEL” like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Service Tax for Services and loading factors (for noncompliance to BHEL standard Commercial terms & conditions) for each of the bidder to enable them to fill-in the price and keep it ready for keying in during the Auction.
- 10.10. Reverse auction will be conducted on scheduled date & time.
- 10.11. At the end of Reverse Auction event, the lowest bidder value will be known on auction portal.

-
- 10.12. The lowest bidder has to fax/e-mail the duly signed and filled-in prescribed format for price breakup including that of line items, if required, (Annexure VII) as provided on case-to-case basis to Service provider within two working days of Auction without fail.
- 10.13. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL shall be opened as per BHEL's standard practice.
- 10.14. Bidders shall be required to read the "Terms and Conditions" section of the auctions site of Service provider, using the Login IDs and passwords given to them by the service provider before reverse auction event. Bidders should acquaint themselves of the "Business Rules of Reverse Auction", which will be communicated before the Reverse Auction.
- 10.15. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind,

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TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED



TECHNICAL CONDITIONS OF CONTRACT (TCC) CONTENTS

| SI No | DESCRIPTION | Chapter | No. OF PAGES |
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| 2 | Scope of Works and technical information | Chapter-II | 3 |
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| 4 | T&Ps and MMDs to be deployed by Contractor | Chapter-IV | 6 |
| 5 | T&Ps to be deployed by BHEL free of hire charges on sharing basis | Chapter-V | 2 |
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| | Annexures | | |
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TECHNICAL CONDITIONS OF CONTRACT (TCC) CONTENTS

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| 21 | Preservation and Protection of components | Chapter-XXI | 1 |

Painting Scheme and Layout for Fire Protection and Fire detection System is uploaded as file title 'Painting Scheme and Layout for Fire System'

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter - I : Project Information

| | |
|------------|--|
| 1.0 | Project Information |
| 1.1 | <p>INTROUCTION</p> <p>ONGC has set up a Gas Processing Complex at Hazira (Surat) in the state of Gujarat, India.</p> <p>The scope of the present project is to set up a combined cycle captive power plant to generate internal steam and to generate power to meet the requirements for the Gas processing Complex. The project shall consist of 1X19 MW STG, 1XFr6B GTG and 1X55 TPH HRSG with associated auxiliary systems and accessories including piping.</p> <p>BHEL has been awarded the EPC package comprising of system design, detailed engineering, manufacturing, procurement, civil works, supply, fabrication, inspection, transportation, storage, installation, insurance, testing, physical completion, pre-commissioning, commissioning and performance guarantee test runs of the complete system.</p> <p>Site information :</p> <p>Location : ONGC Hazira Village: Bhatpore at Hazira, District-Surat-394518 , Gujarat</p> <p>Nearest Railway Station : Surat – 20 km</p> <p>Nearest Town : Surat - 15 Km</p> <p>Nearest Port : Magdalla - 20 Km</p> <p>Nearest Air Port : Surat - 10 km</p> <p>Access Road : NH-8 - 30 Km</p> <p>Height above mean sea level : RL 6.0 above MSL</p> |
| 1.2 | <p><u>CLIMATIC CONDITIONS</u></p> <p><u>Seismic data</u></p> <p>Zone : III (IS 1893)</p> <p>Air Temperature</p> <p>Air Temperature Avg Max/Min : 45.6° C / 4.4° C</p> <p>Design dry bulb Temp Max : 50° C</p> <p>Atmospheric pressure at MSL : 1.013 bar</p> <p>Relative Humidity max/min/avg : 70%/18%/64%</p> <p>Rainfall</p> <p>Annual Rainfall : 1203.5 mm</p> |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter - I : Project Information

| | |
|--|--|
| | Max Intensity of rainfall in 24 hrs : 459.2 mm |
| | Period – Monsoon showers : June to September |
| | Wind velocity/ direction |
| | Max. wind speed (as per IS:875) |
| | 20-61 kmph for 20 days in a year; : 62 km/h/ |
| | < 20 kmph for remaining period |
| | Most predominant wind direction : South west |
| | |

Above furnished information is for general guidance of bidder. The bidder is advised to visit and examine the site of works and its surroundings and obtain for himself on his own responsibility all information that may be necessary for preparing the bid and entering into the contract. All costs for and associated with site visits shall be borne by the bidder.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – II : Scope of Work

2.0 SCOPE OF WORK:

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

I) HEAT RECOVERY STEAM GENERATOR & ALL PIPING:

COLLECTION / TRANSPORTATION OF MATERIALS FROM BHEL / CLIENT'S STORES / STORAGE YARD TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING, APPLICATION OF THERMAL INSULATION, SUPPLY OF PRIMER / PAINTS AND APPLICATION OF PRIMER / PAINTS FOR FINAL PAINTING, COMBINED CYCLE TRIAL OPERATION / PERFORMANCE TEST & HANDING OVER OF 1 UNIT OF 55 TPH HEAT RECOVERY STEAM GENERATOR ALONG WITH ITS AUXILIARIES, STEEL STACK WITH PLATFORMS INCLUDING ELECTRICAL WORK OF STACK/CHIMNEY, ALL PIPINGS INCLUDING INTERNAL, EXTERNAL, FIELD PIPING (IBR, NON IBR INCLUDING CW), BALANCE OF PLANT SYSTEMS LIKE FIRE PROTECTION & DETECTION SYSTEM , MISC. EQUIPMENTS OF 1X51 MW COMBINED CYCLE POWER PLANT (1X19MW STG + 1X32 MW FR 6B GTG + 1X55 TPH HRSG+ PIPING + BOP) AT ONGC COMPLEX, HAZIRA, SURAT, GUJARAT .

The work is mainly categorized as follows:

- Receipt/collection/loading/ unloading/ transportation of materials from BHEL/client's stores /storage yards, transportation to site of work /erection site including the heavy consignment like Boiler drum, modules, steel stack sections and all other related erection materials by making his own transport and handling arrangements. The tentative distance of storage yard from erection site is about 2.5 km.
- Pre-assembly, assembly wherever possible and as applicable.
- Erection, alignment, welding/bolting/fastening, NDT, pre heat treatment / post heat treatment of HRSG, steel stack, Auxiliary Systems, integral piping of HRSG.
- Erection, alignment, welding/bolting/fastening, NDT, pre-heat treatment/post heat treatment of field / external / power cycle piping with supports, Total IBR & Total Non IBR Piping including CW Piping, Underground Piping.
- Assembly, fixing, welding of HRSGs casings (comprising of stainless steel sheet, insulation, outer sheet with stainless steel fixing components/ retainers/hooks) at site.
- Chipping of Foundations, preparation of equipments & structure Foundations.
- Secondary grouting of equipments, structures, auxiliaries, rotating machines etc. Including the associated form works like shuttering and related facilities & process for grout mixing.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – II : Scope of Work

- Erection, laying, welding, NDE/radiography of Piping (external / field / power cycle piping, integral piping, regenerative piping including instrument air & service air piping / Tanks / Valves.
- Preservative coating/ rapping of Buried / under ground piping.
- Testing, pre-commissioning, commissioning, hydraulic testing, chemical cleaning/ air blowing/ flushing, alkali boil out, steam blowing, safety valve floating.
- Assembly of chimney shells, fit-up, welding with NDE/radiography of chimney including electrical work of chimney.
- Application of refractory/thermal insulation with retainers, fixing components, cladding sheet on HRSG with auxiliary, ducts, piping, tanks, vessels, chimney, integral Piping of HRSG, External piping, balance of plant equipments as per scope under these specifications.
- Erection / laying, alignment, welding, NDE/radiography of temporary piping, valves, tanks, supports for air blowing, steam blowing, chemical cleaning/ flushing etc. And their subsequent dismantling after completion of work.
- Checking/cleaning & setting of hangers, cold setting and hot setting of hangers & supports.
- primer painting of site weld joints.
- Provisioning, Servicing and setting of valves, actuators, Dampers, Power Cylinders.
- Handling and filling of chemicals, lubricants/gas/ preservatives during, erection, preservation, chemical cleaning / flushing / blowing, pre-commissioning, commissioning and subsequent topping up till trial operation completion.
- Pre-commissioning checks, trial runs, testing and commissioning.
- Supply of Primer/Paints and application of paints for final painting including surface preparation (shot blasting), cleaning, marking of identification marks, colour bands, direction of rotation / flow marks, legends as per ONGC / Fichtner/ BHEL site requirement.
- Trial operation, Combined cycle trial operation & Performance test.
- Completion of facility points (as applicable)

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – II : Scope of Work

II) BOP PACKAGES :

Erection, Testing & commissioning including performance demonstration at site of Fire Protection & Detection system.

1. Fire Detection And Protection System including

1. Hydrant System Accessories
2. Piping (Hydrant And Spray System) including pipe Fittings and Fasteners
3. Spray System Components
4. Fire & Gas Detection & Alarm System Components
5. Fire Extinguishers
6. Inert Gas System for Control Room

2. Other Miscellaneous items:

Erection, Testing & commissioning of following equipments

A) Workshop Equipments

- a) Radial drilling Machine
- b) Grinding Machine
- c) Bench Vice

B) Chemical lab equipments

- Water Analysis Equipment
- Oil Testing Equipment
- Furniture for Water Analysis Room
- Furniture for Storage and Dark Room
- Furniture for Oil Analysis Room
- Draft Chamber as draft system for Water analysis room
- Eye wash and Safety shower
- Special Tools & Tackles
- All necessary glassware and Apparatus items

C) Electrical Hoist-6 Nos & Manual Hoist-2 Nos

Surface Preparation, Supply of Primer, Paints and application of Paints for final painting as per painting schedule.

Detailed scope of HRSG, Piping, BOP Packages are given in relevant Appendix.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – III : Facilities in the scope of Contractor/BHEL (scope Matrix)

| Sl.No | Description | Scope / to be taken care by | | Remarks |
|-------|--|-----------------------------|--------|--|
| | | BHEL | Bidder | |
| 3.1 | ESTABLISHMENT | | | |
| 3.1.1 | FOR CONSTRUCTION PURPOSE: | | | |
| A | Open space for office (as per availability) | Yes | | Location will be finalized after joint survey with owner. Refer Clause 3.10.3 |
| B | Open space for storage (as per availability) | Yes | | Location will be finalized after joint survey with owner. Refer Clause 3.10.3 |
| C | Construction of bidder's office, canteen and storage building including supply of materials and other services | | Yes | |
| D | Bidder's all office equipments, office / store / canteen consumables | | Yes | |
| E | Canteen facilities for the bidder's staff, supervisors and engineers etc | | Yes | |
| F | Fire fighting equipments like buckets, extinguishers etc | | Yes | |
| G | Fencing of storage area, office, canteen etc of the bidder | | Yes | |
| 3.1.2 | FOR LIVING PURPOSES OF THE BIDDER | | | |
| A | Open space for labour colony (as per availability) | | Yes | Contractor has to make his own arrangements for space, shelter and transportation of labours as per their requirement. |
| B | Labour Colony with internal roads, sanitation, complying with statutory requirements | | Yes | |
| 3.2.0 | ELECTRICITY | | | |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – III : Facilities in the scope of Contractor/BHEL (scope Matrix)

| Sl.No | Description PART I | Scope / to be taken care by | | Remarks |
|-------|---|-----------------------------|--------|---|
| | | BHEL | Bidder | |
| 3.2.1 | Electricity for construction purposes 3 Phase 415 V (To be specified whether chargeable or free) | | | |
| A | Single point source | Yes | | Shall be provided by BHEL on chargeable basis. Refer clause no. 3.10.1 in this regard. |
| B | Further distribution including all materials, Energy Meter, Protection devices and its service | | Yes | |
| C | Duties and deposits including statutory clearances if applicable | | Yes | |
| 3.2.2 | Electricity for the office, stores, canteen etc of the bidder. | | | Contractor has to make his own arrangement. |
| A | Single point source | | Yes | |
| B | Further distribution including all materials, Energy Meter, Protection devices and its service | | Yes | |
| C | Duties and deposits including statutory clearances if applicable | | Yes | |
| 3.2.3 | Electricity for living accommodation of the bidder's staff, engineers, supervisors etc | | Yes | Contractor has to make his own arrangement. |
| A | Single point source | | Yes | |
| B | Further distribution including all materials, Energy Meter, Protection devices and its service | | Yes | |
| C | Duties and deposits including statutory clearances if applicable | | Yes | |
| 3.3.0 | WATER SUPPLY | | | |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – III : Facilities in the scope of Contractor/BHEL (scope Matrix)

| Sl.No | Description PART I | Scope / to be taken care by | | Remarks |
|-------|--|-----------------------------|--------|---|
| | | BHEL | Bidder | |
| 3.3.1 | For construction purposes: (to be specified whether chargeable or free) | | | |
| A | Making the water available at single point | yes | | Contractor has to make his own arrangement. PI refer clause 3.10.2 |
| B | Further distribution as per the requirement of work including supply of materials and execution | | Yes | |
| 3.3.2 | Water supply for bidder's office, stores, canteen etc | | | |
| A | Making the water available at single point | | Yes | Contractor has to make his own arrangement. |
| B | Further distribution as per the requirement of work including supply of materials and execution | | Yes | |
| 3.3.3 | Water supply for Living Purpose | | | Contractor has to make his own arrangement. |
| A | Making the water available at single point | | Yes | |
| B | Further distribution as per the requirement of work including supply of materials and execution | | Yes | |
| 3.4.0 | LIGHTING | | | |
| A | For construction work (supply of all the necessary materials) At office/storage area At the preassembly area At the construction site /area | | Yes | |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – III : Facilities in the scope of Contractor/BHEL (scope Matrix)

| SI.No | Description PART I | Scope / to be taken care by | | Remarks |
|-------|---|-----------------------------|------------|---------|
| | | BHEL | Bidder | |
| B | For construction work (execution of the lighting work/ arrangements) 1. At office/storage area 2. At the preassembly area At the construction site /area | | Yes | |
| C | Providing the necessary consumables like bulbs, switches, etc during the course of project work | | Yes | |
| D | Lighting for the living purposes of the bidder at the colony / quarters | | Yes | |
| 3.5.0 | COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER | | | |
| A | Téléphone, fax, internet, intranet, e-mail etc | | Yes | |
| 3.6.0 | COMPRESSED AIR wherever required for the work | | Yes | |
| 3.7.0 | Demobilization of all the above facilities | | YES | |
| 3.8.0 | TRANSPORTATION | | | |
| A | For site personnel of the bidder | | Yes | |
| B | For bidder's equipments and consumables (T&P, Consumables etc) | | Yes | |

| SI.No | Description PART II | Scope / to be taken care by | | Remarks |
|-------|---|-----------------------------|--------|---------|
| | | BHEL | Bidder | |
| 3.9.1 | 3.9.0 ERECTION FACILITIES Engineering works for construction: | | | |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – III : Facilities in the scope of Contractor/BHEL (scope Matrix)

| Sl.No | Description PART II 3.9.0 ERECTION FACILITIES | Scope / to be taken care by | | Remarks |
|-------|--|-----------------------------|------------|---|
| | | BHEL | Bidder | |
| A | Providing the erection/constructions drawings for all the equipments covered under this scope | Yes | | |
| B | Drawings for construction methods | Yes | Yes | In consultation with BHEL |
| C | As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes | | Yes | Changes are to be marked in drawing & handover to BHEL on completion of work. |
| D | Shipping lists etc for reference and planning the activities | Yes | | |
| E | Preparation of site erection schedules and other input requirements | | Yes | In consultation with BHEL |
| F | Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments | Yes | Yes | In consultation with BHEL |
| G | Weekly erection schedules based on Sl No. e | | Yes | In consultation with BHEL |
| H | Daily erection / work plan based on Sl No. g | | Yes | In consultation with BHEL |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – III : Facilities in the scope of Contractor/BHEL (scope Matrix)

| Sl.No | Description PART II 3.9.0 ERECTION FACILITIES | Scope / to be taken care by | | Remarks |
|-------|---|-----------------------------|--------|----------------|
| | | BHEL | Bidder | |
| I | Periodic visit of the senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two months. | | Yes | |
| J | Preparation of preassembly bay | | Yes | NOT APPLICABLE |
| K | Laying of racks for gantry crane if provided by BHEL or brought by the contractor/bidder himself | | Yes | NOT APPLICABLE |
| L | Arranging the materials required for preassembly | | Yes | NOT APPLICABLE |

3.10 Construction Power, Water & land for office & storage:

3.10.1 CONSTRUCTION POWER: Shall be provided on chargeable basis.

Construction power will be provided on chargeable basis. The charges will comprise of per unit charges as charged by M/s ONGC plus additional charges towards fixed cost. Present rate is Rs 5/KWH. Per unit rate charged by M/s ONGC may vary in future and same shall be applicable to contractor. There will be number of contractors using construction power at LT side. In case there is a difference in energy consumption in HT & LT side, i.e the sum of LT side energy meter readings with individual agency are less than the total energy consumption recorded in HT side energy meter of respective month, the differential consumption shall be proportionately distributed among all users in line with their energy consumption

Construction power (three phase, 415 V/ 440 V) will be provided at one point near the site at a distance of approx. 500M. **The electricity shall be provided on chargeable basis including all taxes, duties, levies etc as applicable.** Further distribution shall be arranged by the contractor at his own cost and services. Contractor shall be responsible for fulfillment of all requirements including statutory requirements in this regard. Contractor shall deploy and install required

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – III : Facilities in the scope of Contractor/BHEL (scope Matrix)

energy meter, cables, fuses, distribution boards, switchboards, bus bars, earthing arrangements, protection devices and any other installation as specified by statutory authority/act. Contractor shall also obtain approvals of appropriate authority and pay necessary fees, levies etc towards the clearance of such installations, prior to use. Sufficient power factor compensation equipments like capacitor shall be provided by contractor for reactive loads like welding machines etc. In case of any fine/penalty on account of low power factor, same shall be shared by contractor proportionately according to power consumption.

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

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

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

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

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

Contractor to note that till construction power is made available by BHEL, contractor shall make his own arrangement like DG set etc. The contractor shall also take the approval/permission of Gujarat State statutory authorities for his DG set installation.

Contractor is requested to maintain the power factor above 0.95. On account of lapses by contractor on such account, the penalty as charged on account of drop in power factor below 0.9 shall be charged proportionately by sub-contractors working in the respective calendar month.

Contractor is advised to maintain the calibrated energy measuring instruments and use their system as efficiently as possible to maintain the HT side input energy meter reading and LT side outgoing energy meter reading to sub-contractors as equal.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – III : Facilities in the scope of Contractor/BHEL (scope Matrix)

Any taxes, duties, levies, cess etc as being charged/ levied by M/s ONGC/ state statutory authority shall be passed on to the sub-contractors proportionately in the respective calendar month bill.

3.10.2 Construction and Potable water will be provided on chargeable basis. . The charges will comprise of per unit charges as charged by M/s ONGC plus additional charges. Present rate is Rs 9/Cubic meter. Per unit rate charged by M/s ONGC may vary in future and same shall be applicable to contractor. No additional payment shall be made on account of this.

3.10.3 Land for Office & storage will be provided on chargeable basis. . The charges will comprise of per unit charges as charged by M/s ONGC plus additional charges. Present rate is Rs 5/square meter per month. Per unit rate charged by M/s ONGC may vary in future and same shall be applicable to contractor. No additional payment shall be made on account of this.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – IV : T&Ps AND MME TO BE DEPLOYED BY CONTRACTOR

A: TOOLS AND PLANTS TO BE DEPLOYED BY CONTRACTOR

| SN | DESCRIPTION | CAPACITY (MINIMUM) | MINIMUM QUANTITY | REMARKS |
|----|--|---|--------------------|---|
| 1 | MOBILE CRANE | 50 MT | 01 | FROM START OF HRSG ERECTION TO TILL THE COMMISSIONING OF PROJECT |
| 2 | MOBILE CRANE | 14 MT | 1 | TO BE DEPLOYED FROM THE START OF ERECTION |
| 3 | PICK & CARRY CRANE | 12 MT | 1 | TO BE DEPLOYED FROM THE START OF ERECTION+1 MONTHS |
| 4 | TRAILER WITH PRIME MOVER | 15/20 MT | As Required | 1 NO. FROM START AND 1 MORE FROM START+2 MONTHS BOTH TILL TRIAL RUN |
| 5 | AIR COMPRESSOR (ELECTRIC/DIESEL OPERATED) | 140 CFM, 7 KG/CM2 | As Required | |
| 6 | TIG WELDING SET | AS REQUIRED | AS PER REQUIREMENT | |
| 7 | PLASMA CUTTING M/C | FOR CUTTING UP TO 10 MM THICK STAINLESS STEEL | AS REQUIRED | |
| 8 | 3-PHASE DISTRIBUTION BOARD WITH COMPLETE SET UP FOR DRAWL OF CONSTRUCTION POWER & FITTED WITH ENERGY METER | 600 Amp | AS PER REQUIREMET | |
| 9 | POWER CABLE FOR DRAWL OF CONSTRUCTION POWER | AS REQUIRED | AS REQUIRED | |
| 10 | PRE HEATING / STRESS RELIEVING SET (HEATING CONTROL PANEL, CABLES, HEATING ELEMENTS, THERMOMETERS ETC.) | AS REQUIRED | AS REQUIRED | |
| 11 | RADIOGRAPHY ARRANGEMENT WITH RADIOACTIVE ISOTOPE SOURCE | IRIDIUM-192 | AS PER REQUIREMENT | |
| 12 | THEODOLITE OF REQUIRED ACCURACY | TO ENSURE VERICALITY OF STRUCTURAL COLUMNS | AS REQUIRED | |
| 13 | SELF DRILLING CUM TAPPING MACHINE FOR FIXING OF SHEETING WORK SCREWS | AS REQUIRED | AS REQUIRED | |

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – IV : T&Ps AND MME TO BE DEPLOYED BY CONTRACTOR

| SN | DESCRIPTION | CAPACITY (MINIMUM) | MINIMUM QUANTITY | REMARKS |
|----|---|--|-------------------------|---------|
| 14 | FIRE RETARDANT TARPAULINS | AS PER REQUIREMENT | AS REQUIRED | |
| 15 | RADIOGRAPHY ARRANGEMENT WITH RADIOACTIVE ISOTOPE SOURCE | COBALT-60 | 1 SET | |
| 16 | CHEMICAL CIRCULATION PUMPS TO HANDLE ACID SOLUTION, OPR TEMP 80 DEG CEL, WITH DRIVE MOTORS, STARTER PANEL, CABLE, SWITCH FUSE UNIT ETC. | SUGGESTED RATING: 150 M3, 120-150 M WC, WITH 90KW, 3000 RPM, 150 Amps MOTOR. HOWEVER, CONTRACTOR SHALL DEPLOY THE RQUIRED CAPACITY PUMP WITH ACCESSORIES AFTER OBTAINING WRITTEN APPROVAL OF BHEL. | AS REQUIRED | |
| 17 | WELDING GENERATOR (ELECTRICAL) | 300 AMPERE RATING | AS REQUIRED | |
| 18 | WELDING GENERATOR (DIESEL OPERATED) | 300 AMPERE RATING | AS REQUIRED | |
| 19 | RADIOGRAPHY FILM VIEWER | AS REQUIRED | AS REQUIRED | |
| 20 | ELECTRIC CABLE FOR DRAWAL & DISTRIBUTION OF CONSTRUCTION POWER | AS PER SITE REQUIREMENT | AS PER SITE REQUIREMENT | |
| 21 | ELECTRIC WINCH | 3/2 TON CAPACITY | AS REQUIRED | |
| 22 | ELECTRO-HYDRAULIC PIPE BENDING MACHINE | FOR UP TO 100 mm Nb PIPES | AS PER SITE REQUIREMENT | |
| 23 | PIPE BENDING MACHINE-HAND OPERATED | UP TO 2" NB PIPES | AS REQUIRED | |
| 24 | HAND WINCH | 1 TON | AS REQUIRED | |
| 25 | BAKING OVEN AND HOLDING OVEN WITH THERMOSTAT AND TEMPERATURE GAUGE FOR WELDING ELECTRODES | AS PER REQUIREMENT | AS REQUIRED | |
| 26 | PORTABLE OVEN FOR COATED WELDING ELECTRODES | AS PER REQUIREMENT | AS REQUIRED | |

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – IV : T&Ps AND MME TO BE DEPLOYED BY CONTRACTOR

| SN | DESCRIPTION | CAPACITY (MINIMUM) | MINIMUM QUANTITY | REMARKS |
|----|---|----------------------------------|---|---------------------|
| 27 | ELECTRIC MOTOR DRIVEN HYDRAULIC TEST PUMP WITH DRIVE AND STARTER ETC. | 400 Kg/Cm2 250 Kg/Cm2 | 1 NO. 1 NO. | FURTHER AS REQUIRED |
| 28 | MIXER FOR GROUTING OF EQUIPMENT FOUNDATIONS | AS PER REQUIREMENT | AS PER REQUIREMENT | |
| 29 | SCAFFOLDING MATERIALS (SCAFFOLDING PIPES WITH CLAMPS ETC.) | ADEQUATE TO SUIT THE REQUIREMENT | 800 SETS AND FURTHER AS PER REQUIREMENT | |
| 30 | ALU. SHEET CLAD PROFILE MAKING MACHINE | AS PER REQUIREMENT | AS REQUIRED | |
| 31 | HAND TOOLS, CUTTING TOOLS GRINDING MACHINES ETC | AS PER REQUIREMENT | AS REQUIRED | |
| 32 | NIBBLING MACHINE | AS PER REQUIREMENT | AS REQUIRED | |
| 33 | SHEARING MACHINE | AS PER REQUIREMENT | AS REQUIRED | |
| 34 | WATER PUMP TO LIFT WATER TO TOP OF HRSG | AS PER REQUIREMENT | AS REQUIRED | |
| 35 | PORTABLE GRINDING M/C | AS PER REQUIREMENT | AS REQUIRED | |
| 36 | PORTABLE DRILLING M/C | AS PER REQUIREMENT | AS REQUIRED | |
| 37 | CHAIN PULLEY BLOCKS | Assorted capacities | AS REQUIRED | |
| 38 | FIRE RETARDANT TARPAULINS | AS PER REQUIREMENT | AS REQUIRED | |
| 39 | FIRE EXTINGUISHER | AS PER REQUIREMENT | AS REQUIRED | |
| 40 | VACUUM CLEANER (INDUSTRIAL) | AS PER REQUIREMENT | AS REQUIRED | |
| 41 | JACKING BOLTS / PRESSOUT BOLTS OF ALL SIZES | AS PER REQUIREMENT | AS REQUIRED | |

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – IV : T&Ps AND MME TO BE DEPLOYED BY CONTRACTOR

| SN | DESCRIPTION | CAPACITY (MINIMUM) | MINIMUM QUANTITY | REMARKS |
|----|---|--------------------|------------------|---------|
| 42 | Gas Detector, Cable detector, Pipe detector | AS PER REQUIREMENT | AS REQUIRED | |
| 43 | GANG OPERATED AND HAND OPERATED HYDRAULIC JACKS WITH SUFFICIENT LONG HOSES | AS REQUIRED | AS REQUIRED | |
| 44 | HYDRAULIC JACKS FOR CW PIPING AREA | AS REQUIRED | AS REQUIRED | |
| 45 | DEWATERING PUMP- VACUUM SUCTION, COMPLETE WITH MOTORS, STARTER, CABLES, SWITCHES ETC. | AS REQUIRED | AS REQUIRED | |
| 46 | TORQUE WRENCH 0 TO 200 N-M CAP | AS PER REQUIREMENT | AS REQUIRED | |
| 47 | SLINGS OF VARIOUS CAPACITY AND QUANTITIES FOR HANDLING OF EQUIPMENTS | AS PER REQUIREMENT | AS REQUIRED | |
| 48 | BOLT STRETCHING DEVICES OF CAPACITY AS PER SITE REQUIREMENT | AS PER REQUIREMENT | AS REQUIRED | |
| 49 | FEELER GAUGE S OF VARIOUS SIZES INCLUDING LONG FEELER GAUGES | AS PER REQUIREMENT | AS REQUIRED | |
| 50 | SPANNERS / EYE BOLTS (OF ALL SIZES) | AS PER REQUIREMENT | AS REQUIRED | |
| 51 | SURFACE PLATES | AS REQUIRED | AS REQUIRED | |
| 52 | CENTRIFUGAL PUMP WITH MOTOR, STARTER PANEL, CABLES BETWEEN STARTER PANEL AND MOTORS, INLET AND OUTLET VALVES FOR THE PUMPS FOR FILLING AND HYDRAULIC TESTING OF CW, ACW SYSTEMS | 150-200TPH | AS REQUIRED | |
| 53 | 24 V TRANSFORMERS | 24 V OUTPUT | AS REQUIRED | |
| 54 | ELECTRIC CABLE FOR DRAWL & DISTRIBUTION OF | AS PER REQUIREMENT | AS REQUIRED | |

BHEL-PSWR

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – IV : T&Ps AND MME TO BE DEPLOYED BY CONTRACTOR

| SN | DESCRIPTION | CAPACITY (MINIMUM) | MINIMUM QUANTITY | REMARKS |
|----|--|--------------------|------------------|---------|
| | CONSTRUCTION POWER | | | |
| 56 | T&P required for surface preparation, Shot Blasting, Primer & Final Painting | AS PER REQUIREMENT | AS REQUIRED | |
| 57 | ANY OTHER MAJOR T&P REQUIRED FOR SATISFACTORY COMPLETION OF THE WORKS | AS PER REQUIREMENT | AS REQUIRED | |

Note:

1. BHEL shall not provide any Chemical Cleaning /Flushing pumps / equipment's as required for Chemical cleaning/flushing of piping and related equipment's / systems. These Chemical pumps of suitable capacity along with motor starters, cables etc. shall have to be provided by the contractor as part of scope of work. Contractor shall arrange / provide all Chemical cleaning arrangements as per requirement and instructions of BHEL engineer without any delay/time lapse.

2. Contractor has to provide Torque wrenches, Spanners of all sizes, Bolt stretching devices etc. as required for satisfactorily carrying out the complete erection / commissioning works. BHEL will not provide spanners to the contractor.

3. Contractor has to arrange slings of all sizes for completing the works covered under these specifications including the special slings for HRSG Drum.

B: MEASURING AND MONITORING DEVICES (MMD) TO BE DEPLOYED BY CONTRACTOR

To be finalized at site as per requirement.

NOTE:

ALL THE TOOLS AND PLANTS REQUIRED FOR THIS SCOPE OF WORK, EXCEPT THE TOOLS & PLANTS PROVIDED BY BHEL ARE TO BE ARRANGED BY CONTRACTOR WITHIN THE QUOTED RATES. THE LIST IS SUGGESTIVE IN NATURE. ANY ADDITIONAL T&P REQUIRED TO BE ARRANGED BY THE CONTRACTOR.

IF ABOVE MENTIONED T & P ARE NOT DEPLOYED IN SPECIFIED TIME BHEL WILL CHARGE TO CONTRACTOR CURRENT MARKET RATE + 30 % OVERHEADS FOR NON AVAILABILITY T&P OR LEVY A DAY WISE PENALTY FOR NON DEPLOYMENT OR DELAYED DEPLOYMENT.

IF THE WORKS GET DELAYED DUE TO NON-AVAILABILITY OF T&P, BHEL RESERVES THE RIGHT TO GET THE WORK DONE AT THE RISK AND COST OF CONTRACTOR WITHIN PREJUDICE TO RIGHTS OF BHEL AS IN GCC.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – IV : T&Ps AND MME TO BE DEPLOYED BY CONTRACTOR

THE MANUFACTURING YEAR OF ALL MAJOR T&PS DEPLOYED BY THE CONTRACTOR (50 MT, CRAWLER CRANE, 14 MT MOBILE CRANE AND 12 MT PICK & CARRY CRANE) SHOULD NOT BE MORE THAN 10 YEARS AS ON THE DATE OF DEPLOYMENT. IF AT ANY MOMENT OF TIME DURING THE EXECUTION OF WORK, ANY CRANE IS FOUND TO BE NOT IN A GOOD WORKING CONDITION AND NON-PERFORMING AT DESIRED MINIMUM CAPACITY, AS CERTIFIED BY BHEL ENGINEER, THE CONTRACTOR SHALL DEPLOY ANOTHER CRANE IN GOOD WORKING CONDITION WITH MINIMUM DESIRED CAPACITY. IF CONTRACTOR FAILS TO DEPLOY THE SAME WITH IN 10 DAYS, BHEL WILL RECOVER NON-REFUNDABLE PENALTY PER DAY OF DELAY IN THE FOLLOWING MANNER -

1. IN RESPECT OF 50 MT CRANE: @ RS. 4,000 / -
2. IN RESPECT OF 14 MT CRANE: @ RS. 2,000 / -
3. IN RESPECT OF 12 MT CRANE: @ RS 1,500 / -

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – V: T&Ps and MMEs to be deployed by BHEL on sharing basis

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

| SN | DESCRIPTION | QUANTITY | REMARKS |
|-----------|--------------------|-----------------|---|
| 1 | Crane-100 MT | 01 | All cranes (except Contractor scope) required for the mentioned work will be arranged by BHEL as per requirement. |

Note:

CRANES DEPLOYED BY BHEL SHALL BE OWNED OR HIRED BY BHEL.

OPERATOR AND O&M FOR BHEL OWNED CRANE WILL BE ARRANGED BY BHEL (FREE OF CHARGES).

OPERATORS AND O&M FOR HIRED CRANE WILL BE PROVIDED BY THE HIRING AGENCY (FREE OF CHARGES).

CONTRACTOR SHALL PROVIDE THE FUEL FOR BHEL PROVIDED CRANES (HIRED/OWNED) FOR THEIR USE.

CONTRACTOR SHALL MAKE NECESSARY ARRANGEMENTS LIKE LAYING OF SPECIAL SLEEPER BEDS AND STEEL PLATES (ALL ARRANGED BY CONTRACTOR), ASSEMBLY AND DISMANTLING OF HEAVY LIFT ATTACHMENT, BOOM, JIB ETC FOR MOVEMENT AND OPERATION OF THE CRANE.

CRANES PROVIDED BY BHEL WILL BE ON SHARING BASIS WITH OTHER AGENCIES / CONTRACTORS OF BHEL. THE ALLOCATION OF CRANES SHALL BE THE DISCRETION OF BHEL ENGINEER, WHICH SHALL BE BINDING ON THE CONTRACTOR. CRANES WILL BE DEPLOYED AT APPROPRIATE TIME AS DECIDED BY BHEL FOR SUITABLE DURATION AND INTENDED PURPOSE.

DAY TO DAY OPERATION/ MAINTENANCE, GENERAL CLEANLINESS, ATTENDING OF GEAR BOX LEAKAGES ETC., APPLYING CALADIUM COMPOUND ON SLINGS AND HOLDING / SUPPORTING THE SUPPLY CABLES ETC. SHALL BE PROVIDED BY THE CONTRACTOR AS PER REQUIREMENT.

CRANE WILL BE USED ON SHARING BASIS BY OTHER AGENCIES WORKING WITHIN THE PLANT UNDER THE INSTRUCTION OF BHEL. THE CONTRACTOR SHALL EXTEND THE SERVICES OF HIS OPERATOR TO SUCH OTHER AGENCIES AS WELL ON MUTUALLY AGREED MODE OF COST SHARING.

ABOVE T&PS WILL BE PROVIDED ON SHARING BASIS ONLY. CONTRACTOR HAS TO PLAN HIS ACTIVITIES WELL IN ADVANCE AND INFORM BHEL ENGINEER IN CHARGE/ CONSTRUCTION MANAGER THE DATE OF ACTUAL USE.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
**Chapter – V: T&Ps and MMEs to be deployed by BHEL on sharing
basis**

CONTRACTOR SHALL PROVIDE ALL NECESSARY TOOLS & TACKLES, CRANE, TRAILERS ETC FOR TRANSPORTATION OF CRANE/COMPONENTS/PARTS FROM BHEL STORES/ STORAGE YARD, ASSEMBLY/ERECTION AT SITE, TESTING, COMMISSIONING, DISMANTLING AFTER COMPLETION OF WORKS AND RETURNING TO BHEL STORES/STORAGE YARD AS PER INSTRUCTION OF BHEL ENGINEER.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VI: Time Schedule

TIME SCHEDULE & MOBILIZATION

6.1.1 INITIAL MOBILIZATION

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

6.1.2 MOBILIZATION FOR ERECTION, TESTING, & COMMISSIONING ETC.

The activities for Erection, Testing etc. shall be started as per directions of Construction Manager of BHEL. Contractor shall mobilize further resources (in addition to those required for activities under clause no. 6.1.1) as per requirement to commence the work of erection, testing etc. of boiler and auxiliaries and progressively augment the resources to match schedule of the project.

6.1.3-A COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE

Erection/placement on its designated foundation / location, of the first major permanent equipment / component / column covered in the scope of these specifications shall be recognized as **“Start of Contract Period”**. Smaller items like packer plates, shims, anchors, inserts etc. will not be considered as start of contract period.

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

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

6.1.3-B Schedule for HRSG & AUX, PIPING & BOP :

| SL No. | Milestones | Date of completion |
|--------|---|--------------------|
| | | |
| | Major Milestone for HRSG & Piping of ONGC Hazira Project | |
| 1 | HRSG Erection Start | 01/05/2016 |
| 2 | HRSG Drum Lifting | 30/06/2016 |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VI: Time Schedule

| | | |
|----|---|------------|
| 3 | Hydraulic Test | 15/10/2016 |
| 4 | Gas In and Alkali boil Out | 30/11/2016 |
| 5 | Steam Blowing & Safety Valve Floating | 15/12/2016 |
| 11 | Co-Gen Commissioning (GTG + HRSG) | 30/12/2016 |
| 12 | Trial Run Completion | 30/01/2017 |
| 13 | Completion of all Facilities & Handing Over | 31/03/2017 |

6.1.4

In order to meet above schedule, and any other intermediate Schedule/targets as set by BHEL/Customer, to meet customer and project schedule requirements, Contractor shall make the note of above and will mobilize his manpower and resources. It will require working in shifts to meet the above schedule / Intermediate targets as set by BHEL Engineer/Customer at site and contractor shall augment the manpower/resources accordingly within the quoted price without any compensation.

Contractor to note that above indicated date of start (01/05/2016) is tentative. However as per availability of inputs, contractor may have to start erection work prior to above Date of start and Contract period will be considered accordingly.

6.1.5 CONTRACT PERIOD

The contract period for completion of entire work under scope shall be 11 (**Eleven**) months for HRSG & AUX, Piping, BOP Systems from the “start of contract period” as specified earlier.

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

Note:

Agency should note that the construction works for both stream viz HRSG-Aux, Piping-BOP shall have to go parallelly to match with the commissioning schedule of the plant. For this, it will be necessary to deploy “Dedicated Resources” like Manpower, Machineries and Materials Area wise to execute the woks simultaneously.

Bidders are requested to submit Resource deployment plan Area wise with detail program in line with above schedule in the form of Bar Chart / MS project planer along with their offer.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VI: Time Schedule

6.1.6

IN ORDER TO MEET ABOVE SCHEDULE AND OTHER INTERMEDIATE TARGETS/ACTIVITIES AS SET **BY BHEL ENGINEER IN CHARGE** AT SITE & TO MEET CUSTOMER REQUIREMENTS/PROJECT SCHEDULE, CONTRACTOR SHALL ARRANGE ALL NECESSARY RESOURCES AND WORK FORCE IN CONSULTATION WITH BHEL ENGINEER AT SITE TO UNDERTAKE WORKS CONCURRENTLY IN ALL POSSIBLE FRONTS AS MADE AVAILABLE TO CONTRACTOR.

CONTRACTOR SHALL NOTE THAT INDIVIDUAL MILESTONES AS ABOVE SHALL BE ACHIEVED AS PER SCHEDULE FURNISHED ABOVE. **THE DATE OF START OF FIRST MAJOR PERMANENT EQUIPMENT / COMPONENT / COLUMN COVERED IN THE SCOPE SHALL BE RECKONED AS THE START OF CONTRACT PERIOD FOR THIS PURPOSE.**

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – VII: Billing Breakup

7. The progressive payment for “Erection, Testing and Commissioning of HRSG & Piping Package” on accepted price of contract value will be released as per the break up given hereinafter:

| TERMS OF PAYMENT FOR ERECTION, TESTING AND COMMISSIONING OF HRSG & AUX, PIPING & BOP PACKAGES | | | | | | | |
|--|---|---------------|---------------------------------------|---------------------|---------------|--|---------------|
| SN | Activity / Milestone | Structures | Pressure Parts & Heat transfer Module | Non-pressure parts* | Chimney | (Piping, Wrapping & Coating, Supports)** | Insulation |
| 1 | PRO RATA PAYMENTS (85%) | | | | | | |
| 1.1 | FABRICATION / PRE-ASSEMBLY WHEREVER APPLICABLE (IF NOT APPLICABLE, THIS PORTION SHALL BE CLUBBED WITH PLACEMENT IN POSITION) | 20.00% | 20.00% | 20.00% | 15.00% | 20.00% | -- |
| 1.2 | ERECTION / PLACEMENT | 25.00% | 10.00% | 15.00% | 20.00% | 20.00% | 50.00% |
| 1.3 | ALIGNMENT | 15.00% | 15.00% | 15.00% | 10.00% | 10.00% | 15.00% |
| 1.4 | WELDING / BOLTING WITH PERMANENT SUPPORTS | 15.00% | 20.00% | 15.00% | 20.00% | 15.00% | 20.00% |
| 1.5 | COMPLETION OF NON DESTRUCTIVE EXAMINATION & STRESS RELIEVING/ HEAT TREATMENT (if not applicable, then this portion to be paid along with welding) | 10.00% | 10.00% | -- | 5.00% | 5.00% | -- |
| 1.6 | COMPLETION OF ATTACHMENT WELDING, FIN WELDING, SUPPORTS ETC. | -- | 5.00% | -- | -- | 5.00% | -- |
| 1.7 | HANGERS & SUPPORTS ETC WHEREVER NECESSARY AS PER DRG | -- | 5.00% | 20.00% | 15.00% | 10.00% | -- |
| | TOTAL FOR PRO RATA PAYMENTS (85%) | 85.00% | 85.00% | 85.00% | 85.00% | 85.00% | 85.00% |
| 2 | STAGE/MILESTONE PAYMENTS (15%) | | | | | | |
| 2.1 | Drum Lifting | 2.00% | | | | | |

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – VII: Billing Breakup

| | | | | | | | |
|------|---|----------------|----------------|----------------|----------------|----------------|----------------|
| 2.2 | AIR & GAS TIGHTNESS TEST | -- | -- | 3.00% | 5.00% | -- | -- |
| 2.3 | BOILER HYDRAULIC TEST (DRAINABLE) | -- | 2.00% | -- | -- | -- | -- |
| 2.4 | ABO | -- | 2.00% | 1.00% | 1.00% | 1.00% | 1.00% |
| 2.5 | Steam Blowing | -- | 2.00% | 2.00% | | 2.00% | 2.00% |
| 2.6 | SVF | -- | 2.00% | | | 2.00% | 1.00% |
| 2.7 | Combined Cycle Trial Operation | 1.00% | 2.00% | 1.00% | 2.00% | 2.00% | 2.00% |
| 2.8 | Completion of sheet covering for HRSG roof / burner roof / completion of gutters. | 2.00% | -- | -- | -- | -- | -- |
| 2.9 | Painting | 5.00% | 1.00% | 3.00% | 2.00% | 3.00% | -- |
| 2.10 | Area cleaning, temporary structures cutting/removal and return of scrap | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 3.00% |
| 2.11 | Pending points liquidation | 2.00% | 1.00% | 2.00% | 2.00% | 2.00% | 3.00% |
| 2.12 | Material Reconciliation | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 2.00% |
| 2.13 | Completion of all Facilities and Handing Over / Contractual Obligation | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% |
| | TOTAL FOR STAGE/MILESTONE PAYMENTS (15%) | 15.00% | 15.00% | 15.00% | 15.00% | 15.00% | 15.00% |
| | TOTAL (I+II) | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |

NOTE:

***Balance Of Plant-MISC EQUIPMENTS IS COVERED UNDER NON PRESSURE PART.**

****Balance Of Plant-FIRE PROTECTION & DETECTION SYSTEM IS COVERED UNDER PIPING-NON IBR-CS.**

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VII: Billing Breakup

A) GENERAL

A.1

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

A.2

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

A.3

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

B) MEASUREMENT OF THE WORK COMPLETED

B.1 Where payment is to be made on the basis of weight, the weight per unit given in the BHEL document only shall be taken in to consideration. In case such information is not available in BHEL documents, then the latest relevant Indian standards in this regard may be applied.

B.2 Spares, surplus quantity, erection contingency materials will not be paid for unless the same has been consumed in place of regular item of measurable work as per the rate schedule.

B.3 Where the payment is made on the basis of item rate, actual executed quantity measured jointly shall only be paid for.

B.4 It is clarified that as far as weight constituted by welding consumables and other consumables supplied by BHEL as well as by the contractor, shall be ignored for the purpose payment.

B.5 BHEL engineer's decision regarding stage of payment corresponding to progress of work, calculation of weight etc. will be final and binding on the contractor.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VII: Billing Breakup

B.6 Wastage allowance provided elsewhere on application of insulation will be applied on the net issued quantity. The net issued quantity is gross issue less the quantity returned. The wastage allowance will be applied at the final reconciliation stage. The payable amount will then be restricted to the net quantity after wastage allowance.

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VIII: Taxes and Other Duties

8.0 TAXES, DUTIES, LEVIES (Consolidated Rev 06 dated 28/12/2015)

8.1. For All types of works excepting works covered under sl no 8.2

8.1.1

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

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

8.1.2 Service Tax & Swachh Bharat Cess on Services:

Contractor's price/rates shall be exclusive of Service Tax and Swachh Bharat Cess on Services. In case, it becomes mandatory for the contractor under provisions of relevant act/law to collect the Service Tax & Swachh Bharat Cess from BHEL and pay the same to the concerned tax authorities, such applicable amount will be paid by BHEL at the prevailing Service Tax Rate presently Service Tax 14% and Swachh Bharat Cess 0.5% on the admitted Service value.

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

- 1. The name, address and the registration number of the contractor,**
- 2. The name and address of the party receiving taxable service,**
- 3. Description and value of taxable service provided and,**
- 4. The service tax and Swachh Bharat Cess payable thereon.**

All the Four conditions shall be fulfilled in the invoice before release of service tax and Swachh Bharat Cess payment.

Wherever, more than one route/option are available for discharge of service tax and Swachh Bharat Cess liability under a particular service, (e.g. "works contract Service"), contractor shall obtain prior written consent from BHEL site before billing the amount towards Service Tax.

8.1.3 VAT (Sales Tax /WCT)

As regards Value Added Tax (VAT)/CST on transfer of property in goods involved in Works Contract (previously known as Works Contract Tax) applicable as per local laws, the price quoted by the contractor shall be inclusive of the same and in no case input or output VAT/CST will be reimbursed extra.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VIII: Taxes and Other Duties

In any case the Contractor shall register himself with the respective Sales Tax authorities of the state and submit proof of such registration to BHEL along with the first RA bill. Contractor will submit all the details of VAT/CST paid for the contract in the prescribed format of the respective state VAT laws. Also, the contractor will issue the tax Invoices to BHEL as per the Tax laws of respective state on monthly basis. Contractor shall also be required to furnish to BHEL necessary proof of VAT remittance on monthly basis.

Deduction of tax at source shall be made as per the provisions of law and is to be construed as an advance tax paid by the contractor and no reimbursement thereof will be made.

Further, if BHEL, at the instance of customer or otherwise adopts the specific route for discharging output VAT liability itself, benefit of the reduction in liability of the contractor will be passed on to BHEL.

In case, BHEL is forced to pay any VAT liability on behalf of contractor, the same will be recovered from contractor's bill or otherwise as deemed fit

8.2 — 'Enabling Works'

~~The contractor shall pay all (save the specific exclusions as enumerated in this contract) taxes, fees, license charges, deposits, duties, tools, royalty, commissions or other charges which may be levied on the input goods & services consumed and output goods & services delivered in course of his operations in executing the contract. In case BHEL is forced to pay any of such taxes, BHEL shall have the right to recover the same from his bills or otherwise as deemed fit. (i.e. rates quoted by bidder shall be inclusive of Service Tax, VAT/WCT and all other taxes and duties including new levies/taxes/duty if any)~~

~~However, Since the proposed work is in the nature of 'Works Contract service' as per Service tax law, Hence, For non corporate contractors being Individual, HUF, Proprietary Firm, Partnership Firm or Association of Persons (AOP), BHEL shall recover the applicable Service Tax under reverse charge mechanism from the contractor and remit the same with the Government as per the provisions of Law. Necessary advice/confirmation of remittance shall be issued to the contractor. The contractor shall not be eligible for any refund/reimbursement of such service tax from BHEL. It shall be the responsibility of the contractor to submit proper invoice giving all the requisite details as per Service Tax Law for the determination of the service tax liability of BHEL under reverse charge mechanism. BHEL reserves the right to determine such liability based on the invoice submitted by the contractor or otherwise independently and remittance of the same with the Government.~~

8.3 New Taxes/Levies - For All types of works excepting works covered under sl no 8.2

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VIII: Taxes and Other Duties

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

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

8.4 BOCW Cess - For All types of works excepting works covered under sl no 8.2

The quoted rates shall be exclusive of the BOCW Cess which, if applicable, shall be paid extra by BHEL against Documentary evidence. However, the applicability of the BOCW Cess shall be got confirmed from BHEL in writing, before remitting such Cess/tax.

8.5 GST: For All types of works excepting works covered under sl no 8.2

As and when GST becomes applicable to this contract, the net differential (negative or positive) financial liability of the bidder to the Authorities (as compared to such liability prior to applicability of GST), if any, shall be to the account of BHEL. For this purpose, all available options under the GST shall be explored, and the decision of BHEL in this regard shall be final and binding on the bidder.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-IX : SPECIFIC INCLUSIONS

SPECIFIC INCLUSIONS

9.1

All terminal connections for equipment & piping are covered in this specification.

9.2

Impulse/ pneumatic piping between customer's battery limit and equipments is the part of scope of work.

9.3

Servicing and assembly of control valves/regulating valves, fixing of filter elements/strainers & steam blowing & blanking devices in MS strainer, Coil strainer & and blanking ESV & IV system, for hydro test, steam blowing etc. is the part of scope of work.

9.4

It may be specifically noted that it should not be construed or claimed by the contractor that with the technical specification and "exclusions and/or inclusions" detailed in this tender specification, BHEL has covered the entire scope of work and/or the details thereof to be executed by the contractor.

9.5

Complete control fluid system included in this specification. Associated assistance for commissioning like lube oil flushing, filling and topping up of lube oil etc. shall be part of the work.

9.6

Chipping of foundation, placement, erection, alignment, commissioning, grouting, and mounting of equipment mount instruments, panels and other fittings of BHEL (bought out items) supplied pumps & packages are in scope of the work. Erection and commissioning of these equipments/pumps & packages will be required to complete and meet the commissioning schedule/ milestone activities of other areas like HRSG, etc. Contractor shall plan and complete erection & commissioning of these equipments on priority as per decision of BHEL engineer/customer requirement. Details of such systems are furnished in relevant appendix.

9.7

Most of the Misc. Pumps with drive motors, base frame, fittings etc will be supplied in loose parts/ dismantled condition as skid mount. These pumps along with drive and fittings shall be assembled at site. The Delivery of these will be taken from BHEL stores/storage yard and will be assembled/ installed at different locations as per drawing and instruction of BHEL Engineer at site. The work involved is preservation, assembly, installation, erection, alignment, foundation grouting including providing non-shrink free flow grout mix material, fixing of loose items, filling of lubricants, greasing, commissioning, no load/ load trial run of motors & pumps. All the works shall be carried out as part of scope of work.

These Misc. pumps will be required for erection and commissioning of other systems, pipings, equipments which will be under scope of erection of other agencies. Contractor shall carry out the installation, erection and alignment works etc. as per priority decided by BHEL Engineer at site to enable the other agencies to proceed with their work. Contractor shall carry out the welding of terminal point/interface/matching & connected flanges joints, pipe joints etc. of

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-IX : SPECIFIC INCLUSIONS

other system & other agencies as scope of work. The decision of BHEL Engineer shall be final and binding on contractor.

9.8

Erection, Testing & Commissioning of Hoists and Workshop & chemical laboratory equipments.

9.9

CONSUMABLES

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

9.10

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

9.11

SURFACE PREPARATION, PRIMERS & PAINTS

Shot Blasting of Non IBR Piping and Steel supplied for Supports is in scope of contractor. Contractor has to make his own arrangement for the same at Outside of Operational Plant area.

Supply of Paints/Primer/Thinner and application of paints for final painting and all other consumables like brush, cleaning agents etc and all T&P including scaffolding materials, manpower, and supervision is in contractor's scope.

9.12

WELDING ELECTRODES, FILLER WIRES FOR TIG WELDING AND GASES

All welding consumables including filler wires are in the contractor's scope.

9.13

HOT WORKING: ONGC Hazira is a gas based operational plant. Hence, wherever hot working is carried out, contractor has to deploy gas detector as a safety device to avoid fire/accident. This is part of work and no extra payment is envisaged for this.

9.14

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-IX : SPECIFIC INCLUSIONS

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

9.15

The contractor shall provide all consumables required for carrying out the work covered under this scope of work including TIG wires for welding of piping joints.

9.16

All the required gases like argon, oxygen, and acetylene etc. including required high purity nitrogen gas (for purging of generator stator water system) shall be arranged by the contractor at his cost.

9.17

Fire protection & detection system (excluding electrical-C&I work) erection & commissioning including painting is in contractor scope. Performance guarantee of the complete system/demonstration test to be conducted after completion of physical work. This is in contractor scope.

FP & DS Vendor/Expert services will be provided for supervision of FP & DS E&C work.

9.18

In HRSG, during modules erection, saddle plates are used which are to be welded on temporary structures, for which no additional cost will be considered. This should be included in quoted rates.

9.19

Bicycle is allowed for movement, vehicular movement is restricted.

9.20

There should be specific person/ group of person for Work Permit system and man/material system so that it can be expedited.

9.21

Before excavation at site, area should be checked by cable locator, pipe locator. Contractor should keep gas detector also during working. If required, provision of one or two fireman should also be made. All these equipments/activities are part of work and no separate payment is envisaged for this.

9.22

During project execution, if customer facilities are damaged then repairing of the same is to be carried out by the contractor.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-X : SPECIFIC EXCLUSIONS

10.0 SPECIFIC EXCLUSIONS

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

10.1 Sub-delivery items and electrical components such as push-buttons, junction boxes etc.

10.2 E&C work of cable trays, cables and earthing etc

10.3 Control panels, EPMS, MCC etc.

10.4 Electrical & C&I items of handling system.

10.5 All electrical and control & instrumentation items including FP & DS system those specified elsewhere in these specifications.

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

10.7 Pneumatic copper tubing and fittings thereof.

10.8 Testing and commissioning of heating elements, thermostats, HV transformers.

10.9 Electrical and C&I items of Variable Frequency Drives as provided elsewhere in these specifications.

10.10 Backfilling job in Underground Piping: Civil agency will dig the trench, mechanical agency will complete piping work. After that backfilling will be done by civil agency.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

ESTIMATED WEIGHT OF VARIOUS SYSTEM IN SCOPE OF WORK

A) ESTIMATED WEIGHT OF HRSG, CHIMNEY, INSULATION WITH CLADDING MATERIALS:

| SR NO | PG | MA | ST | DESCRIPTION | DESIGN WT IN KG | WT IN MT |
|----------------------------|----|-----|----|---------------------------------------|-------------------|----------------|
| STRUCTURE: | | | | | | |
| 01 | 35 | 010 | DL | FOUNDATION MATERIALS-HRSG | 14,086.568 | 14.086568 |
| 02 | 35 | 011 | DL | SLIDE BEARING PLATE | 725.674 | 0.725674 |
| 03 | 35 | 110 | DL | MAIN COLUMNS LEFT | 27,429.720 | 27.42972 |
| 04 | 35 | 120 | DL | MAIN COLUMNS RIGHT | 27,429.720 | 27.42972 |
| 05 | 35 | 131 | HT | INLET DUCT SUPPORT STRUCTURE FOR HRSG | 8,577.652 | 8.577652 |
| 06 | 35 | 140 | HT | AUXILIARY COLUMNS | 4,234.228 | 4.234228 |
| 07 | 35 | 220 | DL | PIPING SUPPORT - STRUCTURE | 3,000 | 3 |
| 08 | 35 | 391 | DL | MODULE TRANSPORTING STRUCTURE | 28,563.405 | 28.563405 |
| 09 | 35 | 392 | DL | SINGLE MODULE LIFTING FRAME | 1,715.922 | 1.715922 |
| 10 | 35 | 393 | DL | MODULE UPRIGHTING FRAME | 3,777.573 | 3.777573 |
| 11 | 35 | 540 | HT | AUXILIARY COLUMN BRACING | 6,731.232 | 6.731232 |
| 12 | 35 | 591 | DL | BOTTOM BRACING BEAM | 7,353.658 | 7.353658 |
| 13 | 35 | 592 | DL | TOP BRACING BEAM | 6,245.032 | 6.245032 |
| 14 | 35 | 593 | DL | BASE BEAMS OR MODULE BOTTOM SUPPORT | 5,529.784 | 5.529784 |
| 15 | 35 | 594 | DL | DUCT STIFFENER BEAMS | 18,996.070 | 18.99607 |
| 16 | 35 | 595 | DL | LATERAL SUPPORT BEAM FRONT | 1,115.274 | 1.115274 |
| 17 | 35 | 596 | DL | LATERAL SUPPORT BEAM REAR | 11,013.873 | 11.013873 |
| 18 | 35 | 597 | HT | MODULE AND DRUM SUPPORT STRUCTURE | 7,545.408 | 7.545408 |
| 19 | 35 | 610 | HT | BOILER ROOF STRUCTURE | 18,500 | 18.5 |
| 20 | 35 | 611 | HT | BOILER ROOF SHEETING | 3,500 | 3.5 |
| 21 | 36 | 210 | HT | MAIN FLOOR 1ST LEVEL | 7,006.711 | 7.006711 |
| 22 | 36 | 220 | HT | MAIN FLOOR 2ND LEVEL | 5,184.486 | 5.184486 |
| 23 | 36 | 230 | HT | MAIN FLOOR 3RD LEVEL | 6,271.862 | 6.271862 |
| 24 | 36 | 240 | HT | MAIN FLOOR 4TH LEVEL | 13,230.411 | 13.230411 |
| 25 | 36 | 250 | HT | MAIN FLOOR 5TH LEVEL | 1,471.382 | 1.471382 |
| 26 | 36 | 390 | HT | MISCELLANEOUS PLATFORMS | 241.095 | 0.241095 |
| 27 | 36 | 810 | HT | FLOOR GRILLS AND GUARD PLATE | 12,226.950 | 12.22695 |
| 28 | 36 | 820 | DL | STAIRS AND LADDERS | 7,147.243 | 7.147243 |
| 29 | 36 | 850 | HT | HANDRAILS AND HAND RAIL POST | 11,867.016 | 11.867016 |
| 30 | 97 | 457 | HT | ANGLES AND CHANNELS | 958.550 | 0.95855 |
| SUB TOTAL-STRUCTURE | | | | | 271676.499 | 271.676 |
| 1 | 04 | 116 | DL | Boiler drum with internals-HP | 29,567.227 | 29.567227 |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | | | |
|----|----|-----|----|---|------------|-----------|
| 2 | 04 | 144 | DL | Drum slide bearing plates-HP | 128.000 | 0.128 |
| 3 | 04 | 148 | DL | Drum slide bearing plates-LP | 128.000 | 0.128 |
| 4 | 04 | 149 | DL | Fasteners for drum saddle-HP | 6.120 | 0.00612 |
| 5 | 04 | 158 | DL | Fasteners for drum saddle-LP | 6.120 | 0.00612 |
| 6 | 04 | 176 | DL | Boiler drum with internals-LP | 10,875.778 | 10.875778 |
| 7 | 04 | 458 | DL | Fasteners for drum saddle LP-Washer Plat | 17.160 | 0.01716 |
| 8 | 04 | 459 | DL | Fasteners for drum saddle HP-Washer Plat | 17.160 | 0.01716 |
| 9 | 07 | 206 | HT | Riser Pipes-HP | 2,324.880 | 2.32488 |
| 10 | 07 | 208 | HT | Riser Pipes-LP | 2,775.575 | 2.775575 |
| 11 | 07 | 210 | HT | Riser links and headers-HP | 2,457.040 | 2.45704 |
| 12 | 07 | 212 | HT | Riser links and headers-LP | 2,242.571 | 2.242571 |
| 13 | 07 | 305 | HT | Supports for evaporator modules-HP Front | 11.920 | 0.01192 |
| 14 | 07 | 306 | HT | Supports for evaporator modules-HP Middl | 44.700 | 0.0447 |
| 15 | 07 | 307 | HT | Supports for evaporator modules-HP Rear(| 19.370 | 0.01937 |
| 16 | 07 | 308 | HT | Supports for evaporator modules-LP(DD it | 19.320 | 0.01932 |
| 17 | 07 | 311 | HT | Supports for Downcomer-DD items(HP) | 142.768 | 0.142768 |
| 18 | 07 | 312 | HT | Supports for Downcomer-DD items(LP) | 142.618 | 0.142618 |
| 19 | 07 | 411 | HT | Supports for Downcomer-HP | 139.574 | 0.139574 |
| 20 | 07 | 412 | HT | Supports for Downcomer-LP | 120.276 | 0.120276 |
| 21 | 07 | 504 | HT | Disc spring for modules | 1,429.436 | 1.429436 |
| 22 | 07 | 505 | HT | Supports for evaporator modules-HP Front | 553.292 | 0.553292 |
| 23 | 07 | 506 | HT | Supports for evaporator modules-HP Middl | 1,982.628 | 1.982628 |
| 24 | 07 | 507 | HT | Supports for evaporator modules-HP Rear | 810.549 | 0.810549 |
| 25 | 07 | 508 | HT | Supports for evaporator modules-LP | 1,243.828 | 1.243828 |
| 26 | 07 | 511 | HT | Supports for Downcomer-Springs(HP) | 159.657 | 0.159657 |
| 27 | 07 | 512 | HT | Supports for Downcomer-Springs(LP) | 117.104 | 0.117104 |
| 28 | 07 | 992 | HT | Welding Consumables | 19.265 | 0.019265 |
| 29 | 07 | 993 | HT | Erection materials and commissioning spares | 206.953 | 0.206953 |
| 30 | 08 | 910 | HT | EXPANSION MOVEMENT MEASURING COMPONENTS | 425.950 | 0.42595 |
| 31 | 10 | 121 | HT | SH Inlet Header | 344.165 | 0.344165 |
| 32 | 10 | 135 | HT | DESH inlet header | 912.458 | 0.912458 |
| 33 | 10 | 221 | HT | SH Outlet Header | 677.013 | 0.677013 |
| 34 | 10 | 235 | HT | DESH outlet header | 1,656.602 | 1.656602 |
| 35 | 12 | 302 | HT | Supports for HP MS Line - DD Items | 5.290 | 0.00529 |
| 36 | 12 | 304 | HT | Supports for DESH Links - DD Items | 6.835 | 0.006835 |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | | | |
|----|----|-----|----|--|-----------|----------|
| 37 | 12 | 305 | HT | Supports for LP Saturated Links - DD It | 2.950 | 0.00295 |
| 38 | 12 | 306 | HT | Supports for LP MS Line - DD Items | 3.313 | 0.003313 |
| 39 | 12 | 312 | HT | HP SH - II Module Supports - DD Items | 11.920 | 0.01192 |
| 40 | 12 | 313 | HT | HP SH - I Module Supports - DD Items | 11.920 | 0.01192 |
| 41 | 12 | 314 | HT | LP SH Module Supports - DD Items | 9.280 | 0.00928 |
| 42 | 12 | 502 | HT | Supports for HP MS Line - Springs | 123.195 | 0.123195 |
| 43 | 12 | 504 | HT | Supports for DESH Links - Springs | 204.458 | 0.204458 |
| 44 | 12 | 505 | HT | Supports for LP Saturated Links - Spring | 56.740 | 0.05674 |
| 45 | 12 | 506 | HT | Supports for LP MS Line - Springs | 219.822 | 0.219822 |
| 46 | 12 | 850 | HT | HP Saturated Links | 1,595.338 | 1.595338 |
| 47 | 12 | 852 | HT | HP DESH Links | 1,240.172 | 1.240172 |
| 48 | 12 | 853 | HT | LP Saturated Links | 939.800 | 0.9398 |
| 49 | 12 | 855 | HT | LP SH Inter Conn Links | 1,063.044 | 1.063044 |
| 50 | 12 | 900 | HT | HP DESH | 619.780 | 0.61978 |
| 51 | 12 | 901 | HT | Supports for HP Saturated Links | 23.224 | 0.023224 |
| 52 | 12 | 904 | HT | Supports for DESH Links | 180.542 | 0.180542 |
| 53 | 12 | 905 | HT | Supports for LP Saturated Links | 324.674 | 0.324674 |
| 54 | 12 | 912 | HT | HP SH - II Module Supports | 521.678 | 0.521678 |
| 55 | 12 | 913 | HT | HP SH - I Module Supports | 580.236 | 0.580236 |
| 56 | 12 | 914 | HT | LP SH Module Supports | 270.972 | 0.270972 |
| 57 | 12 | 992 | HT | Welding consumables (SH circuit) | 24.400 | 0.0244 |
| 58 | 12 | 993 | HT | Erection materials (SH circuit) | 971.480 | 0.97148 |
| 59 | 19 | 301 | HT | Supports for HP Eco Feed Pipe - DD items | 0.681 | 0.000681 |
| 60 | 19 | 302 | HT | Supports for HP Eco Link to Drum - DD It | 1.150 | 0.00115 |
| 61 | 19 | 304 | HT | Supports for LP Eco Feed Pipe - DD items | 0.410 | 0.00041 |
| 62 | 19 | 305 | HT | Supports for LP Eco Link to Drum - DD It | 0.630 | 0.00063 |
| 63 | 19 | 308 | HT | Supports for WPH links-DD items | 0.450 | 0.00045 |
| 64 | 19 | 311 | HT | Supports for WPH modules-DD items | 7.360 | 0.00736 |
| 65 | 19 | 312 | HT | HP ECO - III Module Supports - DD Items | 9.200 | 0.0092 |
| 66 | 19 | 313 | HT | HP ECO - II Module Supports - DD Items | 9.200 | 0.0092 |
| 67 | 19 | 314 | HT | HP ECO - I Module Supports - DD Items | 8.050 | 0.00805 |
| 68 | 19 | 315 | HT | LP ECO Module Supports - DD Items | 1.150 | 0.00115 |
| 69 | 19 | 501 | HT | Supports for HP Eco Feed Pipe - Springs | 64.081 | 0.064081 |
| 70 | 19 | 502 | HT | Supports for HP Eco Link to Drum - Sprin | 16.474 | 0.016474 |
| 71 | 19 | 508 | HT | Supports for WPH links-Springs | 14.606 | 0.014606 |
| 72 | 19 | 701 | HT | HP Eco -I Inlet Header | 144.961 | 0.144961 |
| 73 | 19 | 702 | HT | HP Eco -III Outlet Headers | 147.108 | 0.147108 |
| 74 | 19 | 850 | HT | HP Eco Feed Pipe | 206.318 | 0.206318 |
| 75 | 19 | 851 | HT | HP Eco Link to Drum | 305.682 | 0.305682 |
| 76 | 19 | 852 | HT | HP Eco -I Inter Conn Links | 211.272 | 0.211272 |

BHEL-PSWR

Tender Specification No: BHE/PW/PUR/**HONGI-HRSG/1601**

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | | | |
|-----|----|-----|----|--|-----------|----------|
| 77 | 19 | 853 | HT | HP Eco -III Inter Conn Links | 279.492 | 0.279492 |
| 78 | 19 | 854 | HT | LP Eco Feed Pipe | 132.721 | 0.132721 |
| 79 | 19 | 855 | HT | LP Eco Link to Drum | 117.504 | 0.117504 |
| 80 | 19 | 901 | HT | Supports for HP Eco Feed Pipe | 89.135 | 0.089135 |
| 81 | 19 | 902 | HT | Supports for HP Eco Link to Drum | 73.238 | 0.073238 |
| 82 | 19 | 904 | HT | Supports for LP Eco Feed Pipe | 53.023 | 0.053023 |
| 83 | 19 | 905 | HT | Supports for LP Eco Link to Drum | 19.752 | 0.019752 |
| 84 | 19 | 908 | HT | Supports for WPH links | 94.806 | 0.094806 |
| 85 | 19 | 911 | HT | Supports for WPH modules | 581.300 | 0.5813 |
| 86 | 19 | 912 | HT | HP ECO - III Module Supports | 631.536 | 0.631536 |
| 87 | 19 | 913 | HT | HP ECO - II Module Supports | 631.536 | 0.631536 |
| 88 | 19 | 914 | HT | HP ECO - I Module Supports | 561.464 | 0.561464 |
| 89 | 19 | 915 | HT | LP ECO Module Supports | 70.516 | 0.070516 |
| 90 | 19 | 992 | HT | Welding consumables (Eco circuit) | 5.880 | 0.00588 |
| 91 | 19 | 993 | HT | Erection materials (Eco circuit) | 231.140 | 0.23114 |
| 92 | 24 | 200 | HT | Boiler Drain Trim Piping And Fittings - | 4,000 | 4 |
| 93 | 24 | 201 | HT | Supports For Drain Trim Piping - AD | 800 | 0.8 |
| 94 | 24 | 202 | HT | Boiler Drain Trim Piping And Fittings - | 1,400 | 1.4 |
| 95 | 24 | 203 | HT | Supports For Drain Trim Piping - MDD | 350 | 0.35 |
| 96 | 24 | 204 | HT | Spring Supports For LP Trim Piping - HRD | 210 | 0.21 |
| 97 | 24 | 205 | HT | Boiler Vent Trim Piping And Fittings - B | 4,645 | 4.645 |
| 98 | 24 | 206 | HT | Supports For Vent Trim Piping - AD | 750 | 0.75 |
| 99 | 24 | 207 | HT | Boiler Vent Trim Piping And Fittings - M | 1,430 | 1.43 |
| 100 | 24 | 208 | HT | Supports For Vent Trim Piping - MDD | 300 | 0.3 |
| 101 | 24 | 260 | HT | Valves (BHEL) | 3,782.600 | 3.7826 |
| 102 | 24 | 273 | HT | Direct Water Level Gauge - BHEL | 263.004 | 0.263004 |
| 103 | 24 | 275 | HT | Drain Headers For Trim Piping | 622.508 | 0.622508 |
| 104 | 24 | 280 | HT | Safety Valves(BHEL) | 429.000 | 0.429 |
| 105 | 24 | 285 | LU | Safety Valve Silencers(BHEL) | 1,971.000 | 1.971 |
| 106 | 24 | 290 | LU | Startup vent silencer | 548.000 | 0.548 |
| 107 | 24 | 400 | HT | Boiler Drain Trim Piping And Fittings - | 7,480 | 7.48 |
| 108 | 24 | 401 | HT | Supports For Drain Trim Piping - AD | 1,600 | 1.6 |
| 109 | 24 | 402 | HT | Boiler Drain Trim Piping And Fittings - | 2,000 | 2 |
| 110 | 24 | 403 | HT | Supports For Drain Trim Piping - MDD | 800 | 0.8 |
| 111 | 24 | 404 | HT | Spring Supports For HP Trim Piping - HRD | 500 | 0.5 |
| 112 | 24 | 405 | HT | Boiler Vent Trim Piping And Fittings - B | 7,400 | 7.4 |
| 113 | 24 | 406 | HT | Supports For Vent Trim Piping - AD | 1,500 | 1.5 |
| 114 | 24 | 407 | HT | Boiler Vent Trim Piping And Fittings - M | 2,000 | 2 |
| 115 | 24 | 408 | HT | Supports For Vent Trim Piping - MDD | 1,000 | 1 |
| 116 | 24 | 460 | HT | Valves (BHEL) | 6,511.600 | 6.5116 |

BHEL-PSWR

Tender Specification No: BHE/PW/PUR/**HONGI-HRSG/1601**

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | | | |
|-----|----|-----|----|--|------------|-----------|
| 117 | 24 | 465 | HT | Valves & Fittings (Sd) | 2,000 | 2 |
| 118 | 24 | 473 | HT | Direct Water Level Gauge - BHEL | 263.684 | 0.263684 |
| 119 | 24 | 475 | HT | Drain Headers For Trim Piping | 797.146 | 0.797146 |
| 120 | 24 | 480 | HT | Safety Valves(BHEL) | 450.000 | 0.45 |
| 121 | 24 | 485 | LU | Safety Valve Silencers(BHEL) | 2,192.000 | 2.192 |
| 122 | 24 | 490 | LU | Startup vent silencer | 1,134.000 | 1.134 |
| 123 | 24 | 700 | HT | Fasteners | 1,000 | 1 |
| 124 | 24 | 955 | HT | Lapping Tools For Sv | 121.000 | 0.121 |
| 125 | 24 | 960 | HT | Lapping Tools For Conventional Valves | 45.831 | 0.045831 |
| 126 | 24 | 987 | LU | Commng Spares For Safety Valves/Erv | 0.720 | 0.00072 |
| 127 | 24 | 989 | LU | Commng Spares For Conventional Valves | 23.152 | 0.023152 |
| 128 | 24 | 992 | HT | Welding Consumables | 50 | 0.05 |
| 129 | 24 | 993 | HT | Consumables & Erection Materials | 630.009 | 0.630009 |
| 130 | 24 | 994 | LU | Name Plates | 87.908 | 0.087908 |
| 131 | HL | 098 | DL | COLUMN CASING BRIDGING COMPONENTS | 13,466.404 | 13.466404 |
| 132 | HL | 101 | DL | Evaporator modules-HP Front | 12,978.458 | 12.978458 |
| 133 | HL | 102 | DL | Evaporator modules-HP Middle | 54,821.556 | 54.821556 |
| 134 | HL | 103 | DL | Evaporator modules-HP Rear | 21,894.860 | 21.89486 |
| 135 | HL | 121 | DL | Evaporator modules-LP Front | 26,980.992 | 26.980992 |
| 136 | HL | 122 | DL | Evaporator modules-LP Rear | 44,013.096 | 44.013096 |
| 137 | HL | 131 | HT | HP SH - II Module Assy | 14,997.008 | 14.997008 |
| 138 | HL | 132 | HT | HP SH - I Module Assy | 14,415.372 | 14.415372 |
| 139 | HL | 141 | HT | LP SH - II Module Assy | 1,653.358 | 1.653358 |
| 140 | HL | 142 | HT | LP SH - I Module Assy | 3,269.603 | 3.269603 |
| 141 | HL | 151 | HT | HP ECO - III Module Assy | 42,072.306 | 42.072306 |
| 142 | HL | 152 | HT | HP ECO - II Module Assy | 14,032.796 | 14.032796 |
| 143 | HL | 153 | HT | HP ECO - I Module Assy | 35,065.500 | 35.0655 |
| 144 | HL | 161 | HT | LP ECO Module Assy | 3,109.937 | 3.109937 |
| 145 | HL | 171 | HT | WPH modules | 26,982.436 | 26.982436 |
| 146 | HL | 201 | DL | Links for evaporator modules-HP Front | 480.568 | 0.480568 |
| 147 | HL | 202 | DL | Links for evaporator modules-HP Middle | 5,532.384 | 5.532384 |
| 148 | HL | 203 | DL | Links for evaporator modules-HP Rear | 123.402 | 0.123402 |
| 149 | HL | 221 | HT | Links for evaporator modules-LP Front | 469.350 | 0.46935 |
| 150 | HL | 222 | HT | Links for evaporator modules-LP Rear | 3,830.610 | 3.83061 |
| 151 | HL | 231 | HT | HP SH - II Module Links | 2,602.356 | 2.602356 |
| 152 | HL | 232 | HT | HP SH - I Module Links | 1,909.635 | 1.909635 |
| 153 | HL | 241 | HT | LP SH - II Module Links | 933.784 | 0.933784 |
| 154 | HL | 242 | HT | LP SH - I Module Links | 268.376 | 0.268376 |
| 155 | HL | 251 | HT | HP ECO - III Module Links | 761.540 | 0.76154 |
| 156 | HL | 252 | HT | HP ECO - II Module Links | 271.808 | 0.271808 |
| 157 | HL | 253 | HT | HP ECO - I Module Links | 652.138 | 0.652138 |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | | | |
|---------------------------------|----|-----|----|------------------------------------|-------------------|----------------|
| 158 | HL | 261 | HT | LP ECO Module Links | 112.935 | 0.112935 |
| 159 | HL | 271 | HT | Links for WPH modules | 796.676 | 0.796676 |
| 160 | 97 | 401 | HT | LOCAL GAUGES | 27 | 0.027 |
| SUBTOTAL –PRESSURE PARTS | | | | | 489941.372 | 489.941 |
| NON PRESSURE PARTS: | | | | | | |
| 01 | HL | 301 | DL | Evaporator module casing-HP Front | 3,506.191 | 3.506191 |
| 02 | HL | 302 | DL | Evaporator module casing-HP Middle | 3,757.906 | 3.757906 |
| 03 | HL | 322 | HT | Evaporator module casing-LP Rear | 3,822.060 | 3.82206 |
| 04 | HL | 351 | DL | HP ECO - III Module Skin Casing | 3,793.742 | 3.793742 |
| 05 | HL | 352 | HT | HP ECO - II Module Skin Casing | 4,123.810 | 4.12381 |
| 06 | HL | 353 | HT | HP ECO - I Module Skin Casing | 3,427.137 | 3.427137 |
| 07 | HL | 501 | DL | SIDE CASING S1-S2 | 4,975.065 | 4.975065 |
| 08 | HL | 502 | DL | SIDE CASING S2-S3 | 4,896.495 | 4.896495 |
| 09 | HL | 503 | DL | SIDE CASING S3-S4 | 4,896.495 | 4.896495 |
| 10 | HL | 504 | DL | SIDE CASING S4-S5 | 4,896.495 | 4.896495 |
| 11 | HL | 505 | DL | SIDE CASING S5-S6 | 4,896.495 | 4.896495 |
| 12 | HL | 506 | DL | SIDE CASING S6-S7 | 4,896.495 | 4.896495 |
| 13 | HL | 601 | DL | TOP CASING S1-S2 | 3,268.027 | 3.268027 |
| 14 | HL | 602 | DL | TOP CASING S2-S3 | 2,267.697 | 2.267697 |
| 15 | HL | 603 | DL | TOP CASING S3-S4 | 2,316.073 | 2.316073 |
| 16 | HL | 604 | DL | TOP CASING S4-S5 | 2,247.277 | 2.247277 |
| 17 | HL | 605 | DL | TOP CASING S5-S6 | 2,168.977 | 2.168977 |
| 18 | HL | 606 | DL | TOP CASING S6-S7 | 3,118.793 | 3.118793 |
| 19 | 24 | 220 | LU | Safety Valve Esc Piping - BMR | 1,500 | 1.5 |
| 20 | 24 | 221 | LU | Safety Valve Esc Piping - AD | 1,300 | 1.3 |
| 21 | 24 | 222 | LU | Safety Valve Esc Piping - MDD | 445 | 0.445 |
| 22 | 24 | 223 | LU | Safety Valve Esc Piping - BOI | 1.100 | 0.0011 |
| 23 | 24 | 225 | LU | Silencer Support-AD | 3,395.720 | 3.39572 |
| 24 | 24 | 420 | LU | Safety Valve Esc Piping - BMR | 2,295.629 | 2.295629 |
| 25 | 24 | 421 | LU | Safety Valve Esc Piping - AD | 1,188.988 | 1.188988 |
| 26 | 24 | 422 | LU | Safety Valve Esc Piping - MDD | 15.969 | 0.015969 |
| 27 | 24 | 423 | LU | Safety Valve Esc Piping - BOI | 1.100 | 0.0011 |
| 28 | 24 | 425 | LU | Silencer Support-AD | 3,343.912 | 3.343912 |
| 29 | 37 | 810 | LU | OUTER CASING SHEET -PIPING | 2,880.000 | 2.88 |
| 30 | 41 | 130 | LU | DUCT BURNER ASSY | 1,915.598 | 1.915598 |
| 31 | 41 | 450 | LU | IFM TYPE IGNITOR | 100.000 | 0.1 |
| 32 | 42 | 076 | LU | FG-PG CONTROL STATION | 1,060.182 | 1.060182 |
| 33 | 42 | 156 | LU | PIPING OPRG FLOOR-FUEL GAS | 895.334 | 0.895334 |
| 34 | 42 | 270 | LU | SD BURNER FLOOR SKIDS | 500.000 | 0.5 |
| 35 | 42 | 700 | LU | BPS FASTENERS | 5.216 | 0.005216 |
| 36 | 43 | 002 | LU | SCANNER COOLING/SEAL AIR SYSTEM | 1,794.970 | 1.79497 |
| 37 | 43 | 202 | LU | SD SCANNER COOLING/SEAL AIR SYSTEM | 615.000 | 0.615 |
| 38 | 48 | 200 | LU | INSTRUMENT TAPPINGS | 410.952 | 0.410952 |

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TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | | | |
|---|----|-----|----|--|-------------------|----------------|
| 39 | 48 | 422 | LU | HRSG Inlet Duct | 22,015.708 | 22.015708 |
| 40 | 48 | 424 | LU | EXPANSION JOINT-INLET | 500 | 0.5 |
| 41 | 48 | 452 | LU | DUCT-BOILER OUTLET | 3,657.154 | 3.657154 |
| 42 | 48 | 454 | LU | EXPANSION JOINT-OUTLET | 1,000 | 1 |
| 43 | 48 | 482 | LU | DISTRIBUTION GRID | 677.838 | 0.677838 |
| 44 | 48 | 700 | LU | BULKED BPS COMPONENT | 96.200 | 0.0962 |
| 45 | 48 | 993 | HT | ERECTION MATERIAL | 1,257.300 | 1.2573 |
| SUBTOTAL-NON PRESSURE PARTS | | | | | 120144.100 | 120.144 |
| 4) INTEGRAL PIPING, TANKS, VESSELS | | | | | | |
| 01 | 12 | 851 | HT | HP MS Line | 2,188.389 | 2.188389 |
| 02 | 12 | 854 | HT | LP MS Line | 1,600.287 | 1.600287 |
| 03 | 12 | 902 | HT | Supports for HP MS Line | 279.312 | 0.279312 |
| 04 | 12 | 906 | HT | Supports for LP MS Line | 224.037 | 0.224037 |
| 05 | 19 | 101 | HT | WPH inlet line | 250.898 | 0.250898 |
| 06 | 19 | 102 | HT | WPH outlet line | 217.160 | 0.21716 |
| 07 | 80 | 145 | HT | Exhausts & Vents- BMR | 1,778.995 | 1.778995 |
| 08 | 80 | 146 | HT | Exhausts & Vents- AD | 2,167.320 | 2.16732 |
| 09 | 80 | 147 | HT | Exhausts & Vents- MDD | 57.591 | 0.057591 |
| 10 | 80 | 148 | HT | Exhausts & Vents- BOI | 0.960 | 0.00096 |
| 11 | 80 | 219 | HT | Dosing system | 5,000 | 5 |
| 12 | 80 | 273 | HT | Blow down system valves | 418.600 | 0.4186 |
| 13 | 80 | 274 | HT | CBD Tank safety valve | 25.400 | 0.0254 |
| 14 | 80 | 600 | HT | Dosing piping-BMR | 221.600 | 0.2216 |
| 15 | 80 | 601 | HT | Dosing piping- AD | 162.856 | 0.162856 |
| 16 | 80 | 992 | LU | Welding Consumables | 1.990 | 0.00199 |
| 17 | 81 | 005 | HT | Intermittent Blow Down Tank | 2,985.266 | 2.985266 |
| 18 | 81 | 011 | HT | Continuous Blow Down Tank | 1,500 | 1.5 |
| 19 | 81 | 411 | HT | Blow down tank level gauge | 66.660 | 0.06666 |
| 20 | 81 | 413 | HT | BDT Control valve (SD) | 100 | 0.1 |
| SUBTOTAL-INTEGRAL PIPING, TANKS, VESSELS | | | | | 19247.321 | 19.247 |
| 5) LINING & INSULATION | | | | | | |
| 01 | 28 | 700 | LU | CLADDING SHEET FIXING PINS, NUTS& WASHER | 4,695.140 | 4.695 |
| 02 | 32 | 010 | HT | CLADDING SHEET - INLET DUCT | 7,700 | 7.7 |
| 03 | 32 | 020 | LU | CLADDING SHEET - BURNER DUCT | 6,550 | 6.55 |
| 04 | 32 | 055 | HT | EXTERNAL INSULATION - PIPING | 850.277 | 0.850 |
| 05 | 32 | 110 | HT | CLADDING SHEET - CASING | 10,344.767 | 10.345 |
| 06 | 32 | 700 | LU | BULKED BPS COMPONENTS | 728.310 | 0.728 |
| 07 | 32 | 810 | LU | CLADDING SHEET - OUTLET DUCT | 755.495 | 0.756 |
| 08 | 32 | 993 | LU | ERECTION MATERIALS | 911.720 | 0.912 |
| 09 | 33 | 021 | LU | CERAMIC WOOL | 32,000.000 | 32 |

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TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | | | |
|---|----|-----|----|-------------------------|------------------|----------------|
| 10 | 33 | 621 | LU | MINERAL WOOL FOR PIPING | 15,200.000 | 15.2 |
| 11 | 33 | 970 | LU | WIRE MESH | 240.000 | 0.24 |
| 12 | 33 | 975 | LU | SEALING COMPOUNDS | 100.000 | 0.1 |
| SUBTOTAL-LINING & INSULATION | | | | | 80075.709 | 80.076 |
| GRAND TOTAL HRSG | | | | | 981084 | 981.084 |

ESTIMATED WEIGHT OF HRSG CHIMNEY (Ranipet Supply):

| PGMA | Description | Design Wt (MT) |
|-------------------------------------|----------------------|-----------------------|
| 87010 | CHIMNEY FDN MATERIAL | 3.80 |
| 87100 | CHIMNEY SHELL | 54.890 |
| 87150 | CHIMNEY STRAKES | 11.648 |
| 87200 | PAINTER TROLLEY | 0.996 |
| 87300 | PLATFORMS & LADDERS | 10.583 |
| 87930 | AVIATION LAMPS | 0.569 |
| Sub Total Chimney | | 82.486 |
| 87950 | CHIMNEY INSULATION | 3.808 |
| 87960 | CHIMN INS FIX COMP | 3.190 |
| Sub Total Chimney Insulation | | 6.998 |
| Total Chimney Tonnage | | 89.484 |

Note: HRSG chimney details:

- Wt. of each half shell=5MT one half, shells will be supplied in two halves.
- Single Large Weight after assembly: 10 MT
- ID-3.0 mtr, Ht-44.0 mtr

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

B) ESTIMATED WEIGHT OF VARIOUS SYSTEM IN SCOPE OF PIPING
B.1)ESTIMATED WEIGHT FOR IBR PIPING

| SR NO | PG | MA | WBS Description | Estimated Wt In Kg | Estimated Wt In MT |
|-------|----|-----|--|--------------------|--------------------|
| 1 | 80 | 130 | VHP STEAM SYSTEM | 20,000.00 | 20 |
| 2 | 80 | 131 | HP STEAM SYSTEM | 10,000.00 | 10 |
| 3 | 80 | 132 | MP STEAM SYSTEM | 22,500.00 | 22.5 |
| 4 | 80 | 133 | LP STEAM SYSTEM | 33,000.00 | 33 |
| 5 | 80 | 305 | MS DUMP TO CONDENSER | 1,400.00 | 1.4 |
| 6 | 80 | 345 | AUX STEAM TO DEAERATING HEATER | 900 | 1.5 |
| 7 | 80 | 359 | STEAM FROM PROCESS BLR | 2,700.00 | 2.7 |
| 8 | 80 | 421 | BOILER FEED PUMP RECIRCULATION | 4,100.00 | 4.1 |
| 9 | 80 | 423 | BOILER FEED PUMP TO HPH INCLUDING BYPASS | 1,800.00 | 1.8 |
| 10 | 80 | 424 | BFD BETWEEN HTRS AND GROUP PROTECTION | 3,500.00 | 3.5 |
| 11 | 80 | 430 | SPRAY WATER TO HPBP | 800 | 0.8 |
| 12 | 80 | 431 | SPRAY WATER TO AUX PRDS | 1,500.00 | 1.5 |
| 13 | 80 | 347 | AUX STEAM TO SJAE - TG SCOPE | 200 | 0.2 |
| 14 | 80 | 364 | CBD TANK VENT TO SYSTEM | 1,100.00 | 1.1 |
| 15 | xx | xx | VALVES | 21000 | 21 |
| | | | | | |
| | | | SUB TOTAL | 1,25,000.00 | 125 |

IBR PIPING DETAILS –MATERIALWISE

| SR NO | IBR PIPING | ESTIMATED PIPING WEIGHT- IN TONN (EXCLUDING VALVES) |
|-------|-----------------|---|
| A1 | CARBON STEEL | 79 |
| A2 | ALLOY STEEL-P91 | 16 |
| A3 | ALLOY STEEL-P22 | 7 |

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | |
|----|-----------------|---|
| A5 | ALLOY STEEL-P11 | 2 |
|----|-----------------|---|

IBR PIPING DETAILS (WITHOUT VALVES)-SYSTEMWISE

| IBR PIPING SYSTEMWISE | | IBR | AS (P91) | AS (P22) | AS (P11) | CS | SS | TOTAL |
|-------------------------|------|-----|-----------|----------|----------|-----------|----------|------------|
| VHP STEAM SYSTEM | VHPS | IBR | 16 | 4 | 0 | 0 | 0 | 20 |
| HP STEAM SYSTEM | HPS | IBR | 0 | 3 | 1 | 6 | 0 | 10 |
| MP STEAM SYSTEM | MPS | IBR | 0 | 0 | 0.5 | 22 | 0 | 22.5 |
| LP STEAM SYSTEM | LPS | IBR | 0 | 0 | 0 | 33 | 0 | 33 |
| AUX STEAM SYSTEM | AS | IBR | 0 | 0 | 0.5 | 2 | 0 | 2.5 |
| FEED WATER SYSTEM | WB | IBR | 0 | 0 | 0 | 16 | 0 | 16 |
| TOTAL (IN TONNS) | | | 16 | 7 | 2 | 79 | 0 | 104 |

VALVE DETAILS-IBR & NIBR :

| ITEM / MATERIAL | IBR | NIBR | TOTAL |
|------------------|-----------|-----------|-----------|
| AS (P91) | 8.5 | 0 | 10 |
| AS (P22) | 1.5 | 0 | 0 |
| AS (P11) | 0 | 0 | 0 |
| CS | 11 | 27 | 38 |
| SS | 0 | 1 | 1 |
| SUB TOTAL | 21 | 28 | 49 |

TRICHY VALVES SUPPLY : 25 TONNS

NON TRICHY VALVE SUPPLY : 24 TONNS

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

B.2)ESTIMATED WEIGHT FOR NON IBR PIPING

| SL.NO | ITEM DESCRIPTION | ITEM WEIGHT(TONN) |
|------------------------------------|--|-------------------|
| 01 | PIPING (NIBR) | 300 |
| 02 | FITTINGS (NIBR) | 15 |
| 03 | FLANGES (NIBR) | 18 |
| 04 | GASKETS (NIBR) | 1 |
| 05 | BOLTING (NIBR) | 6 |
| 06 | VALVES (NON TRICHY & TRICHY SUPPLY) | 28 |
| 07 | SPECIALITIES (STRAINERS, STEAM TRAPS , Expansion Bellows) | 12 |
| 08 | INSULATION CLADDING | 16 |
| 09 | INSULATION MATTRESS | 75 |
| 10 | INSULATION ANCILLARIES | 10 |
| 11 | RAW MATERIAL (Steel) FOR PIPING INCLUDING SPRING HANGERS AND ROD HANGERS | 170 |
| SUB TOTAL | | 651 MT |
| TOTAL IBR & NIBR PIPING | | 776 MT |

NON IBR PIPING DETAILS:

| Sr No | NON IBR PIPING | ESTIMATED PIPING WEIGHT- IN TONN (EXCLUDING VALVES) |
|----------|----------------------|---|
| B1 | CARBON STEL | 337 |
| B2 | STAINLESS STEEL | 15 |
| C | SYSTEMWISE | |
| C1 | ACW SYSTEM | 32 |
| C2 | CCW SYSYEM | 157 |
| C3 | CONDENSATE SYSTEM | 41 |
| C4 | CW SYSTEM | 54 |
| C5 | FUEL GAS SYSTEM , CS | 39 |
| C6 | FUEL GAS SYSTEM , SS | 15 |
| C7 | UTILITIES | 14 |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| SL NO | MATERIAL CODE | SPECIFICATION | ITEM DESCRIPTION | MATERIAL | Qty (M) |
|-------|------------------|---------------|---|------------------|--------------|
| 01 | PY97520620 16 | PY52062 | PIPE(WELDED) NB50 HVY MS IS 1239 | IS 1239 | 185 |
| 02 | PY97520620 24 | PY52062 | PIPE (WELDED) MS NB15 HVY IS1239 | IS 1239 | 46 |
| 03 | PY97520620 67 | PY52062 | PIPE (WELDED) MS NB80 HVY IS1239 | IS 1239 | 441 |
| 04 | PY97520620 75 | PY52062 | PIPE (WELDED) MS NB100 HVY IS1239 | IS 1239 | 189 |
| 05 | PY97520620 83 | PY52062 | PIPE (WELDED) MS NB150 HVY IS1239 | IS 1239 | 58 |
| 06 | PY97520800 65 | PY52080 | PIPE (WELDED) MS 219.1 X 10 IS3589FE410 | IS 3589 FE410 | 292 |
| 07 | PY97520800 73 | PY52080 | PIPE (WELDED) MS 273 X 10 IS3589FE410 | IS 3589 FE410 | 48 |
| 08 | PY97520800 81 | PY52080 | PIPE (WELDED) MS 323.8 X 10 IS3589FE410 | IS 3589 FE410 | 177 |
| 09 | PY97520800 90 | PY52080 | PIPE (WELDED) MS 355.6 X 10 IS3589FE410 | IS 3589 FE410 | 146 |
| 10 | PY97520801 20 | PY52080 | PIPE (WELDED) MS 508 X 10 IS3589FE410 | IS 3589 FE410 | 27 |
| 11 | PY97520801 46 | PY52080 | PIPE (WELDED) MS 711 X 10 IS3589FE410 | IS 3589 FE410 | 189 |
| 12 | PY97520801 54 | PY52080 | PIPE (WELDED) MS 1016 X 12 IS3589FE410 | IS 3589 FE410 | 145 |
| 13 | PY97520801 62 | PY52080 | PIPE (WELDED) MS 1067 X 12 IS3589FE410 | IS 3589 FE410 | 28 |
| 14 | PY97520970 14 | PY52097 | PIPE (SMLS) 21.3 X 2.77 CS A106GRB | A106GRB | 38 |
| 15 | PY97520970 22 | PY52097 | PIPE (SMLS) 26.7 X 3.91 CS A106GRB | A106GRB | 57 |
| 16 | PY97520970 30 | PY52097 | PIPE (SMLS) 33.4 X 4.55 CS A106GRB | A106GRB | 1,664. 00 |
| 17 | PY97520970 49 | PY52097 | PIPE (SMLS) 48.3 X 5.08 CS A106GRB | A106GRB | 125 |

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TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | | |
|----|------------------|---------|---|-----------------|--------------|
| 18 | PY97520970 73 | PY52097 | PIPE (SMLS) 88.9 X 5.49 CS A106GRB | A106GRB | 800 |
| 19 | PY97520970 81 | PY52097 | PIPE (SMLS) 114.3 X 6.02 CS A106GRB | A106GRB | 120 |
| 20 | PY97520971 03 | PY52097 | PIPE (SMLS) 168.3 X 7.11 CS A106GRB | A106GRB | 1,264. 00 |
| 21 | PY97520971 11 | PY52097 | PIPE (SMLS) 219.1 X 8.18 CS A106GRB | A106GRB | 32 |
| 22 | PY97520971 54 | PY52097 | PIPE (SMLS) 60.3 X 5.54 CS A106GRB | A106GRB | 1,937. 00 |
| 23 | PY97521290 13 | PY52129 | PIPE (SMLS) 21.3 X 2.77 SS A312GRTP321 | A312GRTP 321 | 6 |
| 24 | PY97521290 30 | PY52129 | PIPE (SMLS) 33.4 X 3.38 SS A312GRTP321 | A312GRTP 321 | 85 |
| 25 | PY97521290 80 | PY52129 | PIPE (SMLS) 114.3 X 6.02 SS A312GRTP321 | A312GRTP 321 | 280 |
| 26 | PY97521291 02 | PY52129 | PIPE (SMLS) 168.3 X 7.11 SS A312GRTP321 | A312GRTP 321 | 84 |
| 27 | PY97521291 10 | PY52129 | PIPE (SMLS) 219.1 X 8.18 SS A312GRTP321 | A312GRTP 321 | 18 |

STRUCTURAL STEEL FOR SUPPORTS:

| SL NO | Material Code | Material Desc | Qty | UNIT |
|-------|---------------|--|--------------|------|
| 01 | AA1012508137 | ANGLE EQ 75X75X8 IS2062 GRE250 QLTY- A | 1547.0 0 | KG |
| 02 | AA1012708039 | CHANNEL 100X50 IS2062GRE250 QLTY-A | 5,200.0 0 | KG |
| 03 | AA1012708063 | CHANNEL 150X75 IS2062 GRE250 QLTY- A | 9,448.0 0 | KG |
| 04 | AA1012708101 | CHANNEL 200X75 IS2062 | 2,453.0 0 | KG |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | |
|----|--------------|---|---------------|----|
| | | GRE250 QLTY-A | | |
| 05 | AA1011819090 | PLATE 12 IS2062 GRE250(FE410 W) QLTY-B | 4,450.9 5 | KG |
| 06 | AA1011819074 | PLATE 10 IS2062 GRE250(FE410 W) QLTY-B | 4,945.5 0 | KG |
| 07 | AA1012808092 | BEAM 200X100 IS2062 GRE250 QLTY-A | 12,256. 00 | KG |
| 08 | AA1012808122 | BEAM 300X140 IS2062 GRE250 QLTY-A | 25,348. 00 | KG |
| 09 | AA1012508080 | ANGLE EQL 50X50X6 IS2062 GRE250 QLTY-A | 2,970.0 0 | KG |
| 10 | AA1012508099 | ANGLE EQL 65X65X6 IS2062 GRE250 QLTY-A | 20,044. 00 | KG |
| 11 | AA1012708039 | CHANNEL 100X50 IS2062GRE250 QLTY-A | 20,080. 00 | KG |
| 12 | AA1012508080 | ANGLE EQL 50X50X6 IS2062 GRE250 QLTY-A | 15,500. 00 | KG |
| 13 | AA1012708039 | CHANNEL 100X50 IS2062GRE250 QLTY-A | 2,024.0 0 | KG |
| 14 | AA1012508080 | ANGLE EQL 50X50X6 IS2062 | 1,935.0 0 | KG |

BHEL-PSWR

Tender Specification No: BHE/PW/PUR/**HONGI-HRSG/1601**

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | |
|----|--------------|---|--------------|----|
| | | GRE250 QLTY-A | | |
| 15 | AA1011819074 | PLATE 10 IS2062 GRE250(FE410 W) QLTY-B | 1,236.3 8 | KG |

TOTAL PAINTING AREA:NON IBR PIPING:1500 SQM

LIST OF MITER FITTINGS TO BE FABRICATED AT SITE FROM PIPES

| DESCRIPTION | Sum of QUANTITY (Nos) |
|--|-----------------------|
| MITER ELBOW 45 DEG (3-PIECE) BW | 17 |
| 700 | 13 |
| 700 | 13 |
| 1000 | 4 |
| 1000 | 4 |
| MITER ELBOW 90 DEG (5-PIECE) BW | 16 |
| 700 | 13 |
| 700 | 13 |
| 1000 | 2 |
| 1000 | 2 |
| 1050 | 1 |
| 1050 | 1 |
| RDCR CONC ASME B16.9 BW | 8 |
| 700 | 3 |
| 450 | 3 |
| 800 | 2 |
| 700 | 2 |
| 1000 | 2 |
| 800 | 2 |
| 1050 | 1 |
| 1000 | 1 |
| RDCR ECC ASME B16.9 BW | 9 |
| 650 | 3 |
| 500 | 3 |
| 900 | 3 |
| 650 | 3 |
| 1000 | 3 |

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | |
|--------------------|-----------|
| 900 | 3 |
| Grand Total | 50 |

LENGTH OF UNDERGROUND PIPING

| | |
|------------------------------------|---------|
| PIPE ERW IS-3589 PE, 28" 10 MM THK | 100 MTS |
| PIPE ERW IS-3589 PE, 40" 10 MM THK | 80 MTS |
| PIPE ERW IS-3589 PE, 42" 10 MM THK | 90MTS |
| PIPE ERW IS-3589 PE, 8" 10 MM THK | 300 MTS |
| PIPE ERW IS-1239 PE, 14" | 220 MTS |
| Pipe 200 NB | 50 Mts |
| Pipe 150 NB | 180 Mts |
| Pipe 100 NB | 80 Mts |

NOTE: THE NUMBER OF MITRE, LENGTH OF PIPING IS FURNISHED AS PER PRESENT ENGINEERING STATUS. VARIATION OF 10 % TO BE CONSIDERED FOR FINAL ESTIMATION.

I) Non-IBR Piping

Notes:

1) Underground Piping Requirement:

- a) The length of underground piping is indicated above, the following requirements is included in scope of Contractor
- b) All underground steel pipes shall be protected with external corrosion Protection Tape Coating shall be coal tar based tape coating materials confirming to AWWA C203. Coal tar tape to be wrapped to the piping before burying.
- c) Holiday test for underground piping is part of scope of work.

2) Mitre Elbows, Reducers:

- a) Fabrication of Mitre bends, Reducers is included scope of Contractor. The number of Mitre Elbows and reducers shall be as above. These Mitres and reducers to be fabricated from IS 3589 pipe supplied.

3) Hot Tapping :

- a) Hot tapping is to be considered for some of the piping hook ups with existing piping. The details are given below.

| SLNO | SERVICE DESCRIPTION | RUN PIPE SIZE | BRANCH PIPE SIZE | MATERIAL | PRESSURE KG/SQ CM (g) | TEMPERATURE (DEG C) | QTY (NOS) |
|------|-----------------------------|---------------|------------------|------------|-----------------------------|------------------------|--------------|
| 01 | NATURAL GAS TO GCS IN CCCPP | 8" #600 | 6" #600 | A106 GR B | 33 | 35 | 1 |
| 02 | NATURAL GAS FROM GCS IN | 4" #600 | 4" #600 | A 312TP304 | 31.6 | 61 | 1 |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | | | | |
|----|---|----------|---------|-------------|-----|----|---|
| | CCCPP TO EXISTING GT | | | | | | |
| 03 | Filtered Water to CCCPP CW-make-up storage tank | 12" #150 | 8" #150 | A106 GR B | 3 | 33 | 1 |
| 04 | INERT GAS (NITROGEN) TO CCCPP | 3" #150 | 2" #150 | A106 GR B | 6.5 | 33 | 1 |
| 05 | INSTRUMENT AIR TO CCCPP | 4" #150 | 2" #150 | IS-1239(GI) | 7.5 | 33 | 2 |

- 4) Lugs For Cathodic Protection: Provision of lugs on Underground piping required as a part of cathodic protection is in piping erection contractor scope.
- 5) Surface Preparation Coating and Final Painting for Structural steel for Piping Supports:
 - a. Surface preparation (Shot Blasting) shall be done by contractor for the structural steel supplied as part of Piping supports, away from the site premises, as "In ONGC Hazira complex no sand blasting or shot blasting shall be done. All equipment shall be protected with anti-corrosive coat and after final painting only shifted to project site for further erection, Touch – up painting for the damage area during transportation can be done at project site."
 - b. Primer, Intermediate and final painting for the structural steel is in erection contractor scope of supply. The quantity of structural steel supplied is indicated above.

NOTE:

- 1) Philosophy of Non IBR Piping material supply (by BHEL Hyd) will be as follows:
 - a. Pipes will be supplied loose in commercially available lengths (without any spooling).
 - b. All pipes to be spooled and edge prepared at site by Contractor as per isometric.
 - c. All Stubs (Pressure tap-offs, Temp tap-offs, Vent & Drain tap-offs and all pipe to pipe tees & stubs) to be welded onto the Main Pipe at site.
 - d. All Fittings (all sizes) will be supplied loose duly edge prepared as per requirement.
 - e. All Flanges, Gaskets & Stud Nuts will be supplied loose.
 - f. All Valves will be supplied loose.
 - g. Final field welding of pipe spools and fittings is in Contractor scope.
 - h. Surface preparation(shot Blasting) and Painting for all the Non IBR Piping items is in the scope of Contractor and shall be as per the applicable Painting & Coating Schedule. Non IBR piping items shall be supplied with only rust preventive coating without any surface preparation..
 - i. No supply of welding electrodes is envisaged.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

- 2) Pipe shoe fabrication is in Contractor Scope. Necessary plates, pipes shall be supplied loose. Shoe pad to be welded at site.
- 3) Spring Hangers and Rigid Hangers are supplied in assemblies.
- 4) Fabrication and Installation of Auxiliary Structure for Pipe Supports is in Contractor Scope. Necessary Structural Steel and Plates shall be supplied loose.
- 5) Concrete pedestals for the Pipe Supports on the Grade/floor level are included in the overall Civil SOQ. However, wherever concrete pedestal is not envisaged for pipe supports, Contractor to install the pipe supports with Anchor fastening the bottom plate. Anchor fastening material will be supplied by BHEL Hyd. (Approximately 400 nos of M16 X 120 anchor fasteners to be considered) Plate will be supplied by BHEL Hyd.
- 6) The Material required for temporary supports are to be arranged by erection contractor.
- 7) Insulation mattress, Aluminium Cladding & Insulation Ancillaries will be supplied under separate packages. Application of Thermal Insulation is in the Scope of Contractor.
- 8) Access platforms wherever required as per Piping Layout and as per final site conditions / Customer's requirements, are in the scope of Hyderabad. Approx. Quantities are Structural Steel : 10 Tonn, Grating (Specification as per customer requirement): 5MT tonnage, Anchor fastness: 150 nos (approx.).
- 9) For NB40 & below piping (IBR & Non-IBR) sketches/isometrics (tentative) shall be provided for routing these small bore lines. However, for all non-critical/non IBR lines supporting shall be done to suit site requirement.
- 10) Special points related to IBR Piping:
 - a. Necessary approvals for IBR Pipe Spool fabrication shall be obtained by BHEL, PC from CIB, Tamilnadu. Contractor should obtain the IBR approval from CIB, Gujarat.
 - b. Any modification to be carried out on the IBR pre-fabricated piping spools (because of engineering issues) shall be done at site by the Contractor.
 - c. Philosophy of IBR Piping material supply (By BHEL, PC) will be as follows:
 - Pipes will be spooled (cut to length as per Isometric).
 - All pipe spools will be edge prepared as per requirement.
 - All Stubs (Pressure tap-offs, Temp tap-offs, Vent & Drain tap-offs and all pipe to pipe tees & stubs) will be welded onto the Main Pipe.
 - All Fittings (all sizes) will be supplied loose duly edge prepared as per requirement.
 - All Flanges, Gaskets & Stud Nuts will be supplied loose.
 - All Valves will be supplied loose.
 - Final field welding of pipe spools and fittings is in Contractor's scope.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

**SUMMARY OF TENTATIVE WEIGHT OF SYSTEMS/EQUIPMENTS INVOLVED IN
ERECTION, TESTING & COMMISSIONING SCOPE FOR HRSG & PIPING**

| S.N. | Package/Equipments | Weight (Kg) | Approx. WT.(MT) |
|----------|--|-------------------|--------------------|
| A | HRSG with associated Equipments & Aux. : | | |
| | Structure | 271676.499 | 271.676 |
| | Pressure Parts including HTM, Integral Piping, Tanks | 509188 | 509.188 |
| | Non Pressure Part | 120144.100 | 120.144 |
| | Lining & Insulation | 80075.709 | 80.076 |
| | Sub Total A | 981084.001 | 981.084 |
| B | HRSG Chimney/Steel Stack | | |
| | Chimney | 82486 | 82.486 |
| | Chimney Insulation | 6998 | 6.998 |
| | Sub Total B | 89484 | 89.484 |
| C | Total Piping | | |
| | Non IBR Piping | 380000 | 380 |
| | IBR Piping | 12500 | 125 |
| | Insulation for Piping | 101000 | 101 |
| | Steel & Hanger For Pipe Supports | 170000 | 170 |
| | Sub Total C | 776000 | 776 |
| | Grand Total (A+B+C) | 1846568 | 1846.568 |

NOTES:

1. Besides product groups indicated herein, there is likelihood of addition of new product groups by BHEL' s unit for release of some items, integral to this work. Tenderers' quoted unit rates shall be applicable for such product groups also.
2. The weights given against PGMA's listed above are tentative. It may change after detailed engineering is done. Rate quoted by the Contractor shall not change due to variation in weight.
3. Rate Schedule Identified for PGMA's of Piping and Insulation are Indicative only and based on envisaged material specification. Payment shall be made on the basis of material specification of actual material received and erected at site.
4. BHEL's decision with regard to classification of a particular product group for applicable rate category shall be final & binding on the Contractor.
5. Besides the above, weight of all temporary piping, valves, pumps, tanks and other miscellaneous equipments etc for carrying out hydraulic test, chemical cleaning, steam blowing and other tests, as stated elsewhere will get added.
6. Electrical & C&I items of handling system is excluded from the scope of work.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| <u>Weight and Dimensions Details Of BOP SYSTEMS :</u> | | | | | | |
|--|--|---|-----------------------------------|-----------------------|----------------|-------------------|
| Sl. No | BOP Equipment /BOP Package Description | Qty | Dimension (each) L x B x H (M) | Weight (each) Tons | Weight (Total) | Remarks |
| 1 | MISC EQUIPMENTS (1.1, 1.2, 1.3) | These equipments will be treated under Non pressure part head & accordingly rate will be applicable of Non Non pressure parts. | | | | |
| 1.1 | Workshop Equipments: | | | | | |
| | 1.Radial drilling Machine | 1 | 3 x 2 x 3 | 3 | 3 | |
| | 2.Grinding Machine | 1 | 2 x 1.5 x 3 | 2 | 2 | |
| | 3.Bench Vice | 1 | 0.5x 0.5 x 0.5 | 0.05 | 0.05 | |
| SUBTOTAL | | | | | 5.05 MT | |
| 1.2 | Hoist | | | | | |
| | Electrical hoist for | | | | | |
| | a)VHP BFP [3.5 T] | 3 | 1X 1.0 x 1.0 | 1.0 | 3 | - Rail length 8m |
| | b)CW & ACW Pump [7.5T] | 1 | 1x 1.0 x 1.0 | 1.0 | 1 | - Rail length 30m |
| | c)Switch Gear [7.5T] | 1 | 1x 1.0 x 1.0 | 1.0 | 1 | - Rail length 6m |
| | d)DG set [7.5 T] | 1 | 1 x 1.0 x 1.0 | 1.0 | 1 | - Rail length 12m |
| | Manual hoist for LP BFP | 2 | 1x 1.0 x 1.0 | 1.0 | 2 | - Rail length 8m |
| SUBTOTAL | | | | | 08 MT | |

| Sl. No. | Equipment /Package Description | Qty | Dimension (each) L x B x H (M) | Weight (each) Tons | Remarks |
|--------------|---------------------------------|--------|-----------------------------------|-----------------------|---------|
| 1.3 | Chemical lab equipment | | | 2 Tons | |
| 1.3.1 | Water Analysis Equipment | | | | |
| a. | pH Meter | 2 Sets | | | |
| b. | Conductivity Meter | 1 No. | | | |
| c. | Drying Oven | 1 Set | | | |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | | |
|--------------|---|----------------|--|--|--|
| d. | Muffle Furnace | 1 Set | | | |
| e. | Magnetic Stirrer | 1 Set | | | |
| f. | Water Bath | 1 Set | | | |
| g. | Direct Reading Balance - Analytical Electronic Balance - Top loading Electronic Balance | 1 Set 1 Set | | | |
| h. | Electric Refrigerator | 1 Set | | | |
| i. | Shaker | 1 Set | | | |
| j. | Hot Plate | 1 Set | | | |
| k. | Demineralizer (Cap. 25 Ltr/Hr) | 1 Set | | | |
| l. | Jar Test Apparatus (Laboratory Flocculate) | 1 Set | | | |
| m. | Filtration equipment - Mini pump – 2 sets - Filter holder – 3 sets | 1 Set | | | |
| n. | Indigo Carmine Apparatus | 1 Set | | | |
| o. | Free Chlorine Tester | 2 Sets | | | |
| 1.3.2 | Oil Testing Equipment | | | | |
| a. | Flash Point Tester | 1 Set | | | |
| b. | Gravity Hydrometers | 1 Set | | | |
| c. | Viscosity Water Bath | 1 Set | | | |
| d. | Water Content Measuring Apparatus | 1 Set | | | |
| e. | Pour Point Tester | 1 Set | | | |
| f. | Centrifuges | 1 Set | | | |
| g. | Hot Plate | 1 Set | | | |
| 1.3.3 | Furniture for Water Analysis Room | | | | |
| a. | Drawer cupboard | 1 Set | | | |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | | |
|--------------|--|--------|--|--|--|
| b. | Sink unit | 1 Set | | | |
| c. | Center table (With two sink unit and drawer cupboard) | 1 Set | | | |
| d. | Storage cupboard | 2 Sets | | | |
| e. | Wall table | 1 Set | | | |
| f. | Corner unit | 1 Set | | | |
| g. | Vibration proof balance table | 1 Set | | | |
| h. | Office desk and chair | 1 Set | | | |
| 1.3.4 | Furniture for Storage and Dark Room (As specified in spec.) | | | | |
| a. | Storage cupboard | 2 Sets | | | |
| b. | Storage cupboard | 2 Sets | | | |
| c. | Wooden shelf | 2 Sets | | | |
| d. | Corner unit | 1 Set | | | |
| e. | Wall table | 1 Set | | | |
| 1.3.5 | Furniture for Oil Analysis Room (As specified in spec.) | | | | |
| a. | Storage cupboard | 1 Set | | | |
| b. | Bottle cabinet | 2 Sets | | | |
| c. | Wall table | 2 Sets | | | |
| d. | Wall table | 2 Sets | | | |
| e. | Drawer cupboard | 1 Set | | | |
| f. | Corner unit | 1 Set | | | |
| g. | Sink unit | 1 Set | | | |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | | |
|-----------------|---|-------|--|-------------|--|
| h. | Center table (With two sink unit and drawer cupboard) | 1 Set | | | |
| i. | Vibration proof balance table | 1 Set | | | |
| 1.3.6 | Draft Chamber as draft system for Water analysis room | 1 Set | | | |
| 1.3.7 | Eye wash and Safety shower | 1 Set | | | |
| 1.3.8 | Special Tools & Tackles | 1 set | | | |
| 1.3.9 | All necessary glassware and Apparatus items | 1 set | | | |
| SUBTOTAL | | | | 2 MT | |

2. FIRE PROTECTION AND DETECTION SYSTEM

Erection, Testing & commissioning including performance demonstration at site of Fire Protection & Detection system. Brief Material details & Brief scope of work are given below. This total system will be treated under Non IBR Piping-carbon steel head & accordingly rate will be applicable of Non IBR Piping-carbon steel piping.

| Fire Detection And Protection System including | | | | | |
|---|--|----|--|-------------------|--|
| 1 | Hydrant System Accessories | | | Total Wt : 5 T | |
| a. | Hydrant Valves (External) | 45 | | | |
| b. | Hydrant Valves (Internal) | 35 | | | |
| c. | Hoses With Coupling (Internal) 7.5 M Long | 25 | | | |
| d. | Hoses With Coupling 15 M Long For External Hydrants | 45 | | | |
| e. | Hoses With Coupling 15 M Long For Internal Hydrants | 35 | | | |
| F | Hose Boxes (Internal) | 35 | | | |
| g. | Hose Boxes (External) | 45 | | | |
| h. | Water Monitor (75mm Size, Nozzle Hose 38mm) Along With Branch Pipes And An Isolation Valve | 5 | | | |
| i. | Branch Pipe, Nozzle (Internal) | 35 | | | |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | | |
|--------------|---|-------|--|-------------------|--|
| j. | Branch Pipe, Nozzle (External) | 45 | | | |
| k. | Fire Siren Complete With All Accessories | 1 Lot | | | |
| 2 | Piping (Hydrant And Spray System) including pipe Fittings and Fasteners: | | | Total Wt: 48 T | |
| 2.1 | Over Ground (On Pedestal) | | | | |
| a. | 200 Nb | 100 M | | | |
| b. | 150 Nb | 150 M | | | |
| c. | 100 Nb | 100 M | | | |
| d. | 80 Nb | 80 M | | | |
| 2.2 | Under Ground | | | | |
| a. | 200 Nb | 200 M | | | |
| b. | 150 Nb | 200 M | | | |
| c. | 100 Nb | 150 M | | | |
| d. | 80 Nb | 80 M | | | |
| 2.3 | GI Pipe | | | | |
| a. | 150 Nb | 50 | | | |
| b. | 100 Nb | 80 | | | |
| c. | 80 Nb | 150 | | | |
| d. | 50 Nb | 300 | | | |
| e. | 40 Nb | 50 | | | |
| f. | 32 Nb | 150 | | | |
| g. | 25 Nb | 350 | | | |
| | | | | | |
| 2.4 | Valves | | | | |
| 2.4.1 | Gate Valves | | | | |
| a. | 200 Nb | 8 | | | |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | | |
|------------|--|-------|--|-----------------|--|
| b. | 150 Nb | 15 | | | |
| c. | 100 Nb | 30 | | | |
| d. | 80 Nb | 2 | | | |
| e. | 50 Nb | 50 | | | |
| 2.4..2 | Butterfly Valves | | | | |
| a. | 150 Nb | 3 | | | |
| b. | 100 Nb | 5 | | | |
| c. | 80 Nb | 6 | | | |
| 2.4.3 | Air Release Valves | | | | |
| a. | 25 Nb | 4 | | | |
| 2.5 | Miscellaneous | | | | |
| a. | Primer for all Piping | 1 | | | |
| b. | Paint for all Piping | 1 | | | |
| c. | Wrapping & Coating for Underground and Trench Piping | 1 | | | |
| | | | | | |
| 2.6 | Fittings | | | 3 tonnes | |
| a. | 90° ELBOW(C.S) | 1 lot | | | |
| b. | 45° ELBOW(C.S) | 1 lot | | | |
| c. | CONCENTRIC REDUCER(C.S) | 1 lot | | | |
| d. | HALF COUPLING | 1 lot | | | |
| e. | FLANGE(Drilled To ANSI B16.5 Class 150) | 1 lot | | | |
| f. | FLANGE(G.I) | 1 lot | | | |
| g. | FLANGE(C.S) | 1 lot | | | |
| h. | END CAP (C.S) | 1 lot | | | |
| i. | DUMMY FLANGE(C.S) | 1 lot | | | |
| j. | BOLTS & NUTS | 1 lot | | | |
| k. | L-ANGLE | 1 lot | | | |
| l. | C-CHANNEL | 1 lot | | | |
| m. | SQUARE PLATE | 1 lot | | | |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | | |
|------------|---|-------|--|--|------------------|
| n. | ANCHOR FASTNER | 1 lot | | | |
| o. | "U" CLAMP WITH NUTS | 1 lot | | | |
| q. | PRIMER | 1 lot | | | |
| 3.0 | Spray System Components | | | | Total Wt: 2 T |
| 3.1 | Deluge Valves | | | | |
| a. | 150 Nb | 8 | | | |
| b. | 100 Nb | 6 | | | |
| c. | Trim Kit | 11 | | | |
| 3.2 | HVW Spray Nozzle | 450 | | | |
| 3.3 | MVW Spary Nozzle | 660 | | | |
| 3.4 | QB Detectors | 250 | | | |
| 3.5 | Strainers (Y-Type Strainers) | | | | |
| a. | 150 Nb | 3 | | | |
| b. | 100 Nb | 3 | | | |
| 3.6 | Electrical Items | | | | |
| . | Deluge Valve Local Control Panels | 14 | | | |
| 3.7 | Instruments | | | | |
| a. | Solenoid Valves | 5 | | | |
| | | | | | |
| 3.8 | Hume Pipe | | | | Total Wt: 5 T |
| a. | 400 Mm Dia | 10 M | | | |
| b. | 300 Mm Dia | 45 M | | | |
| c. | DV Housing | 14 | | | |
| 4.0 | Fire & Gas Detection & Alarm System Components | | | | Total Wt: 3 T |
| a. | Main Fire Alarm Panel | 1 | | | |
| b. | Repeater Panel | 2 | | | |
| c. | Multi senser type detectors | 190 | | | |
| d. | Gas detectors | 16 | | | |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | | |
|------------|---|-----|--|--|------------------|
| e. | Gas detection panel | 1 | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| i. | Rate of rise (ROR) detector | 10 | | | |
| j. | Hooter | 50 | | | |
| k. | Manual call points | 100 | | | |
| l. | Modules | 180 | | | |
| m. | Siren (3.25 km) | 1 | | | |
| n. | Erection hardware | 1 | | | |
| o. | Misc. Items (Hook Up material, Exit Signs, R.I, Tools & Tackles etc.) | 1 | | | |
| 5.0 | Fire Extinguishers | | | | Total Wt: 1 T |
| 5.1 | Portable Type | | | | |
| a. | Pressurized Water Type (9 Lit. Cap) (Is:15683 Operated By Co2 Cartridge Type) | 15 | | | |
| b. | Foam Type (9 Lit. Cap Is : 15683) | 10 | | | |
| c. | CO2 Type (4.5 Kg. Cap. Is: 15683) | 35 | | | |
| d. | Dry Chemical Powder (5kg Cap Is : 15683) | 45 | | | |
| 5.2 | Mobile Type | | | | |
| a. | Foam Type (50 Lit Cap Is: 13386) | 10 | | | |
| b. | Co2 Type (22.5 Kg Cap Is:15683) | 12 | | | |
| c. | Dry Chemical Powder (50 Kg Cap Is : 10658) | 2 | | | |
| | | | | | |
| 6.0 | Inert Gas System for Control Room | | | | Total Wt: 8 T |
| a. | 300 bar 140 Ltrs, Inert gas cylinders | 24 | | | |
| b. | 300 bar pneumatic cylinder valve | 24 | | | |
| c. | Flow control pressure regulator valve | 24 | | | |
| d. | Discharge hose | 24 | | | |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | |
|-----|---|-----------|--|--|
| e. | Check valve | 24 | | |
| f. | Pressure gauge with switch | 24 | | |
| g. | Electromagnetic release devices for master cylinders | 6 | | |
| h. | Pneumatic release devices for slave cylinders | 18 | | |
| i. | Manual/pneumatic release device for master cylinder inbetween cylinders | 4 | | |
| j. | Manual release device for master cylinder | 2 | | |
| k. | Pilot hose 700mm long for cylinder connection | 30 | | |
| l. | Adapter M12 x 1.5-G1/8" | 44 | | |
| m. | Bleed valve DN1.5 | 6 | | |
| n. | Discharge nozzle | 37 | | |
| o. | Pressure relief device | 1 | | |
| p. | Pressure and flow detector switch | 4 | | |
| q. | Pressure gauge with cock valve | 1 | | |
| r. | 3" Selector valve | 2 | | |
| s. | 2" Selector valve | 2 | | |
| t. | Pressure regulator 200 bar to 10 bar for pilot cylinder | 1 | | |
| u. | 200 bar, 10 Ltrs nitrogen pilot cylinder with cylinder valve including electric and manual release unit | 1 set | | |
| v. | Solenoid valve 3/2 way main overdue 23Vdc | 4 No.s | | |
| w. | Pipes and fittings (Sch. 40) | 1 Lot | | |
| x. | Manifolds, Sch. 40 piping | 1 Lot | | |
| y. | 4-way pilot manifold | 1 | | |
| z. | cylinder mounting frame/bracket | 1 Set | | |
| aa. | Gas release panel with NiCd battery | 1 | | |
| ab. | Gas loss indication panel | 1 | | |
| ac. | Pressure relief vent | 1 Lot | | |

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

| | | | | | |
|--|---|---|-----------------|--|--|
| ad. | Gas inhibitor/Gas release/Gas discharge indicator | 4 | | | |
| ae. | Junction box | 3 | | | |
| af. | Warning sign | 8 | | | |
| SUBTOTAL | | | 75 MT | | |
| TOTAL OF BOP PACKAGES (Sr No 1 & 2) | | | 90.05 MT | | |
| <p><u>NOTE:</u> The following specific tests have to be conducted on Fire detection and Protection System by Contractor:</p> <p>I) Hydrant & Spray Systems :</p> <p>a) Special tests:</p> <ul style="list-style-type: none"> - Holiday Test - Underground Piping - Radiography - 10 % of the Welded Joints (50% of these shall be field joints - Functional Tests of all Systems <p>b) Standard Tests including :</p> <ul style="list-style-type: none"> - Hydro Test Of All The Lines (Charged With Water) - 1.5 Times Of The Design Pressure - NDT of Piping Joints - Dry Film Thickness Test For Paint <p>II) Inergen System :</p> <p>a) Special tests:</p> <ul style="list-style-type: none"> - Pneumatic Test of Inergen piping - Leakage Tests for Cylinder System - Functional tests of all Equipment / Systems <p>b) Standard Tests including :</p> <ul style="list-style-type: none"> - NDT of Piping Joints | | | | | |

BRIEF SCOPE OF FIRE PROTECTION SYSTEM:

1.0 Fire hydrant system covers the entire plant.

2.0 The fire protection system also covers the Balance of Plant (BOP) area .

Brief details are as follows:

1.1 Automatic High Velocity Water Spray (HVWS) system for the following:

- All oil filled transformers of rating 10 MVA and above
 - a. STG#1 Transformer- 21/27MVA - 1 No

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

- b. GTG#3 Transformer-31/36MVA - 1No
- c. GTG#4 Transformer- 40/50MVA -1No
- d. Station Transformers- 40/45MVA - 2Nos
- GTG & STG lube oil tanks and coolers
- For the Three nos. of existing deluge valves (DV) in the substation near switchyard area, instruments in the DV (Pressure Switches & Pressure gauge) & solenoid valve requires replacement. Accordingly the pressure gauge, Pressure switch & solenoid valve of the deluge valve shall be provided by BHEL to contractor for the existing Deluge valves located in Switchyard.

1.2 Automatic medium velocity water spray system for the following:

- A. Cable galleries / cable vault / cable spreader rooms in Switchgear cum control building
- B. Following Fuel Gas conditioning area :-

| Sl. No | Description | No. of Skids |
|--------|------------------------------------|--------------|
| 1 | Scrubber and filter separator skid | 1 |
| 2 | Fine Filter skid | 1 |
| 3 | Pressure control station skid | 1 |
| 4 | Steam heater skid | 1 |
| 5 | Drain tank | 1 |

1.3 Control rooms shall have clean agent system for fire protection system.

Clean agent system for the control room based any of the following clean agents:

- IG-541 (Inergen)
 - IG-55 (Aragonite)
 - IG-01 (Argon)
 - IG- 100
 - NOVEC 1230
- A. Fire detection and alarm system for the complete plant.

Provision for repeating of 60 numbers of hard wired signals shall be provided in the Fire alarm Panel supplied by BHEL. Provisions of repeating of these signals shall be provided in repeater panel through RS-485. ONGC/Fitcher shall ensure the compatibility of the signals originating from existing system with the system being supplied by BHEL.

1.4 Gas detection system

1.5 Portable and mobile fire extinguishers for all the buildings in the power plant premises

Fire protection system scheme and hydrant layouts are attached .

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I ESTIMATED WEIGHT OF VARIOUS SYSTEMS IN SCOPE OF WORK

NOTE :

1. THE LIST IS TENTATIVE AND HAS BEEN GIVEN TO ENABLE THE CONTRACTOR TO STUDY THE NATURE OF WORK TO BE DONE IN THIS CONTRACT. THERE MAY BE VARIATION IN SIZE, WEIGHT ETC. AND NO CLAIM, WHATSOEVER, WILL BE ENTERTAINED ON ACCOUNT OF THIS BY BHEL.
2. SOME OF THE PACKAGES MAY BE SENT IN PARTS TO SUIT THE SITE CONDITION / TRANSPORTATION, THE SAME IS TO BE ASSEMBLED AT SITE WITHOUT ANY EXTRA COST, LIKEWISE THE PACKAGE MAY BE ASSEMBLED TOGETHER AND SEND AS A SINGLE ASSY. CONTRACTOR MAY HAVE TO DISMANTLE AND ERECT OR, ERECT AS SINGLE ASSEMBLY AS PER THE INSTRUCTION OF BHEL ENGINEERS WITHOUT ANY EXTRA COST.
3. THE WEIGHT INDICATED ABOVE IS APPROXIMATE AND THERE MAY BE A VARIATION IN WEIGHT OF EQUIPMENT / PACKAGE. NO CLAIM, WHATSOEVER, WILL BE ENTERTAINED BY BHEL ON ACCOUNT OF VARIATION IN WEIGHT QUANTITIES.

SUMMARY OF HRSG & AUX, PIPING, BOP SYSTEMS:

| SL.NO | ITEM DESCRIPTION | SYSTEM WEIGHT(MT) |
|--------------------|--------------------|-------------------|
| 01 | HRSG, AUX, CHIMNEY | 1070.568 |
| 02 | PIPING | 776 |
| 03 | BOP SYSTEM | 90.05 |
| GRAND TOTAL | | 1936.618 |

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-II LIST OF IBR WELD JOINTS

Shall be issued during Execution

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-III PAINTING SCHEME

PAINTING SCHEME:

PAINTING SCHEME AS PER BHEL/ONGC/FICHTNER SPECIFICATION FOR SHOP & FIELD PAINTING [IS ATTACHED](#).

ONGC/Fichtner Specification for Shop & Field Painting with regard to surface preparation, primer, Intermediate & final painting with colour codes / scheme is attached separately along with this tender specification. Contractor shall carry out surface preparation, Primer & final painting works as per painting schedule/customer specification and instruction of BHEL engineer at site.

Surface preparation (shot blasting) of non IBR pipes and Surface preparation (shot blasting) of structural steel for pipe supports is in scope of contractor as per painting schedule.

All the primer, thinner & paints for final painting and all other consumables like brush, cleaning agents etc and all T&P including scaffolding materials, manpower, supervision is in contractor's scope.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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GENERAL REQUIREMENTS – COMMON TO ALL WORK

11.1

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

11.2

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

11.3

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

11.4

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

11.5

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

11.6

The Bidder shall at his cost perform any services, tests etc., although not specified but nevertheless required for the completion of work.

11.7

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

11.8

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI GENERAL

11.9

The work to be carried out under the scope of these specifications covers the complete work of collection from stores/storage yard, handling, transporting, unloading at erection site, pre-assembly, erection, alignment, hot alignment, bolting, fastening, welding, radiography, leveling, cold pulling, adjusting, Non-destructive testing, Post weld heat treatment, hydraulic test, chemical cleaning, passivation, steam blowing, oil flushing, water flushing, air flushing, pre-commissioning tests, trial running of auxiliaries covered under these specifications, commissioning and all other activities till handing over of the unit. The work shall conform to dimensions and tolerances specified in the various drawings, documents etc. That will be provided during the course of installation. If any portion of the work is found to be defective in workmanship or not conforming to drawings or other specifications, the Contractor shall dismantle and re-do the work duly replacing the defective materials at his cost failing which the work will be got done by BHEL at the cost and risk of the contractor.

11.10

The HRSG shall be erected as per relevant provisions of latest Indian Boiler Regulations (IBR) and amendments/addendums thereof, if any.

11.11

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

11.12

The indicative schedule of weight of major equipment's given in relevant appendices is meant for providing a general idea to the Contractor about the magnitude of the work involved.

11.13

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

11.14

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

11.15

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

11.16

The Contractor shall execute the work in the most substantial and workman like manner. The stores shall be handled with care and diligence.

11.17

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI GENERAL

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

11.18

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

11.19

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

11.20

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

11.21

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

11.22

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

11.23

Contractor shall plan and transport equipments, components from storage to erection site and erect them in such a manner and sequence that material accumulation at site does not lead to congestion at site of work. Materials shall be stacked neatly, preserved and stored in the Contractor's shed and at work areas in an orderly manner. In case it is necessary to shift and re-

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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stack the materials kept at work areas/ site to enable other agencies to carry out their work or for any other reason, same shall be done by Contractor most expeditiously as incidental to work.

11.24

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

11.25

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

11.26

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

11.27

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

11.28

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

11.29

Welding of necessary instrumentation tapping points, thermowell, thermocouple pad, metal temp pad and clamps, root valve including reducer (to suit Control & Instrumentation Impulse Piping requirements), condensing vessel, flow metering & measurement devices, and control valves to be provided on HRSG & its auxiliaries and piping are covered within the scope of this specification. The installation of all the above items will be Contractor's responsibility even if:

- a) Items are not specifically indicated under the respective product groups as given in the technical specifications.
- b) Items are supplied by an agency other than BHEL.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI GENERAL

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

11.30

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

11.31

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

11.32

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

11.33

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

11.34

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

11.35

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

11.36

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

11.37

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

11.38

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

11.39

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

11.40

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

11.41

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

11.42

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

11.43

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

11. 2 COLLECTION AND RETURN OF EQUIPMENTS, MATERIALS & CONSUMABLES

11.2.1

Contractor shall take delivery of the components, equipments, lubricants, chemicals, special consumables, steel etc. from the storage yard/stores/sheds of BHEL/ client. The Contractor should note that the transport of equipments to erection site, assembly yards etc should be done by the

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI GENERAL

prescribed route, without disturbing the other works and contractors and in the most professional manner. Special equipments such as laboratory equipments, measuring and controls equipments, special electrodes, valves, shims, packing materials for joints and seals, lubricants, actuators etc, shall be stored, when taken over by the Contractor, in appropriate manner as per BHEL's instructions.

11.2.2

The contractor shall return all parts, materials, consumables etc. remaining extra over the normal requirement with proper identification tags to BHEL stores. In case of any misuse or use over actual requirement, BHEL reserves the right to recover the cost of parts/materials used in excess or misused, with departmental charges.

11.2.3

Transportation of lube oil, Chemicals, Gas cylinders etc from stores, is included in the scope of this contract. The contractor shall have to return all the empty and excess drums to the customer/BHEL stores. Similarly, transport of chemicals for various pre-commissioning activities/processes mentioned in clauses herein from BHEL/customer's stores and charging of chemicals into the system for carrying out various pre-commissioning activities and processes mentioned herein and returning of remaining and/or the empty containers of the chemicals to customer/BHEL stores is the responsibility of contractor. After completion of oil flushing operation, the used oil shall be filled in empty drums and which in turn shall be returned to BHEL/customer's stores.

11.3 TEST TAPPING POINTS

11.3.1

Installation and welding of Tapping Points for taking performance test measurements shall be carried out by the contractor as part of this work for the equipments covered under this tender specification under the guidance of BHEL engineer. The scope will be limited to all the tapping points for which materials are available and their locations identified within the regular contract period and extensions thereof.

11.3.2

All packing and forwarding material shall be returned as soon as the material is unpacked. The location for storage of such materials shall be as indicated by BHEL Engineer.

11.3.3

All Measuring and Monitoring Devices (MMD) used for the work in scope of these tender specifications shall be calibrated by the accredited agencies that are approved by BHEL or calibration tractability is established upto National Physical Laboratory.

11.3.3

Contractor shall furnish the consumption details of chemicals, lubricants, TIG welding filler wire, welding electrodes and other consumables on monthly basis.

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11.4 GENERAL

11.4.1

During the course of erection, platforms and floor grills are to be cut at certain places to route steam, oil, water and air piping, cable trays, etc or for accommodating erection, rigging etc, the cutting of platforms and grills should be minimum and as approved by BHEL engineer. After completion of work, the platform/grills cut shall be made good neatly as instructed by BHEL engineer.

11.4.2

Erection and welding of stainless steel fittings including supply of necessary stainless steel welding electrodes is within the scope of the work/specification.

11.4.3

No temporary supports should be welded on to the piping.

11.4.4

Contractor shall carry out preservation painting on all items taken from stores. The preservation painting has to be carried out on material taken from stores and also on material erected wherever the shop painting has given away. Periodical inspection shall be made as per the instructions of BHEL engineer and the portion of items or the complete items needing painting shall be carried out to the satisfaction of BHEL engineer. This facility shall be provided by the contractor till the commissioning and handing over of the equipment to the customer. Preservative and touch up painting on equipments covered under this specification stored at stores/storage yard shall also be carried out by the contractor.

11.4.5

Adjustment of spring hangers for piping shall be done by the contractor during initial erection. After initial commissioning trials, it is possible that the spring hangers have to be adjusted repeatedly till the correct spring compression is achieved. Contractor shall do the same to the satisfaction of BHEL engineer. The marking of cold and hot positions on the hangers shall be done by the contractor.

11.4.6

The contractor shall return to BHEL the excess materials left over after completion of work, materials issued for temporary pipelines for HT, chemical cleaning, flushing, blowing etc. and materials issued on returnable basis in neatly dressed condition. Necessary grinding, edge cutting (square facing), edge preparation (v), painting etc. to the condition similar to the one at the time of issue shall be in scope of work.

11.4.7

Wherever the equipments are erected by the contractor and connected piping is done by other agency, contractor shall weld / tighten the incoming pipes to either the equipment or the counter flange provided on the equipment.

11.4.8

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI GENERAL

The Contractor shall make his own arrangements of Gate Pass with photo for his employees as prescribed and instructed by the Security deptt. i.e. CISF, ONGC Refinery at his own cost, each gate pass has to be endorsed by the Security Officer of the Refinery before the pass be used by any employee. In case of termination of the service of any of his employee during the contractual period, the contractor shall have to surrender the Gate Pass issued to the employees to the Security Deptt. At the end of the project all the gate passes endorsed by the Security Deptt. for use of the contractor's employees shall have to be returned.

11.4.9

The Contractor shall make his own arrangements of Gate Pass for his Vehicle, T&P etc. as prescribed and instructed by the Security deptt. i.e. CISF, ONGC Refinery at his own cost, each gate pass has to be endorsed by the Security Officer of the Refinery before the pass be used. In case of termination of the service of any of T&P or Vehicle during the contractual period, the contractor shall have to surrender the Gate Pass to the Security Deptt. At the end of the project all the gate passes endorsed by the Security Deptt. for use of the contractor's Vehicle, T&P shall have to be returned.

11.4.10

Where permitted, by Customer/ BHEL, to work beyond normal working hours, the contractor shall arrange necessary work permit for working beyond normal working hours.

11.4.11

Contractor to note that in addition to BHEL requirements of safety, occupational health and environmental management, contractor shall strictly follow & abide the safety laws/rules & regulation requirements of ONGC at site and in the event of any deviation/ dispute, the requirements of ONGC in this regard shall supersede the BHEL requirements. Contractor shall arrange the required safety facilities as per safety requirement of BHEL, FICHTNER and ONGC.

For non-compliances/violation of safety rules, fine/penalty will be imposed by ONGC as per their rules & regulations. This shall be to the account of contractor & same shall be paid by contractor. In event of any recovery from BHEL bills by customer on account of contractor against such fine/penalty, BHEL shall recover such amount/payment in addition to 30% departmental overheads from any available bills/payments of contractor which is due for payment from BHEL.

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Chapter-XII CIVIL WORKS, FOUNDATION, GROUTING

12 PREPARATION OF FOUNDATION

12.1

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

12.2

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

12.3

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

12.3.1

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

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

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

12.3.2

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

12.4

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII CIVIL WORKS, FOUNDATION, GROUTING

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

12.5

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

12.6

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

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13 DETAILS OF SCOPE OF WORK FOR HRSG & AUXILIARIES

13.1 ERECTION OF HRSG STRUCTURE

13.1.1

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

13.1.2

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

13.1.3

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

If the deviations are attributable to Contractor, the materials required for Rectification / Stiffening / Strengthening, fabrication, erection of the same shall be in the Contractors account.

13.1.4

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

No separate payment will be made for fabrication, installations, removal & return of the materials to BHEL stores. This should be included in quoted rates.

13.1.5

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

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13.1.6

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

13.1.7

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

13.1.8

Electro forged floor grills will be supplied for this project. These may have to be cut to suit requirement. Cutting shall be done only by mechanical cutters and not by gas cutting. Cold galvanizing compound is to be applied on the cut surface/edge. Supply of Cold galvanizing paint in contractor's scope.

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

13.1.9

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

13.1.10

All relevant provisions as above shall apply, mutatis-mutandis, to the work of external structures, interconnecting structures, etc.

13.2 ERECTION OF HEAT TRANSFER MODULES:

The heat transfer modules will be sent loose, 2-3 Nos. with intermediate wooden packing, in light crating-cum-arrestor arrangement welded to the trailer bed. The crate-arrestor has to be cut at site for unloading the modules one-by-one. For unloading the modules special unloading frames have to be used as the modules being flexible have propensity to

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bending. Utmost care is, therefore, essential while unloading the modules and a special frame will have to be used for unloading supplied by BHEL manufacturing unit.

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

In HRSG, during modules erection, saddle plates are used to be welded on temporary structures, for which no additional cost will be considered. This should be included in quoted rates.

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

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

In all these handling of modules polyester flat webbing sling shall be used. These slings shall be arranged by Contractor.

The details of module are given in scope of work above.

13.3 ERECTION OF HRSG DRUM:

13.3.1

The tentative weight and dimensions respectively are as under:

HRSG HP Drum: 1 no- weight – 30 MT Approx. The elevation of Centre Line of HRSG Drum is 18650 mm (ID: 1524 mm).

HRSG LP Drum: 1 no- weight – 11 MT Approx.

These have to be erected with the help of adequate capacity crane from the side of HRSG after the erection of casing and heat transfer modules of respective circuits. Crane for lifting of drum will be provided by BHEL.

13.3.2

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

13.3.3

Pressure Parts components like Headers, Modules, loose tubes / links etc. have to be checked for dimensional accuracy and configuration and minor rectifications, if necessary will have to be done before erection. This will involve making appropriate bed of steel structures over the concrete blocks. Steel, in random sizes, for this purpose will be

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provided by BHEL from the packing materials / scraps etc., where as necessary concrete blocks shall be arranged by the contractor. Bed shall be fabricated as per requirement. These shall be dismantled & returned to BHEL at appropriate stage. No separate payment for making / dismantling such bed is envisaged.

13.3.4

Normally the high pressure valves will have prepared edges for welding. But, if it becomes necessary, the contractor shall prepare new edges or recondition the edges by grinding or chamfering to match the corresponding tubes and pipes. All fittings like "T" pieces, weld neck flanges, reducers, etc., shall be suitably matched with pipes for welding (this is applicable to piping work also).

13.3.5

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

13.3.6

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

13.3.7

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

13.3.8

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

13.3.9

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

13.3.10

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

13.4 ROTATING MACHINERY

- a Specifications covered under the following para and also other relevant specifications contained in other paras elsewhere in this tender document will be applicable for rotating machines like Seal air fans, scanner air fans, augmenting fans, Blowers, pump and other similar auxiliaries.
- b All lubricants for testing, preservation and lubricants for Trial runs of the equipments shall be supplied by BHEL as free issue. All services including labour shall be provided by the Contractor for drawing these from BHEL / customer's stores, transporting, handling, filling, emptying, re-filling, accounting and return of surplus lubricants / empty containers / old & used lubricants after draining etc. Contractor should clean the spilled / leaking lubricants thoroughly, consumables for such cleaning will be in Contractor's scope.
- c All rotating machinery and equipments shall be cleaned, lubricated, checked for their smooth rotation, if necessary, by dismantling and re-fitting before erection. Also, the equipments may have to be checked for clearances, tolerances at any stage of the work including during testing, commissioning etc. shaft of the rotating machines shall be rotated periodically to avoid damages. All these shall be part of work.
- d Trial run of the drives in un-coupled state and then coupled with equipment has to be done after necessary alignment & coupling. Forced lube oil systems including lube oil piping of drives, rotating equipments etc form part of the work under these specifications. Hydraulic test of oil coolers, oil piping etc is in the scope of work. Where required cooler may have to be dismantled for hydraulic test and re-erected thereafter as part of work.
- e Certain rotating machinery, after testing, pre-commissioning may have to be re-aligned/hot aligned and vital clearances re-set. This may necessitate disconnection of cabling, removal of certain instruments etc and restoration thereafter.
- f Protective lubricant coats / fill provided on / in the critical area of equipments have to be removed at appropriate stage and regular lubricants, after removal / cleaning of protective coat / fill, as per specifications should be filled / applied. Cleaning / flushing agents / oils will be provided by BHEL.
- g Chemical cleaning, steam blowing and air drying of the connecting pipes for the lube oil system has to be carried out wherever required as per instruction manuals /

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drawings. Chemicals, suiting BHEL specification, for such chemical cleaning is in the scope of Contractor.

- h) Even though rotating machines may be grouted to foundation using non-shrink grout mix, blue matching of packer plates / shims with foundation / between packers / equipment base should be done as incidental to work wherever instructed by BHEL Engineer.
- l) Skid mounted equipments may need checking, re-setting due to various reasons as incidental to work.

13.5 HRSG STEEL STACK / CHIMNEY ERECTION

13.5.1 THE DETAILS OF HRSG CHIMNEY IS AS FOLLOWS:

Wt. of each half shell : 5MT one half, shells will be supplied in two halves.
Wt of shell after assembly : 10 MT
ID-3.0 mtr, Ht-44.0 mtr

All shells are to be welded as per erection detail. Flange holes are given for locating/ erection/ alignment purpose only.

13.5.2

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

13.5.3

Chimney has to be insulated up to full height and approximate. Actual insulation thickness shall be as per drawings which will be provided during execution of work at site.

13.5.4

Helical strakes as indicated in the erection drawings are to be welded onto the chimney.

13.5.5

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

13.5.6

Painter's trolley will be supplied in parts and will have to be assembled.

13.5.7

All electrical works such as lightening arrestors, earthling and aviation lights etc. are in the scope of work.

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13.5.8

Stack/ chimney have to be painted as per the requirement of aviation / Relevant BIS standards.

13.6 OTHER PRODUCTS AND SYSTEMS

13.6.1

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

13.6.2

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

13.6.3

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

13.6.4

In certain areas of piping where conventional supports are not provided, anchor fastening is to be done. This is part of work & no separate payment is envisaged for this. Anchor fastening material will be supplied by BHEL.

13.7 PIPING ERECTION:

13.7.1

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

13.7.2

Laying of pipelines as per the specifications, between equipments constituting terminal point, whether the terminal equipments fall within the scope of the work / specification or not, is within the scope of the work / specification. The contractor shall complete terminal joints at both ends for all the piping schemes covered in the specification.

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13.7.3

Aligning, matching and welding of piping to the terminal points (such as stubs, on terminal equipments, stubs on headers, battery limits etc), even if these terminal equipment/point do not form part of this scope of work / specification, and stress relieving and NDE of joints so made is also within the scope of work / specification. Also, where the piping connection to the terminal points involves flanged joints, mounting and welding of flanges on piping as well as terminal equipment matching of flanges as specified elsewhere herein, fixing of gaskets, bolting and tightening as per BHEL engineer's instruction is also in this scope of work / specifications. required fasteners and gaskets will be supplied by BHEL free of cost.

13.7.4

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

- 1) Installation & removal, as applicable, of isolating devices/ NRVS and removal & re-fixing of internals required for hydraulic testing, pre-commissioning and commissioning activities. Required gaskets will be supplied by BHEL free of cost.
- 2) Matching of flanges for achieving parallelism and alignment resorting to heat correction or other suitable methods as per instructions of BHEL Engineers.
- 3) To locate the cause of vibrations in pumps or other auxiliaries and to carry out necessary corrections in piping and its supports. This may involve cutting, fresh edge preparation, welding, radiography, stress relieving, etc., of suction, discharge, re-circulating and other connected piping and its supports at number of places.
- 4) Increase or decrease in length of piping including change in layout to suit site conditions.
- 5) Fabrication and erection of racks and steel supports for all the piping including of system piping. Steel for this purpose will be supplied by BHEL in random sizes.
- 6) Erection, welding, NDE and stress relieving of certain equipments, e.g. flow nozzles, control valves etc, after completion of certain activities e.g. chemical cleaning, steam blowing etc is part of work. This may involve removal of portions from the already erected pipelines in order to introduce these equipments and resultant edge preparation etc shall be incidental to work. no separate/ additional payment is envisaged for cutting, welding and edge preparation in this regard. the removed pieces of pipes shall be returned to BHEL stores with proper cleaning, dressing and identification marking.

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- 7) Matching of all fittings like tees, bends, flanges, reducers, valves, socket fittings, etc with pipes for welding. This may involve weld build up, edge preparation, etc.
- 8) Cleaning of all pipes as prescribed, flushing by compressed air etc.
- 9) Welding of root valves including reducer (to suit Control & Instrumentation Impulse Piping requirements) with small length of piping to the pressure, flow and level tapping points on piping or flow nozzles / orifices / metering elements fixed on piping.
- 10) Welding of weld blanks with due NDE & PWHT, if required, on a temporary basis.
- 11) Opening of valve actuators, dismantling of actuators from the valves, refitting and rendering assistance connected with the electrical and mechanical problems.
- 12) Fixing and welding including due NDE & PWHT etc of carrier plates on to the pipes.

13.7.5

On all steam piping, water piping, oil piping, air piping, etc, where butt welding is involved, root TIG welding and subsequent arc welding shall be adopted as instructed by BHEL engineer. The decision of BHEL engineer regarding welding procedure for welding of above lines will be binding on the contractor.

13.7.6

Pipes / tubes / structural materials, which are issued in running meters, may not be sent in standard lengths. These have to be cut to suit site conditions.

13.7.7

certain pipe lines of oil, air, steam and water will be field routed as per schemes approved at site or as per the instructions of BHEL engineer, and will be supplied in random lengths / running lengths. The contractor shall lay the piping according to instructions at sites, after carrying out the necessary fabrication, edge preparation, routing, supporting etc, in best professional manner and as per instructions. The supports for field-routed piping shall be fabricated and erected as per the requirement of the work. The steel required for the supports will be provided by BHEL free of cost at their stores.

13.7.8

All weld joints on piping shall be ground or filed on completion of welding and before radiography as per instructions BHEL engineer so as to achieve smooth surface free of notches, ripples, undulations, etc. and to limit the reinforcement as per the codes.

13.7.9

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Contractor shall erect the piping by doing pre-assemble on ground if possible at the first instance. The pipe laying shall be carried out from the available terminal point / points or any other area between the terminal points. The erection can be carried out on temporary supports to obtain proper alignment and welding. After fixing the permanent supports, all the temporary supports shall be removed. The alignment, distances and loading of the supports shall be checked and the required spring compression achieved in the case of spring hangers.

13.7.10

Contractor shall carryout edge preparations for welds joints in accordance with BHEL drawings / BHEL standards / BHEL engineer's instruction.

13.7.11

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

13.7.12

The rate quoted in rate schedule is also inclusive of pre-heating, welding, radiography, post heating, post weld heat treatment/ stress relieving and NDE.

13.7.13

Hanger rods shown in the piping arrangement drawing may have to cut and welded to suit site condition. The contractor shall do cutting and welding of these hanger rods. The NDE & stress relieving required on welded hanger rods shall be carried out. The hanger for piping will be tested for even distribution of load with the help of torque wrench.

13.7.14

The piping may be provided with hand holes. The hand holes will be opened up for inspection and seal welded prior to operation.

13.7.15

Structural materials required for the supporting / operating platforms required for the valves/equipments at various levels for the safe operation will be issued in random sizes to the contractor free of cost. however, the contractor's quoted rate shall include fabrication and erection of all such of platforms at site and no extra payments shall be allowed for this and only tonnage rate applicable for structures only will be payable.

13.7.16

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Erection of piping systems shall be coordinated by the contractor as required, with the erection of the Gas Turbine, Steam Turbine, GT & ST generators, condenser, Boiler feed pumps and other major equipments, approval must be obtained from the concerned BHEL engineer and other agencies concerned prior to making piping interface connections to the aforementioned equipments. Sequence of work shall be carefully planned to minimize interference with other groups working in the same area. Actual sequence to be followed shall be subject to the approval of engineer and engineers may, at time, direct the contractor to reschedule his work as per status of the site work.

13.7.17

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

13.7.18

All pipelines shall be given proper slope towards the drain points during erection.

13.7.19

All pipe lines shall be provided with suitable vent and the drain points with valve (s) on the highest and lower points of the pipe run although may not be specifically mentioned in the drawing as per the instructions of BHEL engineer.

13.7.20

For instrument connections, pipe stubs including the instrument tubing up to the root valves including reducer (to suit Control & Instrumentation Impulse Piping requirements) shall be installed by the contractor. Root valves including reducer (to suit Control & Instrumentation Impulse Piping requirements) shall be located in the convenient location / place as required by the customer to facilitate easy operation as per the decision / instruction of BHEL engineer.

13.7.21

The contractor shall be responsible for correct orientation of all valves so that flow direction, seats, stem and hand wheel are in desired locations. Information regarding orientation of valves, not fully located on drawings, may be obtained from the BHEL engineers.

13.7.22

The piping systems, which come under the purview of IBR, should meet the requirement of IBR. The contractor shall be well versed with all the latest amendments of Indian boiler regulations and should take necessary approvals from concerned IBR authority.

13.7.23

All piping shall be grouped wherever practicable and shall be routed to present a neat appearance.

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13.7.24

For field run piping, contractor shall fabricate and erect all hangers and supports as required with due regard to general arrangement layout of other pipes, hangers, cable trays, ducting, structural members, etc.

13.7.25

For maintaining the slopes as given in the drawings for larger thickness and larger dia pipelines, edge preparation for welding may have to be altered suitably to achieve the slope.

13.7.26

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

13.7.27

In pipelines NRVS and valves will also be erected by contractor under this tender specifications. though these NRVS & valves may be supplied from different units / different sources, the erection, alignment, welding, NDE test, heat treatment, radiography, supporting etc. along with their control/ governing oil system piping with tanks, pumps, power cylinders etc. including the oil flushing & commissioning of these valves shall be carried out by contractor as per instruction of BHEL engineer and drawings / documents requirement. Similarly erection / fixing, welding etc. of strainers, dummy devices in various lines, valves and their subsequent removal & re-fixing during pre-commissioning / commissioning stages of steam blowing, flushing etc. shall be carried out by contractor under these tender specifications.

13.7.28

All temporary lines required for chemical cleaning, hydraulic testing, steam blowing, etc., shall be supplied in 'as is where is' condition. The contractor shall arrange to carry out the required fabrication, dressing, grinding, cleaning, cutting, edge preparation etc., while carrying out erection. No extra claim on this account will be entertained. For human protection, temporary insulation over piping to be applied at no extra cost.

13.7.29

Before laying the piping on supports, the coordinates and elevations of all supports shall be checked by the contractor for correctness. Discrepancies from the execution drawings, if any, shall be promptly brought to the notice of BHEL engineer in writing and correction shall be carried out as per his instructions.

13.7.30

Normally, hangers setting in cold condition are done by simulation adding additional temporary weight, which will be roughly equal to the weight of the insulation. Attachment of temporary weights and floating of the joints in the simulation test to be treated as part of

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job. Hanger settings have to be repeated for achieving free-floating joints. Hanger adjustments to be repeated for steam blowing by resetting hot and cold values if required. This may have to be repeated several times after steam blowing and synchronization. The weights will be supplied by BHEL. Contractor has to transport from BHEL stores and return the same after completion of work. No extra claim on this account will be entertained.

13.7.31

All the instrumentation tap-off points like thermo-wells, root valves including reducer (to suit Control & Instrumentation Impulse Piping requirements), impulse lines, nipples etc., shall also be erected and welded by the contractor irrespective of whether such materials are supplied by BHEL or any other agency.

13.7.32

The weld grooves of MS line, BFD lines and other pipes will be as per BHEL standard specifications. Further, the edge preparation shall be done as per instruction of BHEL site engineer and same shall be binding on the contractor.

13.7.33

All equipments / works shall be preserved and protected properly during and after erection. Instructions / directions given by BHEL in this connection will have to be observed by the contractor.

13.7.34

The location of tanks, vessels, valves, stations etc in the pipelines indicated in the BHEL drawings may be indicative only. The final location and routings shall be decided to suit the site conditions. While routing such lines and fixing the stations, they have to be erected so as to provide easy accessibility and free path for the purpose of easy operation and maintenance. These locations shall be acceptable to the client. Sometimes, the locations of stations and routing of lines may have to be modified as per the site conditions. All such work shall be carried out expeditiously as per the instructions of BHEL engineer. The decision of BHEL engineer is final and binding on the contractor.

13.7.35

All G.I. pipelines shall be joined by threaded (screwed) joints. Pipes and fittings will be supplied by BHEL as commercially available. Contractor shall arrange to check and clean and ream the existing threads if necessary, by running thread cleaning die/tap or by machining. Fresh threading shall be done in case existing thread is found damaged beyond repair after cutting off the damaged portion within the quoted rates. Fresh threading shall also be done in G.I. pipe ends cut to suit site layout.

13.7.36

Both male and female threads shall be cleaned of oil, grease etc, with appropriate solvent etc. prior to joining. Joints shall be sealed by applying Teflon tape on male thread. All joints shall be tightened adequately so as to achieve leak-proof joint. Exposed portion of the

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external threads shall be coated with zinc silicate paint. Contractor shall arrange all consumables for cleaning, sealing and painting.

13.7.37

Pressure testing with compressed air and external application of soap solution or flame or any other BHEL-approved method shall be done on all joints. Such tests may have to be repeated several times to ensure a leak proof system. Leakages if any shall be repaired by the contractor promptly according to the BHEL-approved procedure/method. Any additional expenses for repair attributable to contractor shall be borne by the contractor.

13.8 OTHER DETAILS

13.8.1

The scope of work in piping system (air, Gas, Water, Oil, Steam, etc.) will include cutting to required length, edge preparation, laying, fixing and welding of the elbows/fittings/valves etc., fixing supports/hangers/shock absorbers/ guides and restraints etc. and carrying out all other activities/works to complete the erection and also carrying out all pre-commissioning/ commissioning operations mentioned in these specifications as per engineer's instructions and/or as per approved drawings. Piping covers all pipings of plant except integral piping of Gas Turbine Generator & integral piping of Steam Turbine Generator.

All Pipes are supplied in Single commercial lengths, without edge preparation by Hyderabad Unit. Cutting into required spool lengths, edge preparation of spools, welding of Stubs & support attachments, pipe shoe are to be done at Site by Agency. Mitre Bends, Reducers in Cooling Water Piping are to be fabricated at Site by Erection Agency using the pipe supplied by Hyd.

Buried Piping in CW system; Coal tar tape to be arranged by Erection Agency & wrapped on pipe before burying. Cathodic protection as per customer specification is required for all underground piping; PE&SD will supply the material required, Erection Agency to provide/weld lugs on pipes.

Weld joints and NDT requirement for all Integral piping, Central Lube Oil piping, Service Water Piping, TG Auxiliaries Cooling water piping, DMCW system which includes some lines of Hot well make up, CW/Main circulating water piping & ACW Piping including buried piping / underground piping and other related pipings as applicable under tender specification shall be as per drawings/schemes and suiting to site requirement. The necessary drawings/documents for these weld joints will be provided at site during execution of work.

Contractor to note that TG Auxiliaries Cooling water (called DMCW system piping) will also be extended to some of the Auxiliaries/equipments of HRSG area and other relevant equipments. Contractor shall carry out erection, testing, NDE requirements and commissioning of entire system TG Auxiliaries piping as per drawing requirement and instruction of BHEL Engineer at site.

13.8.2

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Carrying out of piping as per the specifications between equipments constituting terminal points, whether the terminal equipments fall within the scope of the work/specification or not, is within the scope of the work/ specification. The contractor shall complete terminal joints at either ends, with due NDE & PWHT if applicable, for all the piping schemes covered in the scope of work.

13.8.3

Fit up and welding/bolting/fastening of piping to the terminal points (such as stubs, valves, flanges on terminal points/equipments, stubs on headers, battery limits etc) forming part of the scope of work/specification and stress relieving and radiography of joints so made are also within the scope of work. Permanent fasteners and gaskets will be supplied by BHEL.

13.8.4

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

13.8.5

All drains / vents / relief / escapes / safety valve piping to various tanks/ sewage / drain canal / flash box / condenser / sump / atmosphere etc. from the stubs on the piping and equipments erected by contractor is completely covered in the scope of this tender specification.

13.8.6

The following items of work shall be incidental and forming part of piping fabrication and erection:

- (1) To locate cause of vibrations in equipments/auxiliaries/pipelines and carrying out necessary corrections in case the same is attributed to the contractor.
- (2) Fabrication and erection & welding of racks, steel supports, guides, restraints for all the piping. Steel for this purpose will be supplied by BHEL free of charge in random and running lengths.
- (3) Pre-assembly of spring suspension/hangers and shock absorber as per requirement.
- (4) Erection of steam traps, filters, flow nozzles/ flow indicators/ flow orifices other measuring elements in the piping. These may have been supplied either by BHEL or their customer. This may involve cutting of pipe lines, fresh edge preparation and welding with stress relieving wherever applicable.
- (5) Fabrication / making of bends for pipes and tubes of diameter up to 65mm.
- (6) Matching of all fittings like tees, bends, flanges, reducers valves, socket fittings, etc with pipes for welding.
- (7) Servicing of valves, Power Cylinders and actuators etc.
- (8) Cleaning of all pipes by wire brushing / blowing by compressed air.
- (9) Welding of root valves with small length of piping to the pressure, flow and level tapping points on piping or flow nozzles/orifices/metering/ measuring elements fixed on piping.
- (10) Welding of blanks with stress relieving if required on a temporary basis.

13.8.7

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Pipelines will be field routed as per schemes/ suggestive layout or as per the instructions of BHEL engineer. Pipes & tubes will be supplied in random lengths and running lengths. The contractor shall have to lay the piping after carrying out the necessary fabrication, edge preparation, routing etc to suit site requirement in best professional manner.

13.8.8

As far as possible pre-assembly shall be done. The pipe laying shall be carried out from the available terminal point/points or any other area between the terminal points. The erection can be carried out on temporary supports to obtain proper alignment and welding. After fixing the permanent supports, all the temporary supports shall be removed. The alignment, distances and loading of the supports shall be checked and the required settings to be ensured as per requirement.

13.8.9

The detail of Condensate & Feed water piping, Cooling water piping, Plant air & Instrument air piping, gas piping, DM water piping, to be erected under this contract is generally as per the indicative weight given above in piping details. These details are approximate and meant only to give a general idea to the bidder about the magnitude of the work involved, actual quantum and type of equipments will be based on the erection documents, which will be furnished in the course of erection.

The CW / Main circulating water piping will run in excavated trenches underground as well as over the ground. Further the actual works shall be as per drawing requirement. The Excavation of trenches, construction of ducts is not in the scope of work. The protection of all above buried piping with anti-corrosive tape of minimum 4 mm thick conforming to IS-10221 and AWWA C 203-93 along with supply of related materials shall be carried out by contractor as scope of work under these tender specifications. Anti corrosive tape to be wrapped before burying. The pipe surfaces shall be cleaned by shot blasting / sand blasting before application of anti-corrosive taping. Contractor shall also carry out the Bond / Adhesion test and Holiday test on anti-corrosive applied portion of piping as part of scope of work to prove the satisfactory completion of anti-corrosive taping. The payment for Anti-corrosive tapping work including surface preparation, primer & final paint painting, coating, supply of all materials and related works will be made for actual quantum of work carried out at site as per accepted item rate.

DFT requirement of site weld joints internal surface area as scope of work including surface preparation & supply of all required materials. Any other extra payment for such work shall not be entertained.

The complete Main CW piping supply piping from CW Pumps to Condenser including the BF vales & R.E. Joints / Rubber expansion joints with spool / make pieces at both the ends and return piping from condenser with R.E. Joints and BF Valves to Cooling Tower (CW PH) & all branches to terminal points/ Battery limits as per respective drawing with all associated accessories, fittings, valves / relief valves etc. is included under these tender

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specifications. Complete TG Auxiliaries Cooling Water piping as per respective drawings and up-to battery limits are also included under these tender specifications.

13.8.10

The work on piping systems include laying, edge preparation, fixing & welding/ bolting of the elbows/fittings/valves of all types and sizes/ strainers (e.g. Self-cleaning strainers etc)/ Duplex filter and any other equipment shown in the drawing/documents etc coming in the pipelines, fixing & adjustment of supports/angles shock absorbers and carrying out all other activities/work to complete the erection and also carrying out all pre-commissioning/commissioning operations mentioned in the specification as per BHEL engineers instructions and / or as per approved drawings / documents.

13.8.11

Fittings like bends tees, elbows, miter bends, reducers, flanges etc, will be supplied as loose items.

13.8.12

Certain adjustments in length may be necessary while erecting pipelines. The contractor should remove the extra lengths/add extra lengths to suit the final layout after preparing edges afresh at no extra cost.

13.8.13

Minor adjustment like removal of ovality in pipes is in the scope of work.

13.8.14

All drains / vents / relief tubes / escape pipes / air relief valves/ safety valve/ piping to various tanks / sewage / drain canal / flash box / sump / atmosphere etc from the piping and equipments erected by the contractor is completely covered in the scope of work.

13.8.15

Connection (either flanged/bolted or welded) of piping to the terminal points/ equipments etc is in the scope of work even though such terminal point/ equipment may not form part of this work. All NDE including radiography of joints so made, is also within the scope of work/specification.

13.8.16

Hydraulic test of piping assembly shall be conducted after completion of certain number of weld joints as instructed by BHEL. Supply of suitable blanks/ dished ends, welding/ bolting the same, removal of blanks and fresh edge preparation/ restoration of pipeline after successful completion of hydraulic test is to be carried as part of the work. No separate payment shall be made for this work.

13.8.17

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Manhole door openings have to be cut on the main piping and necessary attachments such as access pipe, flange, pad plates etc is in the scope of work. The access pipe may have to be suitably cut in length and in profile to suit the requirement. Blind/blank flanges have to be bolted later on to close the access opening. Materials, fasteners etc for these permanent installations will be provided by BHEL free of charge.

13.8.18

De-watering of pits and shuttering to avoid land-slide:

de-watering of pits excavated by the respective agency have to be done periodically to ensure safe and proper working condition. Similarly, contractor shall arrange shuttering with props of side walls to avoid land slide in the pit wherever required for work.

13.9 BOP SYSTEM : I) FIRE PROTECTION & DETECTION SYSTEM:

- Erection, Testing & Commissioning including performance demonstration at site of Fire Protection & Detection system is scope of work.
- Electrical & C&I portion of this system is excluded from scope of work.
- This total system is included in Non IBR Piping-carbon steel piping & accordingly rate of Non IBR carbon steel Piping will be applicable.
- Fire Protection & Detection System Vendor/Engineer services will be provided for supervision of FP & DS E&C work.

- Brief scope of work of FP & DS system is given below.

1. Fire hydrant system covers the entire plant.
2. Fire protection system also covers the Balance of Plant (BOP) area .

Brief details are as follows:

A) Automatic High Velocity Water Spray (HVWS) system for the following:

- All oil filled transformers of rating 10 MVA and above
 - a. STG Transformer- 21/27MVA - 1 No
 - b. GTG Transformer-31/36MVA - 1No
 - c. GTG Transformer- 40/50MVA -1No
 - d. Station Transformers- 40/45MVA - 2Nos
- GTG & STG lube oil tanks and coolers
- For the Three nos. of existing deluge valves (DV) in the substation near switchyard area, instruments in the DV (Pressure Switches & Pressure gauge) & solenoid valve requires replacement. Accordingly the pressure gauge, Pressure switch & solenoid

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valve of the deluge valve shall be provided by BHEL to contractor for the existing Deluge valves located in Switchyard.

A) Automatic medium velocity water spray system for the following:

- a. Cable galleries / cable vault / cable spreader rooms in Switchgear cum control building
- b. Following Fuel Gas conditioning area :-

| Sl. No | Description | No. of Skids |
|--------|------------------------------------|--------------|
| 1 | Scrubber and filter separator skid | 1 |
| 2 | Fine Filter skid | 1 |
| 3 | Pressure control station skid | 1 |
| 4 | Steam heater skid | 1 |
| 5 | Drain tank | 1 |

C) Control rooms shall have clean agent system for fire protection system.

Clean agent system for the control room based any of the following clean agents:

- IG-541 (Inergen)
- IG-55 (Aragonite)
- IG-01 (Argon)
- IG- 100
- NOVEC 1230

B. Fire detection and alarm system for the complete plant.

Provision for repeating of 60 numbers of hard wired signals shall be provided in the Fire alarm Panel supplied by BHEL. Provisions of repeating of these signals shall be provided in repeater panel through RS-485. ONGC/Fitcher shall ensure the compatibility of the signals originating from existing system with the system being supplied by BHEL.

D) Gas detection system

D) Portable and mobile fire extinguishers for all the buildings in the power plant premises

NOTE: Following specific tests have to be conducted on Fire Detection and Protection System by Contractor:

i) Hydrant & Spray Systems :

- a. Special tests:

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- Holiday Test - Underground Piping
- Radiography - 10 % of the Welded Joints (50% of these shall be field joints)
- Functional Tests of all Systems
- b. Standard Tests including :
 - Hydro Test Of All The Lines (Charged With Water) - 1.5 Times Of The Design Pressure
 - NDT of Piping Joints
 - Dry Film Thickness Test For Paint

ii) Inergen System :

- a. Special tests:
 - Pneumatic Test of Inergen piping
 - Leakage Tests for Cylinder System
 - Functional tests of all Equipment / Systems
- b. Standard Tests including :
 - NDT of Piping Joints

BOP SYSTEMS: II) MISCELLANEOUS EQUIPMENTS:

- Erection, Testing & commissioning of Miscellaneous equipments is in scope of work.
- These equipments are included in Non pressure part items & accordingly Non pressure parts rate will be applicable for this.
- This covers Workshop equipments, chemical lab equipments, electric hoists & manual hoists.
- Electrical & C&I portion of these system is excluded from scope of work.

13.9 OTHER PRODUCTS AND SYSTEMS AND COMMON REQUIREMENTS

- A) Certain structural items like silencer supports, roof cladding structure, platform etc will be supplied in running lengths which shall be cut to required suitable sizes and adjusted/trimmed as part of work.
- B) Contractor has to make canopies for motors, actuators, lube oil units, control valves, etc. Material for this will be supplied in random lengths / sizes. No separate payment for fabrication is envisaged. Only the erection tonnage rate applicable for structure will be paid for this work.
- C) BHEL will supply Metapoly Sheets for roof and side cladding of HRSG. These sheets are to be fixed with self tapping screws (supplied by BHEL) in similar manner as in case of Galvanized floor grills. Contractor shall deploy the drilling cum fixing machine required for this purpose as a regular scope of work.

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- D) In case the fans are provided with variable frequency drive, Contractor has to erect & commission the mechanical components of the fan. Electrical/ Electronic Panels, transformers, cabling etc are not in this work specification. However in case of Hydraulic Coupling, the coupling shall be in scope of this contractor.
- E) Actuators / drives of dampers, gates etc may have to be serviced, lubricated before erection, during pre-commissioning and commissioning, including carrying out adjustments required as incidental of the work.
- F) All welded joints should be painted with anticorrosive paint/primer immediately after completion of all work. Necessary paints and other consumables for the above work are in the scope of the contractor.
- G) Spring suspension / constant load hangers may have to be preassembled for required load and erection carried out as per instruction of BHEL. Adjustments, removal of temporary arrests / locks, cutting of excess thread length of hanger, tie rod etc, have to be carried out as and when required. Load setting of spring hangers, as per BHEL's documents / instructions, during various stages of erection and testing and after floating of piping / ducting during cold and hot condition will have to be done. This exercise may have to be repeated till satisfactory results are achieved.
- H) Hangers and suspensions, support steels for ducts and other equipments, piping etc will be supplied in running/random lengths/ sizes, which shall be cut to suitable sizes and adjusted as required.
- I) Air leak test is to be conducted for the air ducts. Also gas tightness test is to be done for the gas ducts. In addition to this, leak tests are to be done for the HRSG, skin casing works carried out in the HRSG to the satisfaction of BHEL/Customer.
- J) Touch up and preservative painting of all components issued to and/or erected by contractor shall form part of scope of work. The contractor shall arrange all paints, primer and consumables, T&P and facilities.
- K) For lifting and placement of certain equipments, it may require to hold some of structures / casting of certain foundations. Contractor shall study & discuss with BHEL Engineer at site and submit his plan for completion of work which shall not affect the project schedule. The lifting and placement of these equipments shall be required to be put on foundation within one week time after availability of material and other essential inputs, and clear the holds for further civil & structural works.

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13.10 SECURITY, HOUSE KEEPING & OTHER RESPONSIBILITIES OF THE CONTRACTOR

13.10.1

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

13.10.2 Preservation & Protection of components

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

13.10.3

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

13.10.4

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

13.10.5

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

13.10.6

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

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Chapter-XIV HYDROSTATIC TESTING, PRESERVATION & OTHER TESTS

14 HYDROSTATIC TESTING, PRESERVATION & OTHER TESTS

14.1

Contractor shall carry out the following tests required to complete the erection and commissioning of the HRSG & Aux, Piping, & BOP systems & equipments:

- (1) Hydraulic testing of individual equipments like HRSG, Piping, coolers, heaters, other auxiliaries and equipments. Required capacity Hydraulic test pump/Fill pump and other necessary arrangement shall be provided by contractor to carry out hydraulic testing, chemical cleaning of the equipments and piping as part of scope of work under this tender specification.
- (2) Ultrasonic test
- (3) Dye Penetrant test
- (4) Magnetic Particle Test.

All above facilities (men, materials, equipments, consumables etc) with operating engineer/experienced person and proper approach wherever required shall be provided by the contractor for satisfactory completion of the above tests.

14.2

Contractor shall lay all necessary temporary piping, welding, supports, install pumps, valves, pressure gauges, electric cables and switches etc, required for the Hydro test, Air leak test, Chemical cleaning, Steam blowing etc.. After the test is over, all the temporary piping, pumps, etc will be removed. It may also specifically be noted that servicing, erection and dismantling of piping and equipments for conducting above tests will be done by the contractor. No separate payment shall be made for this purpose.

14.3

All the above tests shall be repeated till all the equipments, piping and systems satisfy the technical and statutory requirements. All related works form part of the scope.

14.4

Suitable welding and stress relieving of temporary blanks or suitably fixing temporary blank flanges with gaskets and fasteners and welding and providing suitable de-aeration/ venting /drain points with valves as per BHEL engineer's instruction, for performing hydro test of piping is within the scope of work. After completion of hydraulic test, welded blanks shall be cut and removed and weld burrs ground finished and cavities/scars of cutting weld filled and ground as per BHEL engineers' instruction.

14.5

Hydro test of piping may have to be repeated several times to meet technical and statutory requirements before application of insulation.

14.6

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While conducting hydraulic test of steam lines, water lines, oil lines either individually or grouping a few lines or in portions. Blanks/spools may have to be put up at terminal points, strainers, walls, flanges etc. After conducting the tests, the blanks shall be removed and the lines restored. Also interconnecting piping between HRSG and turbine, the hydraulic test may have to be done section wise and some-times piping of other agencies may have to be combined. Contractor shall carry out all such incidental work to satisfactorily conduct the hydro test. Wherever work is involved in the terminal points, Contractor shall carryout the same as per instruction of BHEL engineer. The decision of BHEL engineer is final and the same is binding on the contractor.

The contractor shall carry out any other tests as desired by BHEL engineers on erected equipment covered in the scope of this contract during testing and commissioning to demonstrate the satisfactory completion of any part or whole of work performed by the contractor.

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Chapter-XV WELDING, HEAT TREATMENT, RADIOGRAPHY

15 WELDING, RADIOGRAPHY AND OTHER NON-DESTRUCTIVE TESTING, POST WELD HEAT TREATMENT

15.1 WELDING

15.1.1

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

15.1.2

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

15.1.3

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

15.1.4

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

15.1.5

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

15.1.6

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

15.1.7

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

15.1.8

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

15.1.9

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

15.1.10

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

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15.1.11

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

15.2 SOCKET WELDING:

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

15.2.1

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

15.2.2

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

15.3 HEAT TREATMENT:

15.3.1

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

15.3.2

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

15.3.3

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

15.3.4

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

15.3.5

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

15.3.6

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

15.3.7

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

BHEL will provide the induction heating equipment set for SA 335 P-91 materials piping only. The set will comprise of following:

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

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

Likely supplier: Mansfield Cable Co. Noida (UP).

15.3.8

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

15.3.9

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

15.3.10

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

15.4 NON DESTRUCTIVE EXAMINATION:

15.4.1

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

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15.4.2

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

15.4.3

All X-Ray / Gamma Ray films of weld joints shall be preserved properly and be handed over to BHEL/ IBR authorities and requisite clearances shall be obtained by the Contractor.

15.4.4

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

15.4.5

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

15.4.6

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

15.4.7

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

15.4.8

For carrying out ultrasonic testing of welding joints of large size tubes and pipes, it will be necessary to prepare surface by grinding and buffing a smooth finish and contour as necessary. The Contractor's scope of work includes such preparation as incidental to work.

15.4.9

After stress relieving 5% of UT for all critical lines and 2% of UT for other alloy steel lines to be taken to ensure soundness of joints particularly stress relieving cracks. No separate payment will be made.

15.4.10

Contractor may have to undertake radiography with cobalt-60 isotope camera in certain cases. However, for any reason if use of Cobalt-60 is not possible then these joints shall be checked by radiography after completion of welding up to suitable part of thickness with IR-192 other suitable

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XV WELDING, HEAT TREATMENT, RADIOGRAPHY

source subsequently after completing the joint UT to be done. For this Contractor has to deploy level-II operator certified by BARC.

15.4.11

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

15.4.12

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

15.4.13

No separate payment for any NDE activities (including radiography) will be made.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter-XVI ACID CLEANING/ALKALI FLUSHING/STEAM
BLOWING/OIL FLUSHING

16 ACID CLEANING/ ALKALI FLUSHING/ STEAM BLOWING/ OIL FLUSHING ETC

16.1

Contractor shall lay and erect temporary pipelines with fittings and accessories and also erect/commission the chemical cleaning/ circulating pumps after servicing as per requirements, tanks and other installations, as a system as instructed by BHEL for the purpose of chemical cleaning, steam blowing, steam washing, steam flushing, water flushing, water washing, oil flushing of piping and shall provide all other arrangements as per requirement as part of scope of work.

It shall be specifically noted by the contractor that all pipes for above works shall be supplied in random length and in loose condition. Contractor has to assemble and erect them as per schemes / drawings provided by BHEL. Further, flanges bend etc for completing the scheme shall be machined/ fabricated by the contractor at his own cost. However, plates/ steel etc for the same will be provided by BHEL free of charges.

16.2

After the chemical cleaning/ flushing have been successfully completed, dismantling of all temporary installations as instructed by BHEL is within the scope of work under this specification. The dismantled materials shall be dressed and returned to BHEL as stated elsewhere in this tender spec.

16.3

Preservation of the cleaned surfaces will be the responsibility of contractor under the guidance of BHEL engineer.

16.4

Hydraulic test of temporary piping is to be carried out as per the instructions of BHEL Engineer. Carrying out repairs, if any, is in the scope of work/specification.

16.5

For chemical cleaning of the piping system, contractor will have to lay temporary piping to connect the entire system irrespective of whether the equipment/system connected is in the scope of contractor or not. Decision of BHEL Engineer in this regard will be final and binding on the contractor.

16.6

During the initial stages of work, trenches for draining water may not be available after alkali flushing or mass flushing for discharging and emptying. Necessary low point drains and temporary piping for this will have to be provided by contractor from materials provided by BHEL.

16.7

Laying effluent discharge line from mixing tank (for acid cleaning or any other chemical cleaning process) as per the instructions of BHEL engineer and dismantling, servicing for preservation and handing over the same to BHEL stores after completion of the job is within the scope of work/specification.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter-XVI ACID CLEANING/ALKALI FLUSHING/STEAM
BLOWING/OIL FLUSHING

16.8

Radiographic examination of weld joints on temporary pipes as required by the Engineer In-charge should be carried out.

16.9

Contractor shall also carry out the repairs or attend leaks etc., in the temporary piping and equipments for the above operations / activities while carrying out the above activities / operations.

16.10

For chemical cleaning of system which consist of equipment/piping erected by the contractor and also equipment/piping erected by other contractors of BHEL/customer's contractor has to arrange for workers and supervisory staff as required supplementing/complimenting the labour and supervisory staff mobilized by other agencies for chemical cleaning of the portion of equipment erected by them in the system. Decision on the strength of gangs and supervisory staff for deployment of labour and allocation of work for them at site by BHEL engineer is final and binding on the contractor.

16.11

Contractors quoted rate shall be inclusive of fabrication, cost of consumables, erection, dismantling of temporary piping and servicing of the equipments and valves and handing over to BHEL. No separate payment on this account shall be entertained.

16.12

After acid cleaning/pickling of lubricating system (including oil piping of lube oil system, HP Oil supply system, oil tank and other fittings) of rotating machines, oil flushing for lubricating systems, LP Bypass systems etc as per instructions of BHEL Engineer shall be carried out. Cleaning of oil tank of lubricating oil system of rotating machineries, cooler etc before and after oil flushing is the responsibility of the contractor.

16.13

For full welding of structures, tanks and piping etc, only welding generators shall be used. The use of welding transformers will be subject to the approval of BHEL Engineer.

16.14

Erection and commissioning of connecting piping – permanent and temporary for oil purification equipments and all operations for cleaning, oil flushing, dismantling of temporary piping during pre and post-commissioning of equipment up to full load shall be the responsibility of contractor as part of scope of work.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XVII TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES

17 TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES

17.1

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

17.2

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

17.3

Contractor shall provide all required suitable cranes and trailers for materials handling during collection from BHEL/ client's stores/ storage yard, transportation to site of work and at work site for all equipments and consignments including heavy and voluminous equipments/ components/ consignments like HP drum, LP drum, modules, etc. BHEL/customer shall not provide any T&P other than mentioned in relevant appendix for the purpose identified.

17.4

Contractor has to provide spanners of all sizes for carrying out the complete erection / commissioning works. No spanners will be provided by BHEL to the contractor.

17.5

Contractor has to arrange slings of all sizes for completing the works covered under these specifications.

17.6

All tools and tackles to be deployed by the contractor for the work shall have the prior approval of BHEL engineer with regard to brand, quality and specification.

17.7

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

17.8

All jack bolts that are required during erection will have to be arranged by the contractor. No jack bolts will be provided by BHEL.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XVII TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES

17.9

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

17.10

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

17.11

The T&P to be arranged by the contractor shall be in proper working condition and their operation shall not lead to unsafe condition. Contractor shall obtain prior approval of BHEL for all the T&P before deploying in actual work. The movement of cranes and other equipment should be such that no damage / breakage occur to foundations, other equipments, material, property and men. All arrangements for the movement of the T&P etc shall be the contractor's responsibility.

17.12

Normally, use of welding generators only is permitted for welding. The use of welding transformers will be subject to prior approval of BHEL.

17.13

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XVIII LINING & INSULATION

18. LINING AND INSULATION

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

1. HRSG, auxiliaries including but not limited to, ducts, fuel oil Equipments, fans etc.
2. HRSG integral piping and tanks & vessels
3. Integral piping including vessels and tanks & other equipments
4. All piping including LP, HP piping and other equipments piping including terminal points provided by ONGC.
5. Other equipments including BOIs, though not listed above but required for completion.

18.1

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

18.2

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

18.3

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

18.4

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

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

18.5

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

18.6

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XVIII LINING & INSULATION

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

18.7

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

18.8

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

18.9

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

18.10

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

18.11

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

18.12

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

18.13

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

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

18.14

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

18.15

Wastage allowances for the material issued are envisaged as follows:

| | | | |
|---|--------------------------------|---|----|
| a | Pourable & castable insulation | - | 2% |
| b | Insulation bricks and motor | - | 2% |

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Chapter-XVIII LINING & INSULATION

| | | | |
|---|-----------------|---|----|
| c | Wool mattresses | - | 2% |
| d | Cladding sheets | - | 2% |

The wastage allowance will be applicable on the net issued quantity i.e. total quantity issued reduced by the quantity returned to stores as unused/fresh item. Contractor shall reconcile the material issues periodically as prescribed by BHEL site

18.16

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

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

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

18.17

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

18.18

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

18.19

Prior to application of refractory bituminous painting on the pressure parts and other area is under Contractor scope. The bituminous paint will be supplied by Contractor. No separate payment will be made for application of paint.

18.20

HRSG casing, inlet and outlet ducts have to be fully insulated at site with ceramic wool and SS cladding on gas flow path side.

18.21

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

- a) Where indicated, removable type of insulation to be provided for valves, expansion joints, etc. as per the drawings or as directed by BHEL engineer.
- b) Wool insulations are received at site as bonded and unbounded mattresses in standard sizes. These are to be dressed / cut to suit work by the contractor.
- c) Application of insulation and refractory works and sheet metal covering as given in various drawings/ specifications of BHEL, supplied to the contractor.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XVIII LINING & INSULATION

- d) Outer sheet cladding by fabrication of aluminum sheets to the sizes and shapes specified in drawings, beading, swaging, beveling of sheets, crowning the sheets, if necessary, fixing the same to supports, over wool insulation with screws/retainers as specified in BHEL drawings or as instructed by BHEL engineer.
- e) Welding of hooks/supports on equipment including on pressure parts and piping to support wool insulation, as per the drawings or as instructed by BHEL engineers.
- f) Painting the inner side of aluminum/GI/steel cladding, with anticorrosive paint as specified. The required paint and thinner is in the contractor's scope. Also, all other accessories consumables for painting, cleaning the surfaces etc shall also be arranged by the contractor.
- g) The contractor shall leave certain gaps and openings while doing the work as per the instructions of BHEL engineer to facilitate inspection by boiler inspector or cut open during commissioning to fix gauges, fittings, and instruments. These gaps will have to be finished as per drawings at a later date by the contractor at no extra cost to BHEL.
- h) The skin casing plate's scalloped bars and other materials that are to be matched with the erected components have to be cut and re-welded from the fabricated pieces as incidental to work.
- i) wastage allowance for the materials issued shall be as under :-
 - Refractory 2%
 - Wool insulation 2%
 - Cladding sheets 2%
- j) The cladding inside the inlet duct, casings etc are of stainless steel material. Some trimming/ finishing required at site during fixing shall also be done as part of work.

18.22

Application of lining and insulation on all piping covered under this Specification is also the part of this work. However, application of spray insulation on turbine is not in the scope of work.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XIX PRESERVATIVE & FINAL PAINTING

19 PAINTING

BHEL/ONGC/FITCHNER Specification for Shop & Field Painting with regard to surface preparation and final painting with colour codes / scheme for surface preparation and finish paints coating including primer coating for shop and field painting is attached separately along with this tender specification for ready reference. Contractor shall carry out surface preparation including Shot blasting and primer, intermediate, finish painting works as per attached painting schedule / customer specification and instruction of BHEL engineer at site.

19.1

All the primer, thinner & paints for final painting and all other consumables like brush, cleaning agents etc and all T&P including scaffolding materials, manpower, supervision is in contractor's scope.

19.2

Components of the HRSG & auxiliaries will in general be supplied painted by BHEL manufacturing units as per their standard applicable painting schemes (Non IBR pipes, steel for supports etc will be supplied in raw form). Contractor shall carry out surface preparation, primer and finish painting coats and DFT requirement with colour codes & specifications as per attached painting schedule/requirement of customer.

All exposed metal parts of the equipment including piping, structures, railings etc. wherever applicable, after installation unless otherwise surface protected, shall be first painted with coats of primer which matches the painting schedule after thoroughly cleaning all such parts of all dirt, rust, scales, greases, oils and other foreign materials by wire brushing, scraping or shot blasting, and the same being inspected and approved by BHEL engineer for painting. Afterwards, the above parts shall be finished with coats of paints mentioned in painting schedule.

19.3

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

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

19.4

The scope of work includes painting of colour bands, lettering, marking and signs for direction of flow/rotation, names etc of approved colours as per the standard colour codes

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XIX PRESERVATIVE & FINAL PAINTING

and specifications specified in tender specification or as advised by BHEL/customer engineer at site for the equipments / components covered in these specifications.

19.5

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

19.6

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

19.7

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

19.8

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

19.9

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

19.10

This work requires working at higher altitudes from ground level to as high as 45 m and more. The work spread is also substantial involving substantial run of structures and piping. Contractor shall take sufficient precautions to avoid any accident and hazard in all respects. The ropes, ladders, scaffolding materials, clamps etc and climber used should be of standard quality for safe and smooth execution of work.

19.11

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

19.12

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XIX PRESERVATIVE & FINAL PAINTING

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

19.13

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

19.14

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

19.15

Final painting work shall be started after submitting necessary documents /test certificates of primer/ paints and after obtaining clearance from BHEL engineers and as per his instructions.

19.16 SHOT BLASTING, PRIMER AND PAINTS FOR FINAL PAINTING

Shot Blasting of items mentioned in attached painting schedule like Non IBR Pipes, steel for supports etc is to be carried out at site by contractor. Supply of Paints/Primer/Thinner and application of paints for final painting and all other consumables like brush, cleaning agents etc and all T&P including scaffolding materials, manpower, and supervision is in contractor's scope.

WELD FIT-UP AND WELD JOINT PROTECTIVE PAINT, COMPONENT PRESERVATIVE PAINTING ETC.

- 1) All protective paints for the protection of weld joint fit-ups, application of primers on finished weld joints are in the scope of contractor.
- 2) Arrangements for surface preparation and paint application like shot-blasting, consumables like surface cleaning agents, paint brush, brush cleanser, labour and necessary tools and plants as required for completion of work are in the scope of contractor.
- 3) Contractor shall submit manufacturer's batch test certificate / test certificate from BHEL approved laboratory for the primers and paints. Prior approval of BHEL for each and every batch of the primer & paints shall be mandatory. In order to achieve a desired minimum paint dry film thickness (DFT) as specified in painting schedule, number of coats may be applied and method of application shall be as recommended by the paint manufacturer. Required paints & primers and other consumables shall be arranged by contractor.

TECHNICAL CONDITIONS OF CONTRACT (TCC) Chapter-XIX PRESERVATIVE & FINAL PAINTING

- 4) All site weld joints falling in steam side shall be painted with two coats of steam washable paint.

- 5) Preservation of all components/equipments during various stages of erection, commissioning till handing over is in the contractor's scope. All prescribed methods of surface cleaning prior to application of preservative paint shall be followed by the contractor. Contractor has to arrange all primer and paints, and other consumables like wire brush, painting brush required for this work.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XX TESTING, PRE-COMMISSIONING, COMMISSIONING

20.1

Testing, pre-commissioning, & commissioning will involve, though not limited to these, various testing e.g. hydro-static pressure, pressure decay tests, leak test, trial runs of equipments; flushing by air, water, oil, steam as applicable; checking/setting various clearances/ parameters, ensuring operation of various equipments free of undue restrictions, chemical cleaning & alkali boil out of HRSG, steam blowing of HRSG and critical piping, floating of safety valves, coal firing, trial operation and loading etc are some of these activities, flushing of the lines by air, water, oil/lube oil, gas, steam as the case may be; chemical cleaning of various systems & piping; steam blowing of the pipe lines; floating of safety valves, Synchronization, Trial operation, combined cycle operation and reliability run etc., are some of these activities. All the activities for commissioning of the set, as informed by BHEL from time to time shall be completed.

20.2

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

20.3

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

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

20.4

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

In accounting of materials following wastage allowances are provided:

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

No wastage allowance for valves & other equipments.

20.5

Fabrication, fit-up, pre-heating, welding, post-weld heating and post-weld-heat treatment if any, of requisite blanks for conduct of hydraulic test / leakage test is part of work. Similarly, removal of blanks, restoration and normalization of the concerned system / line is to be done as part of work.

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Chapter-XX TESTING, PRE-COMMISSIONING, COMMISSIONING

BHEL will provide the material for blanks free of charge. No separate payment is envisaged for these activities.

20.6

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

20.7

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

20.8

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

20.9

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

20.10

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

20.11

- ✓ Contractor shall cut / open / dismantle work, if needed, as per BHEL Engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over.
- ✓ Similarly, during the course of erection, if certain portion of equipments erected by the Contractor has to be undone for enabling other Contractors / agencies of BHEL / customer to carry out their work, Contractor shall carry out such jobs expeditiously and promptly and make good the job after completion of work by other Contractors / agencies of BHEL / customer as per BHEL engineer's / agencies of BHEL / customers instructions. Claims, if any, in this regard shall be governed relevant clauses of 'General Conditions of Contract

20.12

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XX TESTING, PRE-COMMISSIONING, COMMISSIONING

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

20.13

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

20.14

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

20.15

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

20.16

At various stages of completion, HRSG & Piping has to be preserved against corrosion either by wet preservation or by dry preservation as per the requirement of BHEL Engineer. Contractor shall carry out the entire incidental jobs like filling up of water, dozing of chemicals and pressurizing the system to the required pressure, change of gas refills etc.

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

20.17

Commissioning activities will continue till the completion of trial run, Combined Cycle Trial Operation. During this period Contractor shall make available the services of separate dedicated labor force comprising of suitable skilled and semi/un-skilled hands along with necessary tools and plants, consumables etc.

20.18

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

20.19

Conducting of performance guarantee test is in the scope of work. Contractor shall install all necessary tapping points, instruments etc and provide necessary assistance in this regard.

In case PG test is getting delayed beyond the contract period (normal plus extension if any) due to reasons not attributable to the Contractor, PG test issue will be mutually discussed and decided.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XX TESTING, PRE-COMMISSIONING, COMMISSIONING

However installation of necessary tapping points, impulse pipes, approaches etc are to be completed by the Contractor.

20.20

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XXI PRESERVATION & PROTECTION OF COMPONENTS

21.1 PRESERVATION & PROTECTION OF COMPONENTS

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

21.2

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

21.3

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

21.4

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

21.5

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

21.6

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