TENDER SPECIFICATIONS

E- TENDER SPECIFICATION NUMBER
BHE/PW/PUR/ NTPRT-STG U3 /2862

For

Erection & commissioning of Steam Turbine Generator STG#3; broadly including collection of materials from BHEL/Client's stores/Storage yard; Transportation to site; Erection, testing & commissioning, trial operation and handing over of Steam turbine, Generator set, Integral piping, HP/LP heater, Pumps and Motors, Tanks & vessels and associated equipments, DG set, auxiliaries connected with the systems and other BOIs, Insulation, including supply and application of final painting of **STG#3.**

AT

3x800 MW PVUNL PROJECT PATRATU, DISTRICT-RAMGARH STATE-JHARKHAND

VOLUME – I

TECHNICAL BID

THIS TENDER SPECIFICATION CONSISTS OF:

Notice Inviting Tender	
Volume-IA	**Technical Conditions of Contract**
Volume-IB	**Special conditions of Contract**
Volume-IC	**General conditions of Contract**
Volume-ID	**Forms & Procedures**
Volume-IE	**TechnicalAnnexures**
Volume II	**Price Bid**

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

CONTENTS		
Volume No	Description	Hosted in website ww.bhel.com (Briefly) and detailed in BHEL e-Procurement Portal as files titled
NIL	Tender Specification Issue Details	(Part of Vol-I-A-2862)
NIL	Notice Inviting Tender	(Part of Vol-I-A-2862)
I-A	Technical Conditions of Contract	Vol-I-A-2862
I-B	Special Conditions of Contract	(Part of Vol-I-BCD-2862)
I-C	General Conditions of Contract	(Part of Vol-I-BCD-2862)
I-D	Forms & Procedures	(Part of Vol-I-BCD-2862)
I-E	Technical Annexure	Vol-I-E-2862
II	Price Bid Specification as specified in E-Procurement Portal	Volume-II-PRICE-BID-2862

E-TENDER SPECIFICATION

E-Tender Specification no.

BHE/PW/PUR/ NTPRT-STG U3 /2862

FOR

Erection & commissioning of Steam Turbine Generator STG#3; broadly including collection of materials from BHEL/Client's stores/Storage yard; Transportation to site; Erection, testing & commissioning, trial operation and handing over of Steam turbine, Generator set, Integral piping, HP/LP heater, Pumps and Motors, Tanks & vessels and associated equipments, DG set, auxiliaries connected with the systems and other BOIs, Insulation, including supply and application of final painting of **STG#3.**

AT

3x800 MW PVUNL PROJECT PATRATU, DISTRICT-RAMGARH STATE-JHARKHAND

EARNEST MONEY DEPOSIT: Refer Notice Inviting Tender

LAST DATE FOR TENDER SUBMISSION: Refer Notice Inviting Tender

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

M/s. ……

…….

PLEASE NOTE:
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

GM (Purchase)
Place: Nagpur
Date:

2862

NOTICE INVITING TENDER

Bharat Heavy Electricals Limited

Date: 26/09/2023

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NOTICE INVITING TENDER (NIT)

NOTE: BIDDER MAY DOWNLOAD FROM WEB SITES

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To,

Dear Sir/Madam,

Sub : NOTICE INVITING E-TENDER

Sealed offers in two part bid system (National competitive bidding (NCB) ~~or International Co07/11mpetitive Bidding (ICB~~ are invited from reputed & experienced bidders (meeting PRE QUALIFICATION CRITERIA as mentioned in Annexure-1) through E-Procurement Portal https://eprocurebhel.co.in only, 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

S No.	ISSUE	DESCRIPTION	
i	TENDER NUMBER	**BHE/PW/PUR/ NTPRT-STG U3 /2862**	
ii	Broad Scope of job	Erection & commissioning of Steam Turbine Generator STG#3; broadly including collection of materials from BHEL/Client's stores/Storage yard; Transportation to site; Erection, testing & commissioning, trial operation and handing over of Steam turbine, Generator set, Integral piping, HP/LP heater, Pumps and Motors, Tanks & vessels and associated equipments, DG set, auxiliaries connected with the systems and other BOIs, Insulation, including supply and application of final painting of **STG#3.** AT **3x800 MW PVUNL PROJECT PATRATU, DISTRICT-RAMGARH STATE- JHARKHAND**	
iii	DETAILS OF TENDER DOCUMENT		
A	Volume-IA	*Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc.*	*Applicable*
B	Volume-IB	*Special Conditions of Contract (SCC)*	*Applicable*
C	Volume-IC	*General Conditions of Contract (GCC)*	*Applicable*
D	Volume-ID	*Forms and Procedures*	*Applicable*
~~E~~	Volume-IE	*Additional Annexure*	*Applicable*
F	Volume-II	*Price Schedule (Absolute value).*	*Applicable*
iv	Issue of Tender Documents	Tender documents will be available for downloading from BHEL website (www.bhel.com) or e-procurement portal (https://eprocurebhel.co.in) as per schedule below: *Start: 26/09/2023, Time :18:00 Hrs* *Closes: 17/10/2023, Time: 13:00 Hrs*	*Applicable*

S No.	ISSUE	DESCRIPTION	
		Brief information of the tenders shall also be available at central public procurement portal. (*https://eprocure.gov.in/epublish/app*)	
v	DUE DATE & TIME OF OFFER SUBMISSION	*Date: 17/10/2023, Time :13:00 Hrs* The bidder should submit their offer online only in e-Procurement portal at https://eprocurebhel.co.in ***Bidders are requested to upload their offer well in advance in order to avoid last minute congestion at this website.*** Hard copy bid or bids through E-mail / fax shall not be accepted.	*Applicable*
vi	OPENING OF TENDER (Techno-Commercial Bid)	*Date:17/10/2023, Time: 17:00 Hrs* *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. For e-Tender, Bidder may witness the opening of tender through e-Procurement portal only.*	*Applicable*
vii	EMD AMOUNT	*Rs 15,60,000/- (Rupees Fifteen Lakh Sixty Thousand Only)* *Important Note: Bidders kindly to take note that EMD (Earnest Money Deposit) shall be furnished by MSE bidders as well, as per the amount and procedure indicated in the NIT/GCC..*	*Applicable*
viii	COST OF TENDER	*NIL*	*Not Applicable*
ix	LAST DATE FOR SEEKING CLARIFICATION	One day before due date of offer submission. Along with soft version also, addressing to undersigned & to others as per contact address given below: 1) Name: Viveka nand Jha/ Tapish Kumar Designation: Manager Deptt: Purchase Address: Floor no. 5 & 6,Shree Mohini Complex, 345 Kingsway, Nagpur-440001 Mobile-9429198214/ 9010903666 Email:vivekjha@bhel.in/tapishkhandelwal@bhel.in 2) Mr. Kamlesh Kumar Designation: DGM Deptt: Purchase Address: Floor no. 5 & 6,Shree Mohini Complex, 345	*Applicable*

S No.	ISSUE	DESCRIPTION	
		Kingsway, Nagpur-440001 Email: kamleshbhel@bhel.in Mob: 9425554615 3) Name: R. M. Malhotra Designation: GM Deptt: Purchase Address: Floor no. 5 & 6, Shree Mohini Complex, 345 Kingsway, Nagpur-440001 Email :rmalhotra@bhel.in	
x	SCHEDULE OF Pre Bid Discussion (PBD)	---	*Not Applicable*
xi	INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)	*1) Shri Otem Dai, IAS (Retd.)* *2) Shri Bishwamitra Pandey, IRAS (Retd.)* *3) Shri Mukesh Mittal, IRS (Retd.)*	*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 Corrigendum), Central Public Procurement portal (https://eprocure.gov.in/epublish/app) & on e-tender portal https://eprocurebhel.co.in **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 digitally using Class III DSC & uploaded in E-Procurement Portal, as part of offer. **Rates/Price including 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 Not Used

~~4.0~~ Unless specifically stated otherwise, bidder shall deposit EMD as per clause 1.9 of General Conditions of Contract.

For Electronic Fund Transfer the details are as below-:

NAME OF THE BENEFICIARY	BHARAT HEAVY ELECTRICALS LTD
ADDRESS OF THE COMPANY	5th Floor, SHREE MOHINI COMPLEX 345, KINGSWAY,NAGPUR
NAME OF BANK	STATE BANK OF INDIA
NAME OF BANK BRANCH AND BRANCH CODE	SBI,NAGPUR MAIN BRANCH ,CODE-00432
CITY	NAGPUR
ACCOUNT NUMBER	40227423158
ACCOUNT TYPE	MC-C C Clean (C&I)
IFSC CODE OF THE BENEFICIARY BANK BRANCH	SBIN0000432
MICR CODE OF THE BANK BRANCH	440002002

(Note -: In case of E-Tenders, proof of remittance of EMD should be uploaded in the E-Procurement Portal and originals, as applicable, shall be sent to the officer inviting tender within a reasonable time, failing which the offer is liable to be rejected.

(Note -: In case of E-Tenders, proof of remittance of EMD should be uploaded in the E-Procurement Portal and originals, as applicable, shall be sent to the officer inviting tender within a reasonable time, failing which the offer is liable to be rejected.

5.0 Procedure for Submission of Tenders:

This is an E-tender floated online through our E-Procurement Site (https://eprocurebhel.co.in). The bidder should respond by submitting their offer online only in our e-Procurement platform at (https://eprocurebhel.co.in). Offers are invited in two-parts only.

Documents Comprising the e-Tender

The tender shall be submitted online ONLY EXCEPT EMD (in physical form) as mentioned below:

a. Technical Tender (UN priced Tender)

All Technical details (e.g. Eligibility Criteria requested (as mentioned below)) should be attached in e-tendering module, failing which the tender stands invalid & may be REJECTED. Bidders shall furnish the following information along with technical tender (preferably in pdf format):

i. Earnest Money Deposit (EMD) furnished in accordance with NIT Clause 4.0. ~~Alternatively, documentary evidence for claiming exemption as per clause 29 of NIT.~~
ii. Technical Bid (without indicating any prices).

b. Price Bid:

i. Prices are to be quoted in the attached Price Bid format online on e-tender portal.
ii. The price should be quoted for the accounting unit indicated in the e-tender document.

Note:

- It is the responsibility of tenderer to go through the Tender document to ensure furnishing all required documents in addition to above, if any. Any deviation would result in REJECTION of tender and would not be considered at a later stage at any cost by BHEL.
- A person signing (manually or digitally) the tender form or any documents forming part of the contract on behalf of another shall be deemed to warrantee that he has authority to bind such other persons and if, on enquiry, it appears that the persons so signing had no authority to do so, the purchaser may, without prejudice to other civil and criminal remedies, cancel the contract and hold the signatory liable for all cost and damages.
- A tender, which does not fulfil any of the above requirements and/or gives evasive information/reply against any such requirement, shall be liable to be ignored and rejected.

DO NOT'S

Bidders are requested NOT to submit the hard copy of the Bid. In case offer is sent through hard copy/fax/telex/cable/electronically in place of e-tender, the same shall not be considered. Also, uploading of the price bid in prequalification bid or technical bid may RESULT IN REJECTION of the tender.

Digital Signing of e-Tender

Tenders shall be uploaded with all relevant PDF/zip format. The relevant tender documents should be uploaded by an authorized person having Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION digital signature certificate (DSC).

The Requirement:

1. A PC with Internet connectivity &
2. DSC (Digital Signature Certificate) (Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION)

BHEL has finalized the e-procurement service Provider-:
NIC PORTAL (https://eprocurebhel.co.in)

For E-PROCUREMENT ASSISTANCE & TRAINING, NIC PORTAL HELPDESK CONTACTS AS PER FOLLOWING:

For any technical related queries, please call at 24 x 7 Help Desk Number
0120-4001 002
0120-4200 462
0120-4001 005
0120-6277 787
1. Peter Raj, NIC, Ph: 9942069052
Email Support: support-eproc@nic.in
Other details/update yourself from : https://eprocurebhel.co.in

The process of utilizing e-procurement necessitates usage of DSC (Digital Signature Certificate) (Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION) and you are requested to procure the same immediately, if not presently available with you. Please note that only with DSC, you will be able to login the e-procurement secured site and take part in the tendering process.

The contact details of the DSC certifying authority:-
please refer http://www.mca.gov.in/ →MCA SERVICES → DSC SERVICES

Vendors are requested to go through seller manual available on https://eprocurebhel.co.in.

~~Procedure for Submission of Tenders (To be used in case of Paper bid only):~~ ~~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)' 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) (To be used in case of Paper bid only):**

Sl. no.	Description	Remarks
	Part I A	
	ENVELOPE – I superscribed as: PART-I (TECHNO-COMMERCIAL BID) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION: **CONTAINING THE FOLLOWING:**	
i.	Covering letter/Offer forwarding letter of Tenderer.	
ii.	Duly filled in `No Deviation Certificate' as per prescribed format to be placed after document under sl no (i) above. **Note:** 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. b. BHEL reserves the right to accept/reject the deviations without assigning any reasons, and BHEL decision is final and binding. i). In case of acceptance of the deviations, appropriate loading shall be done by BHEL ii). In case of unacceptable deviations, BHEL reserves the right to reject the tender	
iii.	Supporting documents/ annexure/ schedules/ drawing etc. as required in line with Pre-Qualification criteria. 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.	
iv.	All Amendments/Correspondences/Corrigenda/Clarifications/Changes/ Errata etc. pertinent to this NIT.	
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 : Technical 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	
	ENVELOPE – II superscribed as: PART I (EMD) TENDER NO :	

	~~NAME OF WORK :~~ ~~PROJECT:~~ ~~DUE DATE OF SUBMISSION:~~ ~~CONTAINING THE FOLLOWING:~~	
	~~Earnest Money Deposit (EMD) in the form as indicated in this Tender~~	

	~~PART II~~	
	~~PRICE BID consisting of the following shall be enclosed~~	
	~~ENVELOPE-III~~ ~~superscribed as:~~ ~~PART II (PRICE BID)~~ ~~TENDER NO :~~ ~~NAME OF WORK :~~ ~~PROJECT:~~ ~~DUE DATE OF SUBMISSION:~~ ~~CONTAINING THE FOLLOWING~~	
~~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~~	
	~~ENVELOPE IV (MAIN ENVELOPE / OUTER ENVELOPE)~~ ~~superscribed as:~~ ~~TECHNO-COMMERCIAL BID, PRICE BID & EMD~~ ~~TENDER NO:~~ ~~NAME OF WORK:~~ ~~PROJECT:~~ ~~DUE DATE OF SUBMISSION:~~ ~~CONTAINING THE FOLLOWING:~~	
~~i~~	~~o Envelopes I~~ ~~o Envelopes II~~ ~~o Envelopes III~~	

- SPECIAL NOTE: All documents/ annexures to be submitted should be uploaded in respective places in the E-Tender portal as per the list mentioned given in this NIT. BHEL shall not be responsible for any in-complete 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:

Bidder's capacity for executing the job under tender shall be assessed based on its 'LOAD and PERFORMANCE' and 'AVERAGE ANNUAL TURNOVER', 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 cut off month for reckoning 'Load' shall be the 3rd Month preceding the month corresponding to the 'latest date of bid submission', in the following manner -

(Note: For example, if latest bid submission is in Jan 2017, then the 'load' shall be calculated up to and inclusive of Oct 2016)

Total number of Packages in hand = Load (P)

Where 'P' is the sum of all unit wise identified packages (refer table-1) under execution with BHEL Regions as on the cut off month defined above, including packages yet to be commenced, excepting packages which are on Long Hold.

II. PERFORMANCE: Here 'Monthly Performance' of the bidder for all the packages (under execution/ executed during the 'Period of Assessment' in all 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 and including the cut off month. The cut off month for reckoning 'Period of Assessment' shall be the 3rd Month preceding the month corresponding to 'latest date of bid submission', in the following manner:

(Note: For example, if 'latest date of bid submission' is in Jan 2017, then the 'performance' shall be assessed for a 6 months' period up to and inclusive of Oct 2016 (i.e. from May 2016 to Oct 2016), 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:

a) P_1, P_2, P_3, P_4, P_5 , …. P_N etc. be the packages (under execution/ executed during the 'Period of Assessment' in all Regions of BHEL) SIMILAR to the packages covered under the tendered scope, excepting packages not commenced. Total number of similar packages for all Regions = $\mathbf{P_T}$ (i.e. $P_T = P_1 + P_2 + P_3 + P_4 + \ldots P_N$)

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 '$\mathbf{T_T}$' for total similar Packages '$\mathbf{P_T}$' for all Regions (i.e. $\mathbf{T_T} = T_1 + T_2 + T_3 + T_4 + \ldots T_N$)

c) Sum 'S_1 'of 'Monthly Performance Evaluation' Scores (S_{1-1}, S_{1-2}, S_{1-3}, S_{1-4}, S_{1-5}.... S_{1-T1}) for similar package P_1, for the 'period of assessment' 'T_1' (i.e. $S_1 = S_{1-1}+ S_{1-2}+ S_{1-3}+ S_{1-4}+ S_{1-5}+...S_{1-T1}$). 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 (i.e. 'S_T'= $S_1+ S_2+ S_3+ S_4+ S_5+.... S_N$.)

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

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

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

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
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(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 i.e. 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 Packages (as in row 1)	T_1	T_2	T_3	T_4	T_5	...	T_N	Sum (Σ) of columns (iii) to (ix) = T_T

Sl. No.	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
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 at least 6 evaluation scores for '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:

a) 'Period of Assessment' i.e. 6 months preceding and including the cut-off month

b) 12 months preceding and including the cut-off month

c) 24 months preceding and including 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	0.5
3	> 65 and ≤ 70	0.45
4	> 70 and ≤ 75	0.4
5	> 75 and ≤ 80	0.375
6	> 80 and < 90	0.35
7	≥90	0.33

iv). Performance Systems: The performance rating as mentioned in II (i) and (ii) above, shall be calculated as per Online Systems i.e. Contractor Performance Evaluation System (CPES) and Safety Performance Evaluation System (HSEPES). The scores assigned in HSEPES shall be scaled down to 10 and assigned in CPES against the category "HSE" (mentioned in Form F-15).

III. i) 'Assessment of Capacity based on 'LOAD and PERFORMANCE':

a) '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:

i). 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

ii). For R_{BHEL} = 60, P_{Max} = '1'

The Bidder shall be considered 'Qualified' on 'Performance basis' as per 'Assessment of Capacity of Bidder' for the subject Tender if $P \leq P_{Max}$
(Where P is calculated as per clause 'I' above)

b) In addition to above, in case contractor fails to score 5 or more than 5 (five) marks in the scaled down scores of HSEPES for "3 or more than 3 months in a period of 6 months preceding and including the cut-off month in any single package", the contractor shall be considered disqualified for ongoing tender(s) of BHEL. Qualification of bidder for further tendering process shall be subject to qualifying this condition in addition to qualifying requirements mentioned in PQR. Bidders who did not qualify this condition shall not be considered under the provisions of clause 9 IV (iv) of NIT.

ii) Assessment of Capacity based on 'AVERAGE ANNUAL TURNOVER':

If the 'value of contracts in hand' across all PS Regions by a contractor is less than the product of "annual average turnover of the Contractor and multiplying factor", then such bidder shall be considered qualified on 'Annual Average Turnover basis'. The 'value of contracts in hand' will be computed by summing up "50% of the annualized awarded value of each contract" unless performance evaluation is not closed in the online CPES.

Based on the performance rating of the Contractor, the above mentioned multiplying factor shall be as below:

Sl. no.	Overall Performance Rating (R_{BHEL})	(Multiplying factor to Average Annual Turnover)
1	≥ 60 and ≤ 70	1
2	> 70 and ≤ 80	2
3	> 80	3

'Assessment of Capacity of Bidder':

The bidder will be considered qualified for the tender if it qualifies on 'Load and Performance basis' as well as on 'Average Annual Turnover basis'.

However, 'New Vendor'/ 'Consortium Partner' shall be considered qualified based on only 'Load and Performance' (they will be regarded pre-qualified on 'Average Annual Turnover' criteria).

IV. Explanatory note:

i). Similar package means Boiler or ESP or Piping or Turbine or Civil or Structure or Electrical or C&I 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, C&I, 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 TabIe-1 below), the 'PERFORMANCE' part against sl.no. II above, needs to be evaluated considering all the identified packages (i.e. Boiler, ESP and Power Cycle Piping) and finally the Bidder's capacity to execute the tendered scope is assessed in line with III above.

ii). Identified Packages (Unit wise)

Table-1

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

		x). FGD xi). ACC xii). Others (Mechanical)

iii). Bidders who have not been evaluated for at least six package months in the last 24 months preceding and including the Cut-off month in the online BHEL system for contractor performance evaluation in BHEL PS Regions, 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 completion of all the contracts against which vendor has been tagged as First Timer or availability of 6 evaluation scores within last 24 months preceding and including the Cut-off month in the online BHEL system for contractor performance evaluation in BHEL PS Regions.

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 'Assessment of Capacity of Bidders'.

iv). Consequent upon applying the criteria of 'Assessment of Capacity of Bidders' detailed above on all the bidders qualified against Technical and Financial Qualification criteria, if the number of qualified bidders reduces to less than four, then for further processing of the Tender, BHEL at its discretion reserves the right to also consider the bidders who are "not qualified" as per criteria of 'Assessment of Capacity of Bidders' and for this, procedure described in following three options shall be followed:

a) All the bidders having Overall Performance Rating ('R_{BHEL}') ≥60 shall be considered qualified against criteria of 'Assessment of Capacity of Bidders'.
b) If even after using option "a", the number of qualified bidders remains less than four, then in addition to bidders considered as per option "a", "First timer" bidders having average of available performance scores ≥60 upto and including the Cut Off month shall also be considered qualified against criteria of 'Assessment of Capacity of Bidders'.
c)If even after using option "a" and "b", the number of qualified bidders remains less than four, then in addition to bidders considered as per option "a" and "b", "First timer" bidders for

whom no performance score is available in the system upto and including the Cut Off month, shall also be considered qualified against criteria of 'Assessment of Capacity of Bidders'.

Note:- In case, the number of bidders qualified against Technical and Financial Qualification criteria itself is less than four, then all bidders (a)- having Overall Performance Rating ('R_{BHEL}') ≥60, (b)- First timer" bidders having average of available performance scores ≥60 upto and including the Cut Off month, (c)- "First timer" bidders for whom no performance score is available in the system upto and including the Cut Off month, shall be considered qualified against criteria of 'Assessment of Capacity of Bidders' for further processing of tender.

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

a. Up to execution of 90% of anticipated Contract Value in case of Civil, MM, Structural and Turbo Blower Packages

b. Up to Steam Blowing in case of Boiler/ESP/Piping Packages

c. Up to Synchronization in all Balance Packages

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

vi). Contractor shall provide the latest contact details i.e. mail-ID and Correspondence Address to SCT Department, so that same can be entered in the Contractor Performance Evaluation System, and in case of any change/discrepancy same shall be informed immediately. Login Details for viewing scores in Contractor Performance Evaluation System shall be provided to the Contractor by SCT Department.

vii). Performance Evaluation for Activity Month shall be completed in Evaluation Month (i.e. month next to Activity Month) or in rare cases in Post Evaluation Month (i.e. month next to Evaluation Month) after approval from Competent Authority. In case scores are not acceptable, Contractor can submit Review Request to GM Site/ GM Project latest by 27th of Evaluation Month or 5 days after approval of score, whichever is later. However, acceptance/rejection of 'Review Request' solely depends on the discretion of GM Site/GM Project. After acceptance of Review Request, evaluation score shall be reviewed at site and the score after completion of review process shall be acceptable and binding on the contractor.

viii). Project on Hold due to reasons not attributable to bidder -

a. Short hold: Evaluation shall not be applicable for this period, however, Loading will be considered.

b. Long hold: Short hold for continuous six months and beyond or hold on account of Force Majeure shall be considered as Long Hold. Evaluation as well as Loading shall not be considered for this period.

ix). Performance evaluation as specified above in this clause 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 and/or through e-procurement portal https://eprocurebhel.co.in, 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.

14.0 Unless specifically mentioned otherwise, bidder's quoted price shall 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.

"Integrity Pact (IP)"

(a) IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner. Following Independent External Monitors (IEMs) on the present panel have been appointed by BHEL with the approval of CVC to oversee implementation of IP in BHEL.

Sl. No.	IEM	Email
1.	*Shri Otem Dai, IAS (Retd.)*	iem1@bhel.in
2.	*Shri Bishwamitra Pandey, IRAS (Retd.)*	Iem2@bhel.in
3.	*Shri Mukesh Mittal, IRS (Retd.)*	Iem3@bhel.in

(b) The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with techno-commercial bid (Part-I, in case of two/ three part bid). Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.

(c) Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to any of the above IEM(s). All correspondence with the IEMs shall be done through email only.

Note:

No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc. on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department's officials whose contact details are provided below:

Details of contact person(s):

Name:	R M Malhotra/ GM (Purchase)	Viveka nand Jha/Manager (Purchase)
Dept:	Purchase Department	
Address:	Floor No. 5 & 6, Shreemohini Complex, 345 Kingsway, Nagpur-440001	
Email:	rmalhotra@bhel.in	Vivekjha@bhel.in
Phone:		9429198214

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 authorized 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 Reverse Auction: "BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) (https://www.bhel.com/guidelines-reverse-auction-2021) for this tender. RA shall be conducted among the techno-commercially qualified bidders.

Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered for RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking."

Note:-

1. No benefits to MSE bidders w.r.t Reverse Auction Guidelines as available on www.bhel.com against works contract.
2. In case of enquiry through e-procurement the sealed electronic price bid (e-bid) is to be treated as sealed envelope price bid.

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 for the said contract with a validity period of six months initially. In case bidder becomes L1, Consortium Agreement valid till contractual completion period shall be submitted to BHEL before signing the contract. Consortium Agreement shall be kept valid till scope of work awarded to consortium partner(s) as per contract is completed.~~

~~23.2 'Standalone' 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) including Prime Bidder shall be NOT more than 3 (three).~~

~~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 and BHEL shall take necessary action as per extant guidelines. 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 Prime Bidder withdraws or insolvency / liquidation / winding up proceedings have been initiated / admitted against the Prime Bidder, BHEL reserves the right to cancel, terminate or short close the contract or take any other action to safeguard BHEL's interest in the Project / Contract. This action will be without prejudice to any other action that BHEL can take under Law and the Contract to safeguard interests of BHEL.~~

~~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 one work with a consortium partner under direct order of BHEL, the Prime Bidder shall be eligible for becoming a 'standalone' bidder for works similar to that for which consortium partner was engaged, for subsequent tenders.~~

~~23.14 The consortium 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. In case there are two consortium partners, then each partner shall submit SD equivalent to 0.5% of the total contract value in addition to the SD to be submitted by the Prime Bidder for the total contract value. However, Prime Bidder has also option for submission of SD on behalf of consortium partner (s).~~

~~SD submitted by Consortium Partner(s) may be released in case corresponding scope of work of the respective Consortium partner(s) has been completed upto the extent of 80% based on certification by Construction Manager and concurrence by the prime bidder.~~

~~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.~~

24.0 The bidder shall submit/upload 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.

25.0 The bidder may have to produce original document for verification if so decided by BHEL.

26.0 The consultant / firm (and any of its affiliates) shall not be eligible to participate in tender(s) for the related works or services for the same project, if they were engaged for the consultancy services.

27.0 Guidelines/rules in respect of Suspension of Business dealings, Vendor evaluation format, Quality, Safety & HSE guidelines, Experience Certificate, etc. may undergo change from time to time and the latest one shall be followed. The abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' is available on www.bhel.com on "**supplier registration page**".

28.0 The offers of the bidders who are on the banned/ hold list and also the offer of the bidders, who engage the services of the banned/ hold firms, shall be rejected. The list of **banned/ hold firms** is available on BHEL web site www.bhel.com.

28.1 Integrity commitment, performance of the contract and punitive action thereof:

28.1.1 Commitment by BHEL:

BHEL commits to take all measures necessary to prevent corruption in connection with the tender Process and execution of the contract. BHEL will during the tender process treat all Bidder(s) in a transparent and fair manner, and with equity.

28.1.2 Commitment by Bidder/ Supplier/ Contractor:

(i) The bidder/ supplier/ contractor commit to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally entitled to nor will act or omit in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India.

(ii) The bidder/ supplier/ contractor 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 and shall adhere to relevant guidelines issued from time to time by Govt. of India/ BHEL.

(iii) The bidder/ supplier/ contractor will perform/ execute the contract as per the contract terms & conditions and will not default without any reasonable cause, which causes loss of business/ money/ reputation, to BHEL.

If any bidder/ supplier/ contractor during pre-tendering/ tendering/ post tendering/ award/ execution/ post-execution stage indulges in mal-practices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the prices or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, then, action may be taken against such bidder/ supplier/ contractor as per extent guidelines of the company available on www.bhel.com and / or under applicable legal provisions.

~~29.0 Micro and Small Enterprises (MSE)~~

~~Any Bidder falling under MSE category, shall furnish the following details & submit documentary evidence/ Govt. Certificate etc. in support of the same along with their techno-commercial offer.~~

~~Type under MSE~~	~~SC/ST owned~~	~~Women owned~~	~~Others (excluding SC/ ST & Women Owned)~~
~~Micro~~			
~~Small~~			

~~Note: -~~ ~~If the bidder does not furnish the above, offer shall be processed construing that the bidder is not falling under MSE category.~~

~~*a)* MSE suppliers can avail the intended benefits in respect of the procurements related to the Goods and Services only (Definition of Goods and Services as enumerated by Govt. of India vide Office Memorandum F. No. 21(8)/2011-MA dtd. 09/11/2016 office of AS & DC, MSME) only if they submit along with the offer, attested copies of either Udyam Registration Certificate or EM-II certificate having deemed validity (five years from the date of issue of acknowledgement in EM-II) or valid NSIC certificate or Udyog Aadhar Memorandum (UAM) & Acknowledgement or EM-II Certificate along with attested copy of a CA certificate (format enclosed as Annexure – 3) where deemed validity of EM-II certificate of five years has expired applicable for the relevant financial year (latest audited). Date to be reckoned for determining the deemed validity will be the last date of Technical Bid submission. Non-submission of such documents will lead to consideration of their bids at par with other bidders. No benefits shall be applicable for this enquiry if the above required documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal. Documents~~

~~should be notarized or attested by a Gazetted officer. Documents submitted by the bidder may be verified by BHEL for rendering the applicable benefits.~~

30.0 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.

31.0 PREFERENCE TO MAKE IN INDIA:

For this procurement, the local content to categorize a supplier as a Class I local supplier/ Class II local Supplier/Non-Local Supplier and purchase preferences to Class I local supplier, is as defined I Public Procurement (Preference to Make in India), Order 2017 dated 04.06.2020 issued by DPIIT. In case of subsequent orders issued by the nodal ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before opening of Part-II bids against this NIT.

31.1 Compliance to Restrictions under Rule 144 (xi) of GFR 2017

I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority. The Competent Authority for the purpose of this Clause shall be the Registration Committee constituted by the Department for Promotion of Industry and Internal Trade (DPIIT).

II. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.

III. "Bidder from a country which shares a land border with India" for the purpose of this Clause means: -
   a. An entity incorporated established or registered in such a country; or
   b. A subsidiary of an entity incorporated established or registered in such a country; or
   c. An entity substantially controlled through entities incorporated, established or registered in such a country; or
   d. An entity whose beneficial owner is situated in such a country; or
   e. An Indian (or other) agent of such an entity; or
   f. A natural person who is a citizen of such a country; or
   g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above.

IV. The beneficial owner for the purpose of (III) above will be as under:
   1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.
      Explanation
      a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent of shares or capital or profits of the company.
      b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements.

2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership.
3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person has ownership of or entitlement to more than fifteen percent of the property or capital or profits of the such association or body of individuals.
4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.

V. An Agent is a person employed to do any act for another, or to represent another in dealings with third person.

VI. The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.

Note:

(i) The bidder shall provide undertaking for their compliance to this Clause, in the Format provided in Annexure-11.

(ii) Registration of the bidder with Competent Authority should be valid at the time of submission as well as acceptance of the bids.

32.0 Bid should be free from correction, overwriting, using corrective fluid, etc. Any interlineation, cutting, erasure or overwriting shall be valid only if they are attested under full signature(s) of person(s) signing the bid else bid shall be liable for rejection.
All overwriting/cutting, etc., will be numbered by bid opening officials and announced during bid opening.

33.0 In the course of evaluation, if more than one bidder happens to occupy L-1 status, effective L-1 will be decided by soliciting discounts from the respective L-1 bidders.

In case more than one bidder happens to occupy the L-1 status even after soliciting discounts, the L-1 bidder shall be decided by a toss/ draw of lots, in the presence of the respective L-1 bidder(s) or their representative(s).

Ranking will be done accordingly. BHEL's decision in such situations shall be final and binding.

34.0 The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). 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.

In case, the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/ guidelines.

35.0 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

It may please be noted that guidelines/ circulars/ amendments/ govt. directives issued from time to time shall also be applicable.

For BHARAT HEAVY ELECTRICALS LTD

(General Manager - Purchase)

Enclosure:

1.0 Annexure-1: Pre Qualifying Requirements.
2.0 Annexure-2: Check List.
~~3.0 Annexure-3: Certificate by Chartered Accountant~~
4.0 Annexure-4: Reverse Auction Process Compliance Form
5.0 Annexure-5: Authorization of representative who will participate in the online Reverse Auction Process
6.0 Annexure-6: RA Price Confirmation and Breakup
7.0 Annexure-7: Integrity Pact
8.0 Annexure-8: Undertaking as per PQR C4 of Annexure-1 i.e. PQR
9.0 Annexure-9: Declaration reg. Related Firms & their areas of Activities
10.0 Annexure-10: Declaration regarding minimum local content
11.0 Annexure-11: Declaration regarding compliance to restrictions under rule 144 (xi) of GFR 2017
12.0 Annexure 12: Important information.

ANNEXURE-1

PRE QUALIFYING CRITERIA

E-Tender Spec No: BHE/PW/PUR/ NTPRT-STG U3 /2862	
JOB	Erection & commissioning of Steam Turbine Generator STG#3; broadly including collection of materials from BHEL/Client's stores/Storage yard; Transportation to site; Erection, testing & commissioning, trial operation and handing over of Steam turbine, Generator set, Integral piping, HP/LP heater, Pumps and Motors, Tanks & vessels and associated equipments, DG set, auxiliaries connected with the systems and other BOIs, Insulation, including supply and application of final painting of **STG#3.** AT **3x800 MW PVUNL PROJECT PATRATU, DISTRICT-RAMGARH STATE-JHARKHAND**

S No	**PRE QUALIFICATION CRITERIA**	**Bidders claim in respect of fulfilling the PQR Criteria**	
		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	**Technical Criteria:** **B.1: Not Applicable** **B.2:** Bidder shall essentially meet all the Qualifying Requirements as under, in last seven years from latest date of bid submission: Bidder should have Executed Erection & Commissioning of one STG or Boiler* (*Necessarily consisting of rotating machines) of ≥190 MW.	Applicable	
C-1	**FINANCIAL TURNOVER** Bidders must have achieved an average annual financial turnover (audited) of **₹ 234 Lakhs or more over last three Financial Years (FY) i.e. '2019-20, 2020-21 & 2021-22'.**	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 profit in any one of the three Financial Years as applicable in the last three Financial Years as furnished for 'C-1 above.	Applicable	
C-4	Bidder must not be under Insolvency Resolution Process or Liquidation or Bankruptcy Code Proceedings (IBC) as on date, by NCLT or any adjudicating authority/authorities, which will render him ineligible for participation in this tender, and shall submit undertaking (**Annexure-8**) to this effect	Applicable	
D	**Assessment of Capacity of Bidder to execute the work as per sl no 9 of NIT (if applicable)** Applicable, The "Assessment of Capacity of Bidders" for this Tender shall be carried out by considering the identified packages i.e. **"STG"**		
~~**E**~~	**Approval of Customer (if applicable)**	**Applicable**	
F	Price Bid Opening **Note:** Price Bids of only those bidders shall be opened who stand qualified after compliance of criteria A to E		BY BHEL
~~**G**~~	Consortium tie-ups	**Not Applicable**	

Explanatory Notes for the PQR (unless otherwise specified in the PQR):

Explanatory Notes for PQR B.1 (Technical)

- The evaluation currency for this tender shall be INR.
- For the criteria (B.1), actual executed value shall be considered**.**

- Value of work is to be updated with indices for "All India Avg. Consumer Price index for industrial workers" and "Monthly Whole Sale Price Index for All Commodities" with base month as per last month of work execution and indexed up to three (3) months prior to the month of latest due date of bid submission as per following formula-

$$P = R + 0.425 \times R \times \frac{(X_N - X_0)}{X_0} + 0.425 \times R \times \frac{(Y_N - Y_0)}{Y_0}$$

Where

P = Updated value of work

R = Value of executed work

X_N = All India Avg. Consumer Price index for industrial workers for three months prior to the month of latest due date of bid submission (e.g. If latest bid submission date is 02-Mar-17, then bid submission month shall be reckoned as March'17 and index for Dec'2016 shall be considered).

X_0 = All India Avg. Consumer Price index for industrial workers for last month of work execution

Y_N = Monthly Whole Sale Price Index for All Commodities for three months prior to the month of latest due date of bid submission (e.g. If latest bid submission date is 02-Mar-17, then bid submission month shall be reckoned as March'17 and index for Dec'2016 shall be considered).

Y_0 = Monthly Whole Sale Price Index for All Commodities for last month of work execution

Explanatory Notes for Technical Criteria (B2):

1. VOID
2. Unless otherwise specified, for the purpose of "B2 Technical Criteria", the word 'EXECUTED' means achievement of milestones as defined below -
    a. "ACHIEVEMENT OF PHYSICAL QUANTITIES" as per PQRs.
    b. "READINESS FOR COAL FILLING" of at least one Bunker, in respect of Mill Bunker Structure.
    c. "CHARGING" in respect of Power Transformers/ Bus Ducts/ "HT/LT Switchgears" / "HT/LT Cabling".
    d. For C&I works: "SYNCHRONISATION" in case of power project (Excluding Nuclear Projects) / "WORK EXECUTION of the value as defined in PQR" in case of industry & Nuclear Projects.
    e. "BOILER LIGHT UP" in respect of Boiler / CFBC / ESP.
    f. "CHARGING OF ATLEAST ONE PASS" in respect of ESP(R&M)
    g. "GAS IN" in respect of HRSG.
    h. "STEAM BLOWING" in respect of Power Cycle Piping.
    i. "HYDRAULIC TEST"/ ANY OTHER EQUIVALENT TEST LIKE "100% RT/UT OF WELDED JOINTS" of the system in respect of Pressure parts/ LP Piping/CW Piping.
    j. "FULL LOAD OPERATION OF THE UNIT" in respect of Insulation work.
    k. "SYNCHRONISATION" in respect of STG / GTG.
    l. "SPINNING" in respect of HTG.
    m. "GAS IN" in respect of FGD
3. Boiler means HRSG or WHRB or any other types of Steam Generator.
4. Power Cycle piping means Main Steam, Hot Reheat, Cold Reheat, HP Bypass.
5. For the purpose of evaluation of the PQR, one MW shall be considered equivalent to 3.5 TPH 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 of the same in terms of MW shall be considered for evaluation.

Explanatory Notes for PQR -C (Financial):

C-1:

i. Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as indicated against C-1 above.
ii. Evaluation of Turnover criteria shall be calculated from the Audited Balance Sheet and Profit & Loss Account for the three Financial Years (FY).
iii. 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.
iv. 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: Net Worth (Only in case of companies) of the bidder should be positive.

Note: Net worth shall be calculated based on the latest Audited Accounts as furnished for 'C-1' above.

Net worth = Paid up share capital + Reserves

C-3: Bidder must have earned profit in any one of the three financial years as applicable in the last three financial years as furnished for 'C-1' above.

Note: PROFIT shall be PBT earned during any one year of last three financial years as in 'C-1' above.

C-4: Bidder must not be under Bankruptcy Code Proceedings (IBC) by NCLT or under Liquidation / BIFR, which will render him ineligible for participation in this tender, and shall submit undertaking to this effect.

Common Explanatory Notes:

1. For evaluation of PQR, in case Bidder alone does not meet the pre-qualifying technical criteria B1 above, bidder may utilize the experience of its Parent/ Subsidiary Company along with its own experience, subject to following:
   a. The parent company shall have a controlling stake of ≥50% in the subsidiary company (as per Format-1).
   b. The Parent Company/ Subsidiary Company of which experience is being utilized for bidding shall submit Security Deposit(SD) equivalent to 1% of the total contract value
   c. The parent/ subsidiary company and bidder shall provide an undertaking that they are jointly or severally responsible for successful performance of the contract (as per Format-2).
   d. In case Bidder is submitting bid as a Consortium Partner, option of utilizing experience of parent/subsidiary Company can be availed by Prime Bidder only.
   e. Parent Company/ Subsidiary Company of which experience is being used for bidding, cannot participate as a 'Standalone Bidder' or as a 'Consortium bidder'.
2. Completion date for achievement of the technical criteria specified in the 'B' above should be in the last 7 years ending on the 'latest date of Bid Submission' of Tender irrespective of date of the start of work. Completion date shall be reckoned from the " Financial Year quarter of bid submission". (for e.g. -Work completed on 01.01.2014 shall be considered even if latest date of bid submission is 20.03.2021).
3. "Executed" means the bidder should have achieved the technical criteria specified in the Common QR even if the Contract has not been completed or closed.
4. In case the Experience/PO/WO certificate enclosed by bidders do not have separate break up of prices for the E&C portion for Electrical and C&I works (i.e. the certificates enclosed are for composite order for supply and erection of Electrical and C&I and other works if any), then value of Erection & Commissioning for the Electrical and C&I portion shall be considered as 15% of the price for supply & erection of Electrical and C&I.

5. ~~Following shall be complied with in case of consortium:~~
   - ~~a. The Prime Bidder and Consortium Partner(s) are required to enter in to a consortium agreement and certify to BHEL regarding existence and validity of their consortium agreement in line with validity period mentioned in NIT.~~
   - ~~b. Prime Bidder and Consortium partners shall be approved by Customer for being considered for the tender (applicable if customer approval is required).~~
   - ~~c. Number of partners including prime Bidder shall be NOT more than 3 (three).~~
   - ~~d. Prime Bidder alone shall necessarily comply with "B1Technical Criteria" except for mechanical package where B1 criteria is not applicable.~~
   - ~~e. Prime Bidder and Consortium Partner shall together comply with the 'Pre-Qualification Requirements' specified for the respective category of technical requirement as per "B2 technical criteria".~~
   - ~~f. Prime Bidder shall comply with all other Pre Qualifying criteria for the Tender unless otherwise specified.~~
   - ~~g. All other conditions shall be read in conjunction with clause no 23.0 of NIT.~~
   - ~~h. Prime Bidder shall be the Bidder who has a major share of work.~~
   - ~~i. Prime Bidder shall be responsible for the overall execution of the Contract.~~
   - ~~j. Performance shall be evaluated for Prime Bidder and the Consortium partner for their respective scope of work.~~
   - ~~k. In case the Consortium partner backs out, another consortium partner meeting the QRs, has to be engaged by Prime Bidder and if not, the respective work will be withdrawn and executed on risk and cost basis of the prime bidder.~~
   - ~~l. In case Prime Bidder withdraws or insolvency / liquidation / winding up proceedings have been initiated / admitted against the Prime Bidder, BHEL reserves the right to cancel, terminate or short close the contract or take any other action to safeguard BHEL's interest in the Project / Contract. This action will be without prejudice to any other action that BHEL can take under Law and the Contract to safeguard interests of BHEL~~
   - ~~m. After successful execution of one work with a consortium partner under direct orders of BHEL, the Prime Bidder shall be eligible for becoming a 'standalone' bidder for works similar to that for which consortium partner was engaged, for subsequent tenders.~~
   - n. ~~The Consortium 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.~~

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

Credentials submitted by the bidder against "PRE QUALIFYING CRITERIAS" shall be verified for its authenticity. In case, any credential (s) is/are found unauthentic, offer of the bidder is liable to the rejection. BHEL reserves the right to initiate any further action as per extant guidelines for Suspension of Business Dealings.

Format-1

Not Applicable

Format-2

Not Applicable

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.a	Details of Contact person for this Tender	Name : Mr/Ms Designation: Telephone No: Mobile No: Email ID: Fax No:	
3.b	Details of alternate Contact person for this Tender	Name : Mr/Ms Designation: Telephone No: Mobile No: Email ID: Fax No:	
4	EMD DETAILS	DD No: Date : Bank : Amount: Please tick (√) whichever applicable:- ~~ONE TIME EMD /~~ ONLY FOR THIS TENDER	
5	Validity of Offer	TO BE VALID FOR SIX MONTHS FROM DUE DATE	
		APPLICABILITY (BY BHEL)	ENCLOSED BY BIDDER
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	Applicable/~~Not Applicable~~	YES/NO
8	Copy of GST & PAN Card	Applicable/~~Not Applicable~~	YES/NO
9	Whether all pages of the Tender documents including annexures, appendices etc. are read understood and signed	Applicable/~~Not Applicable~~	YES/NO
10	Integrity Pact	Applicable/~~Not Applicable~~	YES/NO
11	Offer Forwarding Letter / Tender Submission Letter	Applicable/~~Not Applicable~~	YES/NO
12	Declaration by Authorized Signatory	Applicable/~~Not Applicable~~	YES/NO

13	No Deviation Certificate	Applicable/~~Not Applicable~~	YES/NO
14	Declaration confirming knowledge about Site Conditions	Applicable/~~Not Applicable~~	YES/NO
15	Declaration for relation in BHEL	Applicable/~~Not Applicable~~	YES/NO
16	Non-Disclosure Certificate	Applicable/~~Not Applicable~~	YES/NO
17	Bank Account Details for E-Payment	Applicable/~~Not Applicable~~	YES/NO
18	Capacity Evaluation of Bidder for current Tender	~~Applicable~~/Not Applicable	YES/NO
~~19~~	~~Tie Ups/Consortium Agreement are submitted as per format~~	~~Applicable~~/Not Applicable	YES/ NO
20	Power of Attorney for Submission of Tender/Signing Contract Agreement ~~Power of Attorney of Consortium Partner.~~	Applicable/~~Not Applicable~~	YES/NO
21	Analysis of Unit rates	Applicable/~~Not Applicable~~	YES/NO
22	Annexure-5: Authorization of representative who will participate in the online Reverse Auction Process	Applicable/~~Not Applicable~~	YES/NO
23	Annexure-6: RA Price Confirmation and Breakup	Applicable/~~Not Applicable~~	YES/NO
24	Annexure-8: Undertaking as per PQR C4 of Annexure-1 i.e. PQR	Applicable/~~Not Applicable~~	YES/NO
25	Annexure-9: Declaration reg. Related Firms & their areas of Activities (x) Other Tender documents as per this NIT.	Applicable/~~Not Applicable~~	YES/NO
26	Annexure-10 Declaration regarding minimum local content	Applicable/~~Not Applicable~~	YES/NO
27	Annexure-11: Declaration regarding compliance to restrictions under rule 144 (xi) of GFR 2017	Applicable/~~Not Applicable~~	YES/NO

NOTE: STRIKE OFF 'YES' OR 'NO', AS APPLICABLE. TENDER NOT ACCOMPANIED BY THE PRESCRIBED **ABOVE APPLICABLE DOCUMENTS** ARE LIABLE TO BE SUMMARILY REJECTED.

DATE :

AUTHORISED SIGNATORY

(With Name, Designation and Company seal)

ANNEXURE-3

Certificate by Chartered Accountant on letter head

(applicable upto 31st March'2021 in line with MSME notification no. S.O. 2119 (E), dated 26th June'2020)

This is to Certify that M/S ....., (hereinafter referred to as 'company') having its registered office at ..... is registered under MSMED Act 2006, (Entrepreneur Memorandum No (Part—II)/ Udyam Registration Certificate No. ..... dtd: ....., Category: .....(Micro/Small/Medium)). (Copy enclosed).

Further verified from the Books of Accounts that the investment of the company as per the latest audited financial year..... ..... as per MSMED Act 2006 is as follows:

1. **For Manufacturing Enterprises:** Investment in plant and machinery (i.e. original cost excluding land and building and the items specified by the Ministry of Small Scale Industries vide its notification No. S.O.1722(E) dated October 5, 2006: Rs..... Lacs

2. **For Service Enterprises:** Investment in equipment (original cost excluding land and building and furniture, fittings and other items not directly related to the service rendered or as may be notified under the **MSMED** Act, 2006:

   Rs..... Lacs

3. **For Enterprises** (having EM-II Certificate/ valid NSIC Certificate or Udyog Aadhar Memorandum): Investment in plant and machinery or equipment is Rs..... Lacs and turnover is Rs. ..... Lacs (as notified in MSME notification no. S.O. 2119 (E) dated 26.06.2020)

4. **For Enterprises** (having EM-II Certificate/ valid NSIC Certificate or Udyog Aadhar Memorandum): Investment in plant and machinery or equipment is Rs..... Lacs and turnover is Rs. ..... Lacs (as notified in MSME notification no. S.O. 2119 (E) dated 26.06.2020)

(Strike off whichever is not applicable)

The above investment of Rs .... Lacs is within permissible limit of Rs ..... Lacs for ..... Micro / Small/ Medium *(Strike off which is not applicable)* Category under MSMED Act 2006.

Or

The enterprise has been graduated upward from its original category (micro/small/medium) (*strike off which is not applicable*), the enterprise shall maintain its prevailing status till expiry of one year from the close of year of registration, as notified vide S.O. No. 2119 (E) dated 26.06.2020 published in the gazette notification dated 26.06.2020 by Ministry of MSME.

Or

The enterprise has been reverse-graduated from its original category (micro/small/medium) (*strike off which is not applicable*), the enterprise will continue in its present category till the closure of the financial year and it will be given the benefit of the changed status only with effect from 1st April of the financial year following the year in which such change took place, as notified vide S.O. No. 2119 (E) dated 26.06.2020 published in the gazette notification dated 26.06.2020 by Ministry of MSME.

Date:

(Signature)

Name:
Membership Number:
Seal of the Chartered Accountant

ANNEXURE-4

Reverse Auction Process Compliance Form

(The bidders are required to print this on their company's letterhead and sign, stamp before RA)

To

- M/s. {*Service provider*
- *Postal address}*

Sub: Agreement to the Process related Terms and Conditions

Dear Sir,

This has reference to the Terms & Conditions for the Reverse Auction mentioned in the RFQ document for {Items} against BHEL enquiry/ RFQ no. { **BHE/PW/PUR/ NTPRT-STG U3 /2862**} dt. {…….}
This letter is to confirm that:

1) The undersigned is authorized official/ representative of the company to participate in RA and to sign the related documents.
2) We have studied the Reverse Auction guidelines (as available on www.bhel.com), and the Business rules governing the Reverse Auction as mentioned in your letter and confirm our agreement to them.
3) We also confirm that we have taken the training on the auction tool and have understood the functionality of the same thoroughly.
4) We also confirm that, in case we become L1 bidder, we will FAX/ email the price confirmation & break up of our quoted price as per *Annexure - 6* within two working days (of BHEL) after completion of RA event, besides sending the same by registered post/ courier both to M/s. BHEL and M/s. {*Service provider.}*

We, hereby confirm that we will honor the Bids placed by us during the auction process.

With regards

Signature with company seal

Name:
Company / Organization:
Designation within Company / Organization:
Address of Company / Organization:

Sign this document and FAX/ email it to M/s *{Service provider}* at *{……..}* prior to start of the Event.

ANNEXURE-5

Authorization of representative who will participate in the on line Reverse Auction Process:

1	NAME OF THE BIDDER	
2	NAME & DESIGNATION OF OFFICIAL	
3	POSTAL ADDRESS (COMPLETE)	
4	TELEPHONE NOS. (LAND LINE & MOBILE BOTH)	
5	E-MAIL ADDRESS	
6	NAME OF PLACE/ STATE/ COUNTRY, WHEREFROM S/HE WILL PARTICIPATE IN THE REVERSE AUCTION	

ANNEXURE-6

Reverse Auction price confirmation and breakup
(To be submitted by L1 bidder after completion of Reverse Auction)

To
- M/s. *Service provider*
- *Postal address*

CC: M/s BHEL
BHEL-PSWR, 345, KINGSWAY, NAGPUR-440001

Sub: Final price quoted during Reverse Auction and price breakup

Dear Sir,

We confirm that we have quoted.

Rs.{____in value & in words_____} for item(s) covered under tender enquiry No. { **BHE/PW/PUR/ NTPRT-STG U3 /2862**} dt.{...}

Total price of the items covered under above cited enquiries is inclusive of {*Packing & forwarding, GST, E.D., C.S.T., freight and insurance charges up to {……} District,{……} State and Type Test Charges etc., (exclusive of service tax), other as per NIT*}

as our final landed prices as quoted during the Reverse Auction conducted today {*date*} which will be valid for a period of {___ in nos. & in words ___} days.

The price break-up is as given below.

========
Total - Rs. in value & in words
========

Yours sincerely,

For _____

Name:
Company:
Date:
Seal:

ANNEXURE-7

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 or 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 E-Tender Spec No: **BHE/PW/PUR/ NTPRT-STG U3 /2862** (Job Description: Erection & commissioning of Steam Turbine Generator STG#3; broadly including collection of materials from BHEL/Client's stores/Storage yard; Transportation to site; Erection, testing & commissioning, trial operation and handing over of Steam turbine, Generator set, Integral piping, HP/LP heater, Pumps and Motors, Tanks & vessels and associated equipments, DG set, auxiliaries connected with the systems and other BOIs, Insulation, including supply and application of final painting of STG#3.
AT
3x800 MW PVUNL PROJECT PATRATU, DISTRICT-RAMGARH STATE- JHARKHAND.

(hereinafter referred to as "Contract"). 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 panel of Independent External Monitor(s) (IEMs), 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 self or third person, any material or immaterial benefit which the person is not legally entitled to.

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

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

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

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

2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. The Bidder(s)/ Contractor(s) commits himself to observe the following principles during 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)/ Contractor(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 Indian Penal Code (IPC) and Prevention of Corruption 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 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(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.

2.3 The Bidder(s)/ Contractor(s) shall not approach the Courts while representing the matters to IEMs and shall await their decision in the matter.

Section 3 -Disqualification from tender process and exclusion 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 , terminate the contract, if already awarded, exclude from future business dealings and/ or take action as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

Section 4 -Compensation for Damages

4.1 If the Principal has disqualified the Bidder (s) from the tender process before award / order acceptance 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 is entitled to terminate the Contract according to Section 3, or terminates the Contract in application of Section 3 above , the Bidder(s)/ Contractor (s) transgression through a violation of Section 2 above shall be construed breach of contract and the Principal shall be entitled to demand and recover from the Contractor an amount equal to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee , whichever is higher, as damages, in addition to and without prejudice to its right to demand and recover compensation for any other loss or damages specified elsewhere in the contract.

Section 5 -Previous Transgression

5.1 The Bidder declares that no previous transgressions occurred in the last 3 (three) 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 this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason or action can be taken as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

Section 6 -Equal treatment of all Bidder (s)/ Contractor (s) / Sub-contractor (s)

6.1 The Principal will enter into Integrity Pacts with identical conditions as this Integrity Pact with all Bidders and Contractors.

6.2 In case of Sub-contracting, the Principal Contractor shall take the responsibility of the adoption of Integrity Pact by the Sub-contractor(s) and ensure that all Sub-contractors also sign the Integrity Pact.

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

Section 7 -Criminal Charges against violating Bidders/ Contractors /Subcontractors

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, 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 panel of Independent External Monitor (s) (IEMs) for this Integrity Pact. The task of the IEMs is to review independently and objectively, whether and to what extent the parties comply with the obligations under this Integrity Pact.

8.2 The IEMs are 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 IEMs shall be provided access to all documents/ records pertaining to the Contract, for which a complaint or issue is raised before them as and when warranted. However, the documents/records/information having National Security implications and those documents which have been classified as Secret/Top Secret are not to be disclosed.

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

8.5 The advisory role of IEMs is envisaged as that of a friend, philosopher and guide. The advice of IEMs would not be legally binding and it is restricted to resolving issues raised by a Bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some Bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.

8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process or during execution of Contract, the matter should be examined by the full panel of IEMs jointly, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.

8.7 The IEMs would examine all complaints received by them and give their recommendations/ views to the CMD, BHEL at the earliest. They may also send their report directly to the CVO, in case of suspicion of serious irregularities requiring legal/ administrative action. Only in case of very serious issue having a specific, verifiable Vigilance angle, the matter should be reported directly to the Commission. IEMs will tender their advice on the complaints within 30 days.

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

8.9 IEMs should examine the process integrity; they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the Principal should be looked into by the CVO of the Principal.

8.10 If the IEMs have reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code / Prevention of Corruption 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 IEMs may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8.11 After award of work, the IEMs shall look into any issue relating to execution of Contract, if specifically raised before them. As an illustrative example, if a Contractor who has been awarded the Contract, during the execution of Contract, raises issue of delayed payment etc. before the IEMs, the same shall be examined by the panel of IEMs. Issues like warranty/ guarantee etc. shall be outside the purview of IEMs.

8.12 However, the IEMs may suggest systemic improvements to the management of the Principal, if considered necessary, to bring about transparency, equity and fairness in the system of procurement.

8.13 The word `Monitor' would include both singular and plural.

Section 9 -Pact Duration

9.1 This Integrity Pact shall be operative from the date this Integrity Pact is signed by both the parties till the final completion of contract for successful Bidder, and for all other Bidders 6 months after the Contract has been awarded. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings.

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

Section 10 -Other Provisions

10.1 This Integrity Pact is subject to Indian Laws and exclusive jurisdiction shall be of the competent Courts as indicated in the Tender or Contract, as the case may be.

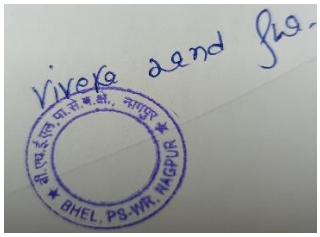
10.2 Changes and supplements as well as termination notices need to be made in writing.

10.3 If the Bidder(s)/ Contractor(s) is a partnership or a consortium or a joint venture, this Integrity Pact shall be signed by all partners of the partnership or joint venture or all consortium members.

10.4 Should one or several provisions of this Integrity Pact turn out to be invalid, the remainder of this Integrity Pact 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 Integrity Pact with the Principal would be competent to participate in the bidding. In other words, entering into this Integrity Pact would be a preliminary qualification.

10.6 In the event of any dispute between the Principal and Bidder(s)/ Contractor(s) relating to the Contract, in case, both the parties are agreeable, they may try to settle dispute through Mediation before the panel of IEMs in a time bound manner. In case, the dispute remains unresolved even after mediation by the panel of IEMs, either party may take further action as the terms & conditions of the Contract. The fees/expenses on dispute resolution through mediation shall be shared by both the parties. Further, the mediation proceedings shall be confidential in nature and the parties shall keep confidential all matters relating to the mediation proceedings including any settlement agreement arrived at between the parties as outcome of mediation. Any views expressed, suggestions, admissions or proposals etc. made by either party in the course of mediation shall not be relied upon or introduced as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the dispute that is the subject of mediation proceedings. Neither of the parties shall present IEMs as witness in any Alternative Dispute Resolution or judicial proceedings in respect of the dispute that was subject of mediation.



For & On behalf of the Principal	For & On behalf of the Bidder/ Contractor
(Office Seal)	(Office Seal)
Place----------	
Date----------	
Witness: _____	Witness: _____
(Name & Address) _____	(Name & Address) _____
_____	_____

ANNEXURE-8

UNDERTAKING

(To be typed and submitted in the Letter Head of the Company/Firm of Bidder)

To,
GM-PURCHASE
BHEL-PSWR, 345, KINGSWAY, NAGPUR-440001

Dear Sir/Madam,

Sub: DECLARATION REGARDING INSOLVENCY/ LIQUIDATION/ BANKRUPTCY PROCEEDINGS

Ref: NIT/Tender Specification No: **BHE/PW/PUR/ NTPRT-STG U3 /2862**

I/We,

_____

declare that, I/We am/are not under insolvency resolution process or liquidation or Bankruptcy Code Proceedings (IBC) as on date, by NCLT or any adjudicating authority/authorities, which will render us ineligible for participation in this tender.

Sign. of the AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

Place:
Date:

ANNEXURE-9

DECLARATION

Date:_____

To,
GM-PURCHASE
BHEL-PSWR, 345, KINGSWAY, NAGPUR-440001

Sub: **Details of related firms and their area of activities**

Dear Sir/ Madam,

Please find below details of firms owned by our family members that are doing business/ registered for same item with BHEL,_____(NA, if not applicable).

1	Material Category/ Work Description	
	Name of Firm	
	Address of Firm	
	Nature of Business	
	Name of Family Member	
	Relationship	
2	Material Category/ Work Description	
	Name of Firm	
	Address of Firm	
	Nature of Business	
	Name of Family Member	
	Relationship	

Note: I certify that the above information is true and I agree for penal action from BHEL in case any of the above information furnished is found to be false.

Regards,
(
_____)

From: M/s _____
Supplier Code: _____
Address: _____
_____

Annexure-10

DECLARATION REGARDING MINIMUM LOCAL CONTENT IN LINE WITH REVISED PUBLIC PROCUREMENT (PREFERENCE TO MAKE IN INDIA), ORDER 2017 DATED 04TH JUNE, 2020 AND SUBSEQUENT ORDER(S)

(To be typed and submitted in the Letter Head of the Entity/Firm providing certificate as applicable)

To,
GM-PURCHASE
BHEL-PSWR, 345, KINGSWAY, NAGPUR-440001

Dear Sir,

Sub: Declaration reg. minimum local content in line with Public Procurement (Preference to Make in India), Order 2017-Revision, dated 04th June, 2020 and subsequent order(s).

Ref : 1) NIT/Tender Spec No: **BHE/PW/PUR/ NTPRT-STG U3 /2862**
2) All other pertinent issues till date

We hereby certify that the items/works/services offered by…… *(specify the name of the organization here)* has a local content of _____ % and this meets the local content requirement for **'Class-I local supplier' / 'Class II local supplier' **** as defined in Public Procurement (Preference to Make in India), Order 2017-Revision dated 04.06.2020 issued by DPIIT and subsequent order(s).

The details of the location(s) at which the local value addition is made are as follows:

1. _____ 2. _____
3. _____ 4. _____

…
…
…

Thanking you,
Yours faithfully,

(Signature, Date & Seal of
Authorized Signatory of the Bidder)

****** - *Strike out whichever is not applicable.*

Note:

1. Bidders to note that above format Duly filled & signed by authorized signatory, shall be submitted along with the techno-commercial offer.
2. In case the bidder's quoted value is in excess of Rs. 10 crores, the authorized signatory for this declaration shall necessarily be the statutory auditor or cost auditor of the company (in the case of companies) or a practising cost accountant or practicing chartered accountant (in respect of suppliers other than companies).
3. In the event of false declaration, actions as per the above order and as per BHEL Guidelines shall be initiated against the bidder.

ANNEXURE-11

DECLARATION REGARDING COMPLIANCE TO RESTRICTIONS UNDER RULE 144 (xi) OF GFR 2017

(To be typed and submitted in the Letter Head of the Entity/Firm providing certificate as applicable)

To,
GM-PURCHASE
BHEL-PSWR, 345, KINGSWAY, NAGPUR-440001

Dear Sir,

Sub: Declaration regarding compliance to Restrictions under Rule 144 (xi) of GFR 2017

Ref : 1) NIT/Tender Spec No: **BHE/PW/PUR/ NTPRT-STG U3 /2862**,
2) All other pertinent issues till date

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries. I certify that _____ *(specify the name of the organization here)*,

a. is not from such a country ☐

b. has been registered with the Competent Authority *(attach valid registration by the Competent Authority, i.e., the Registration Committee constituted by the Dept. for Promotion of Industry and Internal Trade (DPIIT))*; ☐

and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority. *(attach relevant valid registration, if applicable)*

I hereby certify that we fulfill all requirements in this regard and is eligible to be considered.

Thanking you,
Yours faithfully,

(Signature, Date & Seal of
Authorized Signatory of the Bidder)

Note: Bidders to note that in case above certification given by a bidder, whose bid is accepted, is found to be false, then this would be a ground for immediate termination and for taking further action in accordance with law and as per BHEL guidelines.

ANNEXURE-12

IMPORTANT INFORMATION

E -Tender for this work is invited by BHEL PSWR NAGPUR and offer shall be submitted through BHEL e-procurement portal only. All correspondences regarding this tender shall be through E-procurement portal.

Postal Address:
GM /Purchase BHEL PSWR,
SRIMOHINI COMPLEX, Floor No. 5 & 6, 345 KINGSWAY, NAGPUR 440001, INDIA

Following are the concerned BHEL officials to whom bidders can contact in case of any difficulty:

Manager, Purchase, Email:vivekjha@bhel.in, Mob:9429198214

Manager Purchase, Email: tapishkhandelwal@bhel.in , Mob: 9010903666

DGM Purchase, Email: kamleshbhel@bhel.in

GM Purchase, Email: rmalhotra@bhel.in

1. Refer the abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' which is available at www.bhel.com on "supplier registration page" at the following link: https://www.bhel.com/sites/default/files/suspension_guidelines_abridged.pdf

2. "Pradhan Mantri Kaushal Vikas Yojna: The contractor shall, at all stages of work deploy skilled/semi-skilled tradesmen who are qualified and possess certificate in particular trade from CPWD Training Institute/Industrial Training Institute/ National Institute of Construction Management and Research (NICMAR), National Academy of Construction, CIDC or any similar reputed and recognized Institute managed/ certified by State/ Central Government. The number of such qualified tradesmen shall not be less than 20% of total skilled/semi-skilled workers required in each trade at any stage of work. The contractor shall submit number of man days required in respect of each trade, its scheduling and the list of qualified tradesmen along with requisite certificate from recognized Institute to Engineer-in-Charge for approval. Notwithstanding such approval, if the tradesmen are found to have inadequate skill to execute the work of respective trade, the contractor shall substitute such tradesmen within two days of written notice from Engineer-in-Charge. Failure on the part of contractor to obtain approval of Engineer-in–Charge or failure to deploy qualified tradesmen will attract a compensation to be paid by contractor at the rate of Rs.100 per such tradesman per day. Decision of Engineer-in-Charge as to whether particular tradesman possesses requisite skill and amount of compensation in case of default shall be final and binding".

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. The following clause is added under clause 1.10 Security Deposit in Vol-1C:

Clause No 1.10.8 of Vol-IC General Conditions of Contract: Timely Submission of Security Deposit for Execution of the contract: "Bidder agrees to submit Security Deposit required for execution of the contract within the time period mentioned. In case of delay in submission of Security Deposit, enhanced Security Deposit which

would include interest (Base rate of SBI +6%) for the delayed period, shall be submitted by the bidder. Further, if Security Deposit is not submitted till such time the first bill becomes due, the amount of Security Deposit due shall be recovered as per terms defined in NIT/contract, from the bills along with due interest."

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

7. Conflict of Interest among Bidders/ Agents:

"A bidder shall not have conflict of interest with other bidders. Such conflict of interest can lead to anti-competitive practices to the detriment of Procuring Entity's interests. ***The bidder found to have a conflict of interest shall be disqualified***. A bidder may be considered to have a conflict of interest with one or more parties in this bidding process, if:

a) they have controlling partner (s) in common; **or**

b) they receive or have received any direct or indirect subsidy/ financial stake from any of them; **or**

c) they have the same legal representative/agent for purposes of this bid; **or**

d) they have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder; **or**

e) Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all bids in which the parties are involved. However, this does not limit the inclusion of the components/ sub-assembly/ Assemblies from one bidding manufacturer in more than one bid; **or**

f) In cases of agents quoting in offshore procurements, on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. One manufacturer can also authorize only one agent/dealer. There can be only one bid from the following:

1. The principal manufacturer directly or through one Indian agent on his behalf; **and**

2. Indian/foreign agent on behalf of only one principal;

or

g) A Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the contract that is the subject of the Bid; **or**

h) In case of a holding company having more than one independently manufacturing units, or more than one unit having common business ownership/management, only one unit should quote. Similar restrictions would apply to closely related sister companies. Bidders must proactively declare such sister/ common business/ management units in same/ similar line of business."

8. 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."

9. The clause 2.7.9.1 below is added under the heading "Rights of BHEL" of General Conditions of Contract Volume-IC GCC:

2.7.9.1 Provision of Penalty in case of slippage of Intermediate Milestones:

i) Two major Intermediate Milestones are mentioned as M1 & M2 in Chapter VI: Time Schedule of Vol IA Technical Conditions of Contract.
ii) In case of slippage of these identified Intermediate Milestones, Delay Analysis shall be carried out on achievement of each of these two Intermediate Milestones in reference to Form 14.
iii) In case delay in achieving M1 Milestone is solely attributable to the contractor, 0.5% per week of Executable Contract Value*, limited to maximum 2% of Executable Contract Value, will be withheld.
iv) In case delay in achieving M2 Milestone is solely attributable to the contractor, 0.5% per week of Executable Contract Value*, limited to maximum 3% of Executable Contract Value, will be withheld.
v) Amount already withheld, if any against slippage of M1 milestone, shall be released only if there is no delay attributable to contractor in achievement of M2 Milestone.
vi) Amount required to be withheld on account of slippage of identified intermediate milestone(s) shall be withheld out of respective milestone payment and balance amount (if any) shall be withheld @10% of RA Bill amount from subsequent RA bills.
vii) Final deduction towards LD (if applicable as per clause 2.7.9 above), on account of delay attributable to contractor shall be based on final delay analysis on completion / closure of contract. Withheld amount, if any due to slippage of identified intermediate milestone(s) shall be adjusted against LD or released as the case may be.
viii) In case of termination of contract due to any reason attributable to contractor before completion of work, the amount already withheld against slippage of intermediate milestones shall not be released and be converted into recovery.

* Executable Contract Value - Value of work for which inputs/ fronts were made available to contractor and were scheduled for execution till the date of achievement of that milestone.

10. "Performance Guarantee for Workmanship" shall be As per Clause no 2.24 of General Conditions of contract with the amendment of "18 months commencing from the date of Completion of contract as certified by BHEL Engineer".

11. Acceptance of Bank Guarantee (BG)

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

Clause No. 1.10.3 (iii) 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 Hongkond 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".

12. 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:

"BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) (https://www.bhel.com/guidelines-reverse-auction-2021) for this tender. RA shall be conducted among the techno-commercially qualified bidders.
Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered for RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking."

Note:-

1. *No benefits to MSE bidders w.r.t Reverse Auction Guidelines as available on www.bhel.com against works contract.*
2. *In case of enquiry through e-procurement, the sealed electronic price bid (e-bid) is to be treated as sealed envelope price bid.*
3. *Reverse Auction will be conducted if two or more bidders are techno-commercially qualified. In case of two or three qualified bidders, there shall be no elimination of H1 bidder (whose quote is highest in sealed envelope price bid).* ***In case of four qualified bidders, the H1 bidder shall be eliminated whereas in case of five qualified bidders, H1 & H2 bidders shall be eliminated. However, in case of six or more qualified bidders are available, RA would be conducted amongst first 50% of the bidders arranged in the order of prices from lowest to highest****. Number of bidders eligible for participating in RA would be rounded off to next higher integer value if number of qualified bidders is odd (e.g. if 7 bids are qualified, then RA will be conducted amongst lowest four bidders). However, there will be no elimination of qualified bidders who are MSE or qualifying under PPP-MII, Order 2017, provided their bids are within their respective margin of purchase preference {****presently 15% for MSEs and 20% for PPP-MII****, or as amended from time to time}.*

   In case of multiple H1 bidders, all H1 bidders (except MSEs and bidders qualifying under PPP-MII, Order 2017, who are within the margin of purchase preference) shall be removed provided minimum two bidders remain in fray, else no H1 removal.

13. Bidders kindly to take note that EMD (Earnest Money Deposit) shall be furnished by MSE bidders as well, as per the amount and procedure indicated in the NIT/GCC.

14. Bidder to strictly follow all the necessary guidelines issued by Customer, District Magistrate, State Government and Central government to control Pandemic/Epidemic outbreak. The related towards quarantine Centre/Medical expenses etc., if any, shall be in the bidder's scope

15. Quantity Variation Clause No 2.14: Quantity variation clause No 2.14 of Vol-IC General Conditions of Contract shall be applicable only for sl no 7 ' Integral Piping' of Chapter-VII-Terms of Payment'.

16. PRICE VARIATION COMPENSATION Clause no. 2.17 of Vol-I-C-GCC :PVC shall be applicable However Clause 2.17.6 of GCC: PRICE VARIATION COMPENSATION is amended as below-

Existing clause 2.17.6 of GCC : PRICE VARIATION COMPENSATION	Amended clause
Base date shall be calendar month of the 'last date of submission of Tender'.	Base date shall be the calendar month of the start of work

2862

TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED

TECHNICAL CONDITIONS OF CONTRACT (TCC)
CONTENT

1. Project Information

Project Name: 3x800 MW Patratu Vidut Utpadan Nigam Ltd. (PVUNL) Patratu STPP The proposed site is located near Patratu town in Ramgarh district of Jharkhand.
The latitudes and longitudes of the site are as follows:

1	Project Name		3x800 MW Patratu Vidut Utpadan Nigam Ltd. (PVUNL) Patratu STPP
2	Plant Site Location		Near Patratu town in Ramgarh district of Jharkhand
3	Location Co-ordinate		
3.1	Corner name	Latitude	Longitude
3.2	Top Corner	23° 39 ‘ 00'' N	85° 17’ 51.5” E
3.3	Bottom Corner	23° 38 ‘12.5'' N	85° 17’ 27” E
3.4	Left Corner	23° 38 ‘ 22.5'' N	85° 17’ 10.6'' E
3.5	Right Corner	23° 38 ‘ 40'' N	85° 17’ 57'' E
4	Nearest Town/City		Patratu -03Kms Ramgarh– 30Kms Ranchi - 37Kms
5	Nearest Railway Station		Patrat-4Kms
6	Nearest Airport		Ranchi–45Kms
7	Nearest Seaport		Kolkata–424Kms
8	Nearest Road Access		Ranchi Patratu Ramgarh Rd
9	Site Elevation		377M above MSL
10	Ambient Temperature		
10.1	Mean of Daily Maximum Temperature		40°C (During May)
10.2	Mean of Daily Minimum Temperature		10.7°C (During December)
10.3	Wet Bulb Temperature		27°C (Maximum)
11	Annual Rainfall		311 mm average annually
12	Wind Speed		0 to 39 Km/Hr
13	Wind Direction		East North East to West South West
14	Seismic Zone		Zone III as per IS:1893

The Bidder shall visit site and get acquainted himself with the conditions prevailing at site before submission of the bid. The information’s given here in under are for general guidance

and shall not be contractually binding on BHEL/ Owner. All relevant site data's/information's as may be necessary shall have to be obtained/ collected by the Bidder.

2. SCOPE OF WORKS:

Erection & commissioning of Steam Turbine Generator STG#3; broadly including collection of materials from BHEL/Client's stores/Storage yard; Transportation to site; Erection, testing & commissioning, trial operation and handing over of Steam turbine, Generator set, Integral piping, HP/LP heater, Pumps and Motors, Tanks & vessels and associated equipments, auxiliaries connected with the systems and other BOIs, Insulation, including supply and application of final painting of **STG#3 at 3x800 MW PVUNL PROJECT PATRATU, DISTRICT-RAMGARH STATE-JHARKHAND**

The scope of the work will comprise of but not limited to the following:

2.1 Steam Turbine Generator (STG U#3):

2.1.1 Collection of materials from BHEL/Client's stores/Storage yard; Transportation to site; Inspection, preparation of foundation, erection, levelling, centring, alignment, grouting, welding, NDT, testing & commissioning, trial operation and handing over of the following:-

a. Main Turbine (HP, IP, LP) with all auxiliaries.

b. Generator and Auxiliaries.

c. Generator Stator - Unloading from trailer, placement on TG floor with the help of EOT . In case of it would be required to unload the Stator at TG hall then All required assistance, manpower and required T&Ps for unloading of the Stator shall be provided the agency , saddle shall be provided by the BHEL .

d. Drive Turbine & Boiler Feed Pumps (Turbo-driven & Motor Driven).

e. Condensate Extraction Pumps (CEPs).

f. Condensate transfer pumps

g. ACW, DMCW (TG&SG) pumps, Fire fighting pumps.

h. Other vertical and horizontal pumps such as boiler fill pumps, Cycle makeup pumps, DM water transfer pumps, Sump pumps, CT makeup Pumps, Ash water pumps, Raw water pumps, Potable water pumps-plants, potable water pumps-Colony, Service water pumps, APH/ESP wash water pumps, Intake water booster pumps, AHP pumps, FGD and SCR pumps, clarified water transfer pumps, boiler drain pumps, emergency hotwell make up pumps, Vaccum pumps, Condenser air evacuation pump etc

i. Gland Steam Condenser, gland steam exhausters,Drain Cooler, LP Heaters, HP Heaters.

j. Hoists, Single girder EOT cranes and chain pulley blocks.

k. Plate Type Heat Exchangers, Coolers, chemical dosing skids such as NaOH, Oxygen, Ammonia, Hydrazine etc.,

l. Auxiliaries of Turbine, Generator, BFPs and other systems.

m. Lubricating Oil System.-Turbine lube oil, governing oil, Generator seal oil system, gas system, Jacking oil system, control fluid system, oil purifying system, clean oil tank, dirty oil tank, transfer pumps, purifying unit.

n. Primary Water system, dirty/waste fluid system, chemical dosing system, Gland steam system-for main turbine and integral piping for drive turbines of BFPs/MD BFP, Turbine Governing System with Valves and their servomotors, LP Bypass System with Valves, servomotors and HPBP and LPBP oil piping including oil tanks and other systems equipment's as per scope along with valves, fittings, H&S (Hangers and Supports) & insulations.

o. TG Valves, root Valves, TIP valves, Valves pertaining to scope of Turbine integral piping/Generator integral piping/MD BFP/TD BFP integral piping/equipment erected by TG agency including ESV, IV, Overload Valve with servomotors.

p. **Drainage System for Turbine and Auxiliaries**

q. Condenser Evacuation system for the condenser with integral piping and valves.

r. Steam turbine exhaust hood spray cooling system shall be complete with spray arrangements, associated piping

s. Various TG Piping systems as per relevant annexure including erection of valves, fittings. The scope of work for TG integral and miscellaneous piping covered under this specification shall include but not be limited to the following systems

i. Condenser air evacuation system
ii. Cycle make-up system
iii. Control fluid system
iv. Gland steam sealing system

t. HP/LP Bypass system with steam and spray valves, spray control station, throttling devices, fittings, desuperheaters, hydraulic power pack, solenoid valves, quick acting devices, blanking devices for steam blowing, supports, associated piping including warm up arrangements, valves.

u. Condenser air evacuation system with 2 x 100% vacuum pumps, associated motors, all accessories, associated piping, valves & fittings, specialties, duplex filter, instrumentation and control etc. In addition one (1) number start up air evacuation system shall be provided complete with vacuum pumps, associated motor, all accessories, associated piping, valves & fittings, specialties, duplex filter.

v. MS, HRH Strainers, Coolers.

w. Chemical cleaning and associated testing plus related activities of different system and Normalization.

x. Setting and commissioning of governing system.

y. Flushing, cardboard blasting steam blowing/washing (except MS, HRH & CRH), acid prickling, hydro test related testing, pre-commissioning, commissioning activities of lube oil system, governing oil, gas systems, water lines and other systems of Turbine, Generator, Condenser, BFP and other auxiliaries. This includes preparation for flushing, hydro-test, chemical cleaning, steam blowing, other cleaning activities, actual execution of the activities, normalization etc.

z. Grouting, painting of all equipment's along with supply of required materials, machineries and other resources as required to carry out the job.

aa. Insulation of TG & Aux such as LP Heaters, HP Heaters, flash tanks, equipment erected by TG agency.

bb. Operating platform (with grating, railing, toe guards and stairs) around the GSC, MOT Room, CFT Room, Flash tanks, Lube oil/ Control oil tanks, HP/LP Bypass valves, ESVS/IVS, TDBFP Oil skids, Suction strainer, CRH NRV, Local platforms for various inaccessible valves and equipments and Misc platform.

cc. Butterfly valves, bellows.

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

ee. 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.

ff. Erection and commissioning of all miscellaneous tanks of water/ oil/ steam /waste systems etc.

gg. Erection and commissioning of HT and LT motors of the equipment and auxiliaries, greasing of these motors is in the scope of this contract.

hh. Completion of punch points and assistance for handing over of unit to customer. Execution of all Mechanical jobs identified during OWNER Technical audits, check list of pre-commissioning and commissioning. Erection of additional supports required to restrain pipe movement avoiding interference with nearby structural / piping.

ii. Unit trial operation of equipments, systems of Unit as a whole, resolving any deficiencies observed and handing over of Unit.

jj. Assistance during PG testing of main equipment along with all auxiliaries, Supply of Manpower during PG Test for installing of Temp and Pressure gauge Sensors, Mounting of thermo-wells etc.

kk. Obtain clearances and approvals from all applicable statutory / Government agencies e.g. IBR clearance for heaters (HP, LP heaters if required), Electrical Inspectorate for Generator and motors etc.

ll. Installation of any necessary blind or additional valves to isolate lines to facilitate phased commissioning and start-up.

mm. Dewatering inside Power house building / CW/CEP pit and TG building for equipment erection facilitating is in contractor scope, inclusive of providing de-watering pump.

nn. Oveload valve piping

2.1.2 Detail scope of work:

(A) STEAM TURBINE -System Includes the followings:

1. High Pressure (HP), Intermediate Pressure (IP) and Low Pressure(LP) steam turbines complete with sole plates, foundation holding down bolts, bearing, bearing pedestals, rotors, couplings, steam gland seals, electric/hydraulic turning gear and hand barring gear.
2. Emergency stop (ESV) and control valves(CV), reheat stop, interceptor and control valves with their servomotors, steam strainers (including its housing & blanking arrangement) for main and reheat steam lines etc., LP bypass stop and control valves along with their servomotors
3. Electro–hydraulic governing system for the turbine including governing control rack, LP bypass control, rack, valve test devices and racks, turbine gland sealing system complete with converters, associated piping, valves and fittings, specialties, fire protection valves and devices, hangers and supports to make the system complete in all respects.
4. Lube Oil System consists of main oil tank, oil coolers, centrifuge, MOP, AOP, JOP, DC driven EOP, Leak & Dirty oil tank with pumps, Duplex Filter, vapour fans and auxiliaries, clean oil tank, connected oil piping, valves, H&S etc. The pumps with motors may be supplied in loose parts, contractor shall have to match /assemble and align at site as per instructions of BHEL Engineer including placement on foundation.
5. Control oil system: Governing system skids: Control oil pumps, control oil tank, filters, control oil purification system, Accumulators etc. HP governing consists of HPSU skids along with accessories and piping.

(B) GENERATOR

Hydrogen Cooled Main Generator Consisting of the following:

1. Stator
2. Rotor
3. End Shields & Bearing
4. Exciter with coolers, enclosures etc.
5. Seal Oil System

6. Primary Water System
7. H2 Cooling System
8. CO2 System
9. Seal Oil Tank
10. PW Tank & Alkaliser Unit
11. Generator package piping
12. Other Accessories

(C) AUXILIARIES

1. HP, LP & Unit Flash tanks, DM Water Tanks, Steam Drain tanks, FWSVD tanks, Oil Unloading Vessel and all other misc. tanks with equipment drains & vents, Platforms and stairs. The handling system for all auxiliaries as per site requirement will also have to be erected, within this contract.
2. Drain coolers along with fittings, piping, steam traps and gland steam condensers and air exhausters with motor and fittings, associated piping, hangers and supports etc. to make the system complete in all respects.
3. LP and HP heaters, fittings, group protection device, stand pipes along with fittings including gauge glasses for level indication, safety valves etc. to make the equipment complete in all respects.
4. Butterfly valves with Actuators, Bellows, flanges, Blanks and tie rods and spool pieces, H&S etc. NDT requirements also to be met as per Drawing/EWS.
5. The erection of Self-cleaning strainers (SCS) along with its integral piping, panels, gauges etc. is also in the scope of the contract.
6. Turbine oil coolers, gland steam condenser, drain coolers, seal oil coolers, stand pipes and fittings including gauge glasses for level indication, safety valves etc. to make the equipment complete in all respects.
7. Oil strippers, strainers, oil injectors and duplex oil filters.
8. Coolers, Tank, Filters etc. of Control Fluid System.
9. Hydraulic coupling, working oil and lubricating oil coolers of Boiler feed pumps and governing systems and other accessories of TD-BFP.
10. Seal oil storage tank, seal oil unit, pre-chambers, gauge glasses along with stand pipes, gauge glasses for level indication etc. to make the system complete in all respects.
11. Hydrogen cooling system, nitrogen and carbon dioxide systems including H2 dryers, gas control units and gas stands, racks and distributors to make the system complete in all respects.
12. Exciter air cooler.
13. Turbine oil purification system consisting of clean oil storage tank, Main oil tank, dirty oil storage tank, central oil purifier, dirty & clean oil transfer pumps, drain oil return pumps, oil unloading vessel.
14. Temp controlled valve of Primary water system

(D) PUMPS & MOTORS:

1. TDBFP (2 Nos.)
2. MDBFP (01 Nos.)
3. Hydraulic coupling, HT Motor for MD BFP
4. Booster Pumps for BFPs
5. CEP (3 Nos.) along with motors
6. ACW pumps (TG and SG)

7. Fire fighting pumps
8. Air evacuation pumps for each condenser, including priming pumps for maintaining condenser vacuum, along with motors and its accessories, internal piping to make the equipments complete in all respects.
9. A.C. and DC motor driven lubricating oil pumps including DC motors starters along with resistance box.
10. Seal oil pumps with drives and fittings to make the system complete in all respects.
11. HT Motors for BFP, ECW/DMCW-TG/SG Pumps, ACW & other HT and LT Motors. The greasing, mounting of CTs including of the grease guns, testing kits.
12. The erection and commissioning of the actuators of this contract scope. The commissioning of actuators of valves erected in the TG and auxiliaries is also under this contract scope.
13. Lube Oil Piping, Working Oil & Cooling Systems & other Accessories for 03 nos BFPs –01 No motor driven and 02 No. turbine driven.
14. **Boiler Feed Pumps (1 Motor Driven & 2 Turbo Driven)**

    a) 02 Drive Turbine for TD BFP Consists of :
    - Turbine Assembly
    - Governing Valve Assembly
    - Oil Pumps
    - Lube Oil Console
    - Gear Box
    - Connecting Couplings
    - Connecting piping to condenser
    - Oil Coolers etc.

    b) 01 Nos MDBFP consists of:
    - Motor for MD BFP
    - Booster Pumps for BFP
    - Lube Oil Piping,
    - Cooling Systems & other Accessories for

(E) BOUGHT OUT ITEMS:

- Oil Centrifuge, Portable lube oil purification unit & Associated System
- CF Purification Unit with pumps, Vapour exhauster etc.
- 3 Way Control Valves
- Drain Valves
- Springs, Hangers & Supports
- Pumps with Accessories (JOP, AOP, EOP, ACW, DMCW, Drip pumps etc)
- Dampers
- Vacuum Breaker valve
- H2 & CO2 Cylinders, N2 Cylinders
- Bearing Vapour Exhauster
- Coupling Covers
- Stretching Bolt Assembly
- PHEs
- Flash Tanks and flash box
- Butterfly Valves – for TIP and as given in BOM

- ME Bellows – for TIP and as given in BOM
- LP dosing system equipment
- Other vertical and horizontal pumps: boiler fill pumps, Cycle makeup pumps, DM water transfer pumps, Sump pumps, CT makeup Pumps, Ash water pumps, Raw water pumps, Potable water pumps-plants, potable water pumps-Colony, Service water pumps, APH/ESP wash water pumps, Intake water booster pumps, AHP pumps, FGD and SCR pumps, clarified water transfer pumps, boiler drain pumps, emergency hotwell make up pumps, Vaccum pumps, Condenser air evacuation pump etc
- Control valves for TG integral piping scope
- Rotameter for TG integral piping scope.

(F): Turbine Integral Piping Consists of:

- Lube Oil Piping
- Control Oil Piping
- Seal Oil Piping
- Gland Seal Piping
- Equipment Drains & Vents
- Cross around/over Piping
- Gas System Piping
- H2 Cooler piping (Haridwar supply scope) including temp. control valve
- Turbine drainage piping.
- Condensate spray piping

The erection/commissioning of integral piping has to be completed in all respects by the contractor. It may also be required to erect Valves/control valves/Bellows/ steam-traps, fittings, Hanger & Supports etc. of PEM/Trichy scope for completion of the system, with no extra cost to BHEL.

(G) PEM supplied Packages to erected & commissioned under this scope of work:

- Plate heat Exchangers (PHEs)
- Condenser on load tube cleaning system
- Simplex strainers, self cleaning strainer
- Sump pumps
- Electric hoists/single girder EOT Cranes and Chain Pulley Blocks Mono-rails of the above hoists/cranes. Pre commissioning test of hoists before erection with suitable temporary arrangement
- Lube Oil Pumps.
- Valves and other fittings of PEM scope which are required to complete integral piping.
- LP Chemical Dosing & oxygen dosing system. Chemical dosing system such as NaOH, Oxygen, Ammonia, Hydrazine etc. with the integral piping of the skid.
- Erection of Butterfly valves of Drive Turbine exhaust
- Insulation for all rotating and static equipments, heaters, strainers, piping and other auxiliaries erected under this scope, except for insulation for equipments supplied by Haridwar for Turbine, ESV & IV Valves and integral piping etc.

2.2 The quantities indicated above are approximate and are liable for variation and alteration at the discretion of BHEL

The item details and its weights under this scope of work indicated in the Chapter-XI "ESTIMATED WEIGHT FOR VARIOUS SYSTEMS IN SCOPE OF WORK (BOQ)" are approximate and these are subject to change as per site conditions.

The information furnished is only a description regarding the item to be erected by the contractor. BHEL reserves the right of adding or excluding any components/ items / systems according to the site requirements/ customer requirements to complete various systems in all respects. Any other systems / components which are integral to equipment supplied by the manufacturing units shall also be erected and commissioned by the contractor within the quoted/accepted Lump sum rate. No additional payment shall be made towards any variation in weights and quantities for such systems.

2.3 Supervisors / Engineers, consumables etc., required for the scope of work shall be provided by the contractor. All the expenditure including taxes and incidentals in this connection will have to be borne by him unless otherwise specified in the relevant clause. The contractor's quoted rates should be inclusive of all such contingencies.

2.4 It shall be specially noted that, the contractor may have to work round the clock (24x7) to achieve the completion schedules / plans / targets during the entire course of erection, testing and commissioning works, which may involve payment of considerable overtime. Hence contractor's quoted rate shall take into consideration of all expenses that will be incurred for such arrangement of personnel including labours, engineers / supervisors, T&Ps etc.

2.5 The terminal points can be inferred from the relevant drawings and any further clarifications can be obtained / decided by BHEL and that is final and binding on the contractor for deciding the scope of work and effecting the payment for the work done up to the terminals. Carrying out work as per the specification between equipments constituting terminal points, whether the terminal equipments fall within the scope of work/specification, contractor shall carry out the terminal joints at either end. Also where the piping connection to the terminal points involve flanged joints, matching of flanges, fixing gaskets, bolting and tightening as per BHEL Engineers instructions is in the scope of work. In case piping connected to equipment, matching of flanges for achieving the parallelism and alignment at the equipment end, by suitably resorting to heat correction or other method as instructed by BHEL Engineer, with in the quoted rate.

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

2.7 Contractor has to work in close co-ordination with other erection agency at site. BHEL engineer will co-ordinate area clearance. In a project of such magnitude, it is possible that the area clearance may be less/more at a particular given time. Activities and erection program have to be planned in such a way that the milestone events are achieved as per schedule/ plans. Contractor shall arrange & augment the resources accordingly.

2.8 The storage yard is located inside the Main Plant Boundary at a distance of approximately 3-4 KM from the location of Turbine area. All materials have to be transported from storage yard to construction area by the contractor at his own cost.

2.9 During the course of erection, testing and commissioning, certain rework / modification / rectification / repairs / fabrication etc will be necessary on account of feedback/revision from various relevant sources, and also on account of design discrepancies/ alterations, manufacturing defects, site operations/ maintenance requirements. This will also include modifications / re-works suggested by BHEL / customer / other inspection group. Contractor shall carry out such rework / modification / rectification / fabrication / repairs etc promptly and expeditiously. Daily log sheets indicating the details of work carried out, man-hours etc shall be maintained by the contractor and got signed by BHEL engineer every day. Claim of Contractor if any, for such works will be governed by relevant clauses of 'General Conditions of Contract'.

2.10 The scope of work covered under this specification is of highly sophisticated nature, requiring the best quality workmanship, engineering and construction management and green belt management. The contractor should ensure successful and timely completion of the work. The contractor must have adequate quantity of tools, construction aids, equipments etc., in his possession. He must also have on his rolls adequate trained, qualified and experienced supervisory staff and skilled personnel. The manpower deployment identified by contractor shall match with above scope of works.

2.11 Contractor shall execute the work as per sequence and procedure prescribed by BHEL at site. The erection manuals which are available with BHEL site office are to be referred for compliance and guidance before taking up the work. Any failure to comply with the above might lead to rework and the cost for the same shall be borne by the contractor only. BHEL engineer, depending upon the availability of materials, fronts etc., will decide the sequence of erection and methodology. No claims for extra payment from the contractor will be entertained on the grounds of deviation from the method of erection adopted in erection of similar jobs or for any reason whatsoever.

Sl. No	Description PART I	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, if provided it will be free of cost)**	Yes		Location will be finalized after joint survey with owner
B	Open space for storage **(as per availability, if provided it will be free of cost)**	Yes		Location will be finalized after joint survey with owner
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**	Agency has to make his own arrangement at his own cost.
B	Labour Colony with internal roads, sanitation, complying with statutory requirements		Yes	
3.2	**ELECTRICITY**			
3.2.1	Electricity For construction purposes only of Voltage 415/440 V, 3 phase, 50Hz	Yes		At 1 Locations -Single point on chargeable basis + applicable taxes, duties, levy etc. Applicable charges shall be as per rate of PVUNL prevailing during the execution period.
A	Single point source	Yes		At a distance of 500 M from site (Distance is only tentative, it may vary upto an extent depending on site condition)

Sl. No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
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	**Yes**		
A	Single point source (chargeable basis)	Yes		At a distance of 500 M from site (Distance is only estimated, it may vary upto an extent depending on site condition)
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**	Agency has to make his own arrangement at his own cost.
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	**WATER SUPPLY**			
3.3.1	For construction purposes: **(Single point source provided by BHEL)**	**Yes**		**On chargeable basis**
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	Agency has Agency has to make his own arrangement at his own cost.
3.3.2	Water supply for bidder's office, stores, canteen etc.			
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	
3.3.3	Water supply for Living Purpose			

Sl. No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
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	**LIGHTING**			
A	For construction work (supply of all the necessary materials) 1. At office/storage area 2. At the preassembly area 3. At the construction site /area		Yes	
B	For construction work (execution of the lighting work/ arrangements) 1. At office/storage area 2. At the preassembly area 3 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	**COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER**			
A	Telephone, fax, internet, intranet, e-mail etc.		Yes	
3.6	**COMPRESSED AIR** wherever required for the work		**YES**	
A	Supply of Compressor and all other equipments required for compressor & compressed air system including pipes, valves, storage systems etc		Yes	
B	Installation of above system and operation & maintenance of the same		Yes	
C	Supply of the all the consumables for the above system during the contract period		Yes	
3.7	Demobilization of all the above facilities		**Yes**	
3.8	**TRANSPORTATION**			

Sl. No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
A	For site personnel of the bidder		Yes	
B	For bidder's equipments and consumables (T&P, Consumables etc)		Yes	

Sl. No	Description PART II 3.9 ERECTION FACILITIES	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
3.9.1	Engineering works for construction:	Yes		
A	Providing the erection drawings for all the equipments covered under this scope	Yes		Excluding site routed piping, where vendor has to make drgs and get it approved by BHEL/PVUNL
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	In consultation with BHEL
D	Shipping lists etc for reference and planning the activities	Yes		In consultation with BHEL
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 SLNo. g		Yes	In consultation with BHEL
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	

Sl. No	Description PART II 3.9 ERECTION FACILITIES	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
~~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	

3.10 ELECTRICITY:

3.10.1 The construction power (415V) will be provided at a single point for construction purpose only at chargeable basis and the further distribution is to be arranged by the bidder at his cost. Construction power shall be provided from the nearest Substation / tapping point.

3.10.2 Any duty, deposit involved in getting the Electricity shall be borne by the bidder. As regards to contractor's office shed also, all such expenditure shall be borne by the contractor.

3.10.3 Provision of distribution of electrical power from the given single central common point to the required places with proper distribution boards, approved cables and cable laying including supply of all materials like cables, switch boards, pipes etc., observing the safety rules laid down by electrical authority of the State / BHEL / their customer with appropriate statutory requirements shall be the responsibility of the tenderer / contractor.

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

3.10.5 Necessary "Capacitor Banks" to improve the Power factor to a minimum of 0.9 shall be provided by the contractor at his cost. Penalty if any levied by customer on this account will be recovered from contractor's bills.

3.10.6 The PVUNL tariff and tax may vary from time to time. The required Energy meter for measuring the consumption shall be provided and installed by the contractor. Any dispute regarding consumption, the BHEL engineer's decision shall be final & binding to the contractor. The contractor shall make his own arrangement for further distribution with necessary isolator/LCB etc.

3.10.7 The required energy meter for measuring power consumption shall be arranged by the contractor and taken care by the contractor.

3.10.8 Contractor has to make his own arrangements for his electricity requirement for his labour colony at his cost.

3.10.9 As there are bound to be interruptions in regular power supply, power cut/load shedding in any construction sites, contractor should make his own

arrangement for alternative source of power supply through deployment of adequate number of DG sets at their cost during the power breakdown /failure to get urgent and important work to go on without interruptions. No separate payment shall be made for this contingency

3.11 CONSTRUCTION WATER

3.11.1 Water (Raw water) required for construction purposes will be provided at one single point within the plant area on chargeable basis. The required water meter for measuring the consumption shall be provided and installed by the contractor. The required pumps & accessories, pipes for drawing water from the points and further distribution will be arranged by the contractor at their cost.

3.11.2 The water charges may vary from time to time as per PVUNL water conditions, Any dispute regarding consumption, the BHEL engineer decision will be final. In case of non-availability of water, the contractor shall make his own arrangements of water suitable for construction to have uninterrupted work. No separate payment shall be made for any contingency arrangement made by contractor, due to delay / failure for providing water supply. Contractor has to make his own arrangements for his water requirement for his labour colony at his cost.

3.11.3 In case of non-availability of water, the contractor shall make his own arrangements of **water suitable for construction purpose** to have uninterrupted work. No separate payment shall be made for any contingency arrangement made by contractor, due to delay / failure for providing water supply. Contractor has to make his own arrangements for his water requirement for his labour colony at his cost.

3.12 DRINKING WATER

Bidder shall provide drinking water at the work spot at their cost.

3.13 CONSUMABLES:

3.13.1 Such of those consumables as indicated as consumables provided by BHEL alone will be provided to the contractor by BHEL free of charge for erection activities. Other required consumables like electrodes, all gases, and other materials for this scope of work are to be arranged by the contractor at their cost.

3.13.2 All the required 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, suppliers, type of electrodes etc. On receipt of the electrodes at site, it shall be subject to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch number and date of expiry etc.

3.13.3 The contractor shall provide within finally accepted price / rates, all consumables like welding electrodes (including alloy steel and stainless steel), all gases (inert, welding, and cutting), soldering material, dye penetrants, radiography films. Other erection consumables such as tapes, jointing compound, grease, mobile oil, M-seal, Araldite, petrol, CTC / other cleaning agents, grinding and cutting wheels are to be provided by

the contractor. Steel, H&S, packers, shims, wooden planks, scaffolding and pre-assembly materials, hardware items etc. required for temporary works such as supports, scaffoldings, bed are to be arranged by him. Sealing compounds, gaskets, gland packing, wooden sleepers, for temporary work, required for completion of work except those which are specifically supplied by manufacturing unit are also to be arranged by him.

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

Note: List of approved vendors attached as file Named: 'Annexure-2 Approved list of welding electrodes supplier'.

3.14 MATERIAL SUPPLY:

BHEL will supply the materials / equipments indicated in the weight schedule from their respective manufacturing units which are to be executed / incorporated in the permanent system. In addition the material such as lube oil, grease required for commissioning the erected equipments and chemicals required for chemical cleaning of equipments will be supplied free of cost by BHEL.

3.15 LIGHTING FACILITY:

Adequate lighting facilities such as flood lamps, hand lamps and area lighting shall be arranged by the contractor at the site of construction, pre assembly yard and contractor's material storage area etc. at his cost, w.r.t subject tender.

3.16 GASES:

3.16.1 All the required gases like Oxygen / Acetylene / argon / Nitrogen required for work shall be supplied by the Contractor at his cost. It shall be the responsibility of the contractor to plan the activities and store sufficient quantity of these gases. Non availability of gases cannot be considered as reason for not attaining the required progress. BHEL reserves the right to reject the use of any gas in case required purity is not maintained.

3.16.2 The contractor shall submit weekly / fortnightly / monthly statement report regarding consumption of all consumables for cost analysis purposes.

3.16.3 The contractor shall ensure safe keeping of the inflammable cylinder at a separate place away from normal habit with proper security etc.

3.16.4 BHEL reserves the right to reject the use of any gas in case required purity is not maintained.

3.17 ELECTRODES SUPPLY AND STORAGE

3.17.1 The bidder shall use the BHEL / Customer approved quality welding electrodes only.

3.17.1 It shall be the responsibility of the contractor to obtain prior approval of BHEL, before procurement, regarding suppliers, type of electrodes etc. On receipt of the electrodes at site, it shall be subject to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch number and date of expiry etc.

3.17.2 Shortage of any of the electrodes or the equivalent suggested by BHEL shall not be quoted as reason for deficiency in progress or for additional rate.

3.17.3 Storage of electrodes shall be done in an air conditioned / controlled humidity room as per requirement, at his own cost by the contractor.

3.17.4 All low hydrogen electrodes shall be baked / dried in the electrode drying oven (range 375 deg. C - 425 deg. C) to the temperature and period specified by the BHEL Engineer before they are used in erection work and each welder should be provided with one portable electrode drying oven at the work spot. Electrode drying oven and portable drying ovens shall be provided by contractor at his cost.

3.17.5 In case of improper arrangement of procurement of above electrodes BHEL reserves the right to procure the same from any source and recover the cost from the contractor's first subsequent bills at market value plus departmental charges of BHEL communicated from time to time. Postponement of such recovery is not permitted.

3.17.6 BHEL reserves the right to reject the use of any electrodes at any stage, if found defective because of bad quality, improper storage, date expiry, unapproved type of electrodes etc. It shall be the responsibility of the contractor to replace at his cost without loss of time.

3.18 OTHER FACILITIES

3.18.1 Adequate water less urinals (at least 1 nos in alternate Locations) shall be arranged by the contractor within quoted rates, at site of construction at different level and different areas like TG Hall, Pump House areas etc boiler structure, with proper disposal arrangement.

3.18.2 Vendors have to comply requirements of HSE & Statutory requirement in line with BHEL HSE plan, NTPC Safety requirement, Jharkhand/Central statutory requirement.

3.18.3 Agencies are to get registered (to take membership) from Safety Council of India, Mumbai/National Safety Council.

3.18.4 Vendors have to arrange labour rest sheds, drinking water facility, toilets, canteen facility as per local labour act/BOCW act. Maintaining hygiene and disposal of debris, scraps, canteen items and area cleaning is included in vendor's scope.

3.18.5 Agency has to arrange trained scaffolding experts with accreditation from statutory agencies with proper experience and they will issue fitness certificates for safe use. Such kind of qualified scaffolding experts will vary as per job requirement. At the same time, training has to be given by these experts at regular intervals for their own workers for increasing no. of experts.

3.18.6 Agencies HSE officers should have sufficient experience as per rule 209 of Bocw act central rule 1998. Agencies HSE officers will be part of BHEL HSE Team and they will be responsible for giving training on HSE issues in addition to normal field works and other normal site requirements.

3.18.7 Preparation of method statement, HIRA, Job Safety analysis, permit to work, Lifting plans, and all supporting documents as required for starting & continuation of work/job is in vendor's scope.

3.18.8 Hydras are not allowed for materials transport, only pick and carry cranes shall be deployed by the agency.

3.18.9 First aid centre will be maintained by BHEL and cost will be proportionately recovered from vendors.

3.18.10 Vendor has to arrange land within his quoted rate for making labour colony. Vendors labour colony has to be maintained with proper hygiene, drinking water, bathroom water, lighting arrangement, sewerage system. These facilities are to be regularly maintained including drains, surrounding, upkeepment of labour colony. BHEL/NTPC & local statutory authorities will visit labour colony from time to time and all healthy conditions are to be maintained by vendor.

3.18.11 Scaffolding pipes, clamps, safety nets, floor grills for working platforms are to be made of good quality with proper certifications as per IS Codes.

3.19. DEWATERING:

Contractor shall ensure at all times that the work area & approach/ access roads are free from accumulation of water, so that the materials are safe and the erection/ progress schedule are not affected. No separate claim in this regard shall be admitted by BHEL.

3.20. SITE ORGANISATION

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

i. Overall planning, monitoring & control.
ii. Quality control and quality assurance.
iii. Materials management.
iv. Safety, fire & security.
v. Industrial relations and fulfilment of labour laws and other statutory obligations.

3.20.2 The contractor shall maintain a site organization of adequate strength in respect of manpower, construction machinery and other implements at all times for smooth execution of the contract. This organization shall be reinforced from time to time, as required to make up for slippage from the schedule without any commercial implication to BHEL. The site organization shall be headed by a competent construction manager having sufficient authority to take decisions at site.

3.20.3 The contractor should also submit to BHEL for approval a list of construction equipment, erection tools, tackle etc prior to commencement of site activities. These tools & tackles shall not be removed from site without written permission of BHEL.

3.21. ONLINE SITE CONSTRUCTION MANAGEMENT SYSTEM [SCMS]:

3.21.1 The bidder will have to supply and install 01 Nos. of PCs with Operators, 01 no multifunction higher capacity printer (printer should be have A3 size printing facility) and accessories along with one operator per PC with power backup, for the online material management system, reporting of daily progress, billing and updating details in online SCMS package of BHEL, other similar activities pertaining to contractor's scope of work etc., within the quoted rate (Also applicable in the event of the contract period getting extended beyond the stipulated time) PCs & printers are to be installed at places as per instruction of BHEL Engineer.

3.21.2 Computers hall have minimum configuration multimedia PC work station of latest configuration, preferably Core i5 processor or above, 8 GB RAM or above, 1 TB Hard disk, with internet provision on all the computers, 100 MBPS LAN card of DELL/HP/ASUS or equivalent make with window 10 O/S with required accessories like mouse, keyboard, UPS and required software like MS Office 2010 Professional, AutoCAD 2011 or higher, ADOBE PDF CREATOR (version 9.0 or higher) with one laser jet printer compatible for A4 and A3 size printing (ink/ cartridge for which to

be supplied as and when required, (the consumption may be assumed as 1 cartridge per month).

3.21.3 These computers/ printers & accessories shall remain contractor's property/ ownership for all legal/technical purposes. However, contractor will be allowed to take out the same after completion of the site works as per instruction of BHEL Engineer.

3.21.4 If Contractor fails to mobilize above computer infrastructure BHEL reserve the right to recover from Bidder at the rate of Rs 15000 per Month.

4.1 MAJOR TOOLS AND PLANTS & MMEs TO BE DEPLOYED BY THE CONTRACTOR

(Per Package)

The following minimum major Tools & Plants (T&P) shall be arranged by the Contractor within the quoted rate for execution of this contract.

Major T&Ps				
SN	**DESCRIPTION**	**CAPACITY (MINIMUM)**	**QUANTITY**	**REMARKS**
1	Tyre mounted Crane	40 MT	01 No.	Crane to be made available at site in consultation with BHEL Site management, BHEL decision is final and agency has to deploy the crane as per BHEL instructions till Site requirement.

Other T&Ps				
S.N.	**DESCRIPITION**	**MINIMUM CAPACITY**	**MINIMUM QUANTITY**	**Remarks**
1.	Tyre mounted pick & carry crane	12 - 14 MT	01 Nos	
2.	Tyre mounted pick & carry crane	18-20 MT	01 Nos	
3.	Trailer with pulling unit	20/30 TON	02 Nos	
4.	LOW BED TRAILER/HYDRAULIC TRAILER WITH PULLING UNIT**	AS PER REQUIREMENT	AS PER REQUIREMENT	
	**The scope of shifting of material is in the scope of Contractor. Contractor has to arrange for the trailer of appropriate capacity, as per the requirement of shifting of the material from stores/Yard/ place of unloading, with no extra cost to BHEL. The trailers are to be arranged as per BHEL requirement, in addition to the trailers with pulling unit at site.			
5.	WELDING GENERATOR SETS		As per requirement	
6.	Welding generator (diesel operated)		As per requiremnt	
7.	3-PHASE COMPLETE SET UP FOR DRAWAL OF POWER		As per requirement	
8.	RADIOGRAPHY ARRANGEMENT INCLUDING THE SOURCE AND FILM VIEWER		As per requirement	
9.	TIG WELDING SET		As per requirement	
10.	STRESS RELIEVING EQUIPMENT WITH TEMPERATURE RECORDERS		As per requirement	

11.	ELECTRICAL BAKING OVEN – BIG		As per requirement	
12.	ELECTRODE BAKING OVEN – PORTABLE		As per requirement	
13.	Oxy-acetylene gas cutting Set		As per requirement	
14.	MIXER FOR GROUTING OF EQUIPMENT FOUNDATIONS		As per requirement	
15.	VACUUM CLEANER (INDUSTRIAL)		As per requirement	
16.	PIPE CUTTING AND BEVELLING MACHINE		As per requirement	
17.	PIPE BENDING M/C	ELECTRIC/ ELECTRO - HYDRAULIC - UPTO 4" SIZE	As per requirement	
18.	AIR COMPRESSOR	120 CFM	As per requirement	
19.	ELECTRICALLY OPERATED WINCHES	3T/5T	As per requirement	
20.	Hydraulic Pipe bending machine (manual)	Suitable for pipes upto 2 ½"	1 No	
21.	Hydraulic Pipe bending machine (motorized)	Suitable for pipes upto 2 ½"	1 No	
22.	SPANNERS / EYE BOLTS (OF ALL SIZES)		As per requirement	
23.	Tube/ Pipe chamfering machine		As per requirement	
24.	Profile making M/C		As per requirement	
25.	Nibbling M/C		As per requirement	
26.	Shearing M/C		As per requirement	
27.	Portable grinding M/C		As per requirement	
28.	Portable drilling M/C		As per requirement	
29.	Chain Pulley blocks		As per requirement	
30.	Scaffolding pipes		As per requirement	
31.	Surface plate	Grade 1,2,3	As per requirement	
32.	DFT measurement (Elcometer)		As per requirement	
33.	Tools for Reaming and Honing		As per requirement	
34.	Gas Cutting Sets		As per requirement	
35.	Sleeper & Concrete blocks for Bed Preparation for Assy		As per requirement	
36.	Dewatering Pump		As per requirement	
37.	Various sizes of clamps/ fixtures for assembling		As per requirement	

38.	Temperature Recorder for 0-1000 deg C 6/12 points with thermocouples/ rod and compensating cable		As per requirement	
39.	Magnetic particle testing equipment – DRY &WET Type		As per requirement	
40.	Stress relieving equipment		As per requirement	
41.	Fill Pumps		As per requirement	
42.	Hydraulic test pumps For testing lines (up to 400 Kg/Sq.cm)		-	
43.	Electrically operated winches	3T-5T	As per requirement	
44.	Air compressor	120 CFM	As per requirement	
45.	STEP DOWN TRANSFORMER	230V/24V	AS PER REQUIREMENT	
46.	Spectrometer		As per requirement	
47.	Hand Operated Megger 500/1000V		As per requirement	
48.	Tong Tester 10,20 or 50 Amp +/-3% accuracy		As per requirement	
49.	Digital Analogue Multi meter		As per requirement	
50.	Scaffolding Pipes & Clamps		As per requirement	
51.	Master Level		As per requirement	
52.	Pressure Gauges of multiple Ranges	0-800 Kg/cm2)	As per requirement	
53.	**HYDRAULIC JACKS OF VARIOUS CAPACITIES FOR ST. TURBINE , GENERATOR & Pumps:**			
54.	A) - JACKS (WITH HAND OPERATED PUMPS)	100 MT	06 NOS.	
55.	B) - JACKS (WITH HAND OPERATED PUMPS)	50 MT	06 NOS.	
56.	**GANG OPERATED JACKS CONSISTING OF THE FOLLOWING :**			
57.	A) - JACKS (HAVING BROAD BASE ONE INCH LIFT)	100 MT	06 NOS.	
58.	B) - JACKS (WITH 4-6 INCH LIFT , FOR GEN. END SHIELDS)	63 MT	04 NOS.	

59.	C) - LONG HIGH PRESSURE HOSES (FOR GENERATOR ALIGNMENT)		12 NOS.	
ABOVE JACKS FOR GENERATOR ALIGNMENT SHOULD HAVE SUITABLE COUPLING FOR JOINING THE TWO OR MORE HOSES TOGETHER TO GET DESIRED LENGTH OF HOSES, SHOULD HAVE HAND OPERATED PUMPS & ALSO SHOULD BE ABLE TO FIT WITH HYDRAULIC UNIT.				
60.	TORQUE WRENCH	0 TO 200 N-M	03NO.	
61.	TORQUE WRENCH	UPTO 2000 N-M	03 NO.	
62.	BOLT STRETCHING DEVICE (FOR TURBINE & GENERATOR FOUNDATION BOLTS)		AS PER REQUIREMENT	
63.	LONG FEELER GAUGE SET		AS PER REQUIREMENT	
64.	SPANNERS / EYE BOLTS (OF ALL SIZES)		AS PER REQUIREMENT	
65.	HYDRAULIC TEST PUMPS, HAND PUMP AND FILL PUMPS	For testing LP lines	AS PER REQUIREMENT	
66.	Filler wire for both SS and others as required	As required	As required	
67.	Grouting materials/ Grouting cements	As required	As required	
68.	Florescence powder	As required	As required	For tube leak detection
69.	Lapping compound	As required	As required	For valves servicing
70.	Mercury	As required	As required	For Generator gas tightness test and other applications as required
71.	Hydraulic oil	As required	As required	For uses in different equipment and hydraulic jacks, pumps and other applications
72.	Different types of electrical lamps, tube lights , halogen lamps, sodium vapour lamps with Fixtures	As required	As required	
73.	Brazing Rods	As required	As required	
74.	Soldering consumables	As required	As required	
75.	Consumables for welding and NDTs	As required	As required	

76.	Thermal chalks of different ranges	As required	As required	
77.	Consumables for Pre-heating, Stress Relieving, Post heating etc.	As required	As required	
78.	Welders accessories	As required	As required	
79.	Handling accessories for handling chemicals, Control fluid and other items as required	As required	As required	
80.	Services for effluent disposal	As required	As required	
81.	Rustolene	As required	As required	
82.	Kerosene	As required	As required	
83.	CTC, Acetone as per requirement	As required	As required	
84.	Petrol	As required	As required	
85.	Diesel	As required	As required	
86.	Special Consumables for TG & Aux. like Hylomar, Golden Hermetite, Stag-B, Molykote , Anabond compounds, Locktite, Rubber fixing compounds/ rubber,plastic, PVC hoses as per requirement	As required	As required	
87.	Shellack Compound	As required	As required	
88.	Red Lead	As required	As required	
89.	Hemp Fibre	As required	As required	
90.	Asbestos Rope (Pure) 2,4,6,8,10, 12,25 mm and other sizes as required	As required	As required	
91.	Insulation Adhesive Tape 20 mm Width and other sizes as per requirement	As required	As required	
92.	Emery Tape as per requirement	As required	As required	
93.	Hack-shaw of different sizes as per Requirement	As required	As required	
94.	Emery Paper Gr. 60, 80, 100, 120, 150 , 220 and others as per requirement	As required	As required	
95.	Asbestos Cloth in Wax Paper 1X1 M –as Required	As required	As required	
96.	PACKING BLACK PAPER 1X1 M	As required	As required	

97.	ADHESIVE TAPE 0.3 mm THICKNESS-as Required	As required	As required	
98.	WHITE COTTON TAPE 12 mm WIDTH-as Required	As required	As required	
99.	GRAPHITE POWDER FINE QUALITY – as Required	As required	As required	
100.	GRAPHITE FLAKES as required	As required	As required	
101.	RAW LINESEED OIL as required	As required	As required	
102.	DOUBLE BOILED LINSEED OIL AS REQUIRED	As required	As required	
103.	MOBILE VELOCITE OIL 'S' AS REQUIRED	As required	As required	
104.	TURPENTINE OIL AS REQUIRED	As required	As required	
105.	TRICHLORO ETHYLENE AS REQUIRED	As required	As required	
106.	METHYLATED SPIRIT AS REQUIRED	As required	As required	
107.	MOBILOX GREASE 2 (IOC) AS REQUIRED	As required	As required	
108.	SERVOGEM –2,3 GREASE AS PER REQUIREMENT	As required	As required	
109.	MOLYKOTE PASTE AS PER REQUIREMENT	As required	As required	
110.	RUST BAN (ESSO) AS PER REQUIREMENT	As required	As required	
111.	WASHING SODA AND SOAP AS PER REQUIREMENT	As required	As required	
112.	BIRKOSITE AS PER REQUIREMENT	As required	As required	
113.	COTTON WASTE AS PER REQUIREMENT	As required	As required	
114.	CLEAN RAGS AS PER REQUREMENT	As required	As required	
115.	SACK CLOTH AS PER REQUIREMNT	As required	As required	
116.	DP TEST KIT WITH MAGNIFYING GLASS AS REQUIRED	As required	As required	

117.	PORTABLE SWITCH BOARD CONTAINING 15 AMPS TP METAL CLAD SWITCH WITH FUSE 3X15 AMPS, SWITCHES AND 3 PLUG SOCKETS AS PER REQUIREMENT	As required	As required	
118.	All kind of water/oil/steam gasket (asbestos free) (other than those being supplied by BHEL Units)	As required	As required	
119.	TARPAULINE 3X3 M AND 5X5 M AND 10X5 M AND OTHER SIZES AS PER REQUIREMENT	As required	As required	
120.	VULCANISED RUBBER FIBRE 0.5 MX0.5 MX15 mm THICKNESS AS PER REQUIREMENT	As required	As required	
121.	BATTERY CELLS 1.5 VOLTS TORCH LIGHT CELLS,PENCIL BATTERY ETC.AS REQUIRED	As required	As required	
122.	ENGINEERS BLUE / PRUSSIAN BLUE AS REQUIRED	As required	As required	
123.	DP TEST KIT WITH MAGNIFYING GLASS AS REQUIRED	As required	As required	
124.	**List of suggestive safety Equipments/PPEs to be included in List of minimum T&P:**			

125.	Safety Net (Conforming IS 11057:1984) Safety Net (Net Size: 10m x 5m, Mesh Size: 25 mm, Mesh Rope: 2mm double cord, Border/Tie Cord: 12mm diameter polypropylene rope (tested as per IS: 5175).Two meters length shall be provided at all four corners.		AS PER REQUIREMENT	
126.	Fall Arrester 'Rope grab fall arrester' & anchorage line. Anchorage Line: 14mm- 16 mm diameter, three strand twisted Polyamide rope. Rope Grab fall arrester: Openable & Guided type Fall Arrestor (on flexible line) conforming EN 353-2 & works on 14-16 mm diameter polyamide rope. Material: Nickel Chrome plated Steel Connector: Karbiner conforming to EN 362 (Minimum Strength 22 KN), material: Steel		AS PER REQUIREMENT	
127.	**Horizontal life line** Stainless Steel Wire rope of 8mm diameter. Minimum six nos. of steel U-bolt clips are required for clamping each wire rope to a rigid support (03 nos. of U-bolt clips at each end).		AS PER REQUIREMENT	
128.	Fork lift		01 no	
129.	Vacuum cleaner		01 no	

4.2 MEASURING AND MONITORING DEVICES (MMD):

As per requirement to be finalized at site, shall meet the requirements as per field quality plan and other erection, testing related activities.

NOTE:

1. **All above T&Ps are to be deployed by contractor as and when required as per instruction of BHEL engineer. If works gets delayed due to non-availability of above T&Ps, BHEL reserves the right to deploy the same and recover the charges thereof from the contractor as per prevailing market rate/hiring rate/BHEL internal hiring rates, as the case may be, + Applicable overhead rates.**
2. Number of Major T&Ps listed above are fixed. All the other relevant clauses shall be read accordingly.
3. This above list of T&Ps (apart from Major T&Ps) is only indicative and neither exhaustive nor limiting. Quantities indicated above are only the minimum required. Contractor shall deploy all necessary T&P to meet the schedules & as prescribed by BHEL engineer and required for completion of work.
4. Depending upon the nature of work and availability of facilities locally, contractor may have to arrange for a temporary workshop for facilitating uninterrupted progress of work.
5. Necessary electrical / water / air connection required for operation of any of the tools & tackles shall be to Contractor‘s account.
6. Contractor has to submit the Calibration certificates of all the precision Equipement to BHEL. BHEL may ask for recalibration of the MMEs /precision equipments for ensuring quality of work. Contractor must reascertain/ recheck range and accuracy of each IMTE from BHEL Engineer well in advance before arranging calibration/ deployment.
7. Any T&Ps, Cranes, Slings, D-shackles and other lifting tackles, Trailers required for shifting of material from store to site shall be arranged by contractor over and above T&Ps/ crane provided by BHEL.
8. T&P (apart from Major T&Ps) and the mobilization shown in the above mentioned list is suggestive requirement considering parallel working in TGs . Mobilization schedule as instructed at site for all the required T&Ps, have to be adhered to. Numbers / time of requirement will be reviewed time to time at site and contractor will provide required T&P / equipments to ensure completion of entire work within schedule / target date of completion without any additional financial implication to BHEL. Vendor will give advance intimation & certification regarding capacity etc. prior to dispatch of heavy equipments. Also on completion of the respective activity, demobilization of T&P in total or in part can be done with the due approval of engineer in charge. Retaining of the T&Ps during the contract period will be mutually agreed in line with construction requirement.
9. In the event of need of change of type of any of T&Ps, approval shall be taken from BHEL Engineer in-charge prior to mobilization. The decision of Number of T&P required due to replacing the enlisted T&P as per above table, shall be taken after analyzing the production capacity and suitability of both the T&Ps.
10. Crane operators deployed by the contractor shall be tested by BHEL before they are allowed to operate the cranes.
11. The above list is only indicative (apart from major T&Ps) and all these T&Ps including major T&Ps may not be required for entire contract period but contractor shall ensure the availability of the T&Ps as per work requirement and T&P Deployment schedule. T&P Deployment

schedule shall be finalized at site in consultation with BHEL Engineer based on the work fronts/work requirement. BHEL decision shall be final and binding regarding the T&P deployment schedule. Contractor shall mobilize / maintain the T&P's as per the deployment schedule notified time to time by BHEL Engineer.

12. APR- Contractor has to deploy T&P, MMD, IMTE as per requirement of site and as decided by BHEL Engineer.
13. Any additional item (apart from Major T&Ps) required in addition to above mentioned T&P for proper execution of scope of work, contractor has to arrange such T&P within quoted rate on the instruction of BHEL in writing in a reasonable period within two weeks from the written instruction from BHEL.
14. T&Ps mentioned above shall be specifically deployed as per the requirement. However, as per work requirement and availability of T&Ps the inter use in Material Handling and Mechanical works may be permitted as per the instruction of the BHEL Engineer.
15. **If the work related to T & Ps mentioned above is completed then, BHEL can release that T & P during contract period / extended period if any. However, written permission shall be taken by contractor from BHEL construction Manager for releasing the T&P.**
16. In case of any specific requirement of higher capacity crane apart from the vendors scope shall be provide by the BHEL on sharing basis & free of charge.
17. The T&P deployment as specified in above table is only indicative, however the contractor has to ensure the availability of required T&P till completion of all the work under his scope in this tender.
18. In the eventuality of contractor not deploying cranes / abnormal down time of cranes in his scope during the period specified above, and BHEL arranges for the same [either BHEL's own cranes / hired cranes], prevailing BHEL Corporate Crane hire charges (may vary from time to time) shall be recovered from the contractor's running bills. Corresponding pages of Corporate Crane hire charges are enclosed as part of VOL I as File titled "Annexure 1- T&P Hire Charges". (Please note that these charges are as valid up to Aug 31, 2023 and may get revised further).
19. For loading and transportation, all necessary T&P such as Trailers, Cranes, Winches, welding generators, slings, jacks, sleepers, rails etc., are to be arranged by the contractor.
20. All the T&Ps required for this scope of work, except the Tools & Plants provided by BHEL are to be arranged by the contractor with in the quoted rates.
21. All the tools and tackles/measuring instruments shall be duly tested/calibrated and valid certificate to that effect should be submitted to BHEL site in-charge before the start of work.
22. Any or part or all of the T & Ps of the contractor identified for the tendered package shall not the engaged for any works other than that of the works intended in this tender.
23. The contractor shall arrange crane operator, diesel, petrol and other consumables required for the tools and plants, equipment's etc. Preventive and routine maintenance of T&P are also to be arranged by the contractor at his cost without any delay. Required number of experienced mechanics and helpers for routine maintenance of the above cranes shall be provided by the contractor within his quoted rate.
24. For transportation, material handling, loading& unloading of all components / equipments, the contractor has to make his own arrangements at his own cost. BHEL will not provide any crane / T&Ps for unloading the above components. All necessary T&P such as, Trailers, Cranes Winches, Welding generators, Slings, Jacks, Sleepers, Rails etc. are to be arranged by the contractor.
25. All the T & P, lifting tackles including wire ropes, slings, shackles and electrically operated equipment shall be got approved by BHEL Engineer before they are actually put on use. Test certificates obtained from the statutory authority should be submitted before their usage.

26. All the T & P arranged by contractor including electrical connections wherein required shall be reliable / proven / tested with necessary test certificate.
27. All instruments, measuring tools etc. are to be calibrated periodically as per the requirement of BHEL and necessary calibration certificates are to be submitted to BHEL before use.
28. Crane operators deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes.
29. Also Refer BHEL T & Ps in chapter V of this booklet TCC. Other Relevant clauses shall be referred in Special Conditions of Contract (SCC) published in Volume IB of Book II.
30. Contractor shall provide the complete operating crew like operator, helpers for handling trailing cable EOT. It may be specifically noted that the EOT cranes shall be shared by many other agencies working within the TG hall. The contractor shall have to extend the services of the EOT crane operation to all such other agencies as instructed by BHEL; the operation cost (for crew) will be shared proportionately amongst the beneficiary agencies on mutually agreed terms and rate.
31. The contractor shall submit the valid test certificate/calibration certificates for all the T&Ps before put into actual use at site. The certificates shall be renewed time to time as instructed by BHEL Engineer.
32. Crane operators deployed by the contractor shall have valid license for operation of cranes.
33. Apart from above mentioned T&P, any additional item required for proper execution of scope of work, contractor has to arrange such T&P within quoted rate as instructed by BHEL Engineer. Deployment schedule of such T&Ps shall be maintained as per the instruction of BHEL Engineer.
34. T&P's mentioned above shall be specifically deploy as per the respective works. However, as per work requirement and availability of T&Ps the inter use in Material Handling and Mechanical works may be permitted as per the instruction of the BHEL Engineer.
35. Any of the T&Ps deployed by the contractor, will be released from site during contract period / extended period only after completion of work for which the particular T&Ps was envisaged. The written permission shall be taken by contractor from BHEL Construction Manager for releasing the T&Ps.
36. The loading, unloading and transportation of contractors T&Ps shall be in the scope of contractor. All necessary items such as Trailers, Cranes, Winches, welding generators, slings, jacks, sleepers, rails etc., are to be arranged by the contractor at his own cost.

5.1 List of T&Ps to be made available by BHEL to contractor free of hire charges on sharable basis.			
SN	**DESCRIPTION & CAPACITY OF T&P**	**QUANTITY IN NOS**	**PURPOSE /Remark**
1	Crawler Crane of above 40 MT (suitable capacity)	As decided by BHEL	Except Contractor scope, required for mentioned work will be arranged by BHEL as per requirement.
2	Hydro test pump (400 – 1000 kg/cm2 for HP lines) with accessories	1	HT of HP lines (If required)
3	EOT crane in TG Hall (265/25 MT) without Operator	2	For handling and erection within TG hall on sharing basis as available and subject to their accessibility and approachability.

NOTE:

5.1 Hydraulic testing pumps for HP lines shall be provided by BHEL free of hire charges. The testing pumps will be issued to the contractor in working conditions. Installation, electrical connection, erection, testing and dismantling and returning to BHEL stores, etc, shall be carried out by the contractor as part of this work without any extra charges. In case any servicing of the test pump is to be done during the course of the test, the contractor shall provide the necessary labour for the same and spares will be arranged by BHEL.

5.2 Above T&P 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. The decision of BHEL Engineer in-charge/CM on this will be final and binding.

5.3 The cranes mentioned at Sl. No.1 of the table will be provided as per requirement on sharing basis at the discretion of the BHEL Engineer.

5.4 The contractor shall make necessary arrangement like laying of steel plates, assembly & dismantling of heavy lift attachment, boom, jib, providing manpower and T&Ps etc. for altering the crane configuration viz change of boom length etc movement of BHEL cranes to carry out the job for his use.

5.5 Necessary electrical / water / air connection required for operation of any of the BHEL's T & Ps shall be Contractor's account. All the distribution boards, connecting cables, hoses etc., and temporary connection work including electrical connections shall have to be arranged by the contractor at his cost.

5.6 The contractor at his cost shall arrange for grouting of anchor points of T & Ps issued to him. Necessary grout materials are to be arranged by the contractor at his cost.

5.7 All the T&Ps mentioned in table 5.1 above shall be given to contractor on sharable basis and the allotment is made by BHEL on need basis. Contractor shall plan activities well in advance and inform BHEL Engineer in charge/ Construction Manager the date of actual use. The decision of BHEL Engineer in-charge/CM on this will be final and binding.

5.8 Contractor shall transport from BHEL stores, install, operate, carry out maintenance, dismantle after use and return to BHEL stores all T&Ps mentioned in Table 5.1 for his use.

5.9 **For Crawler Crane**:

1. The cranes may be BHEL owned or may be obtained on hiring basis including operating and maintenance crew.
2. Operator and O&M for BHEL owned crane will be provided by BHEL.
3. Operator and O&M for hired crane will be provided by the hiring agency.
4. Contractor shall provide the fuel for BHEL provided cranes (Hired/owned) for his use. Lubricants for crane (hired/owned) shall be provided by the BHEL.
5. Contractor shall provide necessary manpower assistance for initial and final assembly & dismantling and for subsequent operations of boom extension and reduction during execution of work. Contractor shall also make necessary arrangements like laying of special sleeper beds and steel plates (**sleepers for BHEL owned/hired cranes shall be provided by the BHEL)** for movement of the crane.
6. 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. Augmentation of BHEL T & P under special circumstances shall be discretion of BHEL.
7. The cranes mentioned at Sl. No. 1 of Table 5.1 shall be provided as per requirement on sharing basis for loading of HP Turbine, IP rotor, LP rotor, LP Inner casings, IP Outer casings, HP heaters, motors, valves and other heavy components. The types of cranes shall be allotted after seeing the actual load requirement. The cranes shall be issued for the purpose of loading of heavier equipment from BHEL stores/ yard/ other site locations where 40MT crane (Contractors scope) is not suitable, at the discretion of the BHEL Engineer.

5.10 **Hydraulic pump:** Hydraulic testing pumps for HP lines shall be provided by BHEL free of hire charges. The testing pumps will be issued to the contractor in working conditions. Installation, electrical connection, erection, testing and dismantling and returning to BHEL stores, etc, shall be carried out by the contractor as part of this work without any extra charges. In case any servicing of the test pump is to be done during the course of the test, the contractor shall provide the necessary labour for the same and spares will be arranged by BHEL.

5.11 **EOT Crane:**

1. EOT cranes shall be provided to the contractor on sharable basis as per instruction of BHEL Engineer. Experienced EOT crane-operators are to be arranged in shifts by the contractor within the quoted rates. Contractor has to plan the activities on item wise where the EOT crane is required to be used and submit to BHEL site for approval. In case the erection can be carried out by using other T&Ps, contractor shall make his own arrangement. The decision of BHEL Site in-charge on this will be final and binding.
2. The availability of EOT crane is likely to be hampered from time to time due to routine preventive maintenance or breakdown maintenance. Contractor has to make alternative arrangement or plan / modify / alter his activities to suit the above conditions and the contractor will not be liable for any compensation or extension of time due to this non availability, for maintaining the erection schedule.

3. Providing required manpower assistance for moving the trailing cable of EOT Crane is included in the scope of the agency of this contract.
4. Experienced Crane operator for EOT crane shall be arranged by the bidder within the quoted rate / price. Crane operators deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes.
5. The contractor shall extend the services of his operator to other agencies on mutually agreed mode of cost sharing as per site requirement.

5.12 The contractor at his cost shall arrange for grouting of anchor points of T&Ps issued to him. Necessary grout materials are to be arranged by the contractor at his cost.

5.13 The day-to-day and routine maintenance including replacement of spares for the BHEL T&Ps will be carried out by the contractor at his own cost. However, BHEL shall supply spare parts free of charges for normal wear and tear only.

5.14 Any loss/damage of tools by the contractor shall have to be replaced or otherwise cost thereof shall be recovered from the contractor.

6. TIME SCHEDULE & MOBILIZATION

6.1 INITIAL MOBILIZATION

After receipt of fax/Email LOI, Contractor shall discuss with Project Manager / Construction Manager regarding initial mobilization. Contractor shall reach site, conduct KOM (Kick of Meeting) for mobilization of manpower, T&P, Date of start of work and detailed completion program, make his site establishment and be ready to commence the erection work within **15 days from the date of issue of Letter of Intent or as per the directions of Construction Manager/ Project Manager of BHEL.** Such resources shall be progressively augmented to match the schedule of milestones and commissioning.

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

The activities for erection, testing etc. shall be started as per directions of Construction Manager of BHEL. Contractor shall mobilize further resources (in addition to those required for activities under clause no. 6.1) as per requirement to commence the work of erection, testing etc. of TG and auxiliaries, progressively augment the resources to match schedule of the project.

6.3 COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE

Erection/Placement on its designated foundation/location/temporary bed, of the first major permanent equipment/component covered in the scope of these specifications shall be recognized as "Start of contract period", accordingly shall be recorded in the KOM (Kick of Meeting) by Construction Manager/Site-in-Charge/Project Manager of BHEL.

Smaller items like packer plates, shims, anchors, inserts etc. will not be considered as start of contract period. The date of Start of contract period shall be the mutually agreed date between the bidder and BHEL engineer to start the work. In case of discrepancy, the decision of BHEL engineer is final.

Based on the availability of civil foundations from BHEL and materials from manufacturing units, contractor may have to advance the start of erection after getting clearance from construction manager, or the start of erection may get delayed due to site condition.
The contractor has to subsequently augment his resources in such a manner that following major milestones of erection & commission are achieved on specified schedules:

S.N.	Milestones ACTIVITY	STG#3 Schedule Completion from DOS (Date of Start)
1	TG ERECTION START	1ST MONTH
2	TURBINE BOX UP	9TH MONTH
3	COMPLETION OF OIL FLUSHING	10TH MONTH
5	BARRING GEAR	11TH MONTH
6	ROLLING & SYNCHRONISATION WITH OIL	12TH MONTH
8	Full Load	13TH MONTH

S.N.	Milestones ACTIVITY	STG#3 Schedule Completion from DOS (Date of Start)
10	COMPLETION OF TRIAL OPERATION	14TH MONTH
11	COMPLETION OF FACILITIES & PENDING POINTS /ALL OTHER OBLIGATIONS	15th MONTH

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

6.4 COMPLETION PERIOD

The contract period for completion of entire work under scope of these packages shall be **15 (Fifteen) months for this Package** from the "START OF CONTRACT PERIOD" as specified earlier for completion of the entire work **i.e. 15 Months for STG#3.**
During the total period of contract, the contractor has to carry out the activities in a phased manner as required by BHEL and the program of milestone events.
The contractor shall have to mobilize his resources earlier than the start of contract period for preparatory work like taking over & chipping of foundations, start of preassembly, Material transportation for yard etc.
The contractor shall complete all the works in the scope of this contract within the contract period. Pending points identified by the customer/BHEL during the execution of the contract are to be liquidated during the contract period itself.

6.5 WORK COMPLETION:

The work under this scope of contract is deemed to be completed in all respects only when all the components / equipments are erected, insulated and trial runs, testing and commissioning of all the equipments are completed, as certified by BHEL in-charge. The decision of BHEL in this respect shall be final and binding with contractor.

6.6 PROVISION OF PENALTY IN CASE OF SLIPPAGE OF INTERMEDIATE MILESTONES

In case of slippage of Two major Intermediate Milestones, mentioned as M1 & M2 hereunder, Delay Analysis shall be carried out on achievement of each of these two Intermediate Milestones in reference to F-14.

Milestones	Description of Intermediate Millstones	Completion from the Date of Start
M1	TURBINE BOX UP	9th month
M2	BARRING GEAR	11TH MONTH

Note 1: Refer clause no 9.0 of ANNEXURE-12 IMPORTANT INFORMATION of the NIT regarding modalities against provision of penalty in case of slippage of Intermediate Milestones.

Note 2:

1. In order to meet above schedule in general, and any other intermediate targets set, to meet customer/project schedule, contractor shall arrange & augment all necessary resources from time to time as per the instructions of BHEL.
2. In case the activities in the schedule are to be advanced, the related activities in the scope of the contractor are to be advanced to meet the project requirement. No extra payment whatsoever shall be paid on this account.
3. The contractor shall submit area-wise L3 schedule within 7 days in consultation with BHEL. The detailed L3 schedule shall be approved by BHEL and same shall be implemented. Bidder shall submit L3 schedule in MS Projects to meet the agreed project schedule covering various mile stone activities and their split up details such as mobilization, procurement of materials, fabrication & erection activities. This schedule shall also clearly indicate the interface facilities / inputs applicable in each package.

7.0 Terms of payment :

Table-A : PROGRESSIVE PAYMENT of STG PACKAGE ON PRORATA BASIS								
Sl. No.	**Activity/work description**	**Condenser (1)**	**Turbine (2)**	**Generator (3)**	**Pumps & aux/ eq (4)**	**Heaters (5)**	**Miscellaneous items (6)**	**Integral ppg (7)**
	Overall weightage for each area out of lumpsum value quoted for STG	8%	20 %	16 %	18%	6%	20%	12%
I	Pro rata payments (85%)							
1	**Condenser (8%)**							
1.1	Placement and alignment of supports on foundation, Fixed & guide point, earthquake protection bolts	30			--			--
1.2	Grouting of Supports (Last Activity, to be done after fabrication of LP Outer casing)	5			--			--
1.3	Erection, fit up and welding of bottom plates	10						
1.4	Assembly of and fit up lower components like side walls, Front & rear wall and carved wall.	5						
1.5	Welding of lower components like side walls , Front & rear wall and carved wall.	4						

1.6	Assembly and welding of internal stiffening pipes	4						
1.7	Placment , alignmnet & erection of GSC,turbine oil cooler,Exiter Air Cooler including loose items	5						
1.8	Erection of LPH1 icluding loose items	5						
1.9	Assembly of Hotbox dome walls and welding	5						
1.10	Aligning and fit up of Hotbox neck with LP Turbine	5						
1.11	Neck welding and NDT	5						
1.12	Water fill test	2						
	Subtotal for condenser	85						
2	**Turbine (20 %)(1 HP + 1 IP + 1LP)**							--
2.1	Preparation of foundation, placement, alignment and grouting of base plates of HP, IP, LP and bearing pedestals	--	6		--			--
2.1.1	Preparation of foundation		2.5					
2.1.2	Placement, alignment and grouting of base plates of hp,ip & lpc and bearing pedestals		3.5					
2.2	Placement and alignment of LP outer casing - Bottom portion and centre guide keys	--	6		--			--

2.2.1	Placement of end walls & centre guide bolts		1.5					
2.2.2	Welding of guide bolts		0.5					
2.2.3	Placement of end wall, side wall & welding and ndt completion		2.5					
2.2.4	Erection & welding of casing frame section		1.5					
2.3	Placement of LP rotor And alignment with inner casing and checking of blade clearance-	--	5		--			--
2.3.1	Placement & allignment of inner outer casing Bottom half		1.5					
2.3.2	Placement of LP rotor		1.5					
2.3.3	Alignment with inner casing including blade Clearance, checking & allignment		2					
2.4	Assembly, alignment & welding of LP outer casing upper half	--	5		--			--
2.4.1	Placement of LP outer casing, allignment Including fit up		2					
2.4.2	Welding of LP outer casing including DPT/NDT		1.5					
2.4.3	Assy of ATM relief valve & leak test		1.5					
2.5	Boxing up of LP inner-inner & inner- outer And roll check	--	3		--			--

2.5.1	Boxing of LPT inner- inner, inner-outer casing Top half		1.5					
2.5.2	Roll check of LPT		1.5					
2.6	Final box-up of LP turbine LPC	--	6					
2.6.1	Erection & welding of extraction pipes with belows inside the condenser.		3					
2.6.2	Final box up of LP turbine		3					
2.7a	Placement and alignment of IP turbine outer casing and inner casing (lower halves)	--	3		--			--
2.7b	Placement and alignment of IP rotor with lower casing and boxing up of inner & outer casing (upper halves) & roll check, bump check etc.	--	5		--			--
2.8	Final box up of IP turbine	--	1		--			--
2.9	Placement of HP turbine, lowering of HP rotor on bearings and checking of clearances, coupling, HP turbine swing checks etc.	--	6		--			--
2.9.1	Placement of HP turbine on bearing pedestal		2.5					
2.9.2	Allignment of HP turbine, roll check, bump check etc.		3.5					
'2.10	Alignment of all rotors including reaming, honing and fixing of coupling bolts		9					

2.10.1	Allignment of HP-IP, IP-LP turbines		5					
2.10.2	Reaming & honing of HP-IP, IP-LP couplings		2					
2.10.3	Combined swing check of HP-IP, IP-LP and correction to the required value.		2					
2.11	Assembly of governing system/equipment		7					
2.11.1	Placement & alignment of governing equipments (servo motors)		4					
2.11.2	Commissioning of governing system		3					
2.12	Installation of ESVS, IV, MS strainers (internals), HRH strainers (internals)	--	11		--			--
2.12.1	Installation & allignment of ESV including breach nut and tightening to required value		2					
2.12.2	Installation & allignment of IV, CV		2.5					
2.12.3	Installation & allignment of LPBP		2.5					
2.12.4	Installation & allignment of MS strainers including internals		2					
2.12.5	Installation & allignment of HRH strainers including internals		2					
2.13	Erection, alignment and welding of cross around/over and extraction piping	--	6		--			--

2.13.1	Erection & welding of extraction piping with bellows inside the condenser.		3					
2.13.2	Erection of cross around/over pipe, welding and ndt		3					
2.14	Final boxing up of pedestals after oil flushing completion	--	6		--			--
2.14.1	Final boxing up of pedestals after oil flushing completion		3					
2.14.2	Checking of radial & axial keys dimension, machining to correct size and placement		3					
	Subtotal for steam turbine		85					
3	**Generator (16%)**	--		--	--			--
3.1	Preparation of foundation, levelling, matching and grouting of foundation plates	--		6				--
3.1.1	Blue matching of anchor plates			1				
3.1.2	Blue matching of foundation plates & stator body load bearing member			1				
3.1.3	Positioning of foundation plates & bolts, welding of anchor plates			1				
3.1.4	Erection of sole plate, its grouting & erection of temporary pedestals			1				
3.1.5	Final grouting of foundation plates and gravel filling into foundation bolt sleeve			2				

3.2	Lifting, levelling and alignment of stator (including erection and dismantling of portal crane for stator lifting)			20				--
3.2.1	Assy of terminal box			3				
3.2.2	Assy of H2 cooler housing			4				
3.2.3	Placement of stator			10				
3.2.4	Alignment of stator			3				
3.3	Fixing of end shields on to foundation beams	--	--	6				--
3.4	Rotor insertion	--	--	8				--
3.5	Boxing up of generator and assembly of hydrogen seals	--	--	11				--
3.6	Alignment of generator rotor with LP turbine rotor, run-out checks and reaming, honing of coupling holes and fixing of coupling bolts	--	--	9				--
3.6.1	Alignment of GEN rotor w.r.t LP rotor			4				
3.6.2	Reaming & honning of GEN/LP coupling			3				
3.6.3	Final CRO			2				
3.7	Erection of excitation equipments & alignment of gen.-exciter rotors including	--	--	12				--

	swing check and completion of balance works							
3.7.1	Erection & alignment of exciter bed plate			3				
3.7.2	Alignment of GEN/Exciter rotor			3				
3.7.3	CRO & swing check of Exciter rotor			3				
3.7.4	Completion of balance works			3				
3.8	Grouting of GEN bearing pedestals and excitor	--	--	5				--
3.9	Final gas tightness test of stator with complete system	--	--	8				--
3.9.1	Assy of bushing & leak test			3				
3.9.2	Completion of leak test / hydro test of stator winding system			2				
3.9.3	Final gas tightneess test of stator with complete system.			3				
	Subtotal for generator			85				
4	**Pumps and auxiliaries (18 %)**	--	--		--			--
4.1	Erection / testing and commissining of Main oil pump, JOP, EOP, AOP, Centralised lube oil purification system, along with all auxilliaries.				18			

4.1.1	Erection and commissining of Main oil pump along with all auxillaries	--	--		2.5			--
4.1.2	Erection and alignment of Main oil tank				2.5			
4.1.3	Erection of Coolers & oil filters				2.5			
4.1.4	Erection and commissining of JOP along with all auxilliaries.				1.5			
4.1.5	Erection and commissining of EOP along with all auxilliaries.				1			
4.1.6	Erection and commissining of AOP along with all auxilliaries.				2			
4.1.7	Erection and commissining of centralised lube oil purification system along with all auxilliaries				6			
4.2	Erection / testing and commissioning of 1 nos Motor driven BFP, along with all auxilliaries				12			
4.2.1	Preparation of foundations for booster pump, main motor, hydraulic unit & BFP,				2			
4.2.2	Placement of BFP hyfraulic unit and booster pump and grouting				2			
4.2.3	Alignment of BFP with hydraulic coupling and booster pump				2			
4.2.4	Placement of coolers of BFP and hydraulic unit and completion of piping including erection of Loose items of MDBFP				2			
4.2.5	Completion of oil flushing				1			

4.2.6	Trial run of motor & hydraulic unit				1			
4.2.7	Commissioning of BFP with hydraulic unit and booster pump				1			
4.3	Erection and commissioning of Turbine driven BFP, along with all auxilliaries (2 nos.)				20			
4.3.1	Preperation of foundation				2			
4.3.2	Placement of turbine, gear box, booster pumps with all aux.				5			
4.3.3	Grouting of above equips				2			
4.3.4	Assembly of exaust hood with drive turbine				3			
4.3.5	Completion of integral piping				4			
4.3.6	Completion of final alignment, coupling & erection of loose items				2			
4.3.7	Completion of trial run				2			
4.4	Erection, testing, grouting etc. of Condensate extraction pumps (3 nos.)	--	--	--	5			--
4.4.1	Preparation of foundation				1			
4.4.2	Checking & erection of Canister				1			
4.4.3	Placement of pump				1			

4.4.4	Assembly of CEP bearing including connection of cooling water piping				1			
4.4.5	Commissioning of pump				1			
4.6	Erection, testing and commissioning of boiler fill pumps, Drip Pumps, Cycle makeup pumps, DM water transfer pumps, Sump pumps, CT makeup Pumps, Ash water pumps, Raw water pumps, Potable water pumps-plants, potable water pumps-, Service water pumps, APH/ESP wash water pumps, Intake water booster pumps, AHP pumps, FGD and SCR pumps, clarified water transfer pumps, boiler drain pumps, emergency hotwell make up pumps, Vacuum pumps, Condenser air evacuation pump etc				30			
4.6.1	Placement of motor & pumps				8			
4.6.2	Alignment of motor with pumps				12			
4.6.3	Grouting of motor & pumps				6			
4.6.4	Commissioning of motor along with pumps				4			
	Subtotal for pumps and auxiliaries				85			

5	**Heaters (6%)**							
5.1	Erection, testing & commissioning of HP heaters, LP heaters and external desuperheater	--	--	--		70		--
5.1.1	Placement of heater					25		
5.1.2	Alignment & grouting of heater					20		
5.1.3	Erection & welding of stand pipe/loose items & instruments					15		
5.1.4	Commissioning of heater					10		
5.2	Erection, testing & commissioning of gland steam condenser, drain coolers etc	--	--	--		15		--
5.2.1	Placement & grouting of gland steam condenser					10		
5.2.2	Placement & grouting of drain cooler					5		
	Subtotal for heaters	--	--	--		85		--
6	**Miscellaneous items (20%)**							
6.1	Erection, testing & commissioning of , dirty, Clean oil tanks, Enclosures, CO2 & H2 cylinder racks etc						30	
'6.1.2	BF valves						7	

'6.1.3	Dirty & clean oil tanks, oil unloading vessel, central lube oil purification system						7	
'6.1.4	CO2/H2 cylinders racks						3	
'6.1.5	DMCW overhead tank with loose items (1 no)						4	
'6.1.6	Portable water tank with loose items (1 no)						2	
'6.1.7	Seal oil unit						2	
6.1.8	Over load piping						5	
6.2	Erection, testing & commissioning of Control fluid tank, Purification unit etc.	--	--	--			8	
6.3	Erection, testing and commissioning of Flash tanks & flash vessels	--	--	--			10	
6.4	Erection, testing & commissioning of Chemical & Oxygen dosing skids.						8	
6.5	Erection, testing and commissioning of Plate heat exchanger package	--	--	--			8	
6.6	Erection, testing and commissioining of self cleaning strainer package	--	--	--			7	
6.7	Erection, testing and commissioining of Handling equipments Misc hoists, Chain pulley blocks, Single girder EOT cranes and other BOIs						7	
6.8	Erection of approach platforms (For Materials which are free issued from						7	

	BHEL site; apart from those received from MUs)							
	Subtotal for miscellaneous items						85	
7	**Integral piping (12%)**	--	--	--				--
7.1	Turbine integral piping and generator integral piping consisting of lube oil, jacking oil, oil vapour extraction, seal oil, control oil, seal steam, condensate spray/exhaust hood spray, turbine water drainage, gas piping, primary stator water piping, etc including all accessories like thermowells, probes, orifices etc and hangers and supports (erection and commissioning on prorata basis)	--	--	--				85
7.1.1	Pre-assembly							15
7.1.2	Placement in position							20
7.1.3	Alignment							15
7.1.4	Welding/bolting/fixing							20
7.1.5	Completion of non destructive examination and stress relieving/heat treatment , insulation wherever applicable							5

7.1.6	Hangers and supports etc. Wherever necessary as per drawing							5
7.1.7	Hydraulic test/pneumatic test wherever applicable							5
	Sub total for integral piping							85
II	**Stage/milestone payments (15%)**							
1	Oil flushing Completion (TG)	1	1	1	1	1	1	1
2	Barring gear (TG)	1	1	1	1	1	1	1
3	Rolling and synchronization	3	3	3	3	3	3	3
4	Full load	2	2	2	2	2	2	2
5	Trial operation of unit	2	2	2	2	2	2	2
6	Painting (including arrow marking, nomenclature, etc)	2	2	2	2	2	2	2
7	Area cleaning, temporary structures cutting/removal and return of scrap	1	1	1	1	1	1	1
8	Punch list points/pending points liquidation	1	1	1	1	1	1	1
9	Material reconciliation	1	1	1	1	1	1	1
10	Completion of contractual obligations	1	1	1	1	1	1	1

	Total for milestone/stage payments (15%)	15	15	15	15	15	15	15
	Total of I & II	100	100	100	100	100	100	100

NOTE:

1. The payment for integral piping shall be on pro rata basis on a per MT rate. The per MT rate shall be the allocated (the % applicable as per 'terms of payment') value for integral piping divided by the tendered quantity of integral piping in MT.

2. Quantity variation clause No 2.14 of Vol-IC General Conditions of Contract shall be applicable only for sl no 7 ' Integral Piping' of Chapter-VII-Terms of Payment'.

3. The terms of payment is only for enabling release of payment through RABs and is not indicative of the actual quantum or value of work.

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

5. Also refer GCC clause 2.23.1.

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

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

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

8.0 TAXES, DUTIES, LEVIES (Rev 14 dated 09/10/2020)

1. All taxes excluding GST, GST Cess **& BOCW** Cess **but including, Royalties, fees, license, deposits, commission, any State or Central Levy and other charges whatsoever, if any, shall be borne by you and shall not be payable extra.**
2. Any increase of the taxes excluding GST, GST Cess & BOCW **Cess**, at any stage during execution including extension of the contract shall have to be borne by the contractor. Quoted/ accepted rates/ price shall be inclusive of all such requirements. Please note that since GST on output will be paid by BHEL separately as enumerated below, your quoted rates/ price should be after considering the Input Credit under GST law at your end.
3. **GST :**

   The successful bidder shall furnish proof of GST registration .GST along with Cess (as applicable) legally leviable & payable by the successful bidder as per GST Law, shall be paid by BHEL. Hence Bidder shall not include GST along with Cess (as applicable) in their quoted price.
4. GST charged in the Tax Invoice/Debit note by the contractor shall be released separately to the contractor only after contractor files the outward supply details in GSTR-1 on GSTN portal and input tax credit of such invoice is matched with corresponding details of outward supply of the contractor and has paid the GST at the time of filing the monthly return
5. E-invoicing under GST has been implemented with effect from 1st October 2020 for all the taxable persons having turnover more than the threshold limit in any preceding financial year from 2017-18 onwards. Therefore, for all the taxable persons falling under the purview of E-invoice, it is mandatory to mention a valid unique Invoice Reference No. (IRN) and QR code as generated from E-Invoicing portal of the Government for the purpose of issuing a valid Tax Invoice. Only an E-invoice issued in the manner prescribed under rule 48(4) of CGST Rules shall be treated as valid invoice for reimbursement of GST amount.

   If the successful Bidder is not falling under the purview of E-Invoicing then he has to submit a declaration in that respect along with relevant financial statements.
6. Bidder shall note that the GST Tax Invoice complying with GST Invoice Rules (Section 31 of GST Act & Rules referred there under) wherein the 'Bill To' details will as below:

   BHEL GSTN – As per **Annexure -1**

   NAME -- Bharat Heavy Electricals Limited

   ADDRESS – Site address
7. Bidder to immediately intimate on the day of removal of Goods (in case of any supply of goods) to BHEL along with all relevant details and a scanned copy of Tax Invoice to below email ids to enable BHEL to meet its GST related compliances :-

   Email id ---- to be intimated later on.

   In case of delay in submission of the abovementioned documents on the date of dispatch, BHEL may incur penalty /interest for not adhering to Invoicing Rules under GST Law. The same will be liable to be recovered from the successful bidder, if such delay is not attributable to BHEL.
8. In case of raising any Supplementary Tax Invoice (Debit / Credit Note) Bidder shall issue the same containing all the details as referred to in Section 34 read with Rule 53.
9. Bidder shall note that in case GST credit is delayed/ denied to BHEL due to delayed / non receipt of goods and /or tax invoice or expiry of the timeline prescribed in GST Law for availing such ITC, or any other reasons not attributable to BHEL, GST amount shall be recoverable from the vendor along with interest levied / leviable on BHEL, as the case may be.
10. Bidder shall upload the Invoices raised on BHEL in GSTR-1 within the prescribed time as given in the GST Act. Bidder shall note that in case of delay in declaring such invoice in your return and GST credit

availed by BHEL is denied or reversed subsequently as per GST Law , GST amount paid by BHEL towards such ITC reversal as per GST law shall be recoverable from the bidder along with interest levied / leviable on BHEL.

11. Way Bill: Successful Bidder to arrange for way bill / e-waybill for any transfer of goods for the execution of the contract.

    The Bidder has to make their own arrangement at their cost for completing the formalities, if required, with Issuing Authorities, for bringing materials, plants & machinery at site for execution of the works under this contract, Road Permit/ Way Bill, if required, shall be arranged by the contractor and BHEL will not supply any Road Permit/ Way Bill for this purpose.

12. **New taxes and duties**:-Any New taxes & duties, if imposed subsequent to due date of offer submission as per NIT & TCN, by statutory authority during contract period including extension, if the same is not attributable to you, shall be reimbursed by BHEL on production of relevant supporting document to the satisfaction of BHEL. However, you shall obtain prior approval from BHEL before depositing new taxes and duties.
    Benefits and/or abolition of all existing taxes must be passed on to BHEL against new Taxes, if any, proposed to be introduced at a later date.
    In case any new tax/levy/duty etc. becomes applicable after the date of bidder's offer but before opening of the price bid, the bidder must convey its impact on his price duly substantiated by documentary evidence in support of the same before opening of the price bids. Claim for any such impact after opening the price bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.

13. For transportation work, bidder shall declare in his quotation whether he is registered under GST, if yes, whether he intends to claim GST on forward charge basis. In absence of this declaration, BHEL will proceed further with the assumption that bidder intends not to claim GST on forward charge basis. However, in case of GST registered transporter, the amount to the extent of goods and service tax will be retained till BHEL avails the credit of GST. Further, transporter shall issue tax invoice which inter alia includes gross weight of the consignment, name of the consigner and the consignee, registration number of vehicle in which the goods are transported, details of goods transported, details of place of origin and destination, GSTIN of the person liable for paying tax whether as consigner, consignee or goods transport agency, and also containing other information as mentioned under rule 46.

14. **TDS under Income Tax shall be deducted at prevailing rates on gross invoice value from the running bills unless exemption certificate from the appropriate authority/ authorities is furnished.**

15. **TDS under GST shall be deducted at prevailing rates on applicable value from the running bills.**

16. **TCS under Income Tax 1961 has been implemented with effect from 1st October 2020 for every seller having turnover more than threshold limit during financial year immediately preceding financial year in which the sale of goods is carried out, who receives any amount as consideration for sale of any goods of the value or aggregate of such value exceeding threshold limit other than export of goods or who is already covered under other provision of section 206C, collect from the buyer, TCS as per applicable rates of the sale consideration exceeding threshold limit subject to following conditions**
    i. Buyer shall be as per clause (a) of section 206C- (1H)
    ii. Seller shall be as per clause (b) of section 206C- (1H)
    iii. No TCS is to be collected, if the seller is liable to collect TCS under other provision of section 206C or the buyer is liable to deduct TDS under any provision of the Act and has deducted such amount.

If Successful Bidder is falling under the purview of TCS then he has to submit a declaration in that respect along with relevant financial statements before the start of work or if bidder is falling under preview of TCS during the work in progress then bidder is compulsorily required to submit relevant financial statement in the beginning of the respective FY.

For TCS claim, vendor has to submit relevant documents required as per Income Tax Act.

17. Refer Annexure – 2 for BOCW Act & Cess Act.

ANNEXURE-1

State wise GSTIN no.s of BHEL

Sl. No	Projects under state	GSTIN
1	Andhra Pradesh	37AAACB4146P7Z8
2	Bihar	10AAACB4146P1ZU
3	Chhattisgarh	22AAACB4146P1ZP
4	Gujarat	24AAACB4146P1ZL
5	Jharkhand	20AAACB4146P5ZP
6	Madhya Pradesh	23AAACB4146P1ZN
7	Maharashtra	27AAACB4146P1ZF
8	Orissa	21AAACB4146P1ZR
9	Telangana	36AAACB4146P1ZG

ANNEXURE-2

BOCW Act & Cess Act

Bidder may please note that the sub-contractor/bidder of BHEL engaging building or construction worker in connection with building or other construction work, are required to follow the procedures enumerated below:

1. It shall be the sole responsibility of the contractor as employer to ensure compliance of all the statutory obligations under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.
2. It shall be sole responsibility of the contractor engaging Building Workers in connection with the building or other construction works in the capacity of employer to apply and obtain registration certificate specifying the scope of work under the relevant provisions of the Building and Other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 from the appropriate Authorities.
3. It shall be responsibility of the contractor to furnish a copy of such Registration Certificate within a period of one month from the date of commencement of Work.
4. It is responsibility of the contractor to register under the Building and other Construction Workers' Welfare Cess Act, 1996 and deposit the required Cess for the purposes of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 at such rate as the Central Government may , by notification in the Official Gazette, from time to time specify. However, before registering and deposit of Cess under the Building and other Construction Workers' Welfare Cess Act, 1996, the contractor will seek written prior approval from the Construction Manager.
5. It shall be sole responsibility of the contractor as employer to get registered every Building Worker, who is between the age of 18 to 60 years of age and who has been engaged in any building or other construction work for not less than ninety days during the preceding twelve months as Beneficiary under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996.

6. It shall be sole responsibility of the contractor as employer to maintain all the registers, records, notices and submit returns under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.
7. It shall be sole responsibility of the contractor as employer to provide notice of poisoning or occupation notifiable diseases, to report of accident and dangerous occurrences to the concerned authorities under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the rules made thereunder and to make payment of all statutory payments & compensation under the Employees' Compensation Act, 1923.
8. It shall be the responsibility of the sub-contractor as employer to make payment/deposit of applicable cess amount on the extent of work involving building or construction workers engaged by the sub-contractor within a period of one month from the receipt of payment. It shall also be responsibility of the Contractor to furnish BHEL on monthly basis, Receipts/ Challans towards Deposit of the Cess under the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder along with following statistics :
   (i)Number of Building Workers employed during preceding one month.
   (ii) Number of Building workers registered as Beneficiary during preceding one month.
   (iii)Disbursement of Wages made to the Building Workers for preceding wage month.
   (iv) Remittance of Contribution of Beneficiaries made during the preceding month
9. BHEL shall reimburse the contractor the Cess amount deposited for the purposes of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 under the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder. However, BHEL shall not reimburse the Fee paid towards the registration of establishment, fees paid towards registration of Beneficiaries and Contribution of Beneficiaries remitted.
10. It shall be responsibility of the Building Worker engaged by the Contractor and registered as a beneficiary under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 to contribute to the Fund at such rate per mensem as may be specified by the State government by notification in the Official Gazette. Where such beneficiary authorizes the contractor being his employer to deduct his contribution from his monthly wages and to remit the same, the contractor shall remit such contribution to the Building and other construction Workers' Welfare Board in such manner as may be directed by the Board , within the fifteen days from such deduction.
11. Bidders may please note that though the quoted price is exclusive of BOCW (which will be reimbursed by BHEL as per sub-clause 9 above) , however, If at any point of time during the contract period, non-compliance of the provisions of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder is observed, BHEL reserves the right to deduct the applicable cess (1%) on the contract value and penalty (if any, imposed by Cess Authorities) from the payables on account of non-compliance.
12. The contractor shall declare to undertake any liability or claim arising out of employment of building workers and shall indemnify BHEL from all consequences / liabilities / penalties in case of non-compliance of the provisions of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.

9. SPECIFIC INCLUSIONS

9.1 All terminal connections for equipment & piping covered in this specification. Installation of fittings, thermowells/thermo couples etc. required for successful completion of Performance Guarantee Test. All assistance of issue of materials, return after PG test, assistance during PG test is in the scope of vendor. System Isolation, flushing of root valves etc. during PG test is in the scope of vendor.

9.2 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.

9.3 Contractor shall be responsible for all necessary liasioning work with Statutory Authority towards the certification of installation / works. All incidental expenses shall be borne by Contractor. BHEL/ BHEL's Customer shall be providing technical assistance, drawing & document for submission to Statutory Authority. Contractor shall provide all logistics services in this regard. All registration/statutory inspection fees required (under IBR and) other statutory laws/permits/approvals and/or licenses during construction phase may have to be paid by contractor, same shall be reimbursed to Contractor by BHEL/BHEL customer. All other arrangements for site visits periodically by the Inspectorate to site, Inspection certificate etc. will have to be made by contractor. However, BHEL will not make any payment to the Inspectorate in connection with contractor's Welders/Electricians qualification tests etc. (Refer clause 2.8.6 of GCC).

9.4 **WELDING ELECTRODES, FILLER WIRES FOR TIG WELDING AND GASES** All welding consumables including filler wires other than supplied by BHEL are in the contractor's scope. as per shipping list for Alloy steel piping only are in the contractor's scope. If BHEL supplied electrodes consumed more than the specified quantity in shipping list , extra quantity shall be arranged by the agency without any extra claim.

9.5 All the required welding electrodes (other than BHEL supplied)as approved by BHEL shall be arranged by contractor at his cost. It shall be the responsibility of the contractor to obtain prior approval of BHEL, before procurement, regarding manufacturer, type of electrodes etc. on receipt of the electrodes at site, it shall be subject to inspection and approval by BHEL regarding type of electrodes, batch number, date of expiry etc. Batch test certificates shall be made available for verification & record before the actual use of the welding consumables. BHEL reserves the right to reject the use of any electrodes, if found non-acceptable because of bad quality, deterioration in quality due to improper storage, shelf life expiry, unapproved type / brand etc.

9.6 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.

9.7 **Thermowells welding is included in contractors scope of work without any extra claim.**

10.0 EXLUSIONS

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

1 Measuring instruments, monitoring, relaying, protection and signaling equipments other than those supplied with the equipments by / on behalf of BHEL and which have been indicated as scope of work.

2 Civil works to the extent not specifically provided for in this tender.

3 Supply of materials for temporary piping (pipe, valve, structural steel etc.) required for hydraulic test, chemical cleaning, flushing or steam/air blowing of the pipelines.

4 Supply of chemicals and lube oil for pre-commissioning and commissioning activities.

5 Electrical testing of motors, valves actuators etc. However erection of these items will be under the scope of this tender specification.

11.1 WEIGHT SCHEDULE – SUMMARY of Weight of BOQ under the scope of STG #3:-

Sr. No	Description	Rate Schedule Identifier	Approx wt. (In MT) STG#2
1	Condenser & Aux	**1**	**338.491**
2	Steam Turbine & Aux	**2**	**911.006**
3	Turbo Generator & Aux	**3**	**792.313**
4	Pumps & Aux BFP - MD & TD	**4**	**369.6**
5	Pumps & Aux - CEP		
6	Pumps & Aux Drip Pump		
7	BFP TD and Aux	**4**	**104.2**
8	PEM supplied Pumps and Motors	**4**	**70.5**
9	BPL Supplied Motors for Pumps	**4**	**83.6**
10	Heat Exchanger	**5**	**763.25**
11	flash tanks, Misc Tank, BF valves	**6**	**121.46**
12	Major BOI (BOI Haridwar, BOI Supplies)	**6**	**383.692**
13	PEM BOIs	**6**	**204.7**
14	Misc Structure	**6**	**100**
15	TIP (Turbine Integral Piping)	**7**	**121.996**
	Total Weight in MT		**4364.82**

11.2 STG#3 Weight Schedule – Detailed:

TG #3 PACKAGE SUPPLY SCHEDULE BHEL HARIDWAR SUPPLIES-TURBINES, GENERATORS,CONDENSORS& BOIS						
Steam Turbine & Aux						
Unit	PGMA	DESCRIPTIONS			GROSS WT in Kgs (TG#3)	PKG SIZE
HWR	75001/1	ARRANGE.OF EMBED(ANCHOR POINT)			777	2550X800X1000
HWR	75001/2	ARRANGE.OF EMBED(ANCHOR POINT)			777	2550X800X1000
HWR	75001/3	ARRANGE.OF EMBED(ANCHOR POINT)			777	2550X800X1000
HWR	75001/4	ARRANGE.OF			449	2550X800X500

		EMBED(ANCHOR POINT)				
HWR	75001/5	ARRANGE.OF EMBED(ANCHOR POINT)			449	2550X800X500
HWR	75001/6	ARRANGE.OF EMBED(ANCHOR POINT)			627	3350X800X500
HWR	75001/7	ARRANGE.OF EMBED(ANCHOR POINT) EMBED.FOR LPC GUIDE BOLT			627	3350X800X500
HWR	75001/8	ARRANGE.OF EMBED(ANCHOR POINT)- EMBED.FOR LPC GUIDE BOLT			627	3350X800X500
HWR	75001/9	ARRANGE.OF EMBED(ANCHOR POINT)- LOOSE ITEMS			627	3350X800X500
HWR	75001/10	ARRANGE.OF EMBED(ANCHOR POINT)- ANCHOR RODS/NUTS			819	1600X1300X1500
HWR	75001/11	ARRANGE.OF EMBED(ANCHOR POINT)			825	1600X1300X1500
HWR	75003/1	BASE PLATE ASSEMBLY			683	1550X900X900
HWR	75004/0	BASE PLATE ASSEMBLY			3654	3000X2050X1000
HWR	75102/0	CASING UPPER PART			17100	9220X3270X3180
HWR	75103/0	CASING UPPER PART			16900	9220X3270X3180
HWR	75104/0	RUPTURE DIAPHRAGM ASSEMBLY			1049	1600X1500X1700
HWR	75107/0	CASING SIDE WALL (LEFT)			1717	5100X1200X200
HWR	75108/0	CASING SIDE WALL (RIGHT)			1717	5100X1200X200
HWR	75109/0	FRONT WALL (TS)			28348	9460X3090X5015
HWR	75110/0	FRONT WALL (GS)			28348	9460X3090X5015
HWR	75111/0	LP SHAFT SEAL CASING - TS			822	2000X2000X750
HWR	75112/0	LP SHAFT SEAL CASING - GS			822	2000X2000X750
HWR	75113/0	LP SHAFT SEAL COMPENSATOR (TS)			1440	2400X2400X800
HWR	75114/0	LP SHAFT SEAL COMPENSATOR (GS)			1440	2400X2400X800
HWR	75115/0	GRATING COVERING FOR LP			958	1800X500X600
HWR						
HWR	75116/1	CASING FRAME SECTION			1922	3550X900X650
HWR	75116/2	CASING FRAME SECTION			1922	3550X900X650
HWR	75201/0	HP/IP BEARING PEDESTAL			14516	4420X2523X2171
HWR	75202/0	HP/IP BEARING PEDESTAL (PARTS)			1060	1700X1600X600
HWR	75319/4	SPARES OF BLOW OUT DEVICE			450	3000X3000X600
HWR						
HWR	75401/0	IP-LP BEARING PEDESTAL ASSLY			21260	6850X2770X2494
HWR	75402/0	BEARING PEDESTAL (PARTS)			611	2500X1000X600
HWR	75501/0	LP/GEN. PEDESTAL ASSEMBLY			21407	6850X2770X2495
HWR	75502/0	BEARING PEDESTAL (PARTS)			110	1500X1000X800
HWR	75601/1	FRONT BEARING PEDESTAL			6582	3450X1935X1623
HWR	75601/2	HYDRALLIC TURNING MOTOR			697	1300X900X1000
HWR	75601/3	FRONT BEARING PEDESTALS(PARTS)			218	1000X600X600
HWR	75705/1	LP EXTRACTION A1			749	2800X1200X1500
HWR	75705/2	LP EXTRACTION A1			697	3200X1600X1200
HWR	75705/3	LP EXTRACTION A1			747	3400X1400X1600
HWR	75705/4	LP EXTRACTION A1			581	2000X3000X1200

HWR	75706/1	LP EXTRACTION A2			771	2900X2500X1200
HWR	75706/2	LP EXTRACTION A2			640	3000X900X1200
HWR	75706/3	LP EXTRACTION A2			308	1500X1300X200
HWR	75707/1	LP EXTRACTION A3			1144	2500X2500X1500
HWR	75707/2	LP EXTRACTION A3			770	2500X2500X1500
HWR	75708/1	LP EXTRACTION A4			321	1500X1100X400
HWR	75708/2	LP EXTRACTION A4			321	1500X1100X400
HWR	75716/1	EXTRACTION PIPE SHEATHING A3			440	2300X900X800
HWR	75716/2	EXTRACTION PIPE SHEATHING A3			450	2000X800X700
HWR	75716/3	EXTRACTION PIPE SHEATHING A4			483	1750X1150X1050
HWR	75716/4	EXTRACTION PIPE SHEATHING A4			74	1000X600X300
HWR	75717/1	COMPENSATORS FOR CASING GUIDE			1470	2900X1800X600
HWR	75717/2	COMPENSATORS FOR CASING GUIDE			1470	2900X1600X600
HWR	75720/0	LP INNER CASING (U/H)			39012	6035X4778X3820
HWR	75721/0	LP INNER CASING (L/H)			59082	5230X5200X2980
HWR	75722/1	ASSEMBLY OF GUIDE			5400	5100X2800X1100
HWR		BLADECARRIERS 3L LPT (U/H)				
HWR	75722/2	ASSEMBLY OF GUIDE BLADE			4430	4200X2300X1000
HWR		CARRIERS 3R LPT (U/H)				
HWR	75722/3	ASSEMBLY OF GUIDE			10985	3910X1660X2205
HWR		BLADECARRIERS 1L (U/H)-LPT				
HWR	75722/4	ASSEMBLY OF GUIDE			10985	3910X1660X2205
HWR		BLADECARRIERS 1R (U/H)-LPT				
HWR	75723/1	LP CASING ASSEMBLY PARTS			906	4800X700X700
HWR	75723/2	LP CASING ASSEMBLY PARTS			2344	1500X1000X1500
HWR	75723/3	LP CASING ASSEMBLY PARTS			24	500X500X400
HWR	75723/4	LP CASING ASSEMBLY PARTS			240	2100X2100X500
HWR	75724/1	LP INNER CASING ASSEMBLY(PARTS			1650	3300X1750X350
HWR	75724/2	LP INNER CASING ASSEMBLY(PARTS			157	900X600X250
HWR	75725/0	GRATING COVERING FOR LP			435	2300X1000X600
HWR	75801/0	LP ROTOR			64441	7000X3140X3110
HWR	75901/0	IP ROTOR			29814	6090X1880X1700
HWR	75902/0	IP OUTER CASING (U/H)			30543	6240X4200X2427
HWR	75903/0	IP OUTER CASING (L/H)			39813	5945X4200X2325
HWR	75904/0	IP INNER CASING (U/H)			28060	4010X3320X1970
HWR	75905/0	IP INNER CASING(L/H)			30800	4010X3700X2121
HWR	75906/0	SUPPORTING ARMS-IP OUTERCASING			2118	1330X1472X880
HWR	75907/0	IP SHAFT SEALING			650	1100X800X600
HWR	75908/0	IP TURBINE (PARTS)			7200	3000X2000X1600
HWR	75909/0	I.P. TURBINE PARTS			380	1200X1200X200
HWR	76001/0	HP TURBINE			128412	6745X3790X3495
HWR	76002/0	HP INLET ASSEMBLY			105	1000X1000X500
HWR	76004/0	HP TURBINE PARTS			76	500X500X500
HWR	76104/0	ESV & CV CASING WITH VALVESESV			35890	5100X4800X3100
HWR		& CV CASING WITH VALVES				
HWR	76104/1	STEAM STRAINERS FOR MSVALVES			350	1600X700X700
HWR	76105/1	MOUNTING SUPPORT FOR MS VALVE			1100	1700X800X1000

HWR	76105/2	MOUNTING SUPPORT FOR MS VALVE			1100	1700X800X1000
HWR	76108/0	ESV & CV CASING WITH VALVESESV			35890	5100X4800X3100
HWR		& CV CASING WITH VALVES				
HWR	76112/0	OVERLOAD VALVE CASINGWITH			4200	3000X2000X1400
HWR		VALVE				
HWR	76201/0	SUSPENSION OF OVERLOAD VALVE			1050	3900X700X1150
HWR	76202/0	IV & CV CASING WITH VALVES			52000	6210X4870X3600
HWR	76202/2	STEAM STRAINERS FORINTERCEPTOR			1505	2800X1500X1500
HWR		VALVE				
HWR	76205/1	MOUNTING SUPPORT FOR HRH			2600	2750X1750X900
HWR		VALVE				
HWR	76205/2	MOUNTING SUPPORT FOR HRH			2600	2750X1750X900
HWR		VALVE				
HWR	76206/0	IV & CV CASING WITH VALVES			52000	6210X5625X3600
HWR	76301/1	SUSPENSION OF LPBP VALVE			925	3600X800X600
HWR	76301/2	SUSPENSION OF LPBP VALVE			925	3600X800X600
HWR	76412/0	LEAKAGE OIL TANK			515	1000X1000X3000
HWR	76413/0	WASTE OIL TANK			515	1000X1000X3000
HWR	76601/0	COMPONENTS OF COP ASSEMBLY			4724	3500X2300X2500
HWR	76602/0	COMPONENTS OF COP ASSEMBLY			2611	3000X2500X2000
HWR	76603/0	COMPONENTS OF COP ASSEMBLY			3100	3000X2600X1600
HWR	76604/0	COMPONENTS OF COP ASSEMBLY			2781	3000X2400X2500
HWR	76605/0	COMPONENTS OF COP ASSEMBLY			6000	6000X2900X2000
HWR	76606/0	COMPONENTS OF COP ASSEMBLY			60	2100X2100X100
HWR	76607/0	COMPONENTS OF COP ASSEMBLY			240	2500X100X100
HWR	76608/0	COMPONENTS OF COP			11	400X200X200
HWR		ASSEMBLY(PARTS)				
HWR	76801/0	RATING,COLLABORATION			55	1000X650X300
HWR		ANDCOMPANY'S MONOGRAM				
HWR	76914/0	COMPENSATOR			50	600X600X900
HWR	76921/0	VALVE BLOCK ASSLY			12	250X200X200
HWR	77202/0	TEMP. & PRESSURE CONNECTIONS			350	1700X750X750
HWR	77203/0	IMPULSE PIPES (CARBON STEEL)			1706	7000X900X800
HWR	77204/2	TEMP. INSTRUMENTS & SENSORS			281	800X800X500
HWR	77204/3	LEVEL INSTRUMENTS & SENSOR			220	2800X450X450
HWR	77205/0	TRANSMITTERS & J.B.OF BEARINGS			74	800X600X600
HWR	77206/0	IMPULSE PIPES(ALLOY STEEL AND			249	7000X500X500
HWR		SS)				
HWR	77207/0	IMPULSE PIPESIMPULSE PIPES			2685	7000X500X500

Sub Total - Turbine					911006	
GENERATOR & Aux SUPPLIES						
Unit	PGMA	Descriptions			TG#3- Wt In KG	Size
HWR	801	FOUNDATION PLATES			12155	6400X1680X950
HWR	802	FOUNDATION BOLTS			1208	2540X655X600
HWR	803	FOUNDATION ITEMS			2170	5800X1120X520
HWR	805	GENERATOR STATOR			443000	10015X4500X4290
HWR	806	GENERATOR ROTOR			98187	14755X1910X1915
HWR	807	END SHIELD LOWER HALF (TE)			9883	3800X1500X2240
HWR	808	END SHIELD UPPER HALF (TE)			8883	3800X1500X2240
HWR	809	END SHIELD LOWER HALF (EE)			9933	3800X1500X2240
HWR	810	END SHIELD UPPER HALF (EE)			8933	3800X1500X2240
HWR	811	GENERATOR BEARING (EE & TE)			2063	1278X1218X1170
HWR	812	BAFFLE RING CARRIER & AIR GAP SEAL			1306	2035X1885X1200
HWR						
HWR	813	TERMINAL BUSHINGS			1432	2360X1624X735
HWR	814	TERMINAL BUSHING BOX			7337	3500X2600X1740
HWR	815	SHAFT SEALS (EE & TE) & OIL CA TCHER			1411	2260X1140X900
HWR		(INNER & OUTER)				
HWR	816	BAFFLE RING ASSEMBLY			1279	2170X1970X1180
HWR	817	GENERATOR ACCESSORIES			201	1150X1150X350
HWR	818	ARRANGEMENT OF TERMINAL BUSHIN			1860	3410X1800X835
HWR		G COMPONENTS				
HWR	819	GENERATOR ACCESSORIES			550	950X950X450
HWR	820	GENERATOR ACCESSORIES			722	1200X800X800
HWR	821	GENERATOR ACCESSORIES			112	1700X1200X250
HWR	822	PRIMARY WATER TANK			460	1600X1600X2400
HWR	823	PW TANK PIPE LINES			2470	5000X1800X1665
HWR	824	PW TANK PIPE LINES			1040	2750X1400X1565
HWR	826	COOLER HOUSING FRAME			21500	4290X4450X1428
HWR	827	SEAL RINGS			107	820X820X200
HWR	828	CONNECTION PIECE ASSEMBLY			675	1522X1050X500
HWR	830	GENERATOR TERMINAL BOXES			230	1050X750X600
HWR	831	DRY AIR BLOWER			80	1100X1000X700
HWR	837	BRUSHLESS EXCITER SET			30430	5900X2435X2910
HWR	839	DRY AIR BLOWER AND ACCESSORIES			592	1800X1500X1100
HWR	840	EXCITER BED PLATE ACCESSORIES			3000	4500X1200X1200
HWR	842	EXCITER ACCESSORIES			1100	2200X1850X600
HWR	843	EXCITER FOUNDATION ACCESSORIES			520	1000X1000X700
HWR	844	RR WHEEL AIR GUIDE COVER			2900	2300X2090X2020
HWR	845	SEAL OIL STORAGE TANK			2500	5000X1800X2000
HWR	846/1	PW PUMP AND FILTER UNIT-PART I			4958	4300X3100X3392
HWR	846/2	PW PUMP AND FILTER UNIT-PART II			4880	4300X3100X3392

HWR	846/3	ION EXCHANGER SKID			625	2000X1650X2300
HWR	848/1	DOUBLE FLOW S.O.U.-PART I			3859	4300X3350X3192
HWR	848/2	DOUBLE FLOW S.O.U. -PART II			2787	4300X3350X3192
HWR	848/3	DOUBLE FLOW S.O.U. -PART III			1878	3100X1400X2800
HWR	849	LIQUID DETECTOR RACK			600	2500X840X2200
HWR	850	GAS UNIT			778	2550X1750X2560
HWR	851	CO2 VAPOURISER			316	1800X800X850
HWR	852	H2 DISTRIBUTOR			380	3600X1800X800
HWR	853	CO2 DISTRIBUTOR			335	4900X1200X500
HWR	855	DRAIN OIL COLLECTOR			139	1900X650X650
HWR	856				100	1200X600X600
HWR	857	TG SYSTEM INTEGRAL PIPING VLV			2486	2750X1400X1400
HWR	858	TG SYSTEM INTEGRAL PIPING INST			186	1500X940X900
HWR	859	CONSUMABLES			32	800X400X200
HWR	865/1	ROTOR FLUX MONITORING SYSTEM-1			80	1000X800X2400
HWR	803/0	FOUNDATION ITEMS			3470	5800X1120X631
HWR	806/0	SKID PLATE			677	8000X625X335
HWR	822/0	PRIMARY WATER TANK			973	1500X1500X2165
HWR	823/0	PW TANK PIPE LINES			2506	5000X1800X1665
HWR	824/0	PW TANK PIPE LINES			1059	2750X1400X1565
HWR	831/0	DRY AIR BLOWER			648	1360X1190X1625
HWR	833/0	ROTOR INSERTION DEVIES			2321	2460X1170X1350
HWR	834/0	WIRE ROPES FOR ROTOR			523	1800X1800X490
HWR	835/0	GENERATOR ERECTION DEVICES			1455	3300X1555X1140
HWR	836/0	SPECIAL TOOLS & TACKLES			145	800X700X428
HWR	837/0	BRUSHLESS EXCITER SET			30430	5900X2435X2910
HWR	839/0	DRY AIR BLOWER AND ACCESSORIES			1157	1550X1920X1298
HWR	840/0	EXCITER BED PLATE ACCESSORIES			3045	4550X1320X1448
HWR	842/0	EXCITER ACCESSORIES			1533	2250X2220X878
HWR	843/0	EXCITER FOUNDATION ACCESSORIES			783	1200X870X1013
HWR	844/0	RR WHEEL AIR GUIDE COVER			3360	2250X2420X2128
HWR	845/0	SEAL OIL STORAGE TANK			3956	5000X1800X2185
HWR	846/1	PW PUMP AND FILTER UNIT-PART I			5957	4300X2600X3465
HWR	846/2 1914	PW PUMP AND FILTERUNIT-PART II			4043	4300X2600X3465
HWR	846/3	ION EXCHANGER SKID			1481	2550X1750X2725
HWR	848/1	DOUBLE FLOW S.O.U.-PART I			3965	3600X2500X2665
HWR	848/2	DOUBLE FLOW S.O.U. -PART II			2968	3200X2300X2865
HWR	848/3	DOUBLE FLOW S.O.U. -PART III			1938	3100X1400X2365
HWR	849/0	LIQUID DETECTOR RACK			869	2500X840X2340
HWR	850/0	GAS UNIT			1927	2550X1750X2725
HWR	851/0	CO2 VAPOURISER			579	1800X880X900
HWR	852/0	H2 DISTRIBUTOR			919	3750X1800X840
HWR	853/0	CO2 DISTRIBUTOR			864	4900X1200X665
HWR	855/0	DRAIN OIL COLLECTOR			336	2000X550X715
HWR	856/0	RESINS			242	1200X600X715
HWR		TG SYSTEM INTEGRAL PIPING VLV			2346	2750X1400X1565
HWR	858/0	TG SYSTEM INTEGRAL			338	1000X940X1065

		PIPING INST				
HWR	859/0	CONSUMABLES (EXCITER)			22	400X300X300
HWR	865/1	ROTOR FLUX MONITORING SYSTEM-1			500	1130X870X2600
HWR	865/2	ROTOR FLUX MONITORING SYSTEM-2			330	1500X1500X700
Sub Total - Generator					792313	
CONDENSOR & Aux SUPPLIES						
Unit	PGMA	Descriptions			TG#3- Wt In KG	Size
HWR	78004/0	BOTTOM PLATE HOT BOX			7278	8040X1000X150
HWR	78010/0	LOOSE ITEMS (BOTTOM PLATE HOTBOX)			225	500X500X500
HWR						
HWR	78014/0	CONDENSER EMBEDMENT PLATE			1443	2600X1100X1000
HWR	78018/0	SUPPORT OF HOT BOX			2193	1400X1000X950
HWR	78019/0	EARTHQUAKE PROTECTION HOT BOX				600X500X500
HWR	78032/0	SIDE WALL (REAR SIDE-1)			8965	9014X4390X440
HWR	78033/0	SIDE WALL (REAR SIDE-2)			5054	9014X3700X550
HWR	78034/0	SIDE WALL (REAR SIDE-3)			11655	9014X6122X260
HWR	78035/0	SIDE WALL (REAR SIDE-4)			7548	9014X4460X975
HWR	78036/0	SIDE WALL (FRONT SIDE -1)			10614	9100X4390X300
HWR	78037/0	SIDE WALL (FRONT SIDE -2)			10408	9100X4480X265
HWR	78038/0	SIDE WALL (FRONT SIDE -3)			505	4500X800X300
HWR	78039/0	SIDE WALL (TUR SIDE-1)			15251	12215X4390X290
HWR	78040/0	SIDE WALL (TUR SIDE-2)			12594	11929X4480X300
HWR	78041/0	SIDE WALL (GEN SIDE-1)			15313	12215X4390X295
HWR	78042/0	SIDE WALL (GEN SIDE-2)			11500	11684X4480X295
HWR	78043/0	SIDE WALL (LOOSE ITEMS)			7731	9014X4400X750
HWR	78048/0	SHELL INTERNALS-1			5800	9200X1600X500
HWR	78049/0	SHELL INTERNALS-2			10300	9250X1550X800
HWR	78050/0	SHELL INTERNALS-3			11172	9250X1550X800
HWR	78051/0	SHELL INTERNALS-4			8500	6200X2000X800
HWR	78052/0	SHELL INTERNALS-5			9015	11850X1150X800
HWR	78053/0	SHELL INTERNALS-6			3450	1650X1200X1400
HWR	78054/0	SHELL INTERNALS-7			2607	2600X1150X1000
HWR	78055/0	SHELL INTERNALS-8			1200	4900X500X500
HWR	78056/0	SHELL INTERNALS-9			3500	1500X1300X1300
HWR	78057/0	SHELL INTERNALS-10			1930	3754X3279X40
HWR	78075/0	LOWER DOME WALL (TUR. END)			8837	11680X2810X400
HWR	78076/0	LOWER DOME WALL (TUR. END)			6993	11680X2900X260
HWR		LOWER DOME WALL (TUR. END)LOOSE ITEMS			700	8900X250X40
HWR	78103/0	LOWER DOME WALL (GEN. END)			7816	11680X2810X260
HWR	78104/0	LOWER DOME WALL (GEN. END)			6994	11680X2900X260
HWR	78106/0	LOWER DOME WALL (GEN. END)LOOSE ITEMS			712	6300X450X250
HWR	78109/0	LOWER DOME WALL (A ROW SIDE)			5710	9200X2850X300
HWR	78110/0	LOWER DOME WALL (A ROW SIDE)			3980	9200X2850X300
HWR	78112/0	LOWER DOME WALL (A ROW SIDE)LOOSE ITEMS			687	2800X1700X400

HWR		LOWER DOME WALL (B ROW SIDE)			2670	3350X2850X400
HWR	78116/0	LOWER DOME WALL (B ROW SIDE)			2670	3350X2850X400
HWR	78118/0	LOWER DOME WALL (B ROW SIDE)LOOSE ITEMS			6000	9200X2850X1400
HWR	78121/0	PIPES (DOME INTERNALSTIFFENING)			5800	11850X1300X450
HWR	78122/0	PIPES (DOME INTERNALSTIFFENING)			8238	9750X1300X750
HWR	78123/0	PIPES (DOME INTERNALSTIFFENING)			1184	1600X840X600
HWR	78124/0	PIPES (DOME INTERNALSTIFFENING)			3662	6150X900X750
HWR	78125/0	PLATES & PIPES (DOME INTERNALSTIFFENING)			1756	1560X940X600
HWR	78129/0	L.P.HEATER SUPPORTS			1035	1750X1150X950
HWR	78130/0	L.P.HEATER SUPPORTS			4381	6500X1600X750
HWR	78156/0	LOOSE ITEMS HOTBOX			5054	9014X3540X570
HWR	78301/0	GLAND STEAM CONDENSER			1610	1750X1700X1700
HWR	78304/0	LOOSE ITEMS OF GSC			89	800X450X350
HWR	78305/0	LOOSE ITEMS OF GSC (FRAGILE)			35	700X600X500
HWR	78315/0	LP HEATER 1			29400	9500X2900X2700
HWR	78316/0	STAND PIPES OF LPH-1			100	2200X350X350
HWR	78317/0	LOOSE ITEMS OF LPH-1			138	700X600X500
HWR	78318/0	LOOSE ITEMS OF LP HEATER 1			75	1000X500X500
HWR	78319/0	LOOSE ITEMS OF LPH - 1(NFRAGILE)			170	2100X500X400
HWR		TROLLEY FOR LP HEATER 1			664	1350X800X200
HWR	78401/0	TURBINE OIL COOLER			13250	5850X1700X2300
HWR	78402/0	TUBE BUNDLE FOR MOC			5800	4500X1380X1380
HWR	78405/0	TURBINE OIL COOLER			13250	5850X1700X2300
HWR	78406/0	LOOSE ITEMS (TOC)			130	800X800X500
HWR	78431/0	EXCITER AIR COOLER			1570	3450X900X760
HWR	78432/0	EXCITER AIR COOLER			1570	3450X900X760
HWR	10004/0	LOOSE INSTRUMENTSLOOSE			10	500X500X530
HWR		INSTRUMENTS				
Sub Total -Condensor					**338491**	
BOI SUPPLIES						
Unit	PGMA	Descriptions	Qty	UOM	TG#3-Wt In KG	
HWR	BT001	LIFTING BEAM	1	NO	7000	
HWR	BT006	BUTTERFLY VALVES	1	ST	22	
HWR	BT009	NRV WITH ALUMINIUM FLAP	2	NO	25	
HWR	BT011	OIL PURIFICATION UNIT	1	NO	2600	
HWR	BT014	SPRAY NOZZLES	1	ST	1	
HWR	BT015	DIRT CATCHERS	1	NO	50	
HWR	BT016	DAMPER	1	ST	164	
HWR	BT017	VARIABLE LOAD SPRING CAGES	1	ST	800	
HWR	BT023	TURBINE OIL	1	FL	41800	
HWR	BT024	DRY AIR PRESERVATION SYSTEM	1	ST	2300	
HWR	BT025	OIL PURIFICATION SYSTEM (CENTR	1	NO	2600	
HWR	BT043	CONTROL FLUID (FRF)	1	FL	3030	
HWR	BT046	LP BYPASS STOP & CONTROL VALVE WITH EHA AND	1	ST	30000	

		WATER INJECTION VALVE				
HWR	BT054	STEAM TRAP	1	ST	33	
HWR	BT065	GEAR PUMP (LUB. OIL RECIRCULAT	1	NO	25	
HWR	BT074	VACUUM BREAKER VALVE WITH PNEU	2	NO	370	
HWR	BT081	HPT STEAM EVACUATION VALVE	1	NO	670	
HWR	BT096	OIL MODULE	1	NO	37000	
HWR	BT097	OIL THROTTLE VALVES	1	ST	130	
HWR	BT104	SEAL STEAM CONTROL VALVE WITH	1	NO	760	
HWR	BT105	LEAK STEAM CONTROL VALVE WITH	1	NO	1400	
HWR	BT107	PNEUMATIC GLOBE VALVE	1	NO	30	
HWR	BT110	HYDRAULIC POWER SUPPLY UNIT FO	1	ST	5232	
HWR	BT111	ELECTRO-HYDRAULIC ACTUATORS FO	1	ST	12300	
HWR	BT139/1	800MW HPT,	1	ST	130000	
HWR	BG001	EMPTY H2 CYLINDER	265	NO	10560	
HWR	BG002	EMPTY CO2 CYLINDER	125	NO	4420	
HWR	BG003	EMPTY N2 CYLINDER	36	NO	625	
HWR	BG080	STROBOSCOPE	1	NO	50	
HWR	BG082	HYDRAULIC UNIT ASSEMBLY	1	NO	1000	
HWR	BG094	GAS DRIER (DESICCANT TYPE) - D	1	NO	500	
HWR	BG098	EXCITER COVER COMPLETE WITH FA	1	NO	4700	
HWR	BH001					
HWR	BH012	AIR EXHAUSTER WITH MOTOR	2	NO	520	
HWR	BH022	MULTI BALL BEARING SUPPORT FOR	1	ST	8000	
HWR	BG008	MOTORISED TEMPERATURE CONTROL	1	NO	1800	
HWR	BG092	PW TEMPERATURE CONTROL VALVE	1	NO	900	
HWR	BG004	PORTABLE GAS ANALYSER	1	NO	50	
HWR	BG007	VAPOUR EXHAUSTER	2	NO	1000	
HWR	BG011	REFRIGERATION GAS DRYER	2	NO	18000	
HWR	BG080	STROBOSCOPE	1	NO	50	
HWR	BH028	PTFE BEARING SUPPORT	1	ST	200	
HWR	BH028	TITANIUM ELBOWS AND U BENDS	12	NO	500	
HWR	BH034	STAINLESS STEEL PIPES	4800	MM	38000	
HWR	BH035	MOISTURE MEASURING SYSTEM	1	NO	1800	
HWR	BG005	MOTORISED TEMPERATURE CONTROL	1	NO	100	
HWR	BG008	H2 GAS ANALYSER CABINET	2	NO	200	
HWR	BG009	STARTING RESISTOR FOR DC S.O MOTOR	1	NO	50	
HWR	BG018	GROUNDING BRUSH MONITOR	1	NO	100	
HWR	BG021	FIBRE OPTIC END WINDING VIBRAT	1	ST	200	
HWR	BG022	PW TEMPERATURE CONTROL VALVE	1	NO	25	
HWR	BG092	DC STARTERS & INSTRUMENTATION	1	ST	25	
HWR	BT094	PRESSURE TRANSMITTERS	1	ST	25	

		FOR STEA				
HWR	BT147	PRESSURE GAUGES FOR TG SET	1	ST	50	
HWR	BT149	BAR PROBE WITH AMPLIFIER	1	st	50	
HWR	BT150	CALIBRATION JIG	1	st	50	
HWR	BT155	CONSTANT LOAD SPRING CAGES	1	st	50	
HWR	BT071	LEVEL INDICATORS FOR OIL TANKS	1	st	50	
HWR	BT029	CALIBRATED FLOW NOZZLE ASSLY.	2	st	200	
HWR	BT020	THERMAL INSULATION OF TURBINE	3	st	3000	
HWR	BT021	THERMAL INSULATION OF TIP	4	st	8000	
HWR	BT008	DOUBLE THREE WAY VALVES	5	st	500	
Sub Total -BOI Haridwar					383692	
TURBINE INTEGRAL PIPING						
Unit	PGMA	Descriptions	Qty	UOM	TG#3-Wt In KG	Size
HWR	BT027	TURBINE INTEGRAL PIPING	1	LOT	58000	
HWR	BG090	GENERATOR INTEGRAL PIPING	1	LOT	18000	
HWR	BG091	HYDROGEN COOLERS PIPING	1	LOT	7000	
HWR	BT028	H & S FOR TURBINE INTEGRAL PIP	1	LOT	35000	
HWR	823/0	PW TANK PIPE LINES	1	LOT	830	
HWR	824/0	PW TANK PIPE LINES	1	LOT	680	
HWR	857/0	TG SYSTEM INTEGRAL PIPING VALVE	1	LOT	2486	
Sub Total -Turbine Integral piping					121996	
Total BHEL -Haridwar Supplies:					2547498	
		BHEL HYDRABAD SUPPLY-PUMPS,BFPS ,TDBFPS .				
PUMPS & ACCESSORIES						
MDBFP-01						
Unit	PGMA	Qty	UOM	Weight /Unit	TG#3-Wt In KG	Size
HYD	Motor Driven Boiler Feed Pump (MD BFP) with Base Plate & Tubing 01 Nos	1	No	**21000**	21000	3500 x 3000 x 2500
HYD	Motor Driven Boiler Feed Booster Pump (MD BP) with Base Plate & Tubing -01 Nos	1	No	**5100**	5100	3000 x 3000 x 2500
HYD	Hydraulic Coupling -1 No	1	Set	**20000**	20000	4200 x 3200 x 4200
HYD	HC Working Oil Coolers & accessories-1 Set	1	Set	**5100**	5100	5500 x 2200 x 1200
HYD	HC Lube Oil Coolers & accessories-1 Set	1	Set	**2500**	2500	4000 x 1800 x 1000
HYD	Recirculation Valve -1 no	1	Nos	**1200**	1200	200 x 1400 x 3200
HYD	Conical Suction Strainer at BFP	1	Nos	**100**	1000	4000 x 1500 x

	suction -1 no			**0**		2500
HYD	Basket type Suction Strainer at BP suction-1 No	1	Nos	**1200**	1200	1550 x 1550 x 2500
HYD	Local Gauge Rack (LGB)-1,2&3 -3 Nos	3	Nos	**3000**	9000	1100 x 900 x 2200
HYD	Local instrument Transmitter Rack (LIR) - No	1	Nos	**250**	250	1050 x 650 x 1500
HYD	Loose tubing BFP+Motor), Mech Seal assy & Auxiliaries	1	Lot	**13500**	13500	
Sub Total TD MD BFPs					79850	
TD BFP-02 Nos						
Unit	PGMA	Qty	UOM	Weight /Unit	TG#3-Wt In KG	Size
HYD	Turbine Driven Boiler Feed Pump with mech Seal & ausseories (TD BFP) (02 Nos)	2	Nos	**34000**	68000	3500 x 3000 x 2500
HYD	Turbine Driven Boiler Feed Booster Pump (TD BP) with Base Plate & Tubing-02 nos	2	Nos	**26200**	52400	3000 x 3000 x 2500
HYD	Recirculation Valve -02 Nos	2	Nos	1200	2400	200 x 1400 x 3200
HYD	Conical Suction Strainer at BFP suction-02 nos	2	Nos	**1000**	2000	4000 x 1500 x 2500
HYD	Basket type Suction Strainer at BP suction-02 Nos	2	Nos	**1200**	2400	1550 x 1550 x 2500
HYD	Local Gauge Rack (LGB)-1,2&3 -06 nos	6	Nos	**1000**	6000	1100 x 900 x 2200
HYD	Local instrument Transmitter Rack (LIR)	1	Nos	**350**	350	2000 x 650 x 2150
HYD	Subdeliveries of oil system	1	Lot	**400**	400	
HYD	SKID BP DE&NDE MECH SEAL & ACCESSORIES -02 Nos	1	Lot	**4000**	4000	
HYD	CW & FLUSHING WATER PIPING MLC450X350H	1	LOt	**800**	800	
HYD	TDBFp tubing	1	Lot	**500**	500	
Sub Total TD BFPs					**139250**	
CONDENSATE EXTRACTION PUMP						
Unit	PGMA	Qty	UOM	Weight /Unit	TG#3-Wt In KG	Size
HYD	Condensate Extraction Pump-3 Nos	3	Nos	15000	45000	8500 x 3000 x 1600
HYD	Thrust Bearing Pedestal -3 nos	3	Nos	2000	6000	2000 x 2000 x 1100
HYD	Sole plate- 3 nos	3	Nos	1000	3000	2200 x 2200 x 400
HYD	Canister 3 nos	3	Nos	3400	10200	7600 x 2200 x 2200
HYD	Basket type Suction Strainer at CEP suction- 3 Nos	3	Nos	2000	6000	1750 x 1750 x 2750
HYD	Motor stool -3Nos	3	Nos	3000	9000	1900 x 1900 x 1200
HYD	Connecting coupling -3Nos	3	Nos	300	900	1000 x 500 x 500
HYD	Local Gauge Rack- 3 Nos	3	Nos	400	1200	1300 x 900 x 2000
HYD	LIR Rack for Pr. Transmitters 1 nos	1	Nos	300	300	2000 x 650 x 2150

HYD	LIR Rack for Diff. Pr. Transmitters - 1 nos	1	Nos	200	200	1050 x 650 x 1500
HYD	**Tubing & loose Items**	1	**Lot**	24000	24000	
Sub Total CEPs					**105800**	
DRIP PUMP						
Unit	PGMA	Qty	UOM	Weight /Unit	TG#3-Wt In KG	Size
HYD	Drip Pump-2 Nos	2	Nos	15000	30000	5000 x 1200 x 1200
HYD	Sole plate- 2Nos	2	Nos	1000	2000	1200 x 1200 x 200
HYD	Canister-2 Nos	2	Nos	3400	6800	3400 x 900 x 900
HYD	Basket type Suction Strainer at drip pump suction-2 Nos	2	Nos	2000	4000	1750 x 1750 x 2750
HYD	Connecting coupling-2 Nos	2	Nos	300	600	1000 x 500 x 500
HYD	Local Gauge Rack-2 Nos	2	Nos	400	800	1300 x 900 x 2000
HYD	LIR Rack for Pr. Transmitters1 No	1	Nos	300	300	2000 x 650 x 2150
HYD	LIR Rack for Diff. Pr. Transmitters-1 No	2	Nos	100	200	1050 x 650 x 1500
Sub Total Drip Pumps					**44700**	
LP & HP Heaters						
Unit	PGMA	Qty	UOM	Weight /Unit	TG#3-Wt In KG	Size
HYD	Drain cooler #1	1	Nos	**10050**	10050	L 6500 x B 1400 x H 1700
HYD	LP Heater -2	1	Nos	**33500**	33500	L 13650 x B 2050 x H 2425
HYD	LP Heater - 3	1	Nos	**35200**	35200	L 15150 x B 2050 x H 2425
HYD	LP Heater - 4	1	Nos	**44500**	44500	L 15850 x B 2250 x H 2700
HYD	LP Heater - 5	1	Nos	**39000**	39000	L 13150 x B 2250 x H 2700
HYD	HP Heater - 7A	1	Nos	**79500**	79500	L 12560 x B 2400 x H 2850
HYD	HP Heater - 7B	1	Nos	**79500**	79500	L 12560 x B 2400 x H 2850
HYD	HP Heater - 8A	1	Nos	**110000**	110000	L 14350 x B 2400 x H 2900
HYD	HP Heater - 8B	1	Nos	**110000**	110000	L 14350 x B 2400 x H 2900
HYD	HP Heater - 9A	1	Nos	**72500**	72500	L 9250 x B 2400 x H 2800
HYD	HP Heater - 9B	1	Nos	**72500**	72500	L 9250 x B 2400 x H 2800
HYD	Desuper heater for HP Heater - 7A	1	Nos	**33500**	33500	L 8150 x B 2050 x H 2250
HYD	Desuper heater for HP Heater - 7B	1	Nos	**33500**	33500	L 8150 x B 2050 x H 2250
HYD	BFP DT Oil Cooler -02 Nos	2	Nos	**5000**	10000	
Sub Total-Heaters					**763250**	

(BFP DRIVE TURBINE & AUXILIARIES						
Unit	PGMA	Qty	UOM	Weight /Unit	TG#3-Wt In KG	Size
HYD	Steam Turbine Assembly	1	Nos	**65000**	65000	4350x4920x(4250 with Gov. Valves &3500 without Gov. valves)
HYD	Gear Box	1	Nos	**1300**	1300	1150x1400x1150
HYD	Lube oil console Package –I (Lube Oil reservoir and Duplex filter with Piping)	1	Nos	**8000**	8000	7800x4700X3000
HYD	0 Lube oil console Package –II (Pump assembly with Piping)	1	Nos	**6500**	6500	7800x4700X3000
HYD	Lube oil console Package –III (Lube oil Coolers with Vent & Drain Piping)	1	Nos	**6000**	6000	7800x4700X3000
HYD	Emergency oil pump assembly	1	Nos	**1500**	1500	2100x1000x800
HYD	Jacking oil pump assembly	1	Nos	**600**	600	650x1500x600
HYD	Oil purification unit	1	Nos	**2500**	2500	1800x2000x1800
HYD	Oil accumulators	1	Nos	**350**	350	800x600x1900
HYD	Governing console	1	Nos	**750**	750	1300x1000x1500
HYD	Transition piece	1	Nos	**2400**	2400	3500X2100X2300
HYD	Turbine enclosure	1	Nos	**4000**	4000	4550X6500X4000
HYD	DCSC for Emergency lube oil pump	1	Nos	**600**	600	1500X550X1650
HYD	Auxiliary control valve assembly	1	Nos	**700**	700	1250x600x1200
HYD	Jacking oil piping ,Governin oil piping-ESV,Servomotor,,Jet Sparay Cooler	1	LOT	**1000**	1000	
HYD	Lube oil piping,Turbine Drain piping,cooling water piping, Galand steam piping	1	LOT	**2000**	2000	
HYD	Chimey Steam Piping	1	LOT	**1000**	1000	
Sub Total BFP Turbines					**104200**	
Total BHEL Hyd Supplies					1237050	
		BHEL PEM Supplies				
PEM SUPPLLIE DPUMPS & MOTORS						
Unit	PGMA	Qty	UOM	Weight /Unit	TG#3-Wt In KG	Remarks
PEM	AHP M/U Pump-H CM-CI -02 Nos IM-SS	2	Nos	**2000**	4000	
PEM	ECW (TG AUX.) PUMPS &	3	Nos	**300**	9000	03 Per Unit

	accessories -03 Nos/Unit			**0**		
PEM	ECW (TG AUX.) PUMPS -Motor incl. accessories & accessories -03 Nos/Unit	3	Nos	**1000**	3000	03 Per Unit
PEM	ECW (SG AUX.) PUMPS &accessories -02 Nos/Unit	2	Nos	**3000**	6000	02 Nos Per Unit
PEM	ECW (SG AUX.) Motor &accessories-02 Nos/Unit	2	Nos	**1000**	2000	02 Nos Per Unit
PEM	ACW PUMPS incl. accessories -03 Nos/Unit	3	Nos	**13500**	40500	03 Per Unit
PEM	ACW Motor incl. accessories-03 Nos/Unit	3	Nos	**2000**	6000	03 Per Unit
BHEL PEM	Butterfly valves -03 Nos		Nos			
Sub Total PEM supply Pumps					**70500**	
PEM-BOI						
Unit	PGMA	Qty	UOM	Weight /Unit	TG#3-Wt In KG	Remarks
PEM	Ammonia dosing skid	2	nos	7500	15000	5.5m X 5m X 4m
PEM	NaOH dosing skid	1	Nos	7500	7500	5.5m X 5m X 4m
PEM	Supply of Commissioning spares	1	Set	500	500	
PEM	Oxygen dosing Skid	2	Nos	1000	2000	1.8m X 1.8m X 2m
PEM	Injector assy	4	Nos	100	400	
PEM	15 NB 316 SS BWG tubing for o2 dosing	200	Meter	1	200	
PEM	SS tubing fitting	10	Nos	1	10	
PEM	Ss Elbows	10	Nos	1	10	
PEM	Filled O2 Cylinders	32	Nos	25	800	
PEM	Rack to Hold o2 cylinder	1	nos	50	50	
PEM	Compression fittings	35	nos	1	35	
PEM	LOTPs	2	Nos	250	500	
PEM	Stainers	2	Nos	100	200	
PEM	ARVS	28	Nos	10	280	
PEM	Comm Spares	1	Set	10	10	
PEM	Gun Metal valves	100	Nos	1	100	
PEM	Self cleaning Stainers	8		2	16	
PEM	Partable sumbersible pumps sets	4	Nos	25	100	
PEM	Handling eqpt Crane, Hoist & Chain Pulley- Single Girder Cranes	8	Nos		5000	
PEM	Handling eqpt Crane, Hoist & Chain Pulley Electric Hoists	27	Nos		30000	
PEM	Handling eqpt Crane, Chain Pulley Blocks	66	Nos		10000	
PEM	Valves & traps (main) BUTTERFLY VALVES (STEAM SERVICE)	3	Nos		20000	
PEM	Valves & traps (main) SPRING LOADED BYPASS VALVES	3	Nos		12000	
PEM	Misc Pumps and Motors, Self cleaning strainers, ME bellows, Valves, Drip and Sump pumps, Insulation for which erection in TG scope etc	-	-		100000	
Sub Total PEM Supplied BOIs					**204711**	
Total BHEL PEM Supplies					275211	

		BHEL Bhopal Supply				
Flash Tanks						
Unit	PGMA	Qty	UOM	Weight /Unit	TG#3-Wt In KG	Remarks
BPL	ASSY OF FLASH TANK - A	1	Nos	**3850**	3850	
BPL	FOUNDATION BOLT (M30 X 120 LG), NUT & WASHER 6 NOS EACH FOR F/T-A	1	Set	**5.76**	5.76	
BPL	ASSY. OF FLASH TANK-B	1	Nos	**3195**	3195	
BPL	FOUNDATION BOLT (M30 X 120 LG), NUT & WASHER 6 NOS EACH FOR F/T-B	1	Set	**5.76**	5.76	
BPL	ASSY. OF UNIT FLASH TANK	1	Nos	**1190**	1190	
BPL	FOUNDATION BOLT (M30 X 320 LG), NUT & WASHER 3 NOS EACH FOR UNIT F/T	1	Set	**8.94**	8.94	
BPL	LOOSE ITEMS OF FLASH TANK A, B & UNIT	1	Set	**29**	29	
BPL	Valves	1	Nos		0	
BPL	ASSY. OF CLEAN OIL TANK	1	Nos	**10360**	10360	
BPL	ASSY. OF DIRTY OIL TANK	1	Nos	**10360**	10360	
BPL	ASSY. OF OIL UNLOADING VESSEL	1	Nos	**545**	545	
BPL	ASSY. OF ECW/DMCW TANK	1	Nos	**5336**	5336	
BPL	LOOSE ITEMS FOR ECW O/H TANK (Lot 01 to 03)- GATE VALVES & TUBULAR WATER LEVEL GAUGE	1	Set	**81**	81	
BPL	LOOSE ITEMS FOR ECW O/H TANK (Lot 02 to 03)- FASTENERS, COUNTER FLANGES, CAF JOINT, ETC .	1	Set	**36.18**	36.18	
BPL	LOOSE ITEMS FOR ECW O/H TANK (Lot 03to 03)- FABRICATED SUB-ASSEMBLY (e.g.PIPE ASSY. SEAL POT, NaOH BREATHER,STAND PIPE, EXTERNAL LADDER, etc.)	1	Set	**508.43**	508.43	
Sub Total BPL supply Tanks					**35511.07**	
Motors						
Unit	PGMA	Qty	UOM	Weight /Unit	Weight TG#3	Remarks
BPL	BFP MOTOR	1	Nos	**38000**	38000	
BPL	DRIP PUMP MOTOR	2	Nos	**250**	5000	

				0		
BPL	CEP MOTOR	3	Nos	**11000**	33000	
BPL	APH WASH PUMP Motor	2	Nos	**1000**	2000	
BPL	BOILER FILL Pump Motor	2	Nos	**2800**	5600	
Sub Total BPL supply Motor					**83600**	
Butter fly Valves						
Unit	Tagno-- System--Dia	Qty	UOM	Weight /Unit	TG#3-Wt In KG	Remarks
	ACW-14,15,16,17,66,67,68--ACW SYS--900	15	Nos	1450	21750	
	ACW-03,06,09,--ACW SYS--800	9	Nos	1310	11790	
	ACW-05,08,11,20,23--ACW SYS--700	11	Nos	1000	11000	
	ACW-60,61,62,63,64,65--ACW SYS--600	6	Nos	350	2100	
	ACW-50,51,52,53,54,55--ACW SYS--500	18	Nos	300	5400	
	ACW-27--ACW SYS--450	1	Nos	250	250	
	ACW-32,34,35,37--ACW SYS--400	4	Nos	200	800	
	DMCW-1,2,3--ECW SYS--600	9	Nos	350	3150	
	DMCW-5,7,9--ECW SYS--450	9	Nos	250	2250	
	DMCW-12,13,14,15,16,17,18,19,20,39,40--ECW SYS--450	33	Nos	250	8250	
	ECWCS-01,04--ECW SYS--800	2	Nos	1310	2620	
	ECWCS-03,06--ECW SYS--700	2	Nos	1000	2000	
	ECWCS-12,13,14,15,16,17--ECW SYS--500	6	Nos	300	1800	
	ECWCS-10--ECW SYS--400	1	Nos	200	200	
	ECWCS-28,29,32,33--ECW SYS--450	4	Nos	250	1000	
	ECWCS-24,25--ECW SYS--400	2	Nos	200	400	
	DMCWSG-01,04--ECW SYS--400	6	Nos	200	1200	
	PW-1,2--PW SYS--800	2	Nos	1310	2620	
	PW-56,57--PW SYS--800	2	Nos	1310	2620	
	PW-3,4,5--PW SYS--600	3	Nos	350	1050	
	PW-28,29--PW SYS--600	2	Nos	350	700	
	PW-9,10,11--PW SYS--500	3	Nos	300	900	
	PW-32,33--PW SYS--500	2	Nos	300	600	
	PW-21,22--PW SYS--500	2	Nos	300	600	
	PW-25,26--PW SYS--450	2	Nos	250	500	
	PW-35,36--PW SYS--400	2	Nos	200	400	
Sub Total butter fly valves					**85950**	
TOTAL BPL SUPPLIES					**205061.07**	

PSWR		Misc Structures			100000	
Total ofPSWR Supplies					100000	
		BHEL VARANASI Supplies				
GRAND TOTAL HWR+HYD+BPL+PEM SUPPLIES					4364820	

Note:

1. The quantities indicated above are approximate and are liable for variation and alteration at the discretion of BHEL

   The item details and its weights under this scope of work indicated in the Chapter-XI "ESTIMATED WEIGHT FOR VARIOUS SYSTEMS IN SCOPE OF WORK (BOQ)" are approximate and these are subject to change as per site conditions.

   The information furnished is only a description regarding the item to be erected by the contractor. BHEL reserves the right of adding or excluding any components/ items / systems according to the site requirements/ customer requirements to complete various systems in all respects. Any other systems / components which are integral to equipment supplied by the manufacturing units shall also be erected and commissioned by the contractor within the quoted/accepted Lump sum rate. No additional payment shall be made towards any variation in weights and quantities for such systems.

12.1 Site Visit by the Bidder

12.1.1 The bidder shall, prior to submitting his tender for the work, visit and examine the site of works and its surroundings at his own expense, and obtain and ascertain for himself on his own responsibility all information that may be necessary for preparing his tender and entering into a contract, and take the same into account in the quoted contract price for the work.

12.1.2 The bidder shall satisfy themselves about the following factors:

i) Site conditions including access to the site, existing and required roads and other means of transport/communication for use by him in connection with the work including diverting and re-routing of services.
ii) Requirement and availability of land and other facilities of his enabling works, establishment of his nursery, office, stores etc.
iii) Ground conditions including those bearing upon transportation, disposal, handling and storage of materials required for the work or obtained there-from.
iv) Source and extent of availability of suitable materials, including water etc., and labour (skilled and unskilled) required for work, and laws and regulations governing their use and employment.
v) Geological, meteorological, topographical and other general features of the site and its surroundings as are pertaining to and needed for the performance of the work.
vi) The limit and extent of surface and subsurface water to be encountered during the performance of the work, and the requirement of drainage and pumping.
vii) The type of equipment and facilities needed, for and in the performance of the work:
viii) The extent of lead and lift required for the work in complete form over the entire duration of the contract, and
ix) All other information pertaining to and needed for the work including information as to the risks, contingencies and other circumstances which may influence or affect the work or the cost thereof under this contract.

12.1.3 The work to be carried out at quoted / accepted rates by the Contractor under the scope of these specifications covers the complete work of handling, loading and transporting of materials from project stores sheds / storage yards to site of erection or preassembly yard and unloading at pre-assembly area/erection site, checking, cleaning chipping and levelling of foundations, providing packers and shims/pre-assembling of equipments at the preassembly yard, inspection, minor rectification, preservation, erection, levelling, and other adjustments, cutting, edge / surface preparation, welding, grinding, radiography, LPI/ MPI/ UT testing wherever needed, heat treatment, carrying out air tightness test by soap solution / kerosene, hydraulic test, steam / air blowing, light up, chemical cleaning, passivation, steam blowing and safety valve floating including inter connection of all the termination points, erection and dismantling of all temporary piping, valves, pumps, tanks etc., required for the above operations, all pre-commissioning tests and trial runs Steam turbine, Generator set,Integral piping, HP/LP heater, Tanks & vessels and associated equipments, DG set, Pumps & other auxiliaries connected with the system and other BOIs, Insulation, including supply and application of final painting of 3x800MW, Project Patratu.

12.1.4 All the works such as cleaning, levelling, aligning, trial assembly, dismantling of certain components for checking and cleaning, surface preparation, fabrication of sheets, tubes and pipes as per general engineering practice and as per BHEL Engineer's instructions at site, cutting, weld depositing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scrapping, lapping, fitting-up etc., as may be applicable in such erection works and are necessary to complete the work satisfactorily, shall be carried out by the contractor as part of the work within the quoted rate. Major machining work, if any, which is only to be carried out in workshops, will be arranged by BHEL.

12.1.5 No member of the already erected structures, platform, ladders, pipes, grills, other component and auxiliaries should be cut without specific approval of BHEL engineer. In case it is necessary to cut, the contractor shall rectify / repair in a manner acceptable to BHEL / customer without any additional cost

12.1.6 The scope of specification covers the installation, testing and commissioning of the erected equipment / instrument along with accessories as detailed in Bill of Quantity.

12.1.7 The work covered under this specification is of highly sophisticated nature, requiring the best quality of workmanship for fabrication, engineering and construction management. The Bidder should ensure timely completion of work. The Bidder must have adequate quantity of tools, construction aids, equipments etc, in his possession. He must also have on his rolls adequate, trained, qualified and experienced supervisory staff and skilled personnel.

12.1.8 The work shall be executed under the usual conditions affecting major power plant construction and in conjunction with numerous other operations at site. The Bidder and his personnel shall co-operate with the personnel of other agencies, co-ordinate his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.

12.1.9 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.

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

12.1.11 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.

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

12.1.13 Contractor shall erect all the equipments as per sequence prescribed by BHEL at site. The sequence of erection, methodology will be decided by the BHEL engineers depending upon the availability of material, work fronts etc. No claims for extra payment from the Contractor will be entertained on the grounds of deviation from the methods and sequence of erection adopted in erection of similar sets or for any reasons whatsoever.

12.1.14 Scope of work covered under this specification requires quality workmanship, engineering and construction management. The contractor shall ensure timely completion of work. The contractor shall have adequate tools, measuring instruments, calibrating equipment etc. in his possession. He shall also have adequate trained, qualified and experienced engineers, supervisory staff and skilled personnel. The manpower deployment identified by contractor shall match with above scope of works.

12.1.15 All the necessary certificates and licenses required to carryout this work are to be arranged by the Contractor expeditiously at his cost.

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

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

12.1.18 During the course of execution of this work, certain rework/ modification/ rectification/ repairs/ fabrication etc. will be necessary on account of feed back from various thermal power stations on units already commissioned and/or units under erection and commissioning and also on account of design discrepancies and manufacturing defects and site operation/maintenance requirements. Contractor shall carryout such rework/ modification/ rectification/ fabrication/ repairs etc promptly and expeditiously. Daily log sheets indicating the details of work carried out, man hours; consumables used etc, shall be maintained by the Contractor and got signed by BHEL engineer every day. Claims of contractor, if any, for such works will be dealt as per relevant clauses of General Conditions of Contract.

12.1.19 All tools and tackles, fixtures, equipments, materials, manpower, supervisors/ engineers, consumables etc required for this scope of work shall be provided by the Contractor. All expenditure including taxes and incidentals in this connection will have to be borne by him unless otherwise specified in the relevant clause.

12.1.20 The contractor shall make adequate security arrangements including employment of security personnel and ensure protection from theft, fire, pilferage, damage and loss of materials/equipments issued to him for the work. Special care will have to be taken to guard against pilferage / theft of copper tubing, brass fittings, brass valves and other costly materials.

12.1.21 All equipments shall be handled very carefully to prevent any damage or loss. No bare wire ropes, slings etc, shall be used for handling of the equipments without the specific permission of the engineer.

12.1.22 Contractor shall ensure proper housekeeping and remove all scrap materials periodically from various work area covered in the scope and deposit the same at the place earmarked for this purpose. In case of contractor's failure to do the same, BHEL reserves the right to remove scrap at contractor's risk and cost.

12.1.23 Access to site for inspection by BHEL and customer engineers shall be made available by the contractor at all times.

12.1.24 Contractor shall mobilize sufficient quantity of sleepers for stacking of materials in his custody.

12.1.25 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.

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

12.1.27 No temporary supports should be welded on to the piping.

12.1.28 Contractor shall carry out preservation painting ~~on all items taken from store~~s **As applicable/as per requirement**. 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.

12.1.29 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 (vee), painting etc. to the condition similar to the one at the time of issue shall be in scope of work.

12.1.30 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.

12.1.31 **Submission of Periodical Reports**

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

a) Consumption of welding electrodes and gases
b) Consumption of construction power
c) Manpower reports
d) Daily and Monthly Progress reports
e) Field calibration reports
f) Monthly material reconciliation statement

BHEL at site will inform formats for these reports.

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

12.1.33 The scope of specification covers the installation, testing and commissioning of the erected equipment / instrument along with accessories as detailed in Bill of Quantity.

12.1.34 All the works such as cleaning, leveling, aligning, trial assembly, dismantling of certain components for checking and cleaning, surface preparation, fabrication of sheets, tubes and pipes as per general engineering practice and as per BHEL Engineer's instructions at site, cutting, weld depositing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scrapping, lapping, fitting-up etc., as may be applicable in such erection works and are necessary to complete the work satisfactorily, shall be carried out by the contractor as part of the work within the quoted rate. Major machining work, which is only to be carried out in workshops, will be arranged by BHEL.

12.1.35 The dismantling of equipments / components of EOT crane in Pump House shall be carried out by the Contractor as part of the work within the quoted rates, If required.

12.1.36 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.

12.1.37 The work shall conform to dimensions and tolerances given in various drawings and quality manuals provided by BHEL. If any portion of work is found to be defective in workmanship not conforming to drawings or other stipulations, the contractor shall dismantle and redo the work duly replacing the defective materials at his cost, failing which the job will be carried out by BHEL by engaging other agencies and recoveries will be effected from contractor's bill towards expenditure incurred including BHEL's overhead charges.

12.1.38 Contractor shall execute the work as per sequence and procedure prescribed by BHEL at site. BHEL engineer depending upon the availability of materials / work fronts etc will decide the sequence of erection / commissioning methodology. The applicable erection manuals which are available with BHEL site office are to be referred for compliance and guidance before taking up the work. Any rework on this failure to comply with will be to account of contractor only. BHEL engineer, depending upon the availability of materials, fronts etc, will decide the sequence of erection and methodology. No claims for extra payment from the contractor will be entertained on the grounds of deviation from the method of erection adopted in erection of similar jobs or for any reason whatsoever.

12.1.39 Identification of equipment at storage yard, technical assistance for checking and making the shortage/damage reports, taking delivery at storage yard and pre-assembly of equipment wherever required, erecting the equipment, aligning, fastening, supporting, cleaning, checking and carrying out statutory tests as required, trial operation, precommissioning, commissioning and post-commissioning activities up to the time of completion of commissioning activities and commercial operation of the unit and handing over to customer or till completion of contract period whichever is earlier, along with the supply of all consumables, tools and tackles and testing instruments.

12.1.40 It is not the intent to specify herein all details of material. Any item related this work not covered by this but necessary to complete the system will be deemed to have been included in the scope of the work.

12.1.41 Site testing wherever required shall be carried out for all items / materials installed by the contractor to ensure proper installation and functioning in accordance with drawings, specifications and manufacturer's recommendations and Field quality plans of BHEL.

12.1.42 The contractor shall co-ordinate and provide assistance for satisfactory testing, pre-commissioning, commissioning and trial run of the connected equipment under overall guidance of BHEL and shall locate any cause of malfunction and rectify the same for proper operation. Testing shall also include any additional tests, which the Engineer feels necessary because of site conditions and also to meet system specification.

12.1.43 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. All the work shall be carried out as per instructions of BHEL engineer. Wherever Construction sequences are furnished by BHEL, the contractor shall follow the same sequence. 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.

12.1.44 The work shall confirm 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 get 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 as per GCC.

12.1.45 Contractor shall, transport all materials to site and unload at site / working area, or pre-assembly yard for inspection and checking. All material handling equipment required shall be arranged by the contractor.

12.1.46 Contractor shall retain all T&P / Testing instrument / Material handling equipments etc at site as per advice of BHEL engineer and same shall be taken out from site only after getting the clearances from engineer in charge.

12.1.47 The contractor at his cost shall arrange necessary security measures for adequate protection of his machinery, equipment, tools, materials etc. BHEL shall not be responsible for any loss or damage to the contractor's construction equipment and materials. The contractor may consult the Engineer-in-Charge on the arrangements made for general site security for protection of his machinery equipment tools etc.

12.1.48 The Contractor may have to execute work in such a place and condition where other agencies also will be under such circumstances. However completion time for erection agreed will be subject to the condition that contractor's work is not hampered by the agencies.

12.1.49 If required by BHEL, the contractor shall change the sequence of his operation so that work on priority sectors can be completed within the projects schedule. The contractor shall afford maximum assistance to BHEL in this connection without causing delay to agreed completion date.

12.1.50 The contractor must obtain the signature and permission of the security personnel of the customer for bringing any of their materials inside the site premises. Without the Entry Gate Pass these materials will not be allowed to be taken outside.

12.1.51 The contractor shall ensure that his premises are always kept clean and tidy to the extent possible. Any untidiness noted on the part of the contractor shall be brought to the attention of the contractor's site representative who shall take immediate action to clean the surroundings to the satisfaction of the Engineer-in-Charge.

12.1.52 The contractor is strictly prohibited from using BHEL's regular components like angles, channels, beams, plates, pipe / tubes, and handrails etc. for any temporary supporting or approach platforms or scaffolding works or as bed for pre-assembly works. Contractor shall arrange himself all such materials. 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 (angles, channels, beams, plates etc) for such usage as normal scope of work without any cost implication on BHEL.

In case of such misuse of BHEL materials, a sum as determined by BHEL engineer will be recovered from the contractor's bill. The decision of BHEL engineer is final and binding on the contractor.

12.1.53 On completion of work, all the temporary buildings, structures, pipe lines, cables etc. shall be dismantled and leveled and debris shall be removed as per instructions of BHEL by the contractor at his cost. In the event of his failure to do so, the expenditure towards clearance of the same will be recovered from the contractor. The decision of BHEL Engineer in this regard is final.

12.1.54 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.

12.1.55 If the contractor or his workmen or employees break, deface, injure or destroy any part of a building, road, curb, fence, enclosure, water pipes, cables, drains, electric or telephone posts or wires, trees or any other property or to any part of erected components etc, the contractor shall make the same good at his own expense or default, BHEL may made good by other workmen or by other means and deduct the expenses (of which BHEL's decision is final) from any money due to the contractor.

12.1.56 The contractor will be responsible for the safe custody and proper accounting of all materials in connection with the work. If the contractor has drawn materials in excess of design requirements, recoveries will be effected for such excess drawls at the rate prescribed by manufacturing units.

12.1.57 No member of the already erected structure / platform, pipes, grills, platform, other component and auxiliaries should be cut without specific approval of BHEL engineer.

12.1.58 Contractors shall ensure that all their Staff / Employees are exposed to periodical training programme conducted by qualified agencies/ personnel on ISO 9001 – 2015 Standards.

12.1.59 Contractor has to clear the front, expeditiously and promptly as instructed by BHEL Engineer for other agencies, like Boiler erection, Cabling, instrumentation etc., to commence their work from / on the equipments coming under this scope. Some time it may be required to re-schedule the activities to enable other agencies to commence / continue the work so as to keep the overall project schedule.

12.1.60 Crane operators deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes.

12.1.61 For the purpose of planning, contractor shall furnish the estimated requirement of power (month wise) for execution of work in terms of maximum kW demand.

12.1.62 Prior to erection of any components inspection to be done for any foreign materials and damages and they are to be attended as per directions of BHEL engineer.

12.1.63 It is the responsibility of the contractor to do the alignment, checking, etc. if necessary, repeatedly to satisfy BHEL Engineer / Customer Engineers with all the necessary tools and tackles, manpower etc. without any extra cost. The alignment will be completed only when jointly certified so, by the BHEL Engineer & Customer. Also the contractor should ensure that the alignment is not disturbed afterwards.

~~12.1.64 If any item or equipment not covered but requires being erected / commissioned, same shall be carried out by the contractor. Equivalent or proportional unit rate shall be considered wherever possible from the BOQ. The rates quoted by the contractor shall be uniform as far as possible for similar items appearing in rate schedule.~~

12.1.65 All the necessary certificates and licenses required to carry out this scope of work are to be arranged by the contractor then and there at his cost.

12.1.66 Contractor shall arrange the necessary clearance from the statutory authorities as required for installation of the plant and equipment and render all assistance, service required in this regard. Inspection fee, if any will be paid by BHEL. The contractor shall demolish all the hutments, sheds, offices, constructed by him and shall clean the debris after the contract is over. In the event of his failure to do so, the same will be arranged / removed by BHEL Engineer and the expenses incurred with overhead will be recovered from the contractors.

12.1.67 Contractor has to work in testing and commissioning, certain other erection agency at site. BHEL engineer will co-ordinate area clearance. In a project of such magnitude, it is possible that the area clearance may be less / more at a particular given time. Activities and erection program have to be planned in such a way that the milestones are achieved as per schedule / plans. Contractor shall arrange & augment the resources accordingly.

12.1.68 Wherever necessary suitable temporary fencing and lighting shall have to be provided by the contractor as a safety measure against accident and damage of property of BHEL. Suitable caution notices shall be displayed where access to any part may be deemed to be unsafe and hazardous.

12.1.69 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.

12.1.70 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.

12.1.71 not the intent to specify herein all details of all material. Any item related to this work not covered by this but necessary to complete the system will be deemed to have been included in the scope of the work.

12.1.72 wherever required shall be carried out for all items / materials installed by the contractor to ensure proper installation and functioning in accordance with drawings, specifications and manufacturer's recommendations.

12.1.73 contractor shall carryout additional tests if any, which the Engineer feels necessary because of site conditions and also to meet system specification

12.1.74 Contractor has to work in close co-ordination with other agency at site. BHEL engineer will co-ordinate area clearance. In a project of such magnitude, it is possible that the area clearance may be less / more at a particular given time. Activities and Construction program have to be planned in such a way that the milestones are achieved as per schedule/ plans. Contractor shall arrange & augment the resources accordingly.

12.1.75 Contractor shall remove all scrap materials periodically generated from his working area and collect the same at one place earmarked for the same. Load of scraps is to be

shifted to a place earmarked by BHEL. Failure to collect the scrap is likely to lead to accidents and as such BHEL reserves the right to collect and remove the scrap at contractor's risk and cost if there is any failure on the part of contractor in this respect.

12.1.76 It is the responsibility of the contractor to do the checking, testing etc. if necessary, repeatedly to satisfy BHEL Engineer with all the necessary tools and tackles, manpower etc. without any extra cost. The testing will be completed only when jointly certified so, by the BHEL Engineer.

12.1.77 The contractor's work shall not hinder other work, either underground or over ground, such as electrical, phone lines, water or sewage lines, etc. In areas of overlap, the contractor shall work in coordination with other related contractors.

12.1.78 Any damage by the landscape contractor's team to such utilities will be penalized and contractor shall be responsible for cost for such damages.

12.1.79 Contractor at his cost shall lay all necessary temporary piping including cutting and edge preparation, install the pumps, blanks, valves required for the test, pressure gauges etc. Required pipes, valves, plates etc., will be given by BHEL. Temporary piping, pumps, valves, flanges, blanks etc shall be removed by him and returned to BHEL. All thermo well points are to be seal welded, with plug in position. All Temperature Element points are to be provided with blanks and welded. Necessary blanks will be provided by BHEL.

12.1.80 The contractor shall return all 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 (vee), painting etc. to the condition similar to the one at the time of issue shall be in scope of work.

12.1.81 SITE INSPECTION

12.1.85.1 Various Inspection / quality control / quality assurance procedures/methods at various stages of erection and commissioning will be as per BHEL / Customer quality control procedure / codes and other statutory provisions and as per BHEL Engineer's instructions.

12.1.85.2 The contractor shall make necessary arrangements for such inspection and carry out the rectification pointed out by the owner / BHEL/Customer without any extra cost to the owner / BHEL/Customer. No cost whatsoever such duplication of inspection of work be entertained.

12.1.85.3 BHEL / Customer will have full power and authority to inspect the works at any time, either on the site or at the contractor's premises. The contractor shall arrange every facility and assistance to carry out such inspection. On no account will the contractor be allowed to proceed with work of any type unless such work has been inspected and entries are made in the site inspection register by customer / BHEL.

12.1.82 As built drawings:

After successful completion, testing and commissioning of installation work, Purchaser's drawings / documents shall be updated in line with the actual work

carried out and as built drawings / documents shall be submitted by the contractor as agreed for the project. Contractor shall be supplied with one extra copies of the layout & isometrics drawings. Contractor to incorporate in one of the copy with red ink all the changes / deviations / alterations etc., Carried out at site due to various reasons, with site engineer's endorsement. Marked up drawings shall be submitted to BHEL for approval.

12.1.83 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 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.

12.1.84 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.

12.1.85 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.

12.1.86 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.

12.1.87 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.

12.1.88 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.

12.1.89 BHEL is operating web based computerized E-store system 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.

12.1.90 In the event the computerized E-store/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 E-store/SOMS as and when the E-store/SOMS is reactivated/ normalized.

12.2 TEST TAPPING POINTS

12.2.1 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.

12.2.2 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.

12.2.3 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.

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

12.3 UTILITY POINTS

12.3.1 Number of utility points (Service / plant air, service / plant water, service / washing steam etc., shall be indicated in the P & I diagram. Contractor to locate the utility points as advised by BHEL site engineer and shall route the piping to these points as per site conditions, and shall submit as built layout with 'BILL OF MATERIAL' to BHEL for approval.

12.3.2 The utility points shall be located at convenient point to handle and to be terminated with brass / bronze valve with suitable connection for hose pipe.

12.4 PLATFORMS, CROSSOVERS & CANOPIES

Platforms, ladders, crossovers and canopies shall also be provided at places where it has not been shown in drawings but if felt necessary by BHEL site engineer.

Contractor has to fabricate and install canopies for all outdoor pumps and motors, actuators, lub oil units, control valves and at places as instructed by BHEL Engineer etc. Raw materials required for fabrication of platforms, ladders, crossovers and canopies shall be provided by BHEL free of cost. The work is to be carried out as per the instruction of BHEL and shall be paid as under "Miscellaneous items". No separate payment for fabrication is envisaged.

12.5 **Statutory approval for Lifts, hoists, Cranes:** Necessary approval for drawings, documents, load testing of hoists, Single girder EOT, Chain pulley blocks erected by bidders has to be arranged for getting statutory fitness certificates, load test certificates, drawings/documents from Statutory agency/Third party inspectors without any extra commercial implication on BHEL treating as normal scope of work. Weight/loads required for load test of hoists shall be provided by BHEL free of cost.

12.6 Support for Handing Over of T&P, spares to BHEL/Customer, diversion to other BHEL Sites/Units

Vendor shall assist in handing over of Special T&Ps for Erection/commissioning which were issued to them free of charge for returning to BHEL /Customer store.

12.7 Dewatering

Dewatering of Low Lying areas (as per scope applicability) till handing over to customer is in bidders scope for which vendor has to arrange and maintain adequate no. of Diesel & electrical pumps of suitable capacities, operators, necessary manpower with sufficient quantity of suction & discharges hoses, pipes, Clamps, cables, Electrical panels/starters, diesel, consumables without any extra commercial implication on BHEL treating as normal scope of work. Dewatering pumps will be required to run to ensure job progress is not hampered & if required pumps are to be run on round the clock basis on working days & holidays, Sundays.

12.8 Housekeeping/Area Cleaning

The contractor has to do area cleaning on every date on daily basis. Noncompliance of the above cleaning shall call for penal recovery of Rs.5000.00 on each instance and at the same time, cleaning of the area shall be done by BHEL at the risk and cost of the contractor. No excuses on this above account shall be entertained by BHEL on whatsoever account.

Contractor shall engage separate gang exclusively for proper housekeeping of the site. The contractor has to make necessary arrangements for collection and for bringing down the scrap from all locations and taking them away from the erection areas to various locations as indicated by BHEL Engineer. The house keeping must be a routine and continuous activity. in the various work fronts.

12.9 PRESERVATION & PROTECTION OF COMPONENTS

12.9.1 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.

12.9.2 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.

12.9.3 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.

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

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

12.9.6 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.

The scope of the work will comprise of but not limited to the following:
(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

13.1 Refer forms F-14 to F-18 of volume I D (Forms & Procedure) of volume –IBCD. Plan and review will be done as per the formats.

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

13.3 The progress reports shall indicate the progress achieved against plan, indicating reasons for delays, if any. The report shall also give remedial actions which the contractor intends to make good the slippage or lost time so that further works can proceed as per the original plan the slippages do not accumulate and affect the overall programme.

13.4 It is the responsibility of the contractor to provide all relevant information on a regular basis regarding progress of work, labour availability, equipment deployment, testing, etc.

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

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

13.7 Tenderers have to furnish a list of Tools and Plants including cranes, Tractor / Trailers etc., which they propose to deploy for this work.

13.8 The contractor shall submit daily, weekly and monthly progress reports, manpower reports, materials reports, consumables (gases / electrodes) report, cranes availability report and other reports as per Performa considered necessary by the Engineer. The periodicity of the reports will be decided by BHEL Engineer at site.

13.9 The contractor shall submit weekly / fortnightly / monthly statement report regarding consumption of all consumables for cost analysis purposes.

13.10 The contractor shall submit a report of any damage, shortage, discrepancy etc., every week detailing in this regard.

13.11 The monthly report as a booklet shall be submitted at the end of every month and shall contain the following details :-

a. Colour Progress photographs to accompany the report should be submitted.
b. Erection progress in terms of tonnage and welding joints, radiography and stress relieving completed as relevant to the respective work areas against planned.
c. Site Organization chart of engineers & supervisors as on the last day of the month with further mobilization plan
d. Category- wise man hours engaged during the previous month under the categories of fitters, mill wright fitters, welders, riggers, khalasis, grinder-

men, gas-cutters, electricians, crane operators and helpers. Data will be spilt up under the work area of Turbine, Condenser, Generator, Heaters, Pumps&motors, Integral piping ,Main Steam, hot Reheat, Cold Reheat, HP Bypass, LP Bypass lines, LP Piping, tanks and vessels, pumps, FPS etc.

e. Consumables report giving consumption of all types of gases and electrodes during the previous month.
f. Availability report of cranes
g. Safety implementation report in the format
h. Pending material and any other inputs required from BHEL for activities planned during the subsequent month.

13.12 During the course of erection, if the progress is found unsatisfactory, or if the target dates fixed from time to time for every milestone are to be advanced, or in the opinion of BHEL, if it is found that the skilled workmen like fitters, operators, technicians employed are not sufficient BHEL will induct required additional workmen to improve the progress and recover all charges incurred on this account including all expenses together with BHEL overheads from contractor's bills.

14 FOUNDATIONS, GROUTING AND CIVIL WORKS

The scope of the work will comprise of but not limited to the following:
(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

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

14.2 Minor adjustment of foundation level, dressing and chipping of foundation surfaces, enlarging the pockets and blue-matching (wherever required) for of all equipments as per BHEL Engineers instructions, should be done by the Contractor as part of the work. Contractor/BHEL shall prepare protocols before taking over the foundations. Dressing and chipping of foundations upto 30 mm for achieving proper levels will be within the scope of work/specification.

14.3 It shall be contractor's responsibility to check the various equipment foundations for their correctness with respect to level, orientation, dimensions etc., and ascertained dimensions shall be measured and submitted to BHEL for approval before erection.

Foundation pockets are to be cleaned thoroughly before placing the supports / columns / equipments. Verticality of foundation bolts to be checked along with correctness of the threads and freeness of the nuts movement. If required cleaning of the threads to be done with proper dies.

14.4 The surface of foundations shall be dressed to bring the surface of the foundations to the required level and smoothness prior to placement of equipments / equipments based on the foundations including shear lug provisions / openings.

14.5 The concrete foundation, surfaces shall be properly prepared by chipping, as required to bring the top of such foundation to the required level to provide the necessary roughness for bondage and to ensure enough bearing strength. All laitance and surface film shall be removed and cleaned and the packers placed with suitable mortar prior to erection of the equipment. Packer plates should not only be blue matched with foundation but also inter-packer contact surfaces between the packers and foundation frame etc., shall also be blue matched by Prussian Blue match checks and required percentage contact shall be achieved by chipping and scrapping as per BHEL Engineer's instructions.

14.6 All temporary foundations and anchor points required for installing erection Equipments and winches, foundations for pumps, tanks etc are in the scope of Contractor. All building materials like cement, steel including re-enforcement bars,

grits cements etc for such temporary foundations shall have to be arranged by the Contractor within the quoted rates. All such foundations shall be demolished and normal ground conditions restored after the usage.

14.7 Contractor shall carry out scrapping and blue matching of embedded plates, permanent spacers and all matching parts of turbine, generators, pumps and other equipments under the scope wherever required. Chipping and the levelling of concrete surfaces, fine dressing up to the extent required to obtain contact between packer and concrete, is also covered in the scope of this work. Scrapping, chipping and matching shall be done so as to achieve prescribed percentage of contact between the two surfaces.

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

14.9 Complete grouting of equipments under the scope, including anchor/ foundation bolts, pockets, beneath base, base hollows etc, as may be applicable, is included in the scope of Contractor. Arranging all labour, building materials including cement, sand, chips, fine aggregates, ordinary portland as well as quick setting – free flow - non-shrink grout mix (e.g. conbextra gp1/gp2, Shrinkkomp or its equivalent), form work, shuttering, and any other requirements is in the Contractor's scope. Contractor shall obtain approval of BHEL for cement (Ordinary Portland as-well-as quick setting – free flow- non-shrink grout mix) prior to use. Cleaning of foundation surfaces, pocket holes and anchor bolt pits and de-watering and making them free of oil, grease, sand and other foreign materials by soda washing, water washing, compressed air and other approved methods are within the scope of this specification/ work.

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

14.11 The contractor shall arrange for grouting of foundation bolt holes of equipment and final grouting of equipment as per the drawings / specification as advised by the Engineer or BHEL after preparing the foundation surface for grouting. The contractor has to arrange, a representative from the supplier of special cement for witnessing the grouting and other works at their cost including any miscellaneous expenditure for this activity. The certificates of the grout shall be submitted to

BHEL. If necessary test cubes are to be made and tested at site to ensure the quality of the grout as per relevant IS standards.

14.12 **PROCEDURE FOR GROUTING:** Contractor has to carry out the grouting as per the work instructions for grouting available at site or the grouting is to be carried out as per the supplier's recommendation / IS standard. Copy of those recommendations is to be submitted

The scope of the work will comprise of but not limited to the following:
(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

15.1 The contractor will have to follow the instructions provided in the technical manuals, drawings, and specifications provided by BHEL, to the contractor from time to time. In case of ambiguity or deviation the decision/clarification of BHEL engineer will have to be followed.

15.2 Contractor shall cut / open works if needed, as per BHEL Engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over. This contingency shall be included within the quoted value. During commissioning, opening of valves, changing of gaskets, attending to leakages, minor modification, and rectification works may arise. The contractor has to carry out these works at his cost by providing required manpower with T & Ps in all the three shifts. In case any rework is required because of contractor's faulty erection and which is noticed during commissioning, the same has to be rectified by the contractor at his cost.

15.3 The contractor shall take all reasonable care to protect the materials and equipment during erection. Touch up and preservative painting required to be done on any equipment or part during the course of erection will have to be done by the contractor. The Contractor shall arrange all paints, primer and consumables, T&P and facilities.

15.4 Prior to erection of any components inspection to be done for any foreign materials and damages and they are to be removed / attended as per BHEL engineer.

15.5 Field Quality Assurance Formats:-It is the responsibility of the contractor to collect and fill up the relevant FQA log sheets of BHEL and present the same to BHEL after carrying out the necessary checks as per the log sheets and obtaining the signature of BHEL and customer as token of their acceptance. Payment to the contractor will be linked with the submission of these FQA log sheets. All test to be carried out as per FQP (Field Quality Plan) will be in bidders scope. FQP shall be provided by BHEL during execution time.

15.6 Erection of all drains / vents / relief / escape / safety valve, piping to various tanks/ sewage / drain canal / flash box / flash tank / condenser / sump / atmosphere etc. from the stubs on the piping to the equipments erected by the contractor is completely covered in the scope of work.

15.7 Contractor has to carryout fabrication works such as welding of stubs / nipples, attachments etc., preparation of surface for rust preventive coating and application of rust preventive within the quoted / accepted rate.

15.8 Pipes shall not be dropped to avoid impact or bump.

15.9 Normally weld neck 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 tees, weld neck flanges, reducers, elbows, flanges, inserts etc., shall be suitably edge prepared and matched with pipes for welding. No extra cost shall be paid for this.

15.10 Attachment, welding of necessary instrumentation tapping points, thermocouple pads, root valves, condensing vessels, flow nozzles and control valves etc., shall be the responsibility of the contractor and the same shall be done as per the instructions of BHEL Engineer. The erection and welding of all above items will be contractor's responsibility even if, the Items are supplied by an agency other than BHEL if they are integral to the scope envisaged under this package.

15.11 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. Assistance for calibrating / testing the power cylinders / valves, gauges, instruments, etc. and setting to actuators coming under various groups shall be provided by contractor within the quoted rates.

15.12 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. No separate payment is envisaged for the same.

15.13 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.

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

15.15 All the valves will have to be checked, cleaned, lapped or overhauled in full or in parts before erection, after chemical cleaning and during commissioning. The contractor, at his own cost, shall arrange experienced technicians for the above work, including required consumables.

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

15.17 All the dampers, valves, lifting equipments, actuators / power cylinders, etc., shall be serviced and lubricated to the satisfaction of BHEL engineer before erecting the same and also during pre-commissioning. The bearings of dampers shall be properly cleaned, serviced and lubricated before commissioning at no extra cost. Even after commissioning in the equipments, if there are problems in the operation they have to be attended by the contractor during the tenure of the contract.

15.18 In case of any class of work for which there is no such specifications as laid down in the contract such us blue matching, welding of stainless steel parts etc., the work shall be carried out in accordance with instructions and requirements of the BHEL engineer at the quoted rates only.

15.19 In the case of structural members, pipes, plates, ducts etc, in certain cases, the raw material will be supplied in random lengths and the contractor will have to make up the length / prepare the edges to suit the matching profiles, weld / bolt connect the joints within the quoted rates / prices.

15.20 All the tubes and pipes shall be cleaned and blown with compressed air and shown to the Engineer before lifting. Pipes above 2" diameter have to be cleaned by means of wire brush as per the instruction of BHEL Engineer and subsequently flushed with air before lifting them into position. Pipes below 2" diameter, shall be sponge cleaned with air flushing. After cleaning is over, the end caps shall be put back in tube openings till

such time they are welded to other tubes. Required compressors shall be arranged by the contractor at his cost.

15.21 All the equipments / material to be taken inside the plant building shall be cleaned thoroughly before taking them inside and erect. The contractor shall clean, wherever necessary and paint inside surfaces of the equipments like coolers, oil tanks, Rubber expansion joint assemblies and other components as per instruction of BHEL Engineer during erection at the quoted rate. The necessary compressor for air cleaning is to be arranged by contractor at his cost.

15.22 Fine fittings, oil system and other small bore piping have to be routed according to site conditions and hence shall be done only in position as per the site requirement. Necessary sketch for routing these lines should be got approved from BHEL by the contractor. In case any minor modifications are required in these pipelines after completion to meet the system requirements, the same shall be carried out by the contractor within the quoted rate.

15.23 Erection of platform and supporting structures around the equipments / valves / filters etc., is covered in the scope of contract and shall be erected by the contractor as per accepted tonnage rate for —Hangers and Supports.

15.24 Additional platforms for approaching different equipments as per the site requirement, which may not be indicated in drawings, shall be assembled and erected by contractor. However, the contractor shall be paid for this work on accepted tonnage rate for —Hangers and Supports. The steel materials required for these works shall be supplied by BHEL free of cost and the contractor will have to install them to suit the requirement.

15.25 The Contractor shall carry out the reaming and honing of coupling holes with his own reamers, honing machine and honing accessories etc at his own cost.

15.26 Work such as minor rectification of foundation bolts, reaming of holes, drilling of dowels, matching of bolts and nuts, making new dowel pin, etc. are covered in the scope of work.

15.27 Assistance for calibrating / testing the power cylinders/ actuators / valves, gauges, instruments, etc. and setting to actuators shall be provided by contractor within the quoted rates.

15.28 Before erecting the valves and other mountings, check for the tag for correct rating with valve schedule. Ensure correct flow direction. Ensure easy accessibility for operation and maintenance of valves.

15.29 All the drain lines should have sufficient slope towards drain. Slope of 1:500 shall be maintained towards drain point unless otherwise specified. Expansion loops shall be provided in all the vents and drains as per the drawings.

15.30 Wherever pipes / bends / equipments are supplied in pre-fabricated / assembled packages, there may be necessity to make minor changes, including strengthening by additional welds. This shall be treated as part of the contractor‘s scope.

15.31 All the valve packing with asbestos base to be lubricated once in 6 months till handing over. Necessary gland packing will be supplied by BHEL.

15.32 All the oil & gas piping flanges, wherever provided are to be blue matched using surface plates for at least 80% contact area to attain leak proof of joints.

15.33 All the weld joints on equipments and piping shall be ground or filed after completion of welding and before radiography as per instructions of BHEL Engineer so as to achieve smooth surface to avoid of ripples, undulations etc.,

15.34 Flow nozzles, orifice, spray nozzles etc., shall be mounted / erected after chemical cleaning / flushing / or steam blowing at site.

15.35 Erection of Flow nozzles, flow switches, steam traps, filters, flow meters, other metering elements, spray nozzles, steam traps, flow orifices, flow indicators, control valves, aux. control valves, NRVs, suction strainers, servomotors, Valve etc forming part of the system (under this scope of work) irrespective of the suppliers is also to be carried out by the agency without any extra cost after chemical and / or steam blowing / oil flushing at site. This will include collecting from BHEL / Customer stores, transport to site, suitably cutting the erected piping, cleaning, erection, welding, radiography and stress relieving and commissioning.

15.36 Strainers flanges welding is to be carried by the agency without any extra cost .

15.37 Certain instruments like pressure switches, gauges, air sets, regulators, filters, junction boxes, power cylinders, dial gauges, thermometers, flow meters, valve actuators, flow indicators etc., are received in assembled conditions as integral part of equipments. Contractor shall dismount such instruments and re-erect whenever required prior to commissioning. Sometime this may have to be handed over to store or instrumentation contractor.

15.38 The contractor has to fabricate stainless steel orifice plate within the quoted rate (Only if required). No extra payment will be made for fabrication of above orifice plates. The required stainless steel plate will be supplied by BHEL.

15.39 Fixing, fitting, welding of thermo wells, stubs, hoses, tapping points, root valves and instruments etc., on different lines / equipments (which will be supplied by BHEL) is within the scope of work.

15.40 Welding of all thermo wells, draft, pressure and temperature instrumentation points and all other instrumentation points on piping and auxiliaries and welding of thermocouple pads are in the scope of work.

15.41 Contractor shall also weld small length of piping with root valve to the pressure, flow and level tapping points on piping or flow nozzles / orifices / metering elements fixed on piping as per the instructions of BHEL Engineer.

15.42 The contractor shall also weld all thermo wells, small length of pipes to all pressure, flow and level tapping points, isolating valves and root valves on all equipment under scope of erection of this contract. All embedded temperature measuring elements provided in the bearings will have to be terminated at the junction box by the contractor. Thermo wells tapping point connections incorporated shall be plugged during the pressure testing and steam blow out of piping systems. Upon completion of blow out operation all thermo wells and flow elements with branch pipes be installed and welded.

15.43 Suspension for piping etc., will be supplied in running lengths and shall be cut to suitable sizes and adjusted as required. Hangers' components which are being supplied in loose shall be assembled at site and erected as part of the work.

15.44 For hangers and supports the instruction given in the drawings and documents must be followed for handling, erection and setting of cold / hot values and locking etc.

15.45 All hangers, supports and anchors (including concreting or welding) shall be installed as per drawing and complete installation as per instructions of BHEL Engineer. Normally supports are issued in running meters. Any additional supports as called for by BHEL Engineer shall be fabricated by the contractor and provided at no extra cost. However, the raw material required for fabrication of such supports shall be supplied by BHEL free of cost.

15.46 Contractor has to fabricate and erect temporary spool pieces wherever required due to non-receipt of valves/fittings in time and after receipt of valves the spool pieces are to be replaced with regular valves at free of cost. For spool pieces materials will be supplied free of cost by BHEL.

15.47 All welded joints should be painted with anti-corrosive paint, once radiography and stress relieving works are over.

15.48 Welding, non-destructive testing and heat-treatment as prescribed in BHEL Welding / Heat treatment manual is to be carried out by the contractor. The contractor shall conduct non-destructive tests like radiography, ultrasonic test for weld defects etc., ultrasonic test for finding thickness, dye penetrant tests, magnetic particle test etc. on weld joints, castings, valve bodies and other equipments etc. as per BHEL Engineer‘s instructions within the quoted rate.

15.49 Cutting and removal of dummies for all the shop welded stubs (irrespective of the equipments supplier for the above) for all the terminal points and preparation of edge where the piping is to be terminated is also in the scope of the contractor without any extra payment.

15.50 The contractor shall fabricate piping, install lub oil systems, if any and carry out the acid cleaning of fabricated piping. The contractor shall also service the lub oil system, carry out the hydraulic test of oil coolers. etc.,

15.51 For skid mounted equipment, the checking and re-alignment required at site is in the scope of work.

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

15.53 All the shafts of rotating equipment shall have to be properly aligned to those of matching equipment to perfection, accuracy as required and the equipment shall be free from excessive vibration so as to avoid overheating of bearings or other conditions which may tend to shorten the life of the equipment.

15.54 All the bearings, gearboxes etc., of the equipment / actuators and electrical motors to be erected are provided with protective greases only. Contractor shall arrange as and when required by the engineer for cleaning the bearing / gear boxes etc., with kerosene or some other agent if necessary by dismantling some of the parts of the equipment during erection and shall arrange for re-greasing / lubricating them with recommended lubricants and assembling back. Lubricants will however be supplied by BHEL at free of cost.

15.55 The actuators / motors of valves may be supplied in loose parts, contractor shall have to match / assemble and align at site as per instructions of BHEL Engineer including placement on foundation.

15.56 The contractor shall take necessary measures to see that all the machined surfaces are preserved and covered.

15.57 All dimensions / elevations refers to centerline of pipe unless otherwise specified, the pipe routing shall be carried out as per the drawing. Wherever the dimensions are not specified / shown as approximate the same may be routed as per site requirement / convenience as per site engineer‘s advice.

15.58 Contractor has to arrange required fire retardant covering material at their cost to protect the machined components, assembled parts and insulation materials drawn from BHEL before and after erection.

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

15.60 Prior to erection of any components, inspection to be done for any foreign materials and damages and they are to be removed / attended as per instructions of BHEL engineer.

15.61 The temporary structures / items welded to permanent members / pipes are to be cut and removed without any damage. In case of any damage, the same has to be made good by the contractor at his cost.

15.62 Before lifting the heavy components, soft materials like gunny bags to be used while lashing the rope to avoid dents, rubbing marks etc. The capacity, number of sheave pulleys, size of the rope, guide pulley locations are to be decided at site with respect to the capacity and positioning of the winch. The end caps provided at shop for various stubs are to be removed during final fit up only.

15.63 The contractor will have to follow the instructions provided in the technical manuals, drawings, and specifications provided by BHEL, to the contractor from time to time. In case of ambiguity or deviation the decision / clarification of BHEL Engineer will have to be followed.

15.64 All the works such as cleaning, leveling, aligning, trial assembly, dismantling of certain components for checking and cleaning, surface preparation, fabrication of sheets, tubes and pipes as per general engineering practice and as per BHEL Engineer‘s instructions at site, cutting, weld depositing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scrapping, lapping, fitting-up, inspection, edge preparation if required, etc., as may be applicable in such erection works and are necessary to complete the work satisfactorily, shall be carried out by the contractor as part of the work within the quoted rate. Major machining work, which is only to be carried out in workshops, will be arranged by BHEL.

15.65 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.

15.66 The contractor shall provide any fixtures, concrete blocks / wooden sleepers, etc., which are required for temporary supporting / preassembly of the components at site.

15.67 The valves will have to be checked, cleaned or overhauled in full or in part before erection, after chemical cleaning and during commissioning. All the valves, after chemical cleaning, have to be checked, cleaned or over hauled in full or part before erection if called for as part of scope.

15.68 Erection of flow switches, steam traps, filters, flow meters, other metering elements, flow orifices, flow indicators, control valves supplied either by BHEL or customer forming part of the system is in the scope of work. This will include collecting from BHEL/Customer stores, transport to site, suitably cutting the erected piping, cleaning, erection, welding, radiography and stress relieving and commissioning.

15.69 Fixing / Fitting / welding of thermo wells, stubs, hoses, tapping points, root valves and instruments etc., on different lines / equipments (which will be supplied by BHEL) is within the scope of work. Fixing of Pick-ups, Probes & Accessories for vibration monitoring system for the erected equipments / pipe lines are covered in the scope of this specification.

15.70 During hydro test, pipe end dummy if required shall be supplied by BHEL, plates shall be cut for the requirement and shall be returned back to BHEL Stores.

15.71 Arrangements for providing required dewatering (in the area covered in this contract scope) during erection, by suitable dewatering pumps / Continuous Multi Point Dewatering etc ,as per site requirement is included in the scope of work . Vendor has to arrange adequate no. of Diesel & electrical pumps suitable capacities ,diesel ,operators, necessary manpower with sufficient quantity of suction & discharges hoses, pipes, Clamps, cables, Electrical panels/starters, consumables without any extra commercial implication on BHEL treating as normal scope of work.

15.72 All the rubber – lined pipes are flange joined and the flanges are also rubber lined. No welding is allowed on these pipes. If any damages occurred / notices in the above pipe lines during erection / transportation / commissioning of rubber lined pipes, the same has to be rectified by the contractor at his cost.

15.73 Brief list of equipments / sub-assemblies to be erected by the contractor & approximate weight and size of individual heavy components are given under the (Bill of quantity) and is meant for giving general idea to the tender only about magnitude of the work involved. The components are sent in parts for convenient transportation. They are to be cleaned, assembled in stage by stage, fastened / welded, erected and aligned as per the drawing dimensions / tolerance and instructions of BHEL Engineers.

15.74 The terminal points decided by BHEL are final and binding on the contractor for deciding the scope of work and effecting the payment for the work done up to the terminals.

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

15.76 Scaffolding and rigging operations Flame / electric cutting, grinding, welding, radiography and stress relieving & wrap inspection by HOLIDOY equipment. Fitting, fettling, filing, straightening, chamfering chipping, Scrapping, reaming, cleaning, checking, leveling, blue matching, Aligning and assembly. Surface grinding, drilling, doweling, shaping. Temporary erections for alignment, dismantling of certain equipment for checking, cleaning, servicing and site fabrication.

15.77 The temporary structures/ items welded to permanent members/pipes/systems are to be cut and removed without any damage. Any damage so to permanent members/ pipes to be made good by the contractor at his cost.

15.78 Sometimes it may become necessary for the contractor to handle certain unrequired components in order to take out the required materials. The contractor has to take this contingency also into account. No extra payment is payable for such contingencies.

15.79 Materials shall be stacked neatly, preserved and stored in the contractor's shed/work area in an orderly manner. In case it is necessary to shift and restack the materials kept

at work area/site to enable other agencies to carry out their work, same shall be done by the contractor at no extra cost.

15.80 Contractor has to arrange required fire proof tarpaulins to protect the machined components / assembled parts drawn from BHEL before and after erection at their cost.

15.81 All piping items including pipes, valves, flanges, fittings etc. shall be supplied as commercially available. Hence Fit-ups, edge preparation including welding of stubs, shall be included in the contractor's scope. No separate payment will be made for the edge preparation of pipes, Standard fittings such as bends, Tees etc.,

15.82 Contractors has to carryout fabrication works such as welding of stubs /nipples, attachments etc., preparation of surface for rust preventive coating and application of rust preventive is within the quoted / accepted rate.

15.83 Contractor shall engage separate gangs throughout the contract period, exclusively for proper housekeeping of the site. The contractor has to make necessary arrangements for collection and for bringing down the scrap from, all locations and taking them away from the erection areas to various locations as indicated by BHEL Engineer. The house keeping must be a routine and continuous activity.

15.84 The contractor shall take all reasonable care to protect the materials and equipment during erection. Touch up painting required to be done on any equipment or part during the course of erection will have to be done by the contractor.

15.85 Upon completion of daily work, the contractor shall remove from the vicinity of work all scrap packing materials, rubbish, unused and other materials and deposit them in places to be specified by BHEL Engineer.

15.86 The valves will have to be cleaned, checked, lapped or overhauled in full or in parts before erection, during commissioning. Any special tools required for lapping only will be arranged by BHEL.

15.87 Contractor shall remove the bridge, stopper etc., by gouging/ grinding and not by hammering. Any burrs left on the equipments / piping, after welding, shall be ground off or any scar or cavity made good by welding and grinding. NDT tests shall be carried out if necessary to detect surface and sub-surface cracks in these ground areas.

15.88 All erectable gaskets, fasteners and other hardware shall be supplied by BHEL free of cost if any.

15.89 Any other connected material supply which is not covered in BOM but required to complete the system shall be erected by the vendor and payment in this case shall be made as per applicable item rate/respective item category.

15.90 Bidders to exercise utmost care while doing execution and commissioning work for this package so that no damage is caused to the existing plant at site. Any such damage will be back charged to bidder.

15.91 TD BFPs Shall be supplied in assembled condition and may be dismantled at site as per erection requirement and erected.

15.92 Statutory Approval

It shall be the responsibility of the Contractor to obtain the all necessary approvals/permits from the inspection/regulatory/statutory authorities etc. on behalf of the Employer, as may be required for design/calculations, manufacturing and erection procedure, testing etc. As called for under the statutes, regulations and the safety codes. All such documentation required to be submitted to the statutory

authorities shall be submitted to the Employer for its review. Cost of Approval & Inspection fee, if any, to be borne by Contractor without any extra cost to BHEL.

15.93 DOCUMENTATION

15.93.1 Contractor shall be supplied with the layout & isometrics drawings. Contractor to incorporate with Red ink all the changes / deviations / alterations etc. carried out at site due to various reasons, with site engineer's endorsement. Marked up drawings shall be submitted to BHEL for approval.

15.93.2 After successful completion, testing and commissioning of installation work, as built drawings / documents if any, in line with the actual work carried out as per site routing drawing shall be submitted by the contractor as agreed for the project.

15.93.3 Other documents as specified in Technical Conditions of Contract.

15.94 **Statutory approval for Lifts, hoists, Cranes:** Necessary approval for drawings, documents, load testing of hoists, Single girder EOT, Chain pulley blocks erected by bidders has to be arranged for getting statutory fitness certificates, load test certificates, drawings/documents from Statutory agency/Third party inspectors without any extra commercial implication on BHEL treating as normal scope of work. Weight/loads required for load test of hoists shall be provided by BHEL free of cost.

15.95 **Other structures, galleries and platforms:** 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.

15.96 Electroforged floor grills will be supplied for this project. These may have to be cut to suit requirement. Cutting shall be done only by mechanical cutters **and not by gas cutting**. Cold galvanizing compound is to be applied on the cut surface/edge. Cold galvanizing paint supply is in Contractor scope.

15.97 Support for Handing Over of T&P, spares to BHEL/Customer, diversion to other BHEL Sites/Units

Vendor shall assist in handing over of Special T&Ps for Erection/commissioning which were issued to them free of charge for returning to BHEL /Customer store.

15.98 Dewatering

Dewatering of Low Lying areas like CW pit and other low lying areas (as per scope applicability) till handing over to customer is in bidders scope for which vendor has to arrange and maintain adequate no. of Diesel & electrical pumps of suitable capacities, operators, necessary manpower with sufficient quantity of suction &

discharges hoses, pipes, Clamps, cables, Electrical panels/starters, diesel, consumables without any extra commercial implication on BHEL treating as normal scope of work. Dewatering pumps will be required to run to ensure job progress is not hampered & if required pumps are to be run on round the clock basis on working days & holidays, Sundays.

15.99 GENERATOR STATOR

1. Generator stator will be transported from HARIDWAR works to site on Trailer. This will be received at site nearer to the lifting point of EOT Crane (near 'A' row columns). Unloading of Generator Stator from trailer, lifting of stator and shifting it to TG Deck foundation, assembling the terminal box & cooler housing and placing in position using EOT crane is in the scope of this specification.
2. The generator stator shall be lifted and placed by the contractor with the help of EOT Gantry crane as per the scheme envisaged by BHEL on to the generator foundation. For this purpose, the EOT crane will be provided by BHEL free of hire charges to the contractor.
3. Slings for generator stator lifting/handling, shall be provided by BHEL free of charges on returnable basis
4. The assembly of the Trailer for return after unloading of stator is in the scope of this work.

15.100 **HANDLING OF HEAVIER EQUIPMENTS**

15.100.1 Contractor will be provided as per requirement on sharing basis with suitable cranes for loading/lifting of heavy and voluminous equipment/ components/ consignments, for which 40MT contractor scope crane is not suitable, **HP turbine module, IP Outer casing, LP turbine inner casing, LP rotor, IP Rotor, generator rotor, brushless exciter, LP Heater, HP heaters, IV & CV casing with valves etc.** from BHEL/ client's stores/ storage yard/unloading area. Contractors have to arrange trailers including low bed trailers/hydraulic trailer for transportation/shifting of above equipment to the unloading point/erection site. **The contractor shall make necessary arrangement like lying of steel plates, assembly & dismantling of heavy lift attachment, boom, jib etc. for movement and operation of BHEL cranes.**

15.100.2 BHEL shall not provide any T & P other than those specified for the specific work as per relevant Appendix and other relevant clauses of tender specification

15.100.3 Below is the list of major heavy consignments for 3x800MW Patratu project, Vendors may please visit site before submission of tender.

Sl No.	Description	Dimensions/Pkg size	Unit Wt Kgs
1	GENERATOR STATOR	10015X4500X4290	443000
	HP Heater - 7A	L 12560 x B 2400 x H 2850	79500
	HP Heater - 7B	L 12560 x B 2400 x H 2850	79500
	HP Heater - 8A	L 14350 x B 2400 x H 2900	110000
	HP Heater - 8B	L 14350 x B 2400 x H 2900	110000
	HP Heater - 9A	L 9250 x B 2400 x H	72500

		2800	
	HP Heater - 9B	L 9250 x B 2400 x H 2800	72500
	HP TURBINE	6745X3790X3495	128412
	GENERATOR ROTOR	14755X1910X1915	98187
	LP ROTOR	7000X3140X3110	64441
	BFP MOTOR		38000
	IP ROTOR	6090X1880X1700	29814
	LP INNER CASING (U/H)	6035X4778X3820	39012
	LP INNER CASING (L/H)	5230X5200X2980	59082
	IP OUTER CASING (U/H)	6240X4200X2427	30543
	IP OUTER CASING (L/H)	5945X4200X2325	39813
	IP INNER CASING (U/H)	4010X3320X1970	28060
	IP INNER CASING(L/H)	4010X3700X2121	30800
	ESV & CV CASING WITH VALVESESV	5100X4800X3100	35890

15.101 HANDLING OF MATERIALS ISSUED BY BHEL:

Materials shall be issued by BHEL based on the weighment basis/linear measurements & sectional weight. However on specific request of the contractor **"as a special case to expedite the job"** the consignment received at BHEL stores can directly be diverted to the work site following issuance procedure of BHEL. Such direct issues shall be as per the Challan/dispatch document/LR received with the consignment. In such cases, contractor shall do unloading of materials from trucks/lorry at their own cost.

MATERIAL HANDLING, TRANSPORTATION AND SITE STORE

The scope of the work will comprise of but not limited to the following:
(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

16.1 Loading at BHEL / Customer stores and storage yard, transport to site, unloading at site / working area of equipment, placement on respective foundation / location, fabrication yard, pre-assembly bay or at working area are in the scope of work. The scope includes taking materials / Equipments from customer stores / storage yard also. Contractors Quoted / Accepted rate shall be inclusive of the same. Required cranes, tractors, trailer or trucks/ slings/ tools and tackles / labour including operators, fuel, lubricants etc. for loading & unloading of materials will be in the scope of contractor.

16.2 The storage yard is located inside the Main Plant Boundary at a distance of approximately 3-4 KM from the plant.

16.3 Transportation of materials including ODC items from BHEL Store/Yard to Erection site shall be in the contractors scope. However, in some cases, consignments including ODC may be unloaded near erection site as per space availability and site requirements.

16.4 Loading at storage yard and transporting to site, unloading at site / pre assembly area or at working area, is in the scope of work. Required cranes for loading & unloading of materials, trailer shall be in the scope of contractor. The contractor shall provide any fixtures, concrete blocks & wooden sleepers, sandbags which are required for temporary supporting/stacking of the components at site in his custody.

16.5 The equipments / materials from the storage yard shall be moved in sequence to the actual site of erection / location at the appropriate time as per the direction of BHEL Engineer so as to avoid damage / loss of such equipment at site.

16.6 The contractor shall satisfy himself of the quality and quantity of the materials at the time of taking delivery from BHEL stores. No claims whatsoever will be entertained by BHEL because of quality or quantity after the materials are taken by the contractor from BHEL stores.

16.7 Contractor shall plan and transport equipments, components from storage yard to erection site in such a manner and sequence that material accumulation at site does not lead to congestion at site of work. However, in specific cases “as a special case to expedite the job” the consignment received at BHEL stores can directly be diverted to the work site, as decided by BHEL, following issuance procedure of BHEL. Such direct issues shall be as per the Challan/dispatch document/LR received with the consignment. In such cases, contractor shall do unloading of materials from trucks/lorry at their own cost.

16.8 Sometimes it may become necessary for the contractor to handle certain unrequited components in order to take out the required materials. The contractor has to take this contingency also into account. No extra payment is payable for such contingencies.

16.9 All materials issued by BHEL shall be stacked neatly, preserved, stored in the contractor’s shed / work area above ground level by use of concrete or wooden sleepers. No materials shall remain on ground at any time. All concrete or wooden sleepers required for stacking the materials shall be arranged by contractor at his own cost within the quoted rates. In case it is necessary to shift and re-stack the materials kept at work area / site to enable other agencies to carry out their work, same shall be done by the contractor at no extra cost.

16.10 All pipe and tube ends shall be covered with plastic caps or will be closed with wooden plugs as the case may be.

16.11 The contractor shall take care of material issued by BHEL and shall protect the same from damage and weathering. The contractor shall take necessary measures to see that all the machined surfaces are preserved and covered. Contractor has to arrange required fire proof tarpaulins to protect the machined components / assembled parts drawn from BHEL store before and after erection as required at their cost.

16.12 The contractor shall take all such measures as may be reasonably necessary to ensure that its arrangements and those of its sub-contractors with respect to the transport of Goods, Materials and Labour to the site do not interfere with local traffic in the vicinity of the site and where such interference is unavoidable shall make such special arrangements as may be reasonably required to minimize the effect of such interference.

16.13 The contractor shall in no case be entitled for any compensation on account of any delay in supply or non-supply thereof for all or any such materials. However in case of non-availability of any specific materials which delays the completion of work, such cases shall be recorded separately in monthly planning format (F 14) and shall be considered for time extension of contract.

16.14 The contractor shall solely be responsible for the safety & security of material after it is handed over and issued to contractor by the BHEL. BHEL reserves the right to recover from the contractor any loss arising out of damage/ theft or any other causes or during verification/stacking or at any time under the custody of the contractor.

16.15 Contractor shall also carryout in complete association with BHEL, the material management functions and execution like day-to-day update of materials, issued to contractor, accounting for surplus/scrap material returned etc. These functions shall also be carried out through computerized system utilizing suitable software. Contractor shall engage experienced software personnel to associate on dedicated basis for efficient discharge of the same in time.

16.16 Open space for storage purposes shall be provided by BHEL on free of cost/as available basis. Temporary barbed wire fencing, as required, of the open storage yard is to be done by the contractor and is included under the scope of his work. Contractor shall also remove grass, bushes, trees etc wherever required off the land provided to him and shall make proper continuous up keeping of the open yard /land by removing grass, bushes trees etc and same is included under the scope of his work & No extra payment shall be made to the contractor in this regard. The bidder shall make complete arrangement of necessary security personnel's to safeguard all such materials in his custody. The contractor shall take care of material issued by BHEL and shall protect the same from theft, damage and weathering. In case, loss of any materials for whatsoever reasons attributable to the contractor, then cost of such materials shall be recovered from the running bill payment with applicable overheads.

16.17 All surplus materials shall be returned to BHEL store. All wastage / scrap (including melting scrap, wastage, and unusable scrap) shall be returned to the stores on weighment basis in consultation with BHEL Engineer and a receipt obtained for material accounting purposes. Scrap materials shall be sorted section-wise and returned separately at a place directed by BHEL Engineer within the project area. Return of such materials will not be entitled for any handling and incidental charges.

The scope of the work will comprise of but not limited to the following:

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.

17.1 All equipments, pipings shall be erected in conformity as per other standard / specification in practice in BHEL. The method of welding (viz) ARC, TIG or other methods as indicated in the detailed drawing or as instructed by BHEL Engineer shall be followed. BHEL Engineer will have the option to change the method to suit site conditions.

17.2 Welding of piping, high tensile structural steel shall be done by certified high pressure welders who possess valid certificate and who are approved by BHEL Engineer.

17.3 All welders including tack welders, structural and high pressure welder shall be tested and approved by BHEL Engineer before they are actually engaged on work even though they may possess a valid certificate. BHEL reserves the right to reject any welder without assigning any reason if the welder's performance is not found to be satisfactory. The contractor shall maintain the records of qualification and performance of welders. BHEL Engineer will issue all the welders qualified for the work, an identity card. The welder will keep the same with him at work place at all times. He may be stopped from work if he is not found in possession of the same.

17.4 The welder Identification code as approved by the BHEL Engineer shall be stamped by the welder on each joint done by them. The contractor will be responsible for the periodic renewal, retesting of the welders as demanded by BHEL.

17.5 BHEL Engineer is entitled to stop any Welder from the work if his performance is unsatisfactory for any technical reasons or there is a high percentage of rejection of joints welded by him, which in opinion of the BHEL Engineer will adversely affect the quality of the welding though the Welders has earlier passed the tests prescribed by BHEL Engineers. The welders having passed qualification tests does not absolve the contractor of contractual obligation to continuously check the welder's performance.

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

17.7 The contractor shall have to carry TIG welding of weld joints of tubes / pipes as per instruction of BHEL Engineer. During the root runs of stainless steel joints, the contractor shall before and during welding have to purge the pipes with inert gas.

17.8 All expenses for testing of contractor's welders including destructive and Non-destructive tests conducted by BHEL at site or at laboratory shall have to be borne

by the contractor only. Limited quantity of tube and pipe material required for making test pieces will be supplied by BHEL free of cost.

17.9 Only BHEL approved electrodes and filler wire shall be used. All electrodes shall be baked and dried in the electric electrode-drying oven to the required temperature for the period specified by the Engineer before these are used in erection work. All welders shall have electrodes drying portable oven at the work spot. The electrodes brought to the site will have valid manufacturing test certificate. The test certificate should have a co-relation with the lot number / batch number given on electrode packets. No electrodes will be used in the absence of above requirement. The thermostat and thermometer of electrode drying oven will be also calibrated and test certificate from Govt. approved / accredited test house traceable to National / International standards will be submitted to BHEL before putting the oven in use. The contractor shall also arrange periodical calibration for the same. Separate ovens shall be used for baking and holding. All racks and other items used for storage of welding electrodes shall be of steel and not of wood.

17.10 All welding consumables shall be issued to the welders only by authorized person who is controlled by contractor‟s welding engineer. The necessary baking requirements are to be ensured by Contractor‟s welding engineer.

17.11 All butt / fillet welds shall be subject to Non –Destructive testing as per the Drawing/Procedures/Welding Schedules/Documents at no additional cost.

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

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

17.14 The welded surface irrespective of place of welding shall be cleaned of slag and painted with anticorrosive primer paint / red oxide paint immediately once radiography, stress reliving and other NDE works are over as applicable. Necessary consumables and scaffolding etc. including paints shall be provided by contractor at his own cost. Daily welding reports in the format suggested by BHEL should be submitted by next morning without fail.

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

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

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

17.17 The contractor shall also be equipped for carrying out other NDT like LPI /MPI / Hardness test etc. as required as per welding schedules / drawings within the finally accepted price / rates. Ultrasonic testing, wherever required, will be arranged by contractor within the quoted rate.

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

17.19 Contractor at his cost shall arrange necessary safe guards required for radiography. Radiography personnel with sufficient experience and certified by M/s BARC for conducting radiographic tests in accordance with safety rules laid down by Division of Radiological protection only have to be deployed. These personnel should also be registered with DRP / BARC for film badge service.

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

17.21 Lead numbers and letters are to be used (generally 6mm size) for identification of radiographs. Contract number, joint identification, source used, welder's identification and SFD are to be noted down on paper cover of radiograph. Lead intensifying screens for front and back of the film shall be used as per the ASME specification and as per the instructions of BHEL Engineer

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

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

17.23 All arrangements for carrying out radiography work including dark room, air conditioner and other accessories & facilities shall be provided by contractor within the space allotted for office at his cost. There must be a number of radiographic personnel with sufficient experience and certified by BARC for field radiographic inspection. As an alternative the contractor may deploy an agency having all above facilities and who are duly approved / accredited by BARC and / or other Regulatory authorities. Detailed particulars of such agencies will be submitted and got approved by BHEL Engineer before the actual deployment of agency for radiography work.

17.24 The contractor shall have a dark room fully equipped with radiography equipment, film (un-exposed), chemicals and any other dark room accessories. All radiography films shall be developed in the dark room at site.

17.25 100% radiography of weld joints of certain piping has to be carried out as per standards/drawings/Specifications. In case of radiography of less than 100%, the joints identified by BHEL at random shall be radiographed.

17.26 Contractor shall note that 100% radiography will be done at the initial stages on all the piping welding joints. Subsequently radiographic inspection will be done on the basis of quality of welding. However minimum percentage of joints to be radio graphed shall not be less than the requirement of BHEL welding schedule / welding Manual booklet applicable as per IBR/ Customer's requirements. The percentage radiography shown in the respective drawings shall be final and binding on the contractors. The percentage may be increased depending upon the quality of joints and at the discretion of BHEL.

17.27 All the Radiographs shall be properly preserved in air-conditioned rooms and shall become the property of BHEL. They are to be reconciled with the work done, joints radio graphed and submitted to BHEL / customer.

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

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

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

17.31 The defects as pointed out by the Engineer shall be rectified immediately to the satisfaction of Engineer and Re-radio graphed. The decision of Engineer regarding acceptance or otherwise of the joint shall be final and binding on the contractor. However, if the defect persists after first repair, further repair work followed with

radiography shall be repeated till the joint is made acceptable. In case the joint is not repairable, the same shall be cut, re-welded and re-radio graphed at contractor's cost.

17.32 Radiography, heat treatment and other NDE processes may be required to be carried out at any time (day and night) to ensure the continuity of the progress. The contractor shall make all necessary arrangements including labour, operators/ supervisors/ engineer as required for timely and satisfactory execution of radiography work as per directions of BHEL.

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

17.34 All welded joints shall be subjected to acceptance by BHEL Engineer whose decision will be final and binding.

17.35 The technical particulars, specifications and other general details of work shall be in accordance with BHEL welding, Heat treatment and NDE manuals or equivalent as decided by BHEL Engineer.

17.36 The field joints are to be radiographed and preheating and post weld heat treatment to be done as per BHEL procedure and manuals.

17.37 Penetrometor as per ASME/ISO shall be used for all exposures.

17.38 The contractor shall also be equipped for carrying out other NDT like liquid penetrant inspection, magnetic particle inspection, etc. as and when required in the interest of work within the quoted rates.

17.39 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 and quote the price inclusive of all such work and radiography.

17.40 The welding process, weld joint details, joint configuration and material specification may change to suit the design requirements. The contractors quoted rates shall be inclusive of each contingency. All welds involved in the erection of temporary pipe lines for hydraulic test, chemical cleaning, steam blowing etc. to be carried out within the quoted rates.

17.41 Preheating, inter-pass heating, post weld heating and stress relieving after welding are part of erection work and shall be performed by the Contractor in accordance with BHEL engineer’s instructions. Where the electric resistance heating method is adopted Contractor shall make all arrangement including heating equipment with automatic recording devices, all heating elements, thermocouples and attachment

units, graph sheets, thermal chalks, & insulating materials like mineral wool, asbestos cloth/pad, ceramic beads, asbestos ropes etc, required for all heating and stress relieving works.

17.42 Contractor shall deploy NDE and Heat Treatment agency as per the "Guidelines for selection of NDE and Heat Treatment agencies at Site (to be deployed by BHEL's E&C associates).

17.43 List of Penalties on Violations on Quality Provi**sions**

Sr no	Violation	Penalty in Rs
1	Mother oven not working	500 per day & ban on its use
2	Slackness in control over baking of welding electrodes(Doc.)	200 per incident
3	Holding oven not working/plugged in	500 per incident/day & ban its use
4	Portable oven not working/Plugged in	100 per incident & welder to be sent home
5	Use of cold electrodes(Except E6013)	100 per incident & welder to be sent home
6	Unauthorized welder on job	500 per incident & welder to be sent home
7	Delay in NDT Agency deployment w.r.t jointly agreed Ere. Prog	500 per incident & welder to be sent home
8	Failure to monitor Welder's Performance (RT, SR, Penalty Joint etc.)	5000 per week
9	Improper acts w.r.t maintain SR Charts	10000 per incident
10	Site Welding/QLY Engineer not deployed w.r.t mutually agreed Ere. Plan	500 per day
11	Delay in (RT, SR, UT) report submission & customer acceptance Log sheets esp. for Billed qty. from dt. of Billing (Vendor)	10,000 per week
12	Lack of safe approach Scaffolds/Platform for inspection & non-availability of calibrated MMDs –	1000 per incident.

17.44 GUIDELINES FOR WELDING, NDE AND HEAT TREATMENT

- **For NDT & Heat Treatment agencies has to follow the guidelines as per Annexure 5.**

17.44.1 RECEIPT INSPECTION OF WELDING ELECTRODES / FILLER WIRES

1. All electrodes / filler wires received at site stores shall be segregated for type and size of electrode.
2. Ensure that electrode packets received are free from physical damage.
3. Where electrodes are damaged, the same shall be removed from use.
4. Only electrodes identified in the "Rationalized List of Electrodes" are to be accepted.

5. Where filler metals are supplied by manufacturing unit, inspect for damages, if any.
6. Ensure availability of relevant test certificates. Refer tables of chemical compositions and mechanical properties for acceptance.
7. Endorse acceptance / rejection on the test certificate.

17.44.2 STORAGE & IDENTIFICATION OF WELDING ELECTRODES / FILLER WIRES

1. **Scope**

1.1 This procedure is applicable for storage of welding electrodes / filler wires used at sites.

2. **Procedure:**

2.1 Only materials accepted (based on receipt inspection) shall be taken into account for storage.

2.2 Storage Facility:

2.2.1 The storage facility shall be identified.

2.2.2 Access shall be restricted to authorized personnel.

2.2.3 The storage area shall be clean and dry.

2.2.4 Steel racks may be used for storage.

2.2.5 Avoid storing wood inside the storage room.

2.2.6 Maintain the temperature of the storage facility above the ambient temperature.

2.2.7 This can be achieved by the use of appropriate heating arrangement .

2.3 The electrodes / filler wire shall be segregated and identified for

1. Type of electrode e.g. E7018.
2. Size of electrode e.g. Dia 3.15 mm.

2.4 Colour coding for filler wires:

2.4.1 On receipt of GTAW filler wires, codify the filter wires as per table I below . Both ends shall be coloured.

Table - 1

Specification	Brand Name*	Colour Code
RT 1/ 2 Mo (ER80s-D2)	TGSM	Green
RT 1 Cr 1 / 2 Mo (ER80S-B2)	TGS 1CM	Silver grey/White
RT 2 1/ 4 Cr 1 Mo (ER90S-B3)	TGS 2CM	Brown / Red
RT 347 (ER 347	TGS – 347	Blue

(* or other approved equivalents)

2.4.2 Where another set of colour code is followed, maintain a record of coding used

2.4.3 Where the filter wire is cut, apply the appropriate colour code at both ends of the piece.

2.4.4 For other filler wires, a suitable colour distinct from table 1 shall be applied

17.44.3 BAKING AND HOLDING OF WELDING ELECTRODES

A. Purpose:

This section details activities regarding baking and holding of welding electrodes used at sites.

B. Procedure:

1. While handling, avoid contact of oil, grease with electrodes. Do not use oily or wet gloves.
2. It is recommended that not more than two days requirements are baked.

C. GTAW Filler Wires:

1. These wires do not require any baking.

D. Covered Electrodes:

I. Baking and holding
II. Identify baking oven and holding oven.
III. They shall have a temperature control facility upto 350 °C for baking oven and 200 Deg. C for holding oven.
IV. A calibrated thermometer shall be provided for monitoring temperature.
V. On opening a packet of electrodes, segregate and place them in the baking oven. Avoid mix up.
VI. After loading, raise the baking oven temperature to the desired range as per Table below.
VII. Note the time when the temperature reaches the desired range. Maintain this temperature for the duration required as per Table below.
VIII. On completion of baking, transfer the electrodes to holding oven, maintain a minimum temperature of 100°C till issue.
IX. The electrode shall not be subjected to more than two cycles of baking. Maintain a register containing following details:

a. Brand name (e.g. Supratherme)
b. Size (e.g Dia 4.0 mm)
c. Quantity (e.g. 110 pieces)
d. Time at required temperature ie. Above 2500C
e. Time of Transfer to holding oven. Activities a, b, c to be recorded before loading into the oven.

The scope of the work will comprise of but not limited to the following:
(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

18.1.1 All required tests indicated by BHEL and their clients for successful commissioning are included in the scope of these specifications. These tests / activities may not have been listed in these specifications. Specialized test equipment, if any, shall be provided by BHEL/ its client free of hire charges.

18.1.2 It is the responsibility of the contractor to provide necessary manpower, tools, tackles and consumable till the completion of work under these specifications including for trial operation. Commissioning of piping and the other equipments, even though the delay reasons are not attributable to the contractor.

18.1.3 Site testing wherever required shall be carried out for all items / materials installed by the contractor to ensure proper installation and functioning in accordance with drawings, specifications and manufacturer's recommendations and Field quality plans of BHEL.

18.1.4 After completing all the works, contractor shall hand over all remaining extra materials with proper identification tags in a packed condition to BHEL stores / Customer stores. In case of any use over actual design requirements, BHEL reserves the right to recover the cost of material used in excess or misused. Decision of BHEL engineer in this regard will be final and binding on the contractor.

18.1.5 The contractor shall carryout any other test as desired by BHEL Engineer on erected equipment covered under the scope of this contract during testing, pre-commissioning, commissioning, and operation, to demonstrate the completion of any part or whole work performed by the contractor.

18.1.6 The contractor shall carryout the required tests on the equipments & pipelines, such as gas tightness test / air tightness test, kerosene test, hydrostatic test and rectify all the defects caused due to contractor's fault at his own cost. Contractor may have to replace old / damaged gaskets / packing etc. of equipments and the same shall be carried out by contractor as per requirement. Compressed air for pneumatic testing is to be arranged by contractor. The contractor shall carry out the trial run of motors including checking the direction of rotation in the uncoupled condition, checking, aligning and coupling the motor to the respective driven equipment. Before starting the motor IR values of insulation shall be recorded and if found necessary dry out to be done by the contractor to improve the IR value at no extra cost.

18.1.7 During the initial stages of work, trenches for draining water may not be available after Leak test, Hydro test, Flushing or mass flushing. For discharging/ emptying the equipment, system and piping, necessary low point drains and temporary piping upto safe location are be erected by the contractor at his cost. The materials will be provided by BHEL.

18.1.8 In case any erection defect and / or malfunctioning is detected during various tests / operations, trial runs as detailed above, such as loose components, undue noises, vibration, strain on connected equipment, steam / oil / water leakage, etc. the contractor shall immediately attend these defects and take necessary corrective measures. If any readjustment and re-alignments are necessary the same shall be done as per BHEL Engineer's instructions. If any part needs repairs rectification and replacement the same shall be done by the contractor at no extra cost. The parts to be replaced shall be provided by BHEL free of cost. If insulation is to be removed to

attend any of the defects the cost of removal and reapplication of insulation should be borne by the contractor.

18.1.9 In case any defect is noticed during various tests, trial runs and commissioning the contractor shall immediately attend to these defects and take necessary corrective measures. If any readjustment and re-alignment are necessary, the contractor at his cost shall do the same as per Engineer's instructions including repair, rectification and replacement work. The parts to be replaced shall be provided by BHEL.

18.1.10 Temporary blinds / lugs / caps of piping and associated equipments like tanks, pumps etc required for oil flushing / alkali cleaning / acid cleaning of piping & other equipments during erection & pre-commissioning shall be erected by contractor within the quoted rate.

18.1.11 During Commissioning, opening / closing of valves, changing of gaskets, attending to leakage and adjustments of erected equipment may arise. Contractor may have to replace old / damaged gaskets / packing etc. for equipments and the same shall be carried out by contractor as per requirement. The finally accepted price / rates shall also include all such work.

18.1.12 Replacing / cleaning of filters of the erected equipments and piping system etc., during pre-commissioning / commissioning stage is within the scope of work.

18.1.13 During steam blowing operations the required manpower for fixing the target plates shall be arranged by the contractor as per the instructions of BHEL Engineer within the quoted rates. The manpower for the above operation may be required round the clock if necessary. The contractor shall carry out the above operation as per the instructions of BHEL Engineer within the quoted rates.

18.1.14 Main Steam Line & Hot Reheat Line Strainers bodies are erected first by other agency and the lines will be erected by piping contractor. After Hydraulic Test, the strainer elements are to be fixed, by other agency. During trial operation, if required, the strainers will be removed by other agency for inspection of debris & cleaning. During all these activities, piping contractor shall extend all sort of co-operation.

18.1.15 After synchronisation, the commissioning activities and trial operations will continue upto handing over. It shall be the responsibility of the contractor to provide various categories of workers in sufficient numbers as per the work requirement along with supervisors including necessary consumables, tools, etc. during this period. The rate quoted shall include all these contingencies also. The various categories of workers required for precommissioning, commissioning and post–commissioning activities are as follows.

a. Pipe fitters
b. Mill Wright Fitters
c. HP / Structural welders
d. Riggers
e. Unskilled workers
f. Supervisors
g. Electricians

h. Any other category of workers as may be required Further in addition to the above, contractor has to arrange the following manpower exclusively for assisting BHEL commissioning engineers during stabilization and trial operation period. This manpower will be directly controlled by BHEL commissioning engineers only.

1. One supervisor per shift for three shifts
2. Two fitters per shift for three shifts
3. Two helpers per shift for three shifts.

18.1.16 It shall be specifically noted that the contractor may have to work round the clock during the pre-commissioning, commissioning and postcommissioning period along with BHEL Engineers and hence considerable overtime payment is involved. The contractor's quoted rates shall be inclusive of all these factors. The pressure testing for piping system shall be carried out as per IBR / Customer / customers‘ consultant specification / BHEL. Customers‘ consultant specification forms the part of this tender specification.

18.1.17 Soundness of the welds shall be tested hydraulically under the supervision of the BHEL Engineer and Customer, to the pressure indicated in the drawing. Prior to the test, the piping system shall be inspected by the BHEL Engineer to the extent necessary to ensure compliance with clearance for the test, which will be obtained by the contractor from the Engineer.

18.1.18 Contractor has to arrange required pumps with sufficient capacity for filling water in the lines for conducting Hydro test.

18.1.19 Contractor has to arrange Hydraulic Test pump / Hand Pump at his cost for Hydraulic testing of LP lines.

18.1.20 Hydraulic testing pumps for HP lines shall be provided by BHEL free of hire charges. The testing pumps will be issued to the contractor in working conditions. Installation, electrical connection, erection, testing and dismantling and returning to BHEL stores, etc, shall be carried out by the contractor as part of this work without any extra charges. In case any servicing of the test pump is to be done during the course of the test, the contractor shall provide the necessary labour for the same and spares will be arranged by BHEL.

18.1.21 Contractor shall lay all necessary electric cables and switches etc. required for the hydraulic tests and other tests, flushing etc., and maintain the system till the tests are completed satisfactorily.

18.1.22 Raw materials for all temporary piping necessary for conducting Hydraulic test, Chemical cleaning, Steam blowing, Flushing, effluent disposal, etc. will be provided by BHEL free of cost. However, fabrication, servicing, erection and dismantling the same and return of the temporary piping, flanges, valves etc. to BHEL stores is the responsibility of the contractor without any extra charges.

18.1.23 Contractor at his cost shall lay all necessary temporary piping, install the pumps, blanks, valves required for the test, pressure gauges etc. Required pipes, valves, plates etc., will be given by BHEL. Temporary piping, pumps, valves, flanges, blanks etc shall be removed by him and returned to BHEL. All thermo well points are to be seal welded, with plug in position. All Temperature Element points are to be provided with blanks and welded. Necessary blanks will be provided by BHEL.

18.1.24 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 / draining points with valves as per BHEL Engineer‘s instructions, for performing hydro-test of piping and other equipments is within the scope of work. Gaskets, valves, fasteners will be provided free of cost by BHEL. Contractor shall cut steel blanks from steel provided without charging extra. 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 Engineer‘s instructions.

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

static testing on all piping, equipment covered in the specification at cost. Necessary blanks will be provided by BHEL.

18.1.26 After hydro test / steam blowing during the restoration works , it is the responsibility of the contactor to ensure the removal of dummy/plugs and edge preparation for the thermowell stubs if required within the quoted rate.

18.1.27 In general Hydraulic testing of piping shall be performed after all eventual pipe branches have been completed and valves installed. Should it be required to hasten erection work, pressure tests may be performed by sections. For this scope of work, the erected pipe lines shall be hydraulically tested as per site requirement in segments. For conducting hydraulic test, both ends of pipe lines shall be blanked by welding of plates. Only one or two set of plates and structural materials for blanking required for one segment will be provided by BHEL free of charge. After completion of hydraulic test in one segment, the same plates are to be cut and removed and utilized / welded on the other segment of the pipe lines, to carry out the hydraulic test for the respective segments. No separate plates for blanking for each segment will be provided. After completion of Hydraulic test, the required edge preparations shall be carried out on the end of pipe lines and to be welded with the respective pipe lines. In such cases joint connection shall be checked during a final and additional test, if required. The contractor shall note this aspect and quote accordingly.

18.1.28 During hydraulic test, the pipes being tested shall be isolated from the equipments to which they are connected.

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

18.1.30 Openings on piping for pressure / temperature impulse connections shall be fully closed during the test to prevent dust or foreign matter entering into the instrument piping inadvertently.

18.1.31 The following specifications shall also be completed with during hydrostatic test.

a) Vent nozzles with valves shall be provided at the highest point of the runs, to eliminate air pockets. At the lowest point drain nozzles, with valves shall be provided to drain water from pipes. The nozzles and valves shall be of the same materials as the pipe.

b) The lowest part of the pipe shall always be filled first with water.

c) Pressure shall be slowly increased (without shocks) to the stipulated valve and maintained as long as required to visually check all joints.

d) Following the control specified above the pressure shall be slowly decreased to the design pressure after which the pipe shall be subjected to the peening test, applying knocks every 150 mm approx. especially in the welded joint areas, with a 0.5 – 1.5 kg. Hammer (depending on the pipe wall thickness). The hammer used shall be a round headed one.

e) Following the peening test, the pressure shall be increased to the stipulated value and all welded joints shall be visually inspected.

f) Following these test, the pipe shall be drained or pumped out to the other section to be hydro test using the drain out pump to be provided by Contractor and wherever necessary shall be flushed with air for all pipes.

g) The pressure test is considered satisfactory if no cracks, unjustified pressure reductions, leakages, seepages etc., appear.

h) Should defects be found, these shall be repaired in the same manner as these during radiographic examination. Hydraulic test shall be repeated after defects have been repaired.

18.1.32 The contractor shall carry out all the required tests and pre-commissioning and commissioning activities required for successful and reliable operation. These would include hydraulic test of piping, pre-boiler system detergent flushing / chemical cleaning, steam blowing, water washing etc. as instructed by BHEL using contractors own labour and scaffoldings etc.

18.1.33 The Contactor shall carry out all the required tests and pre-commissioning and commissioning activities for TG equipments and aux. required for successful and reliable operation. These would include;

(1) Trial run of Boiler Feed Pumps, CEP, Vacuum Pumps, Booster Pump, etc and other pumps/equipments like Misc pumps etc and other various rotating machineries / pumps as per tender specification.
(2) Trial run of motors/ drives for various auxiliaries.
(3) Hydraulic Test, Chemical Cleaning, Oil flushing of lube oil system, Jacking oil/Lifting oil, HP oil supply system, Governing oil system/Control oil system, LP Bypass system, Air cleaning/blowing of pipelines, closed systems, Tanks and Vessels.
(4) Flushing of all pipelines by air/oil/water/Chemicals/steam as the case may be.
(5) Servicing of all valves, Hydraulic Power cylinders, HP Valves (ESV), HP Overload Bypass valves, IP Valves, LP Bypass valves, CRHNRV and fittings.
(6) Manual/mechanical cleaning of Oil tanks, Suction Strainers / Filter elements of CEP, BFP, Booster Pump, Vacuum Pumps, Misc. Pumps, and other various equipments & tanks /vessels erected by the contractor. This may have to be repeated several times during the commissioning process.
(7) Chemical cleaning of piping systems as per requirement. Contractor shall carry out disassembly and reassembly of vulnerable components like spray nozzles, gauges, instruments etc. as instructed by BHEL during this process.
(8) Putting turbine on barring gear.
(9) Rolling and synchronization.
(10) Full load operation.
(11) Trial operation

18.1.34 All the tests shall be repeated till all the pipelines / equipments satisfy the requirements / obligation of BHEL to their customer. As far as the hydraulic pressure test is concerned, the same shall be conducted at various stages to the satisfaction of BHEL / Boiler Inspector / Customer Engineers. Any rectifications required shall have to be done / redone by the contractor at his cost.

18.1.35 Test records shall be made for pressure testing of above piping system. These records shall contain the following information:

a) Date of test
b) Identification of piping tested
c) Test fluid
d) Test pressure
e) Approval of the Engineer.

18.1.36 The scope of pre-commissioning activities cover installation of all necessary equipment including temporary piping, supports, valves, blanking, pumps, tanks,

with access platforms valves, along with accessories required for hydro test, pre-boiler system detergent flushing / chemical cleaning , steam blowing or for any other tests on piping . The scope also covers the offsite disposal of effluents.

18.1.37 Necessary pipes, valves and other items will be supplied by BHEL free of cost. All arrangements for erection including welding has to be arranged by the contractor at the rates specifically quoted / accepted for this work. After completion of steam blowing, all the temporary lines to be dismantled and restoration of piping to be carried out, within quoted rate. The required steam shall be provided at a central point by BHEL.

18.1.38 Contractor shall lay the temporary pipelines with fittings, accessories and erection & commissioning of pumps, tanks and other installations as Instructed by BHEL Engineer for the purpose of chemical cleaning / alkali flushing / steam blowing / steam washing / steam flushing / water flushing / water washing / oil flushing etc., of piping and other equipments are within the scope of work. Necessary materials for this will be provided by BHEL. Overhauling / cleaning / revisioning / servicing of valves, fittings in temporary system and acid cleaning tanks for re-commissioning activities / operation like water flushing / steam blowing / washing / flushing / passivation / chemical cleaning etc., and also over hauling / revisioning of the pumps & equipments and also to carry out the repairs to attend leaks etc., in the temporary piping & equipments, prior & while carrying out the above operations/activities. All the above works are within the scope of work. All the chemicals will be supplied by BHEL free of cost.

18.1.39 Chemical cleaning (Acid cleaning of piping / alkali flushing) will involve the installation of temporary piping, valves, cutting of some of the existing valves, placing the rubber, wedges in the valves, gagging of valves, and installation of temporary tanks for chemical and for mixing. Necessary temporary access platforms to mixing tank are to be made by the contractor. The dissolving tank, neutralizing tank etc. required for acid pickling will have to be carried out by the contractor. Required materials will be provided by BHEL free of cost. Chemicals for chemical Cleaning will be provided by BHEL. All other consumable are to be provided by the contractor.

18.1.40 All items / materials (Including Chemicals) required for conducting hydraulic test, chemical cleaning, steam blowing etc., will be supplied by BHEL. However fabrication, servicing, erection, dismantling and returning of the same to stores are the responsibility of the contractor who is erecting the equipment / piping. The contractor may note that no separate payment shall be released for any temporary works that are to be carried out for conducting precommissioning and commissioning tests. Bidders are advised to include expenses on temporary works along with the rates being quoted by them. Broadly the work on temporary systems will be as under erection etc. of all temporary piping including valves, tanks, effluent pumps, electrical control panel and cabling along with insulation and supports for steam blowing; Chemical cleaning and effluent disposal are to be carried out as part of work. Contractor will be responsible for their operation and any servicing required during the pre-commissioning activities. He will also service the equipment and handover the equipment to the other agency for further erection / commissioning activities. All the pumps, motors and electrical control panels/ switch gear, valves and actuators will be furnished to the contractor after due servicing. The above is only a broad breakup of the temporary works. The Engineer at site will make final break up. His Decision will be final and binding by all the parties. Dismantling of the temporary equipment and piping will be done by the

agency that has erected the equipment. He will also return the equipment to the stores.

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

18.1.42 Contractor shall cut open the works if needed, as per BHEL Engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over. This contingency shall be included within the quoted value.

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

18.1.44 After the chemical cleaning has been successfully completed, removing all temporary piping, fittings of tanks etc. Checking all the valves for any accumulation of foreign materials, welding the valves & pipes which were cut and cleaning & re-fixing as per BHEL Engineer‘s instructions is within the scope of work/ specification.

18.1.45 Necessary scaffolding and approaches for conducting the above shall also be within the scope of the contract.

18.1.46 During this period, though BHEL's and customer's staff also be associated in the work, it is the contractor's responsibility to make available the resources in his scope till such time the commissioned units are taken over by the customer / BHEL.

18.1.47 The contractor shall see that the water shall not be allowed to accumulate in open trenches where work is in incomplete stage, precautionary works such as blank flanging the open ends of the pipe line and filling the pipe line with water etc. shall be taken as directed by the engineer. Such works shall be to the contractor’s account and no separate payment will be made for the same.

18.1.48 Temporary pipes/materials and chemicals required for conducting hydraulic test, alkali boil out, acid cleaning/steam blowing etc., will be supplied by BHEL. However, servicing, dismantling and returning of the same to stores is the responsibility of the contractor who is erecting the equipment / piping. Broadly the work on temporary systems will be as under:

- Erection etc. of all temporary piping including valves, tanks, effluent pumps, electrical control panel and cabling along with insulation and supports for steam blowing; chemical cleaning and effluent disposal are to be carried out as part of work. Contractor will be responsible for their operation and any servicing required during the pre-commissioning activities. He will also service the equipment and handover the equipment to the other agency for further erection / commissioning activities. All the pumps, motors and electrical control panels/ switch gear, valves and actuators will be furnished to the contractor after due servicing.
- Dismantling of the temporary equipment, piping and return the same to the BHEL stores is also included in the scope of work.

18.1.49 Commissioning of the TG and aux. will involve trial run of all the equipment erected. Flushing of all the lines by air, oil or steam as the case may be, trial run, servicing of valves and any other works incidental to commissioning are to be carried out. Contractor shall supply manpower round the clock.

18.1.50 Cleaning of oil tank by shot blasting or other methods as per instructions of BHEL engineer before and after oil flushing is responsibility of contractor.

18.1.51 The contractor shall associate for initial and subsequent fillings of gas in generator gas system as and when required till unit is handed over to Customer.

18.1.52 The contractor shall carry out leak test of generator air cooling system to the satisfaction of BHEL engineer.

18.1.53 Replacing/changing mechanical/other seals of equipment, pumps etc. during commissioning stage is within the scope of work.

18.1.54 The contractor shall provide necessary assistance to facilitate/enable electrical and instrumentation testing and commissioning of equipments under this scope of work, to BHEL and their Testing & Commissioning agency

18.1.55 The scope include the commissioning activities during initial period and subsequently during unit operation during stabilization period/trial run/PG Test. For this purpose items erected by agency has to provide manpower, other resources, diesel, consumables, scaffoldings, T&Ps as required from time to time. These types activities will be repetitive in natures for no. of times and in cases dismantling, reinstallation of items/parts has also to be done till handing over of unit to customer. During case of dismantling /reinstallation logistic supports like Tyre mounted crane/ Crawler Crane /crane/truck/trailers as applicable including manpower are to be arranged by vendor. These types of activity is treated as vendor's normal scope of work without any extra commercial implication on BHEL.

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

18.1.57 Replacing, cleaning and servicing of all the filters / strainers, toppings of oils in the system shall be done by the contractor within the accepted price. All oils and greases to be filled in the main equipments as first fill and subsequent topping up's will be furnished by BHEL.

18.1.58 At the time of each inspection, the contractor shall take note of the decisions / changes proposed by the BHEL Engineer and incorporate the same at no additional cost. The contractor shall carry out any other test as desired by BHEL Engineer/ Manufacturer on erected equipment covered under scope of this contract during testing and commissioning to demonstrate the physical completion of any part or parts of the work performed by the contractor.

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

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

18.1.61 Laying of insulation of this temporary piping, tanks are to be carried out by the contractor within quoted rate, and required insulation materials will be provided by BHEL.

18.1.62 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

18.1.63 It shall be the responsibility of the contractor to preserve the cleaned surface as per BHEL's requirement.

18.1.64 In case any erection defect is detected during various tests / operations trial runs as detailed above such as loose components undue noises or vibration strain on connected equipment steam or oil or water leakage etc. the contractor shall immediately attend these defects and take necessary corrective measures. The parts to be replaced shall be provided by BHEL free of cost. Necessary scaffolding and approaches for conducting the above shall also be within the scope of the contract. If the insulation is to be removed to attend any of the defects the cost of removal and reapplication of insulation should be borne by the contractor.

18.1.65 Contractor to provide necessary commissioning assistance from pre-commissioning state onwards and up to continuous operation of the unit & handing over to customer. The category of personnel to be as per site requirement and to meet the various pre-commissioning and commissioning programs made to achieve the schedule agreed with customer.

18.1.66 The pre-commissioning activities will start prior to Lube oil, HP Oil supply System, Governing/ Control oil flushing etc. of the TG and various trials, commissioning operations shall continue till the TG is handed over to customer. Simultaneous commissioning checks, activities will be in progress in various areas like trial run of various equipment, checking of equipment erected, making ready for trial runs, filling up of lubricants, chemicals etc. All these works need specialized gangs including electricians, Instrument Technicians, Fitters, in each area to render assistance to BHEL commissioning staff. Contractor shall earmark separate manpower for various commissioning activities. This manpower shall not be disturbed or diverted. The mobilization of these commissioning gangs shall be sufficient so that planned commissioning activities are taken up in time and also completed as per schedule and the work is to be undertaken round the clock as required.

18.1.67 It shall be the responsibility of the contractor to provide various categories of workers skilled, semi-skilled & un-skilled in sufficient numbers as per the work requirement along with supervisors including necessary Tools & plants, consumable etc., during commissioning period. The various categories of workers required for pre-commissioning, commissioning and post-commissioning activities are Supervisors, Pipe fitters / Millwright Fitters, Welders, Riggers, Electricians/Instrument technician, Unskilled workers etc.

18.1.68 After the start of commercial operation of machine, commissioning activities will continue. It shall be the responsibility of contractor to provide following manpower along with supervisor as part of commissioning assistance for a period of three months.

1) Supervisor 2 Nos.
2) Pipe fitter/Millwright fitter 2 Nos.

3) Welder 2 Nos.
4) Rigger 2 Nos.
5) Electrician/instrument technician 1 No. each
6) Unskilled worker 6 Nos.

18.1.69 The above figures shows only minimum required over and above the labour required for completing pending erection and commissioning works and clearing of punch lists. Contractor has to provide number of personnel and other resources as per work demand.

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

18.1.71 During commissioning any improvement / repair / rework / rectification / fabrication / modification due to design improvement / requirement is involved, the same shall be carried out by the contractor promptly and expeditiously.

18.1.72 The contractor has to provide required man power assistance during pre-commissioning and commissioning checks of motor operated valves, actuators, control valves etc. without any extra charges.

18.1.73 Contractor shall lay / install necessary blanking arrangement. This may involve fabrication & erection, welding & after satisfactory completion of test removal of same by cutting & grinding. Temporary installation itself has to be tested, tried, and subject to non-destructive examinations as per the instructions of BHEL as part of work.

18.1.74 No payment will be made for temporary installations made for testing of systems & similarly no payment will be made for electrical installations made for any temporary system.

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

18.1.75 Contractor shall provide assistance in conducting of performance guarantee test (PG test) of the equipments under the scope of work. Contractor shall install all necessary tapping points; instruments etc and provide necessary assistance within the quoted rates. 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. However installation of necessary tapping points, impulse pipes, approaches etc are to be completed by the Contractor.

18.1.76 The 'Initial Operation'/trial operation of the complete facility as an integral unit shall be conducted for continuous 28 days. During the period of trial operation of 28 days, all systems in the scope shall operate continuously at full load at designated

fuel for a period not less than 72 hours .The Initial Operation shall be considered successful, provided that each item/ part of the facility can operate continuously at the specified operating characteristics, for the period of Initial Operation with all operating parameters within the specified limits and at or near the predicted performance of the equipment/ facility.

18.1.77 It shall be the responsibility of contractor to attend all punch points post commissioning and resolve the deficiency as may be necessary for handing over the unit to BHEL's Client.

19 TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES

19.1 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.

19.2 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.

19.3 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.

19.4 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.

19.5 Contractor has to arrange slings of all sizes for completing the works covered under these specifications except the special slings for generator stator lifting/handling, which will be provided by BHEL free of charges on returnable basis.

19.6 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.

19.7 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.

19.8 All jack bolts that are required during erection for carrying out roll-check etc will have to be arranged by the contractor. No jack bolts will be provided by BHEL.

19.9 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.

19.10 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.

19.11 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.

19.12 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.

20 LINING AND INSULATION

20.1 Handling at site stores / storage yard, Transportation to site of work, application of thermal insulation/ spray insulation, finishing, cladding and outer casing etc using their own tools plants, tackles, all consumables, supervisor and men as enumerated under the scope of this tender.

20.2 Application of thermal insulation, sheet metal cladding, welding of hooks / supports to hold insulation and refractory's as wherever necessary for all the equipment covered in this contract are to be carried out as per instruction of BHEL Engineer at site. The systems covers under this contract including but are not limited to the following.

- TG integral piping and tanks & vessels, tanks,
- SG-TG auxiliaries including, but not limited, to heat exchangers, pumps,
- tanks and vessels and other equipments
- TG integral piping including condensate and extraction system piping
- Other equipments including BOI"s, though not listed above but required for completion,

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

20.4 All insulations and refractory materials including iron components and other sheets casing materials, etc., required as per drawing will be supplied by BHEL and the same have to be erected / applied as per the drawings and specifications of BHEL by the contractor.

20.5 Clean the Surface to be Insulated from Rust, Dust, Grease, Loose scale, Oil, Moisture, etc.. Care shall be taken that flexible insulation is not unduly compressed. After insulating the equipment the gaps / joints shall be filled with loose wool/ moulded insulation as applicable

20.6 Painting of inner side of sheet metal covering over the insulation walls with two coats of anti-corrosive paint (IS-158) to be applied to the entire satisfaction of BHEL Engineer and application of bituminous sealing compound on cladding/ sheet metal joints shall also be carried out by the contractor expeditiously, so as to avoid damage to the insulation from the weather. Retainer type 'A' must be coated with Aluminium paint. All required amount of paint, thinner and other accessories for painting, cleaning the surfaces etc., shall be supplied by the contractor within the quoted rate. However, if any supply of sealing compound by the BHEL Manufacturing Units, the same will be issued to contractor free of charges.

20.7 It is the responsibility of the contractor to ensure that the insulation, refractory and sheet metal covering issued to him for application are well protected against loss or damage from weather conditions tending to affect its quality. Closed / semi closed sheds or any other arrangements required for this shall be arranged by contractor at his cost. All the insulation, refractory and sheet metal covering etc., issued to the contractor shall be properly stored and handled before application due the same. If any damage occurs to the material due to improper storage or due to any causes attributable to the contractor except for normal breakage or damages allowed in such cases, the cost of such damaged material shall be to the account of the contractor.

20.8 Contractor is liable for the exact accounting of the materials issued to him and any unaccountable losses shall be made good by him. The necessary accounting of the material issued will have to be furnished by the contractor periodically

20.9 The contractor shall provide the required quantity of wire, nails and other materials for centering works at their cost.

20.10 Wherever iron components are to be welded on non-pressure parts, the contractor shall employ only approved structural welders. It shall also be the responsibility of the contractor to arrange for welding hooks, flats, plates, supports and other fixtures also. All consumables tools and plants etc., required for the work shall be arranged by the contractor at their cost.

20.11 Wool insulations will received at site as bonded, loose bonded and un bonded mattresses in standard sizes. These has to be dressed / cut to suit equipment / site work by the contractor. 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.

20.12 Removal type of insulation to be provided for valves fittings, expansion joints etc., as per the drawings or as directed by BHEL Engineer.

20.13 All piping insulations shall be carried out in such a manner as to facilitate removal of bolts nuts and washers from the flanges.

20.14 Fabrication of covering sheets, Al cladding may be necessary like preparing the sheets to the sizes and shapes specified in drawings. Beading, swaging, beveling of sheets crowning of the sheets if necessary shall be carried out by contractor as specified in BHEL drawings or as instructed by BHEL engineer.

20.15 Fixing or welding of hooks/supports to the equipments, piping and other connected items to support wool insulation, applying of primer paint to welded portion parts, welding certain supports on parts other than piping parts to hold refractory's (by engaging approved welders) as per the drawings or as instructed by BHEL Engineer will have to be carried out by the contractor.

20.16 The contractor shall leave certain gap and opening while doing the work as per the instructions of BHEL Engineer to facilitate inspection by Statutory authority such as Boiler Inspector or during commissioning to fix gauges, fittings, instruments. Those gaps will have to be finished as per drawings at a later date by the contractor at his cost, as required by BHEL .

20.17 Cladding sheets shall be suitably pressed along with diagonals to form diamond shape so as to improve the strength of the sheets, to avoid humpiness and to give aesthetic look.

20.18 Plates, bars, rods and other materials that are to be cut, and re-welded from the fabricated places to suit erection requirements for which no extra payment will be made to the contractor.

20.19 A log book shall be maintained by the contractor for the clearance of the area for application of refractory and insulation. If the contractor does the work on his own accord without prior permission the area should be redone at his cost.

20.20 The contractor shall draw only one week's requirement of material for their work from BHEL stores and keep them in their semi-closed shed near to the work area. The materials required for a particular space of work only shall be taken to the work spot. At the end of the day's work the leftover or unused materials shall be taken back to their semi-closed shed for keeping the materials safe. Necessary records shall have to be maintained by the contractor in respect of the above drawls / deposits, on daily basis as instructed by BHEL.

20.21 Wastages allowance for the materials issued are envisaged as follows:

~~a) Castable refractory 2%~~

b) Insulation bricks & mortar 2%

c) Wool mattresses 2%

d) Cladding sheets 3%

20.22 Upon completion of daily work , the contractor shall remove from the vicinity of work all scrap packing materials rubbish, unused and other materials and deposit them in places to be specified by BHEL Engineer. Also, the contractor will demolish all the hutments, sheds, offices, constructed by him and shall clean the debris after the contract is over. In the event of his failure to do so, the same will be arranged / removed by BHEL Engineer and the expenses incurred with overhead will be recovered from the contractors.

20.23 Welding of hooks as per pitch, applying red oxide paint to the welded portion as directed as per drawings before application of mineral wool mattresses will have to be done by the contractor.

20.24 Applying different layers of mineral wool as directed and as per drawings and specifications for turbine and its auxiliaries, pipelines valves and other vessels and after fixing require holdings materials, suitably if necessary, fabrication of rings etc., and fixing as directed and as per drawings and specifications shall also form part of this work.

20.25 The scope includes; Cutting of cladding sheets as per the profile of the equipment and painting on inner surface two coats of bituminous paint. Paint shall be arranged by contractor. Cutting of the wool mattresses to the required shape and application of finishing cement of required thickness wherever required.

20.26 If necessary the hooks may have to be made from the rods, raw materials supplied in running lengths. The contractor may have to carry out this work also and use the same hooks. This shall be done within the quoted rates.

20.27 In case the contractor is required to dismantle and re-erect certain area as and when required for pre-commissioning / commissioning activities the rate as indicated in the rate schedule shall be paid by BHEL for erection. However, for dismantling no extra charge will be paid under any circumstances.

20.28 Wherever additional / clamps, frame works, etc., are required to be fabricated and installed even though not indicated in the drawings shall be fabricated and installed at their cost. Only steel materials shall be given by BHEL free of cost , consumables like electrodes, gases etc., are to arranged by the contractor at his cost.

20.29 Contractor has to arrange required fire retardant covering material at their cost to protect the insulation materials drawn from BHEL before and after erection.

20.30 The contractor shall provide any fixtures, concrete blocks / wooden sleepers, etc., which are required for temporary supporting of the insulation materials at site.

20.31 Delay in clearance of mechanical equipment and piping for insulations is unlikely to happen. However, if any delay occurs, the contractor shall not claim anything extra, like idle charges.

20.32 Welding of iron components directly on Piping is are to be carried out by certified IBR high pressure welders.

20.33 Application of insulation and removal of the same for temporary piping, tanks under scope of erection of this contract is also included in the scope of the work. However, BHEL will supply the insulation materials free of cost.

20.34 Dressing of insulation to suit site conditions, sheet cladding over insulations, form the part of this work.

20.35 The temporary structures / items welded to permanent members / pipes are to be cut and removed without any damage. Any damage so to permanent members / pipes to be made good by the contractor at his cost.

20.36 The contractor will have to follow the instructions provided in the technical manuals, drawings, and specifications provided by BHEL, to the contractor from time to time. In case of ambiguity or deviation the decision / clarification of BHEL Engineer will have to be followed.

20.37 All rectification including painting of Employer's structure which are damaged by contractor during his work.

20.38 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.

20.39 All attachment welding, including welding of hooks / supports as per pitch both on equipment and piping shall be done as directed by Engineer. Attachment welding shall have to be done by certified welders. If necessary contractor may have to cut the hooks to correct length. Application of red oxide paint including supply of paint on welded portions as directed by BHEL is also included in scope of work.

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

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

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

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

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

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

20.46 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.

20.47 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.

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

PAINTING

Supply and application of final painting:

- The scope includes the supply and application of final paining for the systems/items/components covered in the entire scope of work including supply of primer, paints and associated consumables.
- In case any shop painted structure/component is required to be repainted due to the reasons attributable to the contractor such as Mis-handling, damage during erection process, other reasons incidental to the work etc, such touch-up painting/re-painting of the components/structures shall be in the scope of the contractor including the supply of paints and primers along with all required consumables .

BHEL/Customer 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 will be given at site at the time of painting work.

Contractor shall carry out surface preparation and final painting works as per BHEL/Customer specification and instruction of BHEL engineer at site.

21.1 Scope of Contractor/BHEL regarding Supply of Paint & Paint application

S No	DESCRIPTION	BIDDER	BHEL	REMARKS
a)	Surface preparation	Yes		
b)	Preservation painting	Yes		Wherever applicable
c)	Touch up painting	Yes		Wherever applicable
d	Intermediate Coat application	Yes		Wherever applicable
e)	Finish Painting	Yes		
f)	Painting of Insulation cladding sheet	Yes		Wherever applicable
g)	Painting of welded surface	Yes		Wherever applicable
h)	Supply of Thinner	Yes		
i)	Supply of Primer	Yes		
j)	Supply of Paint (intermediate/Finish) including bituminous paint	Yes		
k)	Supply of Preservative/anticorrosive paint/protective paint	Yes		
l)	Supply of scaffoldings, platforms, structures & ropes etc	Yes		
m)	Supply of tools e.g wire brush, paint brush, Spray M/c, cleaning agents etc	Yes		
n)	Supply of Other Consumables	Yes		

21.2 Paints and painting work carried at site shall confirm to the following codes and standards:

I. IS:5 – Colour for ready mixed paints and enamels
II. IS:101 Part 1 to 9 – Methods of sampling and test for paints, varnishes and related products
III. IS:1477 Part I&II – Code of practice for painting of ferrous metals in building
IV. IS:2932 – Specifications for enamel, synthetic and exterior,
    a. Under Coating
    b. Finishing
V. IS: 9407 – Colour code for identification of pipelines used in thermal power plants.

Contractor shall satisfy himself, availability of all information in the specifications for proper selection of the paints and ensure their applications as per Codes.

21.3 Primer Painting:

a) After surface preparation, two coats of epoxy resin based zinc primer shall be applied. Dry film thickness of each coat shall be as per the recommendations of primer/paint manufacturer. Primer shall be applied by either spraying or bushing ensuring a continuous film without "holidays". Primer coat shall be immediately applied without any time lag after the surface preparation.
b) Any equipment shall be carefully examined and where ever the primer coat is damaged shall be recoated with primer. However over the field welds, bolts and nuts etc. two primer coats as per a) shall be applied.

21.4 Finish Painting

a) After the primer coat has dried out, the surface shall be cleaned of dust without scratching or in any way damaging the primer coat. Over this, dry surface finish painting shall be carried out.
b) Finish painting shall be carried out in two coats. Dry film thickness of each coat shall be as per the recommendation of the primer/paint manufacturer. Minimum thickness including primer and paint coating shall be as per specification.
c) Paint shall be applied either by brushing or spraying. It shall be ensured that brush marks are a minimum and the requirements of workmanship are as specified in IS: 1477 (for site painting works on systems, structures and components).
d) Paint used shall be stirred frequently to keep the pigment in suspension. Paint shall be of ready mixed type in original sealed containers as packed by the paint manufacturer. Addition of thinners shall not be permitted.
e) No painting shall be done in frost/foggy weather or when the humidity is high enough to cause condensation on the surface to be painted. Paint shall not be applied when the temperature of the surface to be painted is 5o C or below.
f) Work of painting of condenser surfaces in various areas and at various stages of work are specified elsewhere in these specifications.

21.5 **Components of TG , and auxiliaries will in general be supplied painted by BHEL manufacturing units as per their standard applicable painting schemes**. Contractor shall carry out primer and finish painting coats and DFT requirement with colour codes & specifications as per 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 at least one coat of suitable primer which matches the shop primer paint used, after thoroughly cleaning all such parts of all dirt, rust, scales, greases, oils and other foreign materials by wire brushing, scraping or sand blasting, and the same being inspected and approved by BHEL engineer for painting. Afterwards, the above parts shall be finished with two coats of alloyed resin machinery enamel paints.

21.6 Paint shall be applied by brushing or by spray painting as per the instruction of BHEL Engineer. It shall be ensured that brush marks are minimal.

21.7 If needed and insisted either by BHEL / Customer in certain cases, spray painting has to be carried out within the Quoted rates. Spray painting gun and compressed air arrangement has to be made by the contractor himself.

21.8 Before applying the subsequent coats the thickness of each coat shall be measured and recorded with BHEL / Customer.

21.9 The scope of painting includes application of colour bands, lettering the names of the systems equipments; tag Nos of valves, marking the directions of flow and other data required by BHEL within the quoted rate.

21.10 No paint shall be applied when the surface temp is above 55 deg. Centigrade or below 10 deg. Centigrade, and when the humidity is greater than 90% to cause condensation on the surface or frost / foggy weather

21.11 **Touch-up painting on damaged areas –**

a) For coatings damaged up to metal surface

Surface preparation shall be carried out by manual cleaning. Minimum 6 inches adjoining area with existing coating shall be roughened by wire brushing, emery paper rubbing etc., for best adhesion of patch primer. Primer coat of touch-up primer has to be applied by brush immediately after the surface preparation.

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

21.12 Painting of welded areas / painting of areas exposed after removal of temporary supports / touch-up painting on damaged areas of BHEL/Customer'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 for touch-up painting on damaged areas.

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

21.14 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.

21.15 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.

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

21.17 This work requires working at higher altitudes from ground level to as high as 50 mtr 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.

21.18 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.

21.19 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.

21.20 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. Laying of air hose pipe and any other line required shall be done by Contractor at his cost

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

21.22 Acceptance of Final Painting for required thickness shall be as per the thickness measured by Alcometer by PVUNL/BHEL Engineer. Contractor shall have to carry out painting till the required thickness is achieved.

21.23 Contractor shall carry out preservation painting ~~on all items taken from stores~~ if required. 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.

21.24 Prior to application of refractory bituminous painting on the equipments is under Contractor scope.

21.25 Painting two coats of bituminous paint on Insulation cladding sheet inner surface.

21.26 **PRESERVATIVE PAINTING**

21.26.1 Two coats of steam washable paints shall be applied on steam side of LP turbine, as advised by BHEL. The steam washable paints, primer and thinner will be provided by contractor as part of scope of work along with other like arrangements for surface preparation and paint

application like sand/shot-blasting, consumables like surface cleaning agents, paint brush, brush cleanser, labour and necessary tools and plants as required for completion of work.

21.26.2 The water boxes shall be sandblasted to remove all traces of primer applied at the works. Thereafter apply two coats of primer paint followed by two/three coats of alloyed resin machinery enamel paints as approved by BHEL. 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 BHEL drawing, number of coats may be applied and method of application shall be as recommended by the paint manufacturer.

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

21.26.4 All water side surfaces of water chambers including tube plate shall be thoroughly surface prepared and painted.

21.26.5 After the successful completion of hydraulic testing, the interior surfaces of the water boxes, main tube plates shall be painted with suitable anticorrosive paints as per special procedures laid down by BHEL.

21.26.6 Preservation of all components/equipments during various stages of erection, commissioning till handing over is in the scope of work. All prescribed methods of surface cleaning prior to application of preservative paint shall be followed by the contractor.

Refer PAINTING SCHEME: Enclosed as Annexure 4

Contract (Packages)	QTY	UOM	Total Price
Lump-sum Total Price for entire Scope of Work as detailed in Tender Specification Number: BHE/PW/PUR/ NTPRT-STG U3 /2862	**1.000**	**Lumpsum**	Total Price quoted by the bidder for STG#3 at E portal

Instructions to the Bidders

1. **Bidders shall quote Total Price for the entire scope of work of STG U#3 only in Rupees in VOL II PRICE BID at BHEL E-procurement Portal.** Any other entry elsewhere in the offer of the bidder shall be treated as Null and Void.