
TENDER SPECIFICATION

TENDER NO. BHEL/ NR/SCT/ GVK GOINDWAL / ELE AND C&I / 803

FOR

“ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF ALL ELECTRICAL AND C&I EQUIPMENTS OF UNIT NO. 1 & 2 OF 2X270 MW GVK, GOINDWAL TPS, DISTT. TARAN TARAN, PUNJAB.”

PART I – TECHNICAL BID



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



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

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
Power Sector – Northern Region,
Plot No. 25 , Sector - 16A ,
Distt. Gautam Budh Nagar, NOIDA – 201 301(INDIA)
Phone: 0091-0120-2515476 / 2416273 /
Fax 091-0120-2416528 / 2515467
Email: msd@bhel.com/swapan@bhel.com

TENDER NO. BHEL/ NR/SCT/ GVK GOINDWAL / ELE AND C&I / 803

IMPORTANT NOTE

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

THIS TENDER SPECIFICATION ISSUED TO:

M/S-----

Rev 00
6th July
2010

NOTICE INVITING TENDER

(Document No PS:MSX:NIT)

Bharat Heavy Electricals Limited





ISO 9001, ISO 14001 and
OHSAS 18001 certified
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Email: swapan@bhelnsr.co.in / msd@bhelnsr.co.in

NOTICE INVITING TENDER

LAST DATE OF SUBMISSION: 07.07.2011: 1500 hrs (IST)
DUE DATE OF BID OPENING: 07.07.2011: 15:30 hrs (IST)

NIT NO. / DESCRIPTION OF WORK

<p>TENDER NO. BHEL/ NR/SCT/ GVK GOINDWAL / ELE AND C&I / 803</p>

<p>Sealed tenders are invited from the contractors fulfilling qualifying requirements as given in tender document for the Work of “ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF ALL ELECTRICAL AND C&I EQUIPMENTS OF UNIT NO. 1 & 2 OF 2X270 MW GVK, GOINDWAL TPS, DISTT. TARAN TARAN, PUNJAB.”</p>

NOTES

1. Please visit our website at **www.bhel.com** for details.
2. All corrigenda, addenda, amendments and clarifications to this Tender will be hosted in this web page and not in the newspaper

SDGM / SCT

NOTICE INVITING TENDER (NIT)
NOTE: BIDDER MAY DOWNLOAD FROM WEB SITES
OR
PURCHASE TENDERS FROM THIS OFFICE ALSO

=====

To

Dear Sir/Madam,

Sub : **NOTICE INVITING TENDER**

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

1.0 Salient Features of NIT

SL NO	ISSUE	DESCRIPTION	
i	TENDER NUMBER		
ii	Broad Scope of job	THE WORK OF ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF ALL ELECTRICAL AND C&I EQUIPMENTS OF UNIT NO. 1 & 2 OF 2X270 MW GVK, GOINDWAL TPS, DISTT. TARAN TARAN, PUNJAB	
iii	DETAILS OF TENDER DOCUMENT		
a	Volume-IA	<i>Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc</i>	<i>Applicable</i>
b	Volume-IB	<i>Special Conditions of Contract (SCC)</i>	<i>Applicable</i>
c	Volume-IC	<i>General Conditions of Contract (GCC)</i>	<i>Applicable</i>
d	Volume-ID	<i>Forms and Procedures</i>	
e	Volume-II	<i>Price Schedule (Absolute value).</i>	<i>Applicable</i>
iv	Issue of Tender Documents	1. <u>Sale from BHEL PS Regional office at :</u> <i>Start : 16.06.2011 , Time : 09.30 Hrs</i> <i>Closes: 07.07.2011 , Time : 12.30 Hrs</i> 2. From BHEL website (www.bhel.com) Tender documents can however be downloaded from website till due date of submission	<i>Applicable</i>
v	DUE DATE & TIME OF OFFER SUBMISSION	<i>Date : 07.07.2011 , Time : 15.00 Hrs</i> <i>Place : BHEL/ PSNR/ NOIDA</i>	<i>Applicable</i>
vi	OPENING OF TENDER	<i>1/2 hour after the latest due date and time of Offer submission</i> <i>Notes:</i> <i>(1) In case the due date of opening of tender becomes a non-working day, tenders shall be opened on next working day at the same time.</i> <i>(2) Bidder may depute representative to witness the opening of tender</i>	<i>Applicable</i>
vii	EMD AMOUNT	<i>Rs 2,00,000/-</i>	<i>Applicable</i>
viii	COST OF TENDER	<i>Rs 2000/-.</i>	<i>Applicable/Not Applicable</i>
ix	LAST DATE FOR SEEKING	<i>Date: 06.07.2011</i> <i>Along with soft version also, addressing to</i>	<i>Applicable</i>

	CLARIFICATION	<i>undersigned & to others as per contact address given below</i>	
x	SCHEDULE OF Pre Bid Discussion (PBD)	<i>Date :</i>	<i>Applicable/Not applicable.</i>
xi	INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)		<i>Applicable/Not Applicable</i>
xii	Latest updates	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com -->Tender Notifications →View Corrigendums) and not in the newspapers . Bidders to keep themselves updated with all such information	

2.0 The offer shall be submitted as per the instructions of tender document and as detailed in this NIT. Bidders to note specifically that all pages of tender document, including these NIT pages of this particular tender together with subsequent correspondences shall be submitted by them, duly signed & stamped on each page, as part of offer. Rates/Price including discounts/rebates, if any, mentioned anywhere/in any form in the techno-commercial offer other than the Price Bid, shall not be entertained.

3.0 Unless specifically stated otherwise, bidder shall remit cost of tender and courier charges if applicable, in the form of Demand Draft drawn in favour of Bharat Heavy Electricals Ltd, payable at Power Sector Regional HQ at Delhi/ Noida issuing the Tender, along with techno-commercial offer. Bidder may also choose to deposit the Tender document cost by cash at the Cash Office as stated above against sl no iv of 1, on any working day; and in such case copy of Cash receipt is to be enclosed with the Techno Commercial offer. Sale of tender Documents shall not take place on National Holidays, holidays declared by Central or State Governments and BHEL PS HQ at Delhi/ Noida, Sundays and second/ last Saturdays

4.0 Unless specifically stated otherwise, bidder shall deposit EMD through Demand Draft/Pay Order in favour of Bharat Heavy Electricals Ltd, payable at NOIDA. For other details and for 'One Time EMD' please refer General Conditions of Contract.

5.0 **Procedure for Submission of Tenders:** The Tenderers must submit their Tenders to Officer inviting Tender, as detailed below:

- PART-I consisting of 'PART-I A (Techno Commercial Bid)' & 'PART-I B (EMD/COST of TENDER)' in two separate sealed and superscribed envelopes (ENVELOPE-I & ENVELOPE-II)
- PART-II (Price Bid) – in sealed and superscribed envelope (ENVELOPE-III)

6.0 The contents for ENVELOPES and the superscription for each sealed cover/Envelope are as given below. (All pages to be signed and stamped)

Sl no	Description	Remarks
	Part-I A	
	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 : <u>Technical</u> Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc	
ix.	Volume – I B : Special Conditions of Contract (SCC)	
x.	Volume – I C : General Conditions of Contract (GCC)	
xi.	Volume – I D : Forms & Procedures	
xii.	Volume – II (UNPRICED – without disclosing rates/price, but mentioning only 'QUOTED' or 'UNQUOTED' against each item	
xiii.	Any other details preferred by bidder with proper indexing.	

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

PART-II	
	PRICE BID consisting of the following shall be enclosed
	<u>ENVELOPE-III</u> 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	<ul style="list-style-type: none"> o Envelopes I o Envelopes II o Envelopes III

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

7.0 No Deviation with respect to tender clauses and no additional clauses/ suggestions/ in Techno-commercial bid/ Price bid shall normally be considered by BHEL. Bidders are requested to positively comply with the same.

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

9.0 Assessment of Capacity of Bidders:

Bidders capacity for executing the job under tender shall be assessed as per the following:

- I. **Assigning Weightages (A) for Similar Jobs Under-Execution:** Weightages shall be worked out and assigned based on the average number of Similar Works under execution including works yet to be commenced by the agency, in the following manner:
 - i). **Number of Similar Jobs**
 - a) No. of jobs in BHEL, PSER : Say 'J'
 - b) No. of jobs in BHEL, PSSR : Say 'K'
 - c) No. of jobs in BHEL, PSWR : Say 'L'
 - d) No. of jobs in BHEL, PSNR : Say 'M'
 - e) No. of jobs with other customers* : Say 'N' (*: Other than BHEL PSER, PSSR, PSWR & PSNR)
 - f) Average No. of Jobs is 'P' = (J+K+L+M+N) divided by 5

- ii) Weightage "A" assigned to bidders based on Average Number of jobs "P":
- If 'P' = 0-1, "A" will be equal to '3'
 - If 'P' = 2-3, "A" will be equal to '2'
 - If 'P' = 4-5, "A" will be equal to '1'
 - If 'P' is Above 5, "A" will be equal to '0'
- II. Weightage "B" for Quarterly Performance Reports of Vendors: This shall be based on the averages of the net weighted score obtained by the bidder for the similar jobs under execution (excluding works not commenced) for the quarter previous to the last quarter reckoned from the date of latest due date of submission, in all four Regions i.e BHEL PSER, PSSR, PSWR & PSNR, in the following manner.
- i). Ratings by Power Sector Region:
- PS ER's Rating 'Rer' = $(X_1 + X_2 + .. + X_n)$ divided by n
 - PS WR's Rating 'Rwr' = $(X_1 + X_2 + .. + X_n)$ divided by n
 - PS SR's Rating 'Rsr' = $(X_1 + X_2 + .. + X_n)$ divided by n
 - PS NR's Rating 'Rnr' = $(X_1 + X_2 + .. + X_n)$ divided by n
 - Over all Power Sector Region Rating 'R_{BHEL}' = (Rer+ Rwr+ Rsr+ Rnr) divided by 4; (No. of Regions as applicable)
- (where "X₁, X₂, X₃,...X_n" is the net weighted score obtained by the bidder as per the "Evaluation of Contractor Performance (Quarterly)" against the various contracts 'n' under execution in the respective Region).
- ii) Weightage "B" assigned to bidders based on Overall Power Sector Rating (R_{BHEL}):
- If R_{BHEL} is 80% and above, "B" will be equal to '6'
 - If R_{BHEL} is > 70% < 80%, "B" will be equal to '5'
 - If R_{BHEL} is > 60% < 70%, "B" will be equal to '4'
 - If R_{BHEL} is = < 60%, "B" will be equal to '0'
- III. Evaluation of Bidders capacity to execute the job under tender: shall be based on the sum of scores obtained in 'A' and 'B', as below:
- 6 or above : Considered 'Qualified' for the job under tender
 - Less than 6: Considered 'NOT Qualified' for the job under tender
- IV. Explanatory note:
- Similar work means Boiler or Turbine or Civil or Electrical or CI, etc irrespective of rating of Plant
 - Quarter shall be as per the quarter defined in the "Evaluation of Contractor performance (Quarterly)". For contracts where annexed Quarterly Evaluation performance was not part of the contract, 'Quarterly Performance Reports' previous to the last quarter reckoned from the date of latest due date of submission, given by the respective project site against the contract will be the basis for evaluation.
 - Vendors who are not executing any jobs presently in the Region and first timers to the Region, may be considered subject to satisfying all other tender conditions
 - 'Under execution' shall mean works in progress upto Boiler Steam Blowing (for Boiler and Auxiliaries) or Synchronisation (for all other jobs including Civil) shall be considered.

- 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 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. No additional claim shall be entertained by BHEL in future, on account of non-acquaintance of above.
- 11.0 For any clarification on the tender document, the bidder may seek the same in writing or through e-mail, as per specified format, within the scheduled date for seeking clarification, from the office of the undersigned. BHEL shall not be responsible for receipt of queries after due date of seeking clarification due to postal delay or any other delays. Any clarification / query received after last date for seeking clarification may not be normally entertained by BHEL and no time extension will be given.
- 12.0 BHEL may decide holding 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 (xi) of 1 above.
- 16.0 The Bidder has to satisfy the Pre Qualifying Requirements stipulated for this Tender in order to be qualified. The Price Bids of only those bidders will be opened who will be qualified for the subject job on the basis of pre-qualification evaluation/ techno-commercial bids, approval/ acceptance of customer (as applicable), etc. and date of opening of price bids shall be intimated to only such bidders.
- 17.0 In case BHEL decides on a 'Public Opening', the date & time of opening of the sealed PRICE BID shall be intimated to the qualified bidders and in such a case, bidder may depute one authorised representative to witness the price bid opening. BHEL reserves the right to open 'in-camera' the 'PRICE BID' of any or all Unsuccessful/Disqualified bidders under intimation to the respective bidders.
- 18.0 Validity of the offer shall be for **six months** from the latest due date of offer submission (including extension, if any) or specified otherwise in SCC of tender.
- 19.0 BHEL reserves the right to decide the successful bidder on the basis of Reverse Auction process. In such case all qualified bidders will be intimated regarding procedure/ modality for Reverse Auction process prior to Reverse Auction and price will be decided as per the rules for Reverse Auction. .
- However, if reverse auction process is unsuccessful as defined in the RA rules/procedures, or for whatsoever reason, then the sealed 'PRICE BIDS' will be opened for deciding the successful bidder. BHEL's decision in this regard will be final and binding on bidder.
- 20.0 On submission of offer, further consideration will be subject to compliance to tender & qualifying requirement and customer's acceptance, as applicable.
- 21.0 In case the bidder is an "Indian Agent of Foreign Principals", 'Agency agreement has to be submitted along

with Bid, detailing the role of the agent along with the terms of payment for agency commission in INR, along with supporting documents.

22.0 The bidders shall not enter into any undisclosed M.O.U. or any understanding amongst themselves with respect to tender.

23.0 In case Consortium Bidding is allowed as per Pre Qualifying Requirement, then Prime Bidder and Consortium Partner shall enter into Consortium Agreement. Validity period of Consortium Agreement shall be 6 months after which the same can be re validated.

'Stand alone' bidder cannot become a 'prime bidder' or a 'consortium bidder' in a consortium 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. .

24.0 The bidder shall submit documents in support of possession of 'Qualifying Requirements" duly self certified and stamped by the authorized signatory, indexed and properly linked in the format for PQR. In case BHEL requires any other documents/proofs, these shall be submitted immediately.

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

26.0 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

for BHARAT HEAVY ELECTRICALS LTD

(SCT)

Enclosure

01. Annexure-1: Pre Qualifying criteria.
02. Annexure-2: Check List .
- 03 Other Tender documents as per this NIT.

ANNEXURE - 1

PRE QUALIFYING CRITERIA

JOB	“ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF ALL ELECTRICAL AND C&I EQUIPMENTS OF UNIT NO. 1 & 2 OF 2X270 MW GVK, GOINDWAL TPS, DISTT. TARAN TARAN, PUNJAB.”
TENDER NO. BHEL/ NR/SCT/ GVK GOINDWAL / ELE AND C&I / 803	

Sl. No.	CRITERIA
1.0	Tenderers should have an average annual turnover of minimum of Rs 96 Lac (Rs Ninty Six lac only) based on the audited accounts of last three financial years (2007-08, 2008-09 & 2009-10). Bidders shall submit audited annual accounts (balance sheets and profit & loss account) in support of this.
2.1	Bidder who wish to participate should have executed electrical works of similar nature, consisting of 132 KV / 150 MVA HT transformers or of higher rating and 11 KV Isolated phase bus ducts or of higher rating of power projects / industrial project during last 7 years, as on the date of opening of Technical Bid. AND
2.2	Should have executed C & I works of similar nature, consisting of Boiler and Turbine control panels and related field instrumentation works of power projects / industrial project with single unit rating of 120 MW or of higher rating during last 7 years, as on the date of opening of Technical Bid. ((Relevant document in support of above works shall be submitted.))
3.0	<u>Tie Up / JV Arrangement</u>
3.1	The Tenderer should meet all the QR at SL NO. 1.0, 2.1 & 2.2 above. However, the tenderer having experience of Electrical works but do not possess requisite experience in Control and Instrumentation or vice versa, shall be allowed to have a tie-up/JV with another associate having requisite experience for the works for which the tenderer does not possess the requisite experience.
3.2	Maximum one tie up shall be permitted. The tenderer shall be the Lead Partner and he will submit documents in support of his experience and experience of his partner in line with all the Technical QRs. However, the tie up arrangement is subject to approval of BHEL. In such a case of tie up, the tenderer (Lead Partner) shall submit documents related to their Tie-up arrangement in Part-I bid (Technical Bid). The composition of the Tie-up arrangement and role and responsibility of each constituent must be well defined and the document submitted shall clearly indicate who shall be the lead partner.

3.3	The tenderer (Lead Partner) shall meet all Financial QR criteria given at SI No 1.0.
4.0	Bidder's selection for this work is subject to approval of BHEL's customer.
5.0	Assessment of Capacity of Bidder to execute the work shall be carried out as per SI no. 9 of NIT.
	<p><u>Notes:</u></p> <ol style="list-style-type: none">1. 'Executed' mentioned above means that unit has been synchronized.2. If the Qualifying work is executed in the 7 years period as specified above, even if it has been started earlier, the same will also be considered meeting the qualifying requirements.

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

ANNEXURE - 2

CHECK LIST

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

1	Name and Address of the Tenderer		
2	Details about type of the Firm/Company		
3	Details of Contact person for this Tender	Name : Mr/Ms Designation: Telephone No: Mobile No: Fax No:	
4	EMD DETAILS	DD No: Date : Bank : Amount: <u>Please tick (√) whichever applicable:-</u> ONE TIME EMD / ONLY FOR THIS TENDER	
5	Validity of Offer	TO BE VALID FOR SIX MONTHS FROM DUE DATE	
		APPLICABILITY	BIDDER REPLY
6	Whether the format for compliance with PRE QUALIFICATION CRITERIA (ANNEXURE-I) is understood and filled with proper supporting documents referenced in the specified format	Applicable	YES / NO
7	Audited profit and Loss Account for the last three years	Applicable/Not Applicable	YES/NO
8	Copy of 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	Declaration by Authorised Signatory	Applicable/Not Applicable	YES/NO
12	No Deviation Certificate	Applicable/Not Applicable	YES/NO
13	Declaration confirming knowledge about Site Conditions	Applicable/Not Applicable	YES/NO
14	Declaration for relation in BHEL	Applicable/Not Applicable	YES/NO
15	Non Disclosure Certificate	Applicable/Not Applicable	YES/NO
16	Bank Account Details for E-Payment	Applicable/Not Applicable	YES/NO
17	Capacity Evaluation of Bidder for current Tender	Applicable/Not Applicable	YES/NO
18	Tie Ups/Consortium Agreement are submitted as per format	Applicable/Not Applicable	YES/NO
19	Power of Attorney for Submission of Tender/Signing Contract Agreement	Applicable/Not Applicable	YES/NO
20	Analysis of Unit rates	Applicable/Not Applicable	YES/NO

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

DATE :

AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

TECHINICAL CONDITIONS OF CONTRACT (TCC)

TENDER NO. BHEL/ NR/SCT/ GVK GOINDWAL / ELE AND C&I / 803

FOR

**ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION AND HANDING OVER
OF ALL ELECTRICAL AND C&I EQUIPMENTS OF UNIT NO. 1 & 2 OF 2X270 MW
GVK, GOINDWAL TPS, DISTT. TARAN TARAN, PUNJAB.**



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

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Chapter - 1: Project Information

1. PROJECT INFORMATION

Name of the Owner	GVK POWER (GOINDWAL SAHIB) Pvt. LIMITED
Address	: GVK Goindwal Sahib TPS, District Taran Taran, Punjab
Location	: Taran Taran- Kapurthala road about 3 Kms from Goindwal Sahib
Capacity	: 2X270 MW
Route	: By Road from Jalandhar via Kapurthala By Road from Amritsar via Taran Taran
Nearest City	: Taran Taran -24 KM Kapurthala- 25 KM Jalandhar -40 KM Amritsar -45 KM
Maximum Temperature	: 47.7 Deg C
Minimum Temperature	: (-) 3.3 Deg C
Relative Humidity	: 25%-75%

Chapter - 2: SCOPE OF WORKS

2.0 SCOPE OF WORK

- 2.1 BHEL has been awarded the work of Design, Manufacture, supply, installation, erection & commissioning of BTG package of **2x270 MW units at GVK, Goindwal TPS, Distt. Tarn taran, Punjab**. The equipment consists of boiler, Electro-static precipitator, Fans, milling systems, steam turbines, generators, boilers feed pumps, condensate extraction pumps and piping along with the associated auxiliary supports and controls.
- 2.2 Scope of these specifications cover complete work of handling, transportation of materials from Project storage yard / stores to erection site / place of erection , storage at erection site, preservation, watch and ward, dressing, chipping and levelling of foundations, cleaning , checking, testing, pre-assembly, erection, calibration, alignment, grouting, welding, NDT wherever required, preservative/ touch-up painting including supply of paints etc, earthing of equipment, including other activities required for erection, testing, commissioning, post commissioning, trial operations & handing over of all BTG Electrical & C&I equipments and items indicated in the rate schedule covered within the scope of these specifications for 2 x 270 MW GVK, Goindwal TPS,

2.2.1 SCOPE OF WORK FOR ELECTRICAL PACKAGE IN GENERAL

1. Erection and commissioning of Generator Transformers(315 MVA), Station Transformers, Unit Transformers
2. Erection and commissioning of Isolated phase bus ducts, LAVT, NG cubicle, Current transformers etc.
3. Erection and commissioning of Digital automatic voltage regulator panel
4. Erection and commissioning of soot blower MCC/Starter Panel/Marshalling Boxes etc.
5. Supply of adequate quantity of touch up paint and paints as required for items covered in scope of works.
6. Supply as well as installation of material for sealing and making vermin/ dust proof unused openings, if any, in panels/ JB's
7. Installation of Danger Board, First aid box
8. Supply of all consumables and hardwares required for installation
9. Functional Electrical Site testing of LT/HT Motors

2.2.2 SCOPE OF WORK FOR C&I PACKAGE IN GENERAL

The C&I works shall be covered for the total plant, which consists of Boiler ESP, Steam turbine, Generator and auxiliaries.

The Scope of C&I work covered in the above packages shall be as follows:

1. Erection and commissioning of Boiler, Steam turbine & Station C&I control panels etc.
2. Erection and commissioning of All Types of Field Instruments like Temperature, Pressure and Flow instruments (local & remote) and special instruments like EWLI, SWAS System, Flue Gas analyser etc.
3. Erection and commissioning Man Machine Interface & Data Acquisition System consists of Operator Workstations (max Station), Engineering station (common for SG/TG/GT), Computers / PLC based Equipments, Laser printers (B/W-A3), Ethernet Switches
4. Erection & Testing of all types of control/instrumentation cables etc
5. Erection of all types of Hardware like impulse pipes, cable trays & tray supports etc.
6. Fabrication and installation of steel supports, wherever required
7. Erection Installation of canopy for outdoor pushbutton stations/motors/panels/ instrumentation.
8. Commissioning of all Types of Electrical/ Pneumatic operated Valves/Actuators/ Controllers and Relief Valves.
9. Supply of adequate quantity of touch up paint and paints as required for items covered in scope of works
10. Erection and commissioning of UPS Panel and ACDB etc.

ELECTRICAL /C&I/PACKAGES**2.3 GENERAL**

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

- 2.3.1 Identification of equipments at storage yard, technical assistance for checking and making the shortage/damage reports, taking delivery from storage yard/stores and calibration, erection, aligning, fastening, supporting, cleaning, checking, testing, commissioning, troubleshooting and carrying out statutory tests as required, trial operation, 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.
- 2.3.2 It is not the intent to specify herein all details of material. Any item related to this work not covered, but necessary to complete the system will be deemed to have been included in the scope of the work.
- 2.3.3 All the work shall be carried out as per 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 contractor.
- 2.3.4 Contractor shall erect all items/materials etc. as per sequence prescribed by BHEL at site. BHEL engineer depending upon the availability of materials/work fronts etc will decide the sequence of erection/commissioning methodology. No claims for extra payment from the contractor will be entertained on the grounds of deviation from the methods of erection/commissioning adopted in erection/commissioning of similar job or for any reasons whatsoever.
- 2.3.5 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.
- 2.3.6 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.
- 2.3.7. During the course of erection, testing and commissioning Electrical/ C&I work certain rework / modification / rectification / repairs / fabrication etc. may be necessary on account of feedback from other power stations or units already

commissioned and/ or units under erection and commissioning and also on account of design changes and manufacturing incompatibilities and site operation / maintenance requirements. Contractor shall carryout such rework /modification / rectification / fabrication / repairs etc, promptly and expeditiously and the same shall be deemed to be part of the scope of work.

- 2.3.8 The work shall be executed under the usual conditions without affecting power plant construction and in conjunction with other operations and contracting agencies at site. The contractor 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.
- 2.3.9 All necessary certificates and licenses required to carry out this work are to be arranged by the contractor expeditiously at his cost.
- 2.3.10 The contractor shall take delivery of item, materials, from the storage yard / stores/ sheds of BHEL / customer which are within plant premises. He shall also make arrangements for, safe custody, watch and ward of equipment after it has been handed over to him till they are fully erected, tested and commissioned till the contract period. The contractor shall note that items/materials shall be transported to erection site / assembly yard etc. by the prescribed route without disturbing and causing damage to other works in the most professional manner. All items, Hardware, etc. shall be stored in appropriate manner as per BHEL's instructions.
- 2.3.11 The contractor shall take delivery of items/materials, and consumables from the stores/ storage area / sheds of BHEL / customer after getting approval of engineer / customer in the prescribed indent forms of BHEL / customer.
- 2.3.12 After completing all the works, contractor shall hand over all remaining extra materials with proper identification tags in packed condition to BHEL 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.
- 2.3.13 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.
- 2.3.14 Contractor shall retain all T&P/Testing instrument/Material handling instrument 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.
- 2.3.15 Contractor shall remove all scrap materials periodically generated from his working area in and around power station 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. All the

package materials, including special transporting frames, etc. shall be returned to the BHEL stores / customer's stores by the contractor.

- 2.3.16 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.
- 2.3.17 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.
- 2.3.18 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.
- 2.3.19 The Contractor may have to execute work in such a place and condition where other agencies also will be under such circumstances.
- 2.3.20 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 deployed by contractor shall match with above scope of works.
- 2.3.21 All the surplus, damaged, unused materials, package materials, containers, special transporting frames, etc. shall be returned to the BHEL stores / customer's stores by the contractor.
- 2.3.22 Any wrong erection shall be removed and re-erected promptly to comply with the design requirements to the satisfaction of Site Engineer.
- 2.3.23 BHEL will provide vendor's technical support for commissioning of various proprietary type special instruments/systems like Analysers, Vibration Monitoring System, Microprocessor based relays, Flame Scanners etc. The contractor shall carry out the works as per instructions of BHEL/ Vendor Engineer.

2.3 .24 Contractor shall ensure following:

- I. Contractor has to maintain contact with local hospital having ambulance facility, scanning & other ultra modern medical facilities required during emergency.

- II. Contractor has to ensure pre employment medical check for all staff & workers.
- III. Contractor has to ensure that adequate First Aid facilities with trained nurse are available at work site for emergency purpose. This emergency set-up should include, but not limited to, following
- Male nurse (in shifts)
 - Oxygen set up
 - Breathing apparatus
 - Eye wash facility
 - Stretcher
 - Trauma blanket
 - Medicines.

In addition to above, BHEL (through its other contractor) has arranged ambulance at work site for emergency purpose, which can be utilized by the contractor in case of emergency. The charges for the same will be decided mutually at site. In case, under unavoidable circumstances, if the ambulance is not available / being used elsewhere, the contractor will have to arrange for the same as under clause 2.3 (I).

2.3.25 The contractor shall comply with following towards Social Accountability;

- a) The contractor shall not employ any employee less than 15 years of age in pursuant to ILO convention. If any child labour were found to have been engaged, the Contractor shall be levied with expenses of bearing his education expenditure which will include stipend to substantiate appropriate education or employ any other member of family enabling to bear the child education expenditure.
- b) The contractor shall not engage Forced/ Bonded Labour and shall abide by abolition of Bonded Labour System (Abolition) Act, 1976.
- c) The contractor shall maintain Health & safety requirement as stipulated in the Contract and Contract Labour (Regulation & Abolition) Act, 1970.
- d) The Contractor shall abide by UN convention w.r.t. Human Rights and shall be liable for Discrimination/ Corporal punishment for failure in meeting with relevant requirements.
- e) The Contractor shall abide the requirement of Contract Labour (Regulation & Abolition) Act, 1970 for working hours.
- f) The Contractor shall abide by the Statutory requirement of Minimum Wages Act 1948, payment of Wages Act 1936.
- g) The Contractor shall arrange potable drinking water to its employees & workers.

2.3.26 In order to meet the environmental concerns it is expected that the contractor shall plant, protect and maintain at least 100 trees or equivalent in the vicinity of the project as per the available space and as per the advice of Engineers.

2.3.27 The scope of specification covers the installation, testing and commissioning of the instrument, hardware along with accessories as detailed in Bill of Quantities (BOQ).

Note:

The quantity indicated in the BOQ/ Rate Schedule is tentative only and is liable for variation. Payment will be made as per actual quantum of job executed at the unit rate accepted by BHEL.

2.4 The contractor's scope of work is further described in the clauses hereafter:

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

**A. GENERATOR TRANSFORMERS/STATION SERVICE
TRANSFORMERS/UNIT TRANSFORMERS**

The scope of work under this head is defined as below.

1. Contractor shall transport the transformer tanks & accessories of Gen. Transformers/Station Service Transformer/Unit transformers from BHEL stores/ Storage yard to respective foundation of unit.
2. Generator Transformers (315 MVA) / Unit Transformers (25 MVA) / Station Service Transformers tank (35 MVA) shall be made available to the contractor 70 to 100 Meters (approximately) away from the respective foundation, further transport and shifting to the foundation shall be in the scope of this work. The shifting operation may require dragging either on ground with suitable arrangement OR dragging after fixing of wheels on rail track. It may also require turning of transformer at suitable locations enroute to foundation.

The contractor shall arrange wooden sleepers, winches, jacks, rails, crane, plates etc at his cost for this operation. However all loose accessories (other than Transformer Tank) shall have to be shifted from stores / storage yard.

3. The transformers shall be handled in such a manner so that no jerk is transferred to the core, winding and internals of the transformer.
4. Transformers are generally supplied in partly assembled condition either filled with oil up to the core level / winding level or gas filled. Accessories, like radiators, conservator tank, pipes, fittings, hardware, gaskets, buchholz relay, marshalling box, relief vent, valves, pumps, cooling fans, cables, bushings, radiator headers/fans, rollers, tap changer drive unit, cables of various sizes for interconnection from marshalling control box to field devices, bushing turrets and oil in 205/210 liters, barrels shall be supplied loose.
5. Cable trays (for transformer local cabling, if not supplied along with transformer) shall be issued separately by BHEL site and the installation charges is inclusive in rate schedule for Transformer and no extra charge shall be paid on this account.
6. All the accessories should be thoroughly cleaned prior to installation and same shall be assembled/mounted as per OGA drawings.

7. Placement on plinth, alignment with respect to the foundation and lay out drawings.
8. Internal inspection to verify the intactness of core and winding, tap changer leads, off-load switch/on load tap changer, measurement of core and core bolt insulation.
9. In case transformers are supplied partly oil filled/gas filled, after internal inspection, the transformer shall be kept under vacuum (for a period to be decided by site engineer) and treated oil to be filled up to required level.
10. Each drums of oil to be tested for BDV. After getting BDV/ withstand value, this treated oil to be filled in the transformers and auxiliaries.
11. Contractor shall arrange storage tank of 20 kilo liter capacity, internally sand blasted and with one coat of oil resistance paint. Oil from drums to be transferred in storage tank and filtration to be carried out to achieve the required BDV/ withstand value. This treated oil to be filled in the transformers and auxiliaries. However, for low capacity transformer, a separate storage tank for filtration may not be required.
12. Drying out of transformer and filtration of oil in cooling bank, pipeline, diverter tank of tap changer etc. to be done with ultra vacuum filtering machine of adequate capacity (760 mm HG). Drying out process shall be carried out round-the-clock and contractor shall deploy trained manpower for this purpose
13. During dry out process, contractor has to plot the curve for insulation resistance value/time/oil temperature. Hourly reading to be recorded till completion of the dry out.
14. The criteria for deciding completion of drying out shall be breakdown value of oil, PPM value of contaminants in oil, resistively of oil, insulation resistance value and polarisation index.
15. Filter machine capacity if found to be inadequate, or in case of failure of an existing machine, alternative arrangement is required to be made to meet the required result and time schedule. **It is to be particularly noted that that as per exigencies of site working, contractor will have to arrange more oil filtration machines as per site requirement.**
16. Contractor shall discuss and finalise installation and testing activity procedure with BHEL/GVK prior to starting the work.
17. Tests are required to be conducted on Current Transformer, Potential Transformer & prior to / after installation. Contractor shall also carryout oil processing / filtration to achieve the desired results before charging and handing over of the entire system.

18. Contractor shall arrange required testing equipments for carrying out electrical test like voltage ratio, turn ratio, vector group, magnetic balance, winding resistance measurements, BDV value of oil, tan delta measurement of bushings & winding, insulation resistance, measurement of oil PPM, Acidity, Resistively and Tan Delta and **DGA** test. The contractor shall arrange oil sample testing for PPM / resistively or any other tests applicable for oil sample at approved testing laboratory/BHEL Bhopal at his own cost including all incidental expenses.
19. Contractor should have valid electrical contractor license to carry out installation of high voltage equipment.

B. ISOLATED PHASE BUS DUCT 16.5 KV, 12.5KA CONTINUOUS AIR-COOLED

GENERAL DESCRIPTION

1. Generator isolated bus duct is connected to low voltage side of three phase generator transformer (315 MVA) and main bus duct shall have tee off connection for Unit transformer, LAVT cubicles & NG cubicles etc.
Flexible connections and expansion joints are excitation transformer and air pressurization equipment. Bus duct consist of round / octagonal/ box hollow aluminium alloy conductor and supported inside aluminium enclosure with post insulator provided at terminals and intermediate point to alleviate stresses. Ring type protection current transformer will be mounted inside the bus duct.
2. Isolated phase bus duct shall have tap connection for potential transformer, surge protector etc. housed in a metal clad cubicle, UT and NG cubicle/resistor cubicle. Various electrical tests have to be performed before and after erection.
3. Bus duct enclosure /conductor is a continuous welded type. Conductor, enclosure, makeup pieces, shunts pieces etc have to be welded at site.
4. The scope of for Isolated Phase Bus Duct shall include Transportation of material from stores/ storage yard, preparatory work such as erection of supporting structure, placement of sub assemblies / equipments, alignment, edge preparation of conductor / enclosure, welding of conductor / enclosure, welding of shunt pieces & make up pieces, installation of seal of bushing & wall frame assemblies, shorting links, earthing, LAVT cubicle, copper flexibles, copper rubber bellows, weldable/ bolted flexibles, installation of air pressurising unit and its associated piping work and cable etc, testing and commissioning.
5. Pre-fabricated G.I. supporting members shall be supplied in loose condition and are to be erected as per lay out drawing. Foundation pockets and embedded plate inserts shall be provided as per lay out drawing (on floor for bottom support and on bottom of concrete slabs).Contractor shall weld the supports on insert plate and shall carry out grouting including supply of grout materials after complete alignment/bolting of structural members. If any modification required in supporting structure due to site conditions, the same

shall be carried out without any extra cost. All welded joints shall be applied cold galvanizing zinc paint. Supply of Paints, primers etc are in the scope of the supplier, within the quoted rates.

6. Required aluminium welding of conductor, enclosures, shunt, make up pieces, aluminium flexible etc as detailed in drawings has to be carried out by contractor. MIG/ TIG welding shall be applicable. Contractor shall arrange necessary welding equipment/ accessory in sufficient number, filler wire, argon gas and other required consumables at his cost.
7. During erection of bus duct/enclosure, makeup pieces and shunts, if any modifications needed to match the alignment shall be part of work and no extra payment shall be made.
8. All bolted joints and flanges shall be tightened with torque wrench to the approved torque. Wherever there are bolted joints, the same shall be cleaned and a layer of anti-oxidation paints shall be applied. Necessary paints etc to be arranged by contractor within the quoted rates.
9. Top chamber/adaptor box for line and neutral side, hood assembly at UT hood assembly at excitation transformer and at LAVT cubicle end shall have drilled hole in flange. If there is any mismatch of the hole in above with respect to the counter flange/welded studs provided on UAT, LAVT and excitation cubicle, the contractor shall drill new holes if required.
10. Proper sequence shall be followed during erection to avoid any mismatch and alignment problem.
11. Prior to installation of bus duct assemblies in position, various components like conductor, insulator shall be inspected and cleaned and insulation resistance to be measured and recorded. If any insulator is found damaged, the same shall be replaced.
12. Electrical test on current transformers and potential transformers shall have to be carried out prior to installation & during pre-commissioning. The tests are insulation resistance measurement, winding resistance, magnetisation characteristic, ratio test water ingress and air leak test on assembled bus ducts.
13. Minor civil work such as chipping, levelling of foundation, providing pockets, drilling/enlargement of holes in structure, bus bar etc. Which are incidental to the erection of bus duct shall not be treated as extra.
14. All miscellaneous items such as disconnecting links, flexibles, shorting bars, hardwares, conduit for wiring, marshalling box, CTs and PTs wiring through conduit, earthing materials, bus bar fish plates etc. are part of bus duct installation. Hence separate breakup quantity is not given in BOQ.

15. Round makeup pieces for main and tee off duct shall be supplied in two halves and it involves but circumferential and horizontal welding at parting plain.
16. Air tightness and water tightness test have to be carried out on completion of bus duct installation. In case of any leakages, contractor has to rectify and bring to the required level of air tightness/water tightness without any extra cost.
17. High voltage test of bus duct is to be carried out as per the instruction of BHEL engineer. Contractor shall arrange necessary test equipment / instrument for conducting various electrical tests at his own cost.
18. Contractor has to carry out final painting as per standard colour code recommended by BHEL. Paints and consumables shall be in contractor's scope.
19. Shunt pieces shall be supplied in two halves and to be welded between two-phase bus duct at transformer end. The shunt pieces to be welded on both the side on matching plain and bus duct circumference and horizontal plain
20. Contractor shall conduct 10 % radiography and 100% NDT test on welded joints.
21. One end of the enclosure to be earthed to the station earth at shunt location where all three-phase enclosure are shorted. Wherever shunts are not provided, each phase should be earthed separately.
22. In case of bolted busducts, phase split covers, rubber bellows, aclamping earth straps to be connected to maintained the electrical continuity and in turn enclosure gets earthed at one point.
23. All other equipment such as LAVT, NG cubicle, air pressurisation, CT chambers, junction boxes, etc to be earthed at two points to the earth grid.

C. SOOT BLOWER SYSTEM

1. Soot blower system comprises of motor control centre / Local Starter Boxes having various feeders of motor starters / Switch Fuse Units , micro-processor based PLC panel with mimic diagram and control station, push button boxes, junction boxes, wall blowers/LRSB with drive mechanism, integral control box with limit switch and internal wiring, inter connecting cables between field blowers and MCC, PLC panel etc. The scope of work for testing, commissioning covers the items/devices as per rate schedule and the testing, commissioning of blowers shall be carried out in close co-ordination with mechanical agencies who shall be erecting these blowers and contractor shall obtain clearance from BHEL engineer prior to start of work.
2. The contractor shall carry out the following works under testing & commissioning:-

- a. Pre-commissioning checks and tests on MCC's / Local Starter Boxes, soot blowers, PLC panels, energisation of MCC and its feeders, wiring checks, insulation resistance measurements, testing of thermal over load relays etc.
- b. Adjustment of limit switches, torque switches, internal wiring checks, minor wiring modification to suit to system requirements for wall/LRSB blowers.
- c. Electric operation of each blower from local, MCC / Local Starter Box and PLCpanels and from Unit control board.
- d. Providing loop on terminal block of MCC individual feeders & blowers.
- e. During pre-commissioning / post-commissioning of soot blower system, the component like TB's, limit switch, torque switch, over load relay, contactors etc. if found defective, contractor shall replace such components without any extra payment.

D. SCOPE OF ABOVE GROUND EARTHING

Earthing work mainly involves laying and tack welding of of conductors on columns / beams at every one meter interval and bolted connections with equipment at least at two points. Low hydrogen content electrodes shall be used for welding. All the above ground welded joints shall be coated with two coats of red oxide primer and two coats of enamel paints.

E. INSTALLATION OF PANELS (LT MCCs/ MAX CONTROL PANEL/AVR/GEN. CONTROL PANEL etc.)

1. Different types of panels like max control panel, DAVR, LT MCC, Generator panels etc. Panels, etc. are covered in the scope of work for erection and commissioning.
2. Panels are normally supplied in suite of one / two / three/ four cubicles with bottom base frame and these panels are to be mounted on separate site fabricated base frames as per site condition. The base frames to be properly grouted to the concrete floor or to be TIG welded to the embedded insert plates.
3. Wherever the base channels are not available, the same shall be fabricated, erected and painted at site. The material for this shall be supplied by BHEL. If base frame is to be fabricated /erected, separate rate shall be paid for the executed tonnage as per the rate for fabrication and erection of structural steel. Contractor to arrange anchor bolts required if any.
4. Scope of work include erection at site / control room including chipping of floor, fabrication and fixing of base channel frame, levelling & alignment

with spirit level, welding the base channel to the embedded plates / channels, grouting , fixing of anti-vibration pads, termination of inter panel connections, mounting / connections of loose instruments, inter panel bus bar connections, commissioning including loop checking, system checking, and putting necessary controls on automatics.

5. Terminations of cables will be by conventional screwed connections. Checking of internal wiring, rectification, testing and calibration of equipment mounted inside is in the scope of contractor. The contractor may have to change / replace items found faulty without any extra cost, however materials for this shall be provided by BHEL.
6. Mostly panels will be delivered fully wired. However wherever required termination of loose wires, bus wires is to be done. Canopy for panels will be supplied loose & shall be installed by the contractor after erection of panels. The cleaning of panels have to be done with electrical vacuum cleaner, besides conventional cleaning with brush etc.
7. The drilling of holes in the gland plates for cable entry shall be part of panel erection. All blank holes / gaps in the gland plates / boxes etc. shall be properly sealed. The base frames shall be painted suitably. The contractor shall carry out the plugging and sealing of left out holes in the gland plates and other openings at the bottom of panels at his own cost by using fire retardant mortar or good quality sealing material as advised by BHEL .
8. **Any minor alterations required in the bus bar arrangement, wiring in the panels/ cubicles shall also form part of the work. During testing, commissioning, some equipment / modules may need replacement / repairs. All such replacements / repairs and assistance during commissioning and running of the unit till handing over to the Customer are part of the scope as some of the test / commissioning will have to be done after the machine is running on various loads.**

F. CABLE TRAYS/CABLE DUCTS

1. Various types of sheet metal, galvanized cable tray, i.e. perforated, ladder type, sheet metal duct, solid bottom trays, pre-fabricated structural trays etc., will be supplied in standard lengths along with accessories and hardware viz; coupler plate, tray covers and tray clamps etc.
2. **Erection of cable tray/cable duct shall include cutting, laying, jointing, fixing tee/reducers/ bends/clamps, fixing of tray covers, hardware, fabrication & welding of tray supports as per tray route layout etc.**
3. Fabrication of bends/tee/ reducers from straight length of tray is within the scope of work and rate quoted shall be inclusive in unit rate (in running meter). All site welds of cable trays shall be painted with approved primer and cold galvanizing paint, which shall be arranged by the contractor.

4. In case structural cable trays, bends, tees, reducers etc., are required to be fabricated from structural steel and installed, unit rate applicable for fabrication and installation of structural steel shall be applicable in such instances.
5. Cable trays/duct etc may have to be routed underground in cable trench, over head on structure, along the walls, floors etc.

Installation of tray/duct covers, wherever provided, will be done as a part of tray erection and no extra rates will be payable.

G. CABLE LAYING - (CONTROL / INSTRUMENTATION SHIELDED/ UNSHIELDED CABLES / PLUG-IN CABLES / Coaxial / UTP / STP /DATA HIGHWAY, ARMoured / UN-ARMoured,SINGLE / MULTI-CORE, PVC / HR PVC / FRLS / TEFLON / XLP INSULATION, Optical fibre)

1. Cable laying includes cutting to the required length, laying in overhead Cable racks / underground cable trenches, pipes, flexible conduits, dressing/clamping in tray, drilling of holes in gland plates in panels and junction box, glanding, splicing, dressing of spliced wire inside the panel and JB's, providing printed ferrules (ferrule printing machines to be provided by contractor for printing necessary cross ferruling details) / PVC numerical / alphabetical ferrules (where printed ferrules not possible at all) machine engraved ferrules sleeve/ ferrule, termination by using crimp type copper tinned/aluminium lugs, insulated/un-insulated, crimp and soldered termination, plug-in connections with insert type crimping, providing identification cable tags of PVC/aluminium at both the ends and at appropriate interval (Approximately 30meters) throughout the route length, continuity checking, insulation resistance checking. Contractor to arrange adequate numbers of his own ferrule printing machines.
2. Entry to the panels, JB's may be at top, side or bottom. All cable are required be supported and clamped near to the panel.
3. **PVC cable ties, PVC ferrules, PVC button and tapes, cable identification tag of PVC/metal as per site requirement, clamping and dressing material such as suitable cable ties/ clamps etc with hardware, PVC sleeves etc. shall be supplied by contractor within the quoted rate for cable laying. Only Cable Lugs & Glands Shall Be Issued By BHEL As Free Issue Item.**
4. All care should be taken to avoid abrasion, tension, twisting, kinking and stretching of cables during installation.
5. Cable shielding – all signal cables are supplied with bare shielded copper wire/with braided wire shield. Generally, shield wire is kept isolated at instrument/field device end and continuity is maintained through JB's and earthed at panel end only. While terminating the shield wire in either panel or JB's, PVC sleeves are to be used to avoid two-point earthing.

6. Wherever cables run through ducts, conduits, valves, etc., they shall be sealed using fire/weather proof compound. In addition to this, cable entry in panels, MCCs, instruments, electrical actuators etc., are also required to be sealed. The required material for doing so shall be included by contractor in the cabling
7. Contractor shall carefully plan the cutting schedule of each cable drum in consultation with BHEL site engineer such that wastages are minimized. Recovery will be made in case the wastages are exceeding the wastage allowances fixed in this contract.

H. CABLE TERMINATION

1. The Cost Of Cable Laying As Per BOQ Cum Rate Schedule Shall Also Include The Cost Of Termination With Suitable Crimping Type Lugs & Ferrules
2. Only Cable Lugs & Glands Shall Be Issued By BHEL as Free Issue Item. Drilling of holes in gland plates of control panels, JBs etc as per requirement shall also be part of cabling at no extra cost to BHEL.
3. The contractor shall carryout insulation testing, simulation testing etc. as per the instructions of Engineer at site.
4. Screen of signal cables shall run in insulated sleeve (to be arranged by contractor at no extra cost) and shall be terminated as per the instructions of the BHEL Engineer.

I. SCOPE OF WORK FOR FIELD INSTRUMENTS

1. The type of instruments to be erected and commissioned shall be as detailed below:
 - a. All types of transmitters like temperature, pressure, flow, level transmitters etc. Local mounted pressure gauges, DP gauges, thermocouples, RTDs, temperature gauges, temperature switches, pressure switches, DP switches, flow switches and limit switches and flow indicator level switches etc.
 - b. Air filter regulators, Air lock off valves etc.
 - c. Panels / Control desk mounted Instruments like indicators, recorder, console and electronic modules etc.
 - d. I / P converters and local controllers.

- e. Pneumatic operated control valves, trip valves, solenoid valves, power cylinders, etc. and electrically operated valves.
 - f. Special instruments like vibration sensors, electronic water level indicator, Gas analyser, PC based instruments, etc.
2. Prior to installation, all the local & remote Instruments, thermocouples/RTDs, I/P converters, etc. shall be calibrated. Similarly, limit switches, flow switches, level switches, solenoid valves, air filter regulator, purge meters, etc. shall be checked for proper operation.
 3. The scope of work for each instrument shall include calibration, installation, loop checking, commissioning and troubleshooting until satisfactory performance as per operational and system requirement and maintenance till the end of contract period or trial operation whichever is earlier.
 4. **In case any instrument requires recalibration to achieve the expected performance, the same shall be carried out at no extra cost.** If any recalibration or replacement of instruments and rechecking of cable termination is found necessary during commissioning, the same shall be done at free of cost.
 5. If any instrument is to be relocated for satisfactory performance, the same shall be carried out by the contractor.
 6. Fabrication and installation of racks and supports for instruments, wherever required, shall be carried out by the contractor. Steel materials required for fabrication shall be supplied by BHEL.
 7. The scope shall also include marking Tag numbers on the instruments or racks, either by paint or a separate tag plate as per BHEL Engineer's directive.
 8. For field mounted instruments, pre-fabricated canopies shall be provided by BHEL. Mounting of canopies shall be done by the contractor as part of scope.
 9. The scope of work for pressure/differential pressure transmitters, gauges, switches, shall include fixing the instruments on the racks / supports along with manifolds, and associated fittings and clamps.
 10. The scope of work for Temperature transmitters, I/P converters, Air filter/Air lock off valves, Purge meters, Rotameters, position transmitter, probes etc shall include fixing the instruments on the racks / supports along with associated fittings and clamps.
 11. The scope of work for control room mounted instruments shall cover mounting of instruments on panels / desk wiring, minor grinding on the cut out of panels for proper fixing.

12. The scope of work for erection of Casing temperature thermocouple of turbine/ metal temperature thermocouple (MTM) shall cover laying, dressing and clamping, supply and fixing of tag plates, etc.
13. The scope of work for erection and checking of thermocouple, RTD etc. shall include cleaning of thermo well stubs threads using tap sets, fixing of thermo wells, seal welding of thermo well, wherever required as per BHEL directive of site engineers.
14. The scope of work for temperature switches, gauges shall include providing suitable support for capillary type temperature Gauges/switches besides the works covered above for RTD & T/C.
15. The scope of work for erection and commissioning of float type Level switches includes fixing of switches on float chambers and fixing of float chambers on stand pipe, any minor modification required to match Float chamber with tapping point, providing supports wherever required etc.
16. The scope of work for Electronic type Level switches includes fixing of Electrode standpipe, Electrodes, Electronic unit, any minor modification required to match Float chamber/ Electrode standpipe with tapping point, integration of all loose supplied items etc .
17. The scope of work for special instruments like, Electronic water level indicator, Flue Gas analysers, SWAS Analyser, etc. shall include installation of all loose items which are not explicitly mentioned, but comes as part of the system, integration of total system and commissioning. The quantities of loose supplied items are approximate only. No extra payment will be applicable for any variation in quantity or for any additional items supplied as part of equipments.
18. For Special Instruments like, Analysers, SWAS System, DCS/PLC vendor support shall be provided by BHEL for commissioning. The contractor shall provide necessary assistance for commissioning activities.
19. All instruments are generally covered in the BOM. However, if any instruments not covered, but requires being erected/commissioned, same shall be carried out by the contractor.
20. In case of Instruments that are mounted and supplied along with main equipment, the contractor shall carry out removal, calibration, re-fixing and commissioning of same, as per requirement.

J. RIGID & FLEXIBLE CONDUITS

1. Cables shall normally be laid on cable trays. However, in case of shorter routes where trays are not possible, suitable GI pipe/flexible conduits shall be used.

2. The scope of works for flexible conduit includes drilling of the holes on the plates, fixing of the end connectors, providing suitable supports and fixing tag marks wherever specified as required by BHEL. The supply of suitable clamps, fasteners and tag plates are in contractor's scope.
3. Fixing end connectors shall be part of scope of flexible conduit laying.

K. JUNCTION BOXES/PUSH BUTTONS

Different type of junction boxes are to erected by the contractor like junction boxes below 48 ways and above 48 ways. The junction boxes are to be located at the locations jointly decided at site during erection. The junction boxes are to be erected on the frames fabricated at site.

L. SCOPE OF WORK FOR IMPULSE PIPES

1. Fabrication and erection of channel / angle / slotted angle supports, cleaning impulse pipe with wire brush and compressed air, edge preparation, cold bending, laying to the required slopes, clamping, welding of isolation / drain valves and fittings by butt / socket welding / swoze lock joints. Servicing of valves, connecting with the process end and to the instruments, NDT, Hydraulic testing the impulse lines, and painting the lines as per requirement of BHEL engineer. The impulse line may have to be cleaned chemically for removing grease / rusting. Proper tagging of valves and impulse lines on both ends shall be done for proper identification. No extra charges will be claimed by contractor for any modification carried out after laying of Impulse / draft pipe lines due to site requirement in general.

M. SCOPE OF WORK FOR COPPER/ SS TUBES

Fabrication and erection of single angle supports / tray supports for single multi run tube. Laying tubes in the angles / trays from the panel to the equipment, instrument to instrument, air supply line to drive / instrument, air line connections, clamping properly as per standard ferruling and termination at both ends. This includes all fittings and needle valves, stop valves etc. also. Proper tagging of valves and pneumatic tubes on both ends shall be done for proper identification. No extra charges will be claimed by contractor for any modification carried out after laying of pneumatic tubes / draft pipe lines due to site requirement in general.

N. SCOPE OF WORK FOR ELECTRIC & PNEUMATIC ACTUATORS

1. Pneumatic actuators shall be calibrated at site

2. For calibration of any Pneumatic Actuator at field, temporary air supply, if required, shall be arranged by the contractor.
3. All calibration instruments required for calibration of actuators shall be arranged by the contractor.
4. For all electrical actuators of the valves, functioning, setting and performance of limit switches/torque switches of various positions shall be checked before and after installation of the actuators. The position transmitters for inching applications shall also be calibrated.

O. SCOPE OF WORK FOR THE INSTRUMENTS MOUNTED AND SUPPLIED ALONG WITH EQUIPMENT/ SKIDS

1. Scope of work covers removal, re-calibration, re-fixing, re-termination of cables, checking the continuity, replacing any defective parts or replacing the total instrument, if required.
2. The scope also covers collecting the replacement instruments/parts from BHEL/customer stores, stockyard etc.

P. STRUCTURAL FABRICATION AND INSTALLATION

INSTRUMENT/ JUNCTION BOX FRAME/ PANEL BASE FRAME / CABLE TRAY & MISC STRUCTURES FABRICATION

1. Structural steel material like MS angles, channels, beams, flats, plates etc. shall be supplied in running meter and the same shall be used for misc fabrication if required and the same shall be used for fabrication of panel base frame, cable tray supports, Canopies for instruments/panels/ drives/JB's/Push Buttons etc., Instrument/Junction box frames, Impulse Pipe/Instrument Air Pipe supports and instruments etc.
2. This shall include cutting to size, contouring of ends for connections if required, welding, grinding of excess weld deposits/burrs, drilling of holes for mounting of device/instrument, installation at location, leveling, alignment, providing bracings and painting etc. No gas cut holes will be permitted.
3. All the fabricated supports/frames for instruments, trays, pipes, electrical equipments, etc., shall be painted after thoroughly cleaned by wire brush, scrapping or any other method as per requirement of BHEL/GVK. Paints and other associated items are in the scope of the contractor.
4. Frame installation at site may involve mounting either on concrete floor by grouting / using anchor fasteners or on steel structure by welding etc. All consumables including anchor fasteners shall be arranged by the contractor. Where required, as part of work, concrete floors may have to be chipped out

to reinforcement depth for anchoring the frames. Wherever grouting is required, contractor shall arrange all the required material including cement / grout mix, shuttering etc., necessary labour and meet all other requirements as part of work.

5. In case, structural cable trays, bends, tees, reducers etc., are required to be fabricated from structural steel and installed, unit rate applicable for fabrication and installation of structural steel shall be applicable in such instances.
6. In certain packages, members of frames/rack for mounting of junction boxes/ instruments may be supplied readymade. These have to be assembled prior to installation. The installation rate as quoted shall include assembly of the frames.
7. **Gas cutting of tray/impulse pipe support and holes in frame is not permitted. Only hacksaw cutting/ drilled hole shall be permitted.**

Q. POWER CYLINDER ERECTION

Platforms on which Power Cylinders are to be mounted are usually provided by the Civil Contractor / other agency. However minor structure work required shall form a part of the work within the quoted rate of the the respective cylinder . Fabrication / erection of stands for mounting of the cylinders The work also includes minor rectifications/alteration in the tubing , servicing of accessories , setting of limit switches , calibration of actuators and feedback position transmitters

2.5 SCOPE OF CIVIL WORKS

1. The scope of civil works covers minor civil works like drilling, chipping and punching & opening in concrete floors, slabs, brick walls, grouting of foundation bus duct columns, base frame of panels, Transformer etc. Scope of civil works also covers minor civil works required for installation of push button stations, Junction Boxes.
2. Scope of civil works includes supply of grouting materials like cement, sand, etc., and cleaning of all debris at free of cost.

2.6 WELDING, NON-DESTRUCTIVE TESTING ETC.

- 2.6.1 Installation of equipment involves good quality welding, NDE checks etc.
- 2.6.2 Welder deployed for aluminium welding shall have experienced and approved by BHEL and BHEL's Customer after due qualification process/testing.
- 2.6.3 Welding of all structural steel & aluminium shall be done only by the qualified and approved welders.

- 2.6.4 All the welders shall be tested and approved by BHEL engineer/ Customer's quality engineer before they are actually engaged on work though they may possess IBR/other certificate. BHEL reserves the right to reject any welder without assigning any reason.
- 2.6.5 The welded surface shall be cleaned of slag and painted with primer paint to prevent corrosion. For this paint will be supplied by the contractor.
- 2.6.6 Welding electrodes have to be stored in enclosures having temperature and humidity control arrangement. This enclosure shall meet BHEL specifications.
- 2.6.7 Certain types of coated welding electrodes, prior to their use, call for baking for specified period and will have to be held at specified temperature for specified period. Also, during execution, the coated welding electrodes have to be carried in portable ovens.

2.7 MEASUREMENTS & WASTAGE & CUTTING ALLOWANCES

- 2.7.1 For all payment purposes, measurement shall be made on the basis of the actual execution of work in line with drawings/documents/site requirements. Physical measurements shall be made by the contractor in the presence of the Engineer.
- 2.7.2 The measurement for cable, impulse pipes/tubes, GI pipe, conduits, flexible conduits, trays etc., shall be made on the basis of length actually laid.
- 2.7.3 All the surplus, scrap and serviceable materials, out of the quantity issued to the contractor shall be returned to BHEL in good condition and as directed by the engineer.
- 2.7.4 All materials returned to stores should carry aluminium tag indicating the size and type. Cables more than 15 meters length is termed as serviceable material and shall be returned size wise and category wise to the owner's stores/yard. Cable of serviceable length being returned to the stores in drums shall have their free ends sealed and the balance lengths on the drum(s) shall be noted and certified by the Engineer-in-charge. This shall be applicable only for the purpose of accounting the cables issued for installation.
- 2.7.5 While carrying out material reconciliation with contractor, all the above points will be taken into account. All serviceable material returned by the contractor shall be deducted from the quantities issued for the respective sizes and categories and the balance quantity (ies) will be taken as the net quantity (ies) issued to the contractor. Material reconciliation shall be done and allowable scrap quantity calculated as per wastage allowance percentage specified above. Any scrap/wastage generated by the contractor in excess of the allowable percentage shall be charged at the rates decided by the Engineer whose decision shall be final and binding on the contractor.**

- 2.7.6 For all site-fabricated steel items such as supports, racks, frame, Canopy etc. physical measurement shall be made and then converted to tonnage. For steel material supplied to the contractor, all scrap shall be returned to BHEL stores with due accounting.
- 2.7.7 Every month the contractor shall submit an account for all the materials issued to him by BHEL in the standard Performa prescribed for this purpose by the site in charge.
- 2.7.8 The erection contractor shall make every effort to minimize wastage during erection work. Cutting and wastage allowance shall be computed on length, weight of material actually used, measured and accepted. In any case, the wastage shall not exceed the following limits;
- | Sl.No. | Item | % Wastage on issued Qty |
|--------|---|-------------------------|
| 01. | Each iron/steel section | 2 |
| 02. | Each size of control / shielded cable | 2 |
| 03. | Each size of power cables | 1 |
| 04. | Impulse pipe/tubes/GI pipes/copper tube | 1 |
- 2.7.9 If the actual wastage is more than the specified figure, then equivalent price of the excess portion will be deducted from the contractor's bill.
- 2.7.10 The cable take off from drums shall be planned strategically such that jointing in the run of cables and wastage are avoided. For this purpose the exact route length between various equipment/panels as per the cable schedule shall be measured and the route length recorded before laying of the cables. Depending upon the route length and the type of cable required for various destinations, the cable drums shall be suitably selected for cable laying. Any jointing shall have to be approved by BHEL engineer. All the cut pieces/bits of cables, which are not used, shall be returned to the purchaser for accounting towards wastage. The cables damaged by the contractor shall have to be replaced by the contractor at his own cost.

2.8 FINAL PAINTING

- 2.8.1 The contractor shall provide all the primer, paint, and other consumables like brush, cleaning agents etc. All T&P, manpower, supervision is in contractor's scope. Painting shall be carried out as per colour scheme approved by BHEL/ GVK.
- 2.8.2 All metal parts of the equipment including supports, structures, etc., as applicable shall be painted after thoroughly cleaning the surface from dust, rust, greases, oils, scales, etc, by wire brush, scrapping etc; as specified in relevant erection documents. The above parts shall then be painted with specified two coats of specified paint over the shop primer/paint.

2.8.3 Also, where the shop primer/paint has peeled off, the affected area shall be cleaned thoroughly by the specified method and then primer coat applied. Similarly, certain components may be supplied without any primer/paint coat from shop. The surface of such items shall be cleaned as per specifications, coated with suitable primer and then coated with final paint coats. The dry film thickness after final coat should be as per specification. The color, shade etc. shall be as per specification.

2.8.4 Paint and other materials so purchased shall be ISI marked and as per drawing, documents and specifications and painting should be as per colour scheme and quality approved / specified by Engineer. Painting schedule will be furnished at site. Valid Test certificate for the paint so supplied shall be made available before use of the same on work.

In order to have consistency in painting system, it is preferable that all the supplies are sourced from one single manufacturer.

2.8.5 All the fabricated frames, racks, supports, panel base frame etc. wherever applicable shall be painted with two coats of primer and followed by two coats of paint as specified earlier herein. In case of G I Structure, The cold galvanizing paint to be applied as touch up where ever needed. This is to be done as per instruction of BHEL engineer. The Paint required for this purpose is in scope of Contractor

2.8.6 The painters have to undergo test on a mock plate of size 1m*1m and only qualified painters will be allowed to work.

2.8.7 The contractor shall ensure availability of
Ford Cup-4 to measure consistency of paint,
Automatic magnetic gauge to measure the dry film thickness and
SSPC Visual standards to assess degree of cleanliness of surfaces to be painted.

2.8.7 Touch-up painting of LT MCC \ Control Panels or any other equipment /devices wherever necessary.

2.8.8 The primer shall be compatible with the final coat paint schedule.

2.8.9 Full (Spray) painting of transformers, bus ducts with two coats of paint as per Specification

2.8.10 Colour Banding, Legend and Identification Marking, Direction marking etc. shall be in scope of the contractor. Letter writing shall be done in Hindi / English or in both languages. The painters have to undergo test and only qualified painters will be allowed to work.

2.9 TESTING, PRE-COMMISSIONING, AND POST COMMISSIONING

Pre-commissioning / commissioning and post commissioning Activities

- 2.9.1 The work is also inclusive of various commissioning activities of the boiler and turbine package along with its auxiliaries and station C&I package. The various activities, tests, trial runs may have to be repeated till satisfactory results are obtained and also to satisfy the requirements of customer/consultant/ statutory authorities like boiler inspector, electrical inspector etc.
- 2.9.2 In case any malfunctioning and/or defects are found during tests, trial runs such as loose components, undue noise or vibration, strain on connected equipments etc., the contractor shall immediately attend to these defects/malfunctions and take necessary corrective measures. If any readjustment and realignment is necessary, the same shall be done as per BHEL engineer's instructions.
- 2.9.3 In case, any rework is required because of contractor's faulty erection which is noticed during commissioning, the same has to be rectified by the contractor at his cost. If any equipment / part is required to be inspected during commissioning, the contractor will dismantle / open up the equipment / part and reassemble/redo the work without any extra claim.
- 2.9.4 The pre-commissioning activities will start prior to light up of boiler and various trials, commissioning operations shall continue till the unit is handed over to customer. Simultaneous commissioning activities will be in progress in various areas, checking of equipments erected, making ready for trial runs, etc.
All these works need specialised gangs including electricians/instrument mechanics in each area. Contractor shall earmark separate manpower for various commissioning activities. This manpower shall not be disturbed or diverted.
- 2.9.5 The mobilisation of these commissioning gangs shall be such that planned activities are taken up in time and also completed as per schedule and the work undertaken round the clock if required. It is the responsibility of contractor to discuss on day to day / weekly / monthly basis the requirement of manpower, consumables, tools and tackles with BHEL engineer and arrange for the same. If at any time the requisite manpower, consumables, T&P are not arranged then BHEL shall make alternate arrangements and necessary recoveries with overhead cost will be made from the bills of the contractor.
- 2.9.6 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 without any extra payment.
- 2.9.7 In case any rework / repair / rectification / modification / fabrication etc. is required because of contractor's faulty erection which is noticed during

commissioning or at any stage, the same has to be rectified by the contractor at his cost. If 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. Claims if any, for such works from the contractor shall be governed by Section 2.15 of General Conditions of Contract.

- 2.9.8 It is the responsibility of contractor to provide for necessary labour, tools and tackles and consumables till the completion of work under these specifications even in case erection, testing and commissioning of this work is delayed due to reasons not attributable to the contractor.
- 2.9.9 During commissioning activities and carrying out various tests, minor items like gauges, manometers, etc., have to be temporarily erected and put in service to suit the commissioning activities. BHEL will provide the necessary gauges and equipment. Contractor has to carry out the erection, calibration, dismantling of the same. After completion of activities the temporary systems have to be removed and returned to stores. No extra charges will be payable towards these.

2.10 Commissioning

- 2.10.1 During pre-commissioning, commissioning, post commissioning and trial operation stages of various systems, certain category of manpower with T&P and consumables will have to be provided to BHEL commissioning engineers exclusively at their disposal. It shall be the responsibility of the contractor to provide Engineers, Electricians, technicians, Helpers, Fitters etc along with necessary consumables, hand tools, calibration equipment etc, for the various commissioning activities in progress. **During peak months there could be requirements of separate commissioning gangs simultaneously in even upto 12 to 15 areas. Contractor has to augment the manpower as and when required as per work demand and necessity at site. The quoted rates shall include this.**
- 2.10.2 It shall be specifically noted that contractor manpower may have to be engaged round the clock simultaneously at different areas and hence considerable number of personnel and their overtime payment may be involved. *This aspect must be considered by the contractor while quoting their rate.* No additional compensation by for the same shall be payable, irrespective of number of persons engaged or number of working hours per day.
- 2.10.3 Certain systems may be supplied with portable programming units, which are to be connected at various locations during pre-commissioning to handing over. Necessary cabling interconnecting the programming units and other connected panels has to be carried out by the contractor and are to be dismantled after work. For the purpose of testing, monitoring, commissioning, etc., these programming units will have to be repeatedly connected and disconnected at various locations. These will be considered as part of

commissioning activities and no separate payment will be entertained for the above.

2.11 Calibration, Testing & Commissioning

Calibration, testing & commissioning activity as specified in this technical specification and rate schedule against various equipments, devices, systems etc. are broadly classified below. However, there may be some overlapping between the activities (erection, calibration and testing, commissioning.) The classification of activity is only a guideline for understanding the total volume of work in each activity. The contractor shall have no claim for performing or providing manpower for such overlapping work, which is also within the scope of the work.

A Calibration

1. Verification after drawing of material of various types, range of the field devices with respect to instrument schedule, data sheet or system document.
2. Codification of instruments as per system tag numbers
3. Calibration / adjustment of instrument as per system requirement / set values.
4. Providing head correction in case of pressure measurement as per calculated values or actual measured value for the instrument, which are used for interlock protections / monitoring. This is generally applicable for turbine / generator, lube oil systems, lube oil system of fans etc.
5. Verification of installation of instruments for range, type, tag number as per physical location of process point as per process, instrumentation diagram.
6. Checking and ensuring the proper function of instrument.
7. All the recorders shall be made functional with proper chart movement and ink marking.
8. Preparation of computerised calibration certificates in the formats specified by BHEL Engineers and getting those signed by the customer is in the scope of the contractor.

B Erection

1. Drawal of material from store, verification, inspection as per shipping list, drawings and documents.
2. Preservation, upkeeping, safe custody of the erected equipments till handing over to the customer.
3. Verification of installation as per drawing and document for the correctness of cabling, JB's, impulse pipe, various field device, panels, instruments etc.
4. Continuity check and IR value check of cables.
5. Verification of correction of cable termination with respect to instrument, electrical hook-up diagram, panel interconnection diagram, JB schedule.
6. Checking earthing of the equipments and cable shield wire continuity.
7. Energizing the functional group control panels and field devices.
8. Flushing of impulse pipe before making the instruments process connections through.

9. Any leakages, damages to impulse pipe, field device connections, air connections etc. shall be fully attended by contractor.
10. All cable glands/piping/tubing to be fixed as per installation requirement before commissioning.

C. Testing, Commissioning & Trial Operation

1. Checking/verification of binary/analogue input and output signal from field and panel and upto recording/indicating instrument/HMI monitors.
2. Adjustment, testing, calibration of pneumatic drive (control valve, trip valve, power cylinder for gate/dampers), electrical actuator operated valve/gate/dampers of other functional elements.
3. Checking the operating electrical/pneumatic drive through functional group panel, remote control desk, HMI, CRT operation and repeatability and smooth operation to be checked.
4. Checking the interlock, protection and alarm for various process by simulation of field devices/process changes.
5. Functional check of sub-loop control, sub group control and auto loop and fine tuning.
6. Adjustment of limit switches/feed back position transmitter checking the actuator for correct Limit switch operation for correct position indication and repeatability shall be ensured.
7. Motor IR value measurement, bearing/winding RTD checking, drying out of motor, providing assistance for trial run of motor which includes monitoring temperature rise winding/bearing during trial run.
8. Contractor shall prepare calibration/testing report/protocols.
9. During trial run of various systems, if the performance of any instrument is found erratic, un-satisfactory and requires re-adjustment, re-calibration etc., the defect shall be attended by contractor.
10. Observing and checking the performance of the various devices on load/process variation. Any deficiencies/defect noticed during the variable load conditions, the same should be attended properly.
11. Observe the proper functioning of sub-group/sub-loop control.
12. Check the operation of various controls in manual/auto mode for smooth functioning.
13. Clearing of all bad / invalid signals noticed during commissioning.
14. Providing necessary assistance for **Trial Operation** of the unit is in scope of this specification. Trial Operation shall be considered successful on completion of operation of the respective units for a continuous period of 720 hours at maximum available load.
15. Out of this period, 72 hours shall be at full rated load of the unit. Smooth operation and availability of all instrument/controls of the systems installed under the scope herein, shall be ensured by the contractor. Contractor shall provide adequate number of skilled manpower and T&P for this purpose.
16. Interruption in Trial Operation for reasons attributable to the Contractor shall result in re-start of the Trial Operation all over again, consequential extension in Time Schedule / Contract Period shall be to the contractor's account. If any small wiring correction or minor modification in control panel wiring is noticed

during the commissioning, it shall be carried out as a part of commissioning activity.

2.12 Post-commissioning

Contractor shall rectify the defect observed/informed by customer during the trial run. Contractor shall submit the as-built drawing as per guidelines and instruction of BHEL engineer. After trial run/handling over of the equipment, if due to unforeseen reasons, certain works crop up, the contractor shall provide all the assistance.

2.13 PG Test Assistance

For PG test assistance, laying of impulse pipes, cables, etc. and installation of instrument tapping points shall be done by the contractor. These activities may be carried out at any point of time before or after Completion of Facilities. Such temporary installations shall have to be dismantled and returned to BHEL Stores, after the completion of PG Test for which no separate payment is admissible.

Chapter - III: Facilities in the scope of Contractor/BHEL

3.0 FACILITIES IN THE SCOPE OF CONTRACTOR/BHEL

S.No.	Description	Scope /to be taken care by		Remarks
		BHEL	CONTRACTOR	
1.1.0	ESTABLISHMENT			
1.1.1	FOR CONSTRUCTION PURPOSE			
A.	Open space for office	YES		Limited space. Free of charge. As and where made available by M/s GVK
B.	Open space for storage	YES		Limited space. Free of charge. As and where made available by M/s GVK
1.1.2	FOR LABOUR COLONY			
A	Open space	YES		Limited space. Free of charge. As and where made available by M/s GVK
1.2.0	ELECTRICITY			
1.2.1.	Electricity for construction purposes (chargeable/free)			Chargeable PSEB tariff rates prevailing on the date

				of the award will be applicable. The applicable rates for Bulk Supply for HT consumers i.e. 409 paise/kWh of Energy Rate and Rs.192/kVA MMC charges will be applicable
1.2.1.1	Single point source	YES		
1.2.1.2	Further distribution for the work to be done which include supply of materials & execution		YES	
1.2.2	Electricity for the office, stores, canteen etc of the bidder which include:			
1.2.2.1	Distribution from single point including supply of materials & service		YES	
1.2.2.2	Supply, Installation & connection of material of energy meter including operation & maintenance		YES	
1.2.2.3	Duties & deposits including statutory clearances for above		YES	
1.2.2.4	Demobilization of the facilities after completion of works		YES	
1.2.2.5	Electricity for living accommodation of the bidder's Staff, engineers, supervisors etc. on the above lines		YES	
1.3.0	WATER SUPPLY			

1.3.1	FOR CONSTRUCTION & LABOUR COLONY:			
1.3.1.1	Making the water available at single point		YES	Contractor to make Borewell himself
1.3.1.2	Further distribution as per the requirement of work including supply of materials & execution		YES	
1.4.0	LIGHTING			
1.4.1	For construction work (supply of all materials) 1. At office storage area 2. At preassembly area 3. At construction site/area		YES	
1.4.2	For construction work (execution of lighting work/arrangements) 1. At office storage area 2. At preassembly area 3. At construction site/area		YES	
	Providing the necessary consumables like bulbs, Switches, etc during the course of construction		YES	
1.5.0	Communications facilities for site operations of the bidder			
	Telephone, fax , internet ,intranet, email etc.		YES	
1.6.0	COMPRESSED AIR SUPPLY			
1.6.1	Supply of compressor and all other equipments required for compressor & compressed air system including pipes, valves, storage system etc.		YES	
1.6.2	Installation of the above system and operation & maintenance of the same		YES	

1.6.3	Supply of all the consumables for the above system during the contract period.		YES	
	ERECTION FACILITIES			
2.1.1	Providing erection drawings for all the Equipments covered under this scope	YES		
2.1.2	Drawings for construction method	YES	YES	In consultation with BHEL
2.1.3	As-built-drawings-where ever deviations Observed & executed and also based on Decisions taken at site		YES	do
2.1.4	Shipping lists etc for reference & planning the activities	YES	YES	do
2.1.5	Preparation of site erection schedules and other input requirements		YES	do
2.1.6	Review of performance & revision of site erection schedules in order to achieve the end dates & commitments	YES	YES	do
2.1.7	Weekly erection schedule based on Sl. No.2.1.5		YES	do
2.1.8	Daily erection/work plan based on Sl. No.2.1.7		YES	do
2.1.9	Periodic visit of senior official of 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 month		YES	
2.1.10	Preparation of preassembly bay		YES	

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

3.2 The Contractor shall be responsible for providing all necessary facilities like residential accommodation, transport, electricity, water, medical facilities etc. at

his own cost as required under various labour laws and statutory rules and regulations framed there under to the personnel employed by him.

- 3.3** Provision of distribution lines of both electrical power and water from the central points to the required place with proper distribution boards observing the safety rules laid down by the electrical authorities of the state shall be done by the contractor, supplying all the materials like cables, distribution board, switch boards, TPN, CBS, ELCBS/ MCCBS/ Copper / Brass clamps, copper conductor, change over switches pipes etc. at his own cost. If any failure is caused in supply of the power and water, it is the responsibility of the contractor to make alternate arrangements at his cost. The contractor shall adjust his working shifts / hours accordingly and deploy additional manpower if necessary so as to achieve the targets. **The energy meter to be installed by the contractor & shall be tested and certified by State Electricity Board or any other agency approved by the GVK at his cost.**
- 3.4** The contractor while drawing construction power supply from Distribution Board should strictly adhere to following points.
- a) All electrical installations should be as per Indian Electricity rules.
 - b) All distribution Boards installed by the contractor should be constructed with fireproof materials viz. Steel frames, Bakelite sheets etc.
 - c) Connection for single phase should be taken from phase and neutral. Nowhere the connection should be taken with earth as neutral.
 - d) All electrical connections should be made through connectors, nuts and bolts, switches, plug and sockets. Loose connections or hooking up of wires shall not be permitted.
 - e) Contractor have to make their own earthing arrangement for their equipment / DB earthing.
 - f) All electrical equipment / tools and plants should be properly earthed. DBs to be earthed diagonally opposite at two points.
 - g) Contractor should use “MCCB” and “ELCB” either on incoming or outgoing connections to the DBs.
 - h) Contractor should ensure that all the CBs / TPNs/ Fuses/ MCCB / ELCB cables etc. should be of adequate rating/ capacity.
 - i) For permission of supply connections contractor has to submit a test report of their installations with a single line diagram of connected/ proposed loads.
- 3.5** ELCB will be tested once in a week or as directed by BHEL by actually simulating the earth leakage for all installations and the same shall be recorded in the logbook to be maintained by the contractor.
- 3.6** In case of power cuts / load shedding no compensation for idle labour or extension of time for completion of work will be given to contractor.
- 3.7** On completion of work or as and when required by BHEL, all the temporary buildings, structures, pipe lines, cables etc. shall be dismantled and levelled and debris shall be removed, as per instructions of BHEL, by the contractor at his cost. In the event of his failure to do so, the Engineer will get it done and

expenses incurred shall be recovered from the contractor along with prevailing overheads. The decision of BHEL Engineer in this regard shall be final.

- 3.8** Compressor required capacity for construction purposes shall be arranged by Contractor.
- 3.9** Contractor should install a PC ALONG WITH MODEM to connect with our server (LAN) AT SITE.

Chapter - IV: T&Ps and MMEs to be deployed by Contractor

4.0 T&P AND MMD DEPLOYED BY CONTRACTOR

S.NO.	EQUIPMENT	CAPACITY	QTY
1.	Welding Generators & Transformers, Rectifiers & TIG Welding sets		APR
2.	Chain pulley blocks	5/10 T	APR
3.	Trailer with Pulling Unit	10 / 20 MT	APR
4.	Hydra crane	12/14 MT	2 NOS
5.	Hydraulic Jack (Low Height)	25/50/100T	APR
6.	Screw Jacks	5/10/25/50T	APR
7.	Oil Filtration Machine	5 to 6 kl/ hr	01 no.
8.	Crimping tools up to all size of cables under scope of work		Adequate nos.
9.	Hydraulic crimping tool		1 No.
10.	Vacuum Cleaner (Industrial)		1 no
11.	Pipe bending machine		02 Nos
12.	Grinding Machine		02 Nos
13.	Drilling Machines		APR
14.	Electric Winches		APR
15.	Phase sequence indicator		1 No.
16.	Digital Multimeters 3½ digit of reputed make		10 Nos.
17.	Digital,4 1/2 digit Motwane/HIL/Fluke		4 nos.
18.	Analog multimeter		4 nos.
19.	250V/500 V / 1000V rated Hand operated megger Mains/battery operated		1 no. each
20.	HV Test Kit 0 to 60 KV		1 No.
21.	Insulation tester mains operated 2500/5000V		2 No.
22.	Tong Testers AC 5/10,25/60/300 ,Amp Range ,of reputed make		1 No. each
23.	Tong Testers DC 30/60/300 A		1 No.

24.	Stop watch		2 No.
25.	Tele talk 2 wire system		6 sets
26.	Torque wrench(12-60 Nm,50-225 Nm)		1 No. each
27.	Ferrule printing machine		1 no.
28.	Dead Weight Tester rated 400 Kg/cm ² with weights & test gauge facility		1 no.
28.	Oil temperature bath suitable to calibrate the instruments range 0-300 deg. C with standard temp. gauges & thermostatic control		2 nos.
29.	Standard gauges 12" dial size make		
30.	A) 0-1 kg/cm ² pressure gauge(vacuum gauge) B) 0 – 5 or 6 kg/cm ² pressure gauge C) 0 – 10 kg/cm ² – do – D) 0 – 25 kg/cm ² – do – E) 0 – 60 kg/cm ² – do – F) 0 – 100 kg/cm ² –do – G) 0 – 250 kg/cm ² – do – H) 0 – 600 kg/cm ² – do – I) 0.2 to 1 kg -- do --		1 no. 1 no. 1 no. 1 no. 1 no. 1 no. 1 no. 1 no. 1 no.
31.	Manometers (+/-) 1000 mm water column With hand bulb for lab and small manometers for field purpose.		2 nos.
32.	Manometer (+/-) 500mm mercury column with hand bulb for lab and small manometer for field purpose.		1 no.
33.	Inclined manometer (+/-) 300 mm water column		1 no.
34.	Portable air compressor with drier and regulator rated for 7 to 10 kg/cm ²		2 nos.
35.	Vacuum pump		1 no.
36.	Standard milliamps / millivolts source of reputed make. Range 0 to 50 ma and 0 to 100 mv		2 nos.
37.	DC power supply 0-50 VDC, 5 A make "Aplab" or equivalent (variable source)		2 nos.
38.	Single phase variac 250 V, 8 amp		1 no.
39.	3 phase variac rating 5 amps		1 no.
40.	Glass thermometer 0-120 deg. C, 0-200 deg.c and 0-600 deg.c		1 no. each
41.	Primary current injection kit		1 no.

42.	Secondary current injection kit up to 300 amp		1 no.
43.	DC shunt 400 amp 75 mv		1 no.
44.	Tachometer non-contact type 0 to 4000 rpm		1 no.
45.	Decade resistance box		2 sets
46.	Transformer oil testing kit		1 no.
47.	Relay testing kit		1 no.
48.	Kelvine double bridge (for low resistance measurement)		1 no.

***APR-As per requirement**

NOTES:

1. The above list specifies only major T&P/MMD (may not be complete) to be deployed by the contractor. All additional/ other tools and plants which are required for satisfactory & timely completion of work shall also be deployed by the contractor within finally accepted rate/ price..
2. If works gets delayed due to non-availability of T&P and MMD, BHEL reserves the right to get work done at the risk & cost of contractor without prejudice to right of BHEL as in GCC
3. Contractor must re-ascertain/ recheck range and accuracy of each IMTE from BHEL Engineer well in advance before arranging calibration/ deployment.
4. Other terms and conditions regarding above items shall be as per T&P clause in SCC

Chapter - V: T&P AND MMD DEPLOYED BY BHEL ON SHARING BASIS

5.0 T&P AND MMD DEPLOYED BY BHEL ON SHARING BASIS

LIST OF T&P and MMD being provided by BHEL for use of contractor free of hire charges on sharing basis.

S.NO.	EQUIPMENT	CAPACITY	QTY
T&Ps			
1.	EOT Crane (in T.G. hall)	85T / 25T	1 No.
2.	Suitable capacity crane		APR

NOTES:

- Any other special T&P if supplied by the manufacturer and available with the customer will also be provided to the contractor free of hire charges as and when made available. Special tools and tackles are to be used only for the purpose for which these are meant and to be returned in good condition.
- Other terms and conditions regarding above items shall be as per T&P clause in SCC

Chapter - VI: TIME SCHEDULE

6.0 TIME SCHEDULE

6.1 The contractor is required to commence the work within 15 days from the date of issue of LOI unless BHEL decides to fix any other later date. However, the actual date of start of work, to fix up the zero date of the contract, will be certified by BHEL Engineer after adequate mobilisation of manpower and T&Ps by the contractor.

6.2 Entire work as detailed in the tender specifications shall be completed within 14 months from the Zero date as per programme/ milestones indicated by BHEL Engineer. Contractor has to mobilise adequate resources to meet BHEL's commitments to their customer as indicated from time to time.

In case due to reasons not attributable to the contractor, the work gets delayed and additional manpower / resources have to be mobilized so as to expedite the work to meet various milestones, same shall be done within the quoted rates as per Rate Schedule, at no extra cost to BHEL. In the event the contractor fails to respond to these requirements, BHEL shall take appropriate actions to meet customer's commitments in line with the provisions of General Conditions of Contract.

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

MILE STONES	MONTHS
Erection Start	ZERO
Boiler Light up	05 months
Steam Blowing / TG Barring gear	07 months
Synchronization	08 months
Trial Operation	10 months

The milestones of unit-2 shall follow with a time lag of THREE months.

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

6.5 This project is a fast track project. Customer is making all out efforts to advance the project schedule. In case the project is to be advanced by customer, the erection work in the scope of the contractor is to be

advanced to meet the project requirement. No extra payment whatsoever shall be paid on this account.

- 6.6 The contractor has to ensure that work is completed in all respects leaving no pending points. However the punch list/ pending points, which are possible to be attended at site, shall be fully liquidated within two months from successful trial operation of the unit.
- 6.7 The work under the scope of this contract is deemed to be complete in all respects, only when the contractor has discharged all the responsibilities laid down in the contract. The decision of BHEL on completion date shall be final and binding on the contractor.

Chapter - VII: TERMS OF PAYMENT

7.0 TERMS OF PAYMENT

- 7.1 The 'Engineer' will certify regarding the actual work executed in the measurement books and bills, which shall be accepted by the contractor in measurement book.
- 7.2 Contractor shall submit bills for the work completed under the specification, once in a month detailing work done during the month. The format for billing shall be approved by BHEL before raising invoices.
- 7.3 Subject to any deduction, which BHEL may be authorised to make under the contract, the contractor on the certificate of the Engineer at site be entitled for payment as explained hereunder.

7.3.1 Interest bearing recoverable advance: Applicable as per Clause No. 2.13 of GCC.

7.3.2. PROGRESSIVE PAYMENT ON PRORATA BASIS

I. 85 % of contract value payable on fulfillment of following conditions:

(A) For Equipment / items such as Panels, Cable Trays, cable, JB, impulse pipe, tubing etc. where no calibration is required

- (i) 50% of item rate shall be payable on erection \ installation /cable laying
- (ii) 20% of item rate on final alignment, welding, clamping, termination etc.
- (iii) 10% of item rate on testing, pre-commissioning, charging etc.
- (iv) 5 % of item rate on pending point clearance

(B) For equipment/items where calibration and testing is required.

- i) 20% of item rate on calibration and testing
- ii) 30% of item rate on erection, installation alignment and termination wherever involved.
- iii) 15% of item rate on individual device loop checking/hydro test/ charging of installation and panels.
- iv) 15% of item rate on system loop checks, pre-commissioning checks by simulation/ field calibration or with actual system operation.
- v) 5% of item rate on pending points clearance.

(C) For equipment/items such as GT,UAT, ST Transformers, IP Bus Ducts & its accessories etc.

- i) 20% of item rate shall be payable on placements
- ii) 40% of item rate shall be payable on erection/installation
- iii) 15% of item rate on final alignment, oil centrifuging, welding, clamping, termination etc.
- iv) 5% of item rate on testing, pre-commissioning, charging etc.
- v) 5% of item rate on pending points clearance.

E. STAGE/MILESTONE PAYMENTS (15% of Contract value)

1.	Boiler Light up	2X0.5%
2.	Barring Gear (TG)	2X0.5%
3.	Rolling and Synchronisation	2X1.5%
4.	Full Load	2X1%
5.	Trial Operation of Unit	2X1%
6.	Painting (including arrow marking, nomenclature, etc	2X1%
7.	Area cleaning, temporary structures cutting/removal and return of scrap	2X0.5%
8.	Punch List points/pending points liquidation	2X0.5%
9.	Material Reconciliation	2X0.5%
10.	Completion of Contractual Obligations	2X0.5%

Note:

1. 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.
2. Retention amount shall be @5% from each running bill admitted including PVC bills & Payment of retention amount and final bill shall be as per clause No. 2.22 and 2.23.2 of GCC.

Chapter - VIII: TAXES, DUTIES, LEVIES

8.0 TAXES, DUTIES, LEVIES

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

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

8.1 Service Tax & Cess on Service Tax

Service Tax and Cess on Service Tax as applicable on output Services are excluded from contractor's scope; therefore contractor's price/rates shall be exclusive of Service Tax and Cess on Output Services.

Contractor shall obtain prior written consent of BHEL before billing the amount towards such taxes. The Service Tax Rules permit more than one option or methodology for discharging the liability of tax/levy/duty and BHEL will have the right to adopt the appropriate one considering the amount of tax liability on BHEL/Client as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the

Contractor for discharging the obligation of BHEL in respect of the tax liability to the Contractor. Contractor shall submit to BHEL documentary evidence of Service Tax registration certificate specifying name of services covered under this contract. For the purpose of claiming any Service Tax from BHEL, the following procedure shall be adopted :

Contractor shall submit serially numbered Service Tax and Cess Invoices, signed by him or a person authorized by him in respect of taxable service provided, and shall contain the following, namely:

1. The name, address and registration number of the contractor
2. The name and address of the party receiving taxable service (BHEL)
3. Description, classification and value of taxable service provided and
4. The Service Tax payable thereon.

All the four conditions shall be fulfilled in the invoice for payment of Service Tax by BHEL.

Where more than one nature of Service under Service Tax Rules is involved, the invoice mentioned above shall contain the break up of all values for each nature of Service.

8.2 VAT (Sales Tax /WCT)

The rates quoted by the Contractor shall be inclusive of VAT/Sales Tax and BHEL shall not reimburse any amount on this account due to any reason whatsoever.

The Contractor shall register himself with the respective Sales Tax authorities of the state and submit proof of such registration to BHEL along with the first RA bill.

Deduction of tax at source shall be made as per the provisions of law unless otherwise found exempted.

In case tax is deducted at source as per the provisions of law, this is to be construed as an advance tax paid by the contractor and no reimbursement thereof will be made unless specifically agreed to.

Contractor has to make his own arrangement at his cost for completing the formalities, if required, with Sales Tax/VAT Authorities, for bringing all their material, plant and equipment etc at site for the execution of the work, including arrangement of Road Permits if and as applicable under the relevant VAT Act.

8.2.1 Modalities of Tax Incidence on BHEL

Wherever the relevant tax laws permit more than one option or methodology for discharging the liability of tax/levy/duty, BHEL will have the right to adopt the appropriate one considering the amount of tax liability on BHEL/Client as well as procedural simplicity with

regard to assessment of the liability. The option chosen by BHEL shall be binding on the Contractor for discharging the obligation of BHEL in respect of the tax liability to the contractor.

8.2.2 New Taxes/Levies

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

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

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

Chapter - IX: Others

9.0 OTHERS

9.1 For reverse auction/ for Price Bid opening, only those bidders will be considered who will be qualified for the subject job on the basis of pre-qualification evaluation/ Techno-commercial bids. BHEL reserves the right to reject the bidders with unsatisfactory past performance in the execution of a contract. BHEL's decision in this regard shall be final & binding.

9.2 Clause no. 2.17.3 of GCC on Price Variation Compensation may be read as below;

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

SL NO.	CATEGORY	BASE INDEX	COMPONENT ('K)				
			CIVIL PACKAGES (See Note A/B/C)			MECHANICAL PACKAGES	LABOUR ORIENTED PACKAGES (See Note D)
			A	B**	C		
i)	LABOUR (ALL CATEGORIES)	'MONTHLY ALL-INDIA AVERAGE CONSUMER PRICE INDEX NUMBERS FOR INDUSTRIAL WORKERS' published by Labour Bureau, Ministry of Labour and Employment, Government of India. (Website: labourbureau.nic.in)	40	25	30	65	80
ii)	HIGH SPEED DIESEL OIL	Name of Commodity : HIGH SPEED DIESEL. Type : INDIVIDUAL COMMODITY (See Note F)	5	3	5	5	5
iii)	ELECTRODE	Name of Commodity : WELDING RODS Type: INDIVIDUAL COMMODITY (See Note F)				15	
iv)	CEMENT	Name of Commodity : GREY CEMENT Type: INDIVIDUAL COMMODITY (See Note F)		20	30		
v)	STRUCTURAL AND REINFORCEMENT STEEL	Name of Commodity : a1. IRON & SEMIS Type: GROUP ITEM (See Note F)		25			
vi)	MATERIALS (Other than Cement & Steel)	Name of Commodity: ALL COMMODITIES Type: GROUP ITEM (See Note F)	40	12	20		

Note: A) Cement & Steel : Free Issue (BHEL Scope)

B) Cement & Steel : In Contractor Scope (**: unless otherwise specified in Special Conditions of Contract (SCC))

C) Cement in Contractor Scope, and Steel is Free Issue (BHEL Scope)

D) Predominantly 'Labour Oriented' packages include Material Handling & Management, Insulation, Painting, Electrical and CI or a combination thereof, which are separately tendered and awarded

E) For Composite packages (i.e. Civil+Mechanical+Electrical/CI or Civil+Mechanical or Mechanical+Electrical/CI), the components for various categories shall be as per respective packages

F) As per the 'MONTHLY WHOLE SALE PRICE INDEX' for the respective Commodity and Type, published by Office of Economic Adviser, Ministry of Commerce and Industry, Government of India. (Website : www.eaindustry.nic.in)

Chapter - X: BOQ

SL	ITEM DESCRIPTION	UNIT	QTY	RATE	AMT
	HT/LT TRANSFORMERS:				
1	Transportation up to foundation, Assembly, testing & commissioning of Three Phase, 16.5/235kV,315MVA,OFAF,GENERATOR TRANSFORMER Core & winding 153 MT Tank & fittings 64 MT Shipping Weight 176 MT Total Weight 268 MT Overall dimensions 16300x8300x7750mm Oil Qty. 58600 ltr.	NO.	2		
2	Transportation up to foundation, Assembly, testing & commissioning of Three Phase ,220kV/6.9kV, 28/35 MVA, ONAF, STATION SERVICE TRANSFORMER Core & winding 35 MT Tank & fittings 15 MT Shipping Weight(N ₂ filled) 50 MT Total Weight 80MT Overall dimensions 10400X6500X7400 mm Oil Qty. 28000 ltr.	NO.	2		
3	Transportation up to foundation, Assembly, testing & commissioning of Three Phase ,16.5/6.9kV, 20/25 MVA, ONAF, UNIT TRANSFORMER Core & winding 24 MT Tank & fittings 15 MT Shipping Weight(N ₂ filled) 31 MT Total Weight 70 MT Overall dimensions 9100x5100x6600 Oil Qty. 25500 ltr.	NO.	2		

	ISOLATED PHASE BUS DUCT				
4	<p>Transportation from stores / storage yard to erection site, assembly, erection, welding, testing & commissioning of Isolated Phase Bus Duct (12500A) for interconnection of Generator & Generator Transformers, tap-off to unit transformers, LAVT, NG cubicles ,CT transformers along with all accessories & auxiliaries</p> <p>Main Run Enclosure Size:1070x8 mm Conductor size: OD 530 mm, Thk. 16 mm Phase to phase distance:1300mm Approx. length per unit 245 Mtr.</p> <p>Tap-off Enclosure Size:780x4.78 mm Conductor size: OD 152.4 mm, Thk. 8.1 mm Phase to phase distance:1000mm Approx. length per unit 45 Mtr.</p>	SET.	02		
	PANELS/RACKS/CONSOLES				
5	DCS Panel for SG,TG,STATION CNI 750X800X2415 mm	No.	212		
6	Generator ,GT,UAT Protection Panel 1000x1000x2230 mm	No.	08		
7	Generator Control Panel 2500X1000x2415 mm	No.	02		
8	Generator instrumentation Cabinet 1000X800X2200 mm	No.	02		
9	SOOT BLOWER MCC 9700x2450x1000 mm	No.	02		
10	Gas Analyser cabinet 1200x800x2110 mm	No.	02		
11	DAVR Panel 1200X1200X2315 mm	No.	02		
12	VMS PANEL 800X800X2415 mm	No.	06		
13	VMS Local Cabinet 400x300x300 mm	No.	22		

14	EWLI LOCAL PANEL 600x600x350 mm	No.	04		
15	EWLI REMOTE DISPLAY UNIT 99x194x81 mm	No.	08		
16	ELEVATOR CONTROL PANEL	No.	02		
17	ERV CONTROLLER BOX 400x350x270 mm	No.	02		
18	FTP LOCAL STARTER 650x1000x300 mm	No.	04		
19	DC SCANNER AIR FAN STARTER 900x1120x375 mm	No.	02		
20	UPS PANEL 6580X900X2230 mm	No.	06		
21	ACDB 2280X895X2115 mm	No.	04		
22	HART MANAGEMENT SYSTEM PANEL 1200X800X2415 mm	No.	02		
23	UNIT CONTROL PANEL 1000x800x2415 mm	No.	02		
24	GRAVIMETRIC FEEDER REMOTE PANEL 1200X600X2315 mm	No.	10		
25	GRAVIMETRIC FEEDER INTEGRAL PANEL 1200X600X2315 mm	No.	10		
26	GPS RECEIVER 900X600X2415 mm	No.	02		
27	STRP 1000x800x2295 mm	No.	06		
28	NETWORK PANEL 800x800x2415 mm	No.	08		
29	HART MANAGEMENT STATION 1505X760X735 mm	No.	02		
30	SWAS Sample handling system with racks & Sample conditioning panel with chiller	Set	02		
31	Starter cabinet for DC Jacking Oil Motor, Emergency Lube Oil Motor, DC seal oil Motor 1000X800X2200 mm	No.	06		
32	Max engineer/max storian/max operator/max link stations/station supervisor/shift in charge terminal/LVS PC/TSC PC/22" TFT monitor	Nos.	38		

33	PRINTERS(A4 & A3 COLOUR LASER JET, INKJET, DOT MATRIX) WITH PRINTER TABLE and accessories	No.	10		
34	LARGE VIDEO SCREEN(67") ,resolution 1400x1050 pixels	No.	02		
35	Ethernet switches	Set	02		
36	Control Desk	No.	02		
37	Computer furniture for all Servers, PCs, Printers	Set	02		
	INSTALLATION,CALIBRATION & COMMISSIONING OF LOCAL/FIELD INSTRUMENTATION/EQUIPMENT				
38	Flow meters/Flow transmitters	No.	50		
39	Temperature gauges/Pressure gauges/ Diff. Pressure gauge	No.	506		
40	Temp. Transmitter /Pressure Transmitters / Differential pressure/position transmitters	No.	184		
41	Level Transmitter/Level gauge	No.	22		
42	Temp. switches/Pressure switches /DP switches	No.	144		
43	Level switch/Level switch(Conductivity type)/ Level switch(Float type) / Level Instruments	No.	06		
44	Electronic/Guided Wave Radar type level Transmitters	No.	44		
45	Limit switches	No.	12		
46	EWLI /DWLG for drum	No.	08		
47	Flame scanner head assy.	No.	32		
48	Flue gas Analyser Sample Handling System	Set	02		
49	ANALYSER(pH/Dissolved /oxygen/silica/sodium/Hydrazine/conductivity/phosphate)	Nos.	42		
50	Oxygen Analyser	Set	10		
51	Thermocouples/RTD's	No.	1034		
52	Thermocouple assy with 6 / 9 Cr-Al MI T/C along with integral JB	No.	04		
53	MTM Thermo Couple (Simplex/duplex)	No.	40		
54	Burner Tilt shear pin failure indication box	No.	08		
55	Furnace temp. Probe	No.	04		
56	HEA exciter system	No.	24		
57	Air Filter Regulators	No.	100		
58	I/P Converters	No.	130		
59	Vibration Transducers/Monitor/ Detectors	No.	78		

60	Solenoid Valves	No.	150		
61	Speed Regulators / Air lock valves in oil gun corner rack	Nos	24		
62	Opacity monitor	Set	02		
63	Coal bunker level Monitoring strain gauge	Sets	02		
64	Recorder 24 / 30 Channel	No.	4		
65	Recorder 3 channel	No.	6		
66	Speed switch / Speed detector	No.	6		
67	Pneumatic Pressure controller with accessories	No	2		
68	Pneumatic Temperature controller with accessories	No	10		
69	Master Slave Clock System	SET	01		
	CONTROL/SIGNAL/SCREENED/POWER CABLES LAYING,DRESSING,CLAMPING & TERMINATION	UNIT	QTY		
70	2P X 0.5 SQ MM	Mtr	19000		
71	2P X 1.5 SQ MM	Mtr	23800		
72	4P X 0.5 SQ MM	Mtr	70500		
73	8P X 0.5 SQ MM	Mtr	35250		
74	12 P X 0.5 SQ MM	Mtr	13600		
75	2C X 2.5 SQ MM	Mtr	8000		
76	3C X 2.5 SQ MM	Mtr	87000		
77	3C X 6 SQ MM	Mtr	2000		
78	5C X 2.5 SQ MM	Mtr	28000		
79	7C X 2.5 SQ MM	Mtr	6400		
80	10C X 2.5 SQ MM	Mtr	1000		
81	16C X 2.5 SQ MM	Mtr	6000		
82	19C X 1.5 SQ MM	Mtr	4000		
83	19C X 2.5 SQ MM	Mtr	3000		
84	T/C ext. cable	Mtr	16000		
85	Flame scanner cables	Mtr	4000		
86	UTP E-CAT cable	Mtr	2000		
87	Fibre optic cable	Mtr	2000		
88	Compensating cable	Mtr	500		
	EARTHING MATERIAL				
89	75 x 10 mm GI earthing flat	Mtr	1000		
90	50 x 6 mm GI earthing flat	Mtr	1000		
91	35 X 6 mm GI earthing flat	Mtr	500		

92	3.15 mm GI earthing wire	Mtr	5000		
	CABLE TRAY & Accessories(including supports fabrication/erection)				
93	Ladder/ Perforated type Cable tray, W=50mm	MTRS	1785		
94	Ladder/ Perforated type Cable tray, W=100mm	MTRS	2000		
95	Ladder/ Perforated type Cable tray, W=150mm	MTRS	525		
96	Ladder/ Perforated type Cable tray, W=300mm	MTRS	70		
	INSTALLATION & FABRICATION OF STRUCTURAL STEEL				
97	ANGLE ,ISMC,PLATES etc	MT	20		
	IMPULSE PIPES/ TUBES ALONG WITH FITTINGS				
98	Copper Tube-6mm/8mm	MTRS	1500		
99	6mm SS Tube	MTRS	500		
100	1/2",3/4" CS impulse pipe	MTRS	2000		
101	1/2",3/4" AS impulse pipe	MTRS	1500		
102	1/2",3/4" SS impulse pipe	MTRS	500		
103	GI pilica conduit with fittings(up to 1" size)	MTRS	50		
104	GI pilica conduit with fittings(above 1" size)	MTRS	50		
105	GI Rigid conduit up to 1"	MTRS	50		
106	GI pipe 15 NB	MTRS	500		
107	Flexible conduiting /Rubber hoses/pipes	MTRS	500		
	JUNCTION BOXES/INDICATION BOXES/LOCAL CONTROL STATIONS				
108	JB up to 12 ways	No.	50		
109	JB 24 way 340x280x145	No.	80		
110	JB 48 way 480x280x145	No.	60		
111	FSSS oil gun maintenance switch box	No.	24		
	COMMISSIONING/CALIBRATION/TESTING of control valves, on/off valves, electrical/pneumatic valves, actuators, solenoid valves, power cylinders etc.				
112	Commissioning of Open/close type Electrical actuators	No.	47		
113	Commissioning of Pneumatic actuators/drives	No.	107		
114	Commissioning of Control Valves	No.	42		

115	Commissioning of motorised actuators	No.	10		
116	Commissioning of Power cylinders	No.	50		

GENERAL TERMS AND CONDITIONS OF REVERSE AUCTION (RA)

Against this enquiry for the subject item / system with detailed scope of supply as per our tender specification, BHEL-PSNR, NOIDA may resort to “REVERSE AUCTION PROCEDURE” i.e. **ONLINE BIDDING on INTERNET.**

1. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
2. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on Internet.
3. In case BHEL decides to conduct reverse auction, BHEL’s service provider shall contact the vendor directly and impart them the training.
4. Business rules like event date, time, start price, bid decrement, extensions, etc. also will be communicated through service provider for compliance.
5. Vendors have to fax the compliance form in the prescribed (provided by service provider) before start of Reverse auction. Without this the vendor will not be eligible to participate in the event.
6. **Total Price quoted shall be inclusive of all taxes except service tax in line with the NIT conditions for the subject work in Indian Rupees (INR), which is to be worked out as per the BOQ (Rate Schedule) given in tender enquiry and subsequent changes made, if any. EXCEL Sheet shall be provided, if applicable.**
7. Reverse auction will be conducted on schedule date & time.
8. At the end of reverse auction event, the lowest bidder value will be known on the network.
9. The lowest bidder has to fax the duly signed filled-in prescribed format as provided on case-to-case basis to BHEL through service provider after completion of event on the same day preferably. BHEL shall reserve the right for award of work to the lowest bidder.
10. Any variation between the on-line bid value and signed document especially if the online opening bid price is found more than the price in submitted sealed bid, it will be considered as sabotaging the tender process and may invite disqualification of vender to conduct business with BHEL as per prevailing procedure.
11. In case BHEL decides not to go for Reverse auction procedure for this tender enquiry, the price bids and price impacts, if any already submitted and available with BHEL shall be opened as per BHEL standard practice.

ANNEXURE – B

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

1	NAME & DESIGNATION OF OFFICIAL	
2	POSTAL ADDRESS (COMPLETE)	
3	TELEPHONE NOS. (LAND LINE & MOBILE B	
4	FAX NO.	
5	E-MAIL ADDRESS	
6	NAME OF PLACE/ STATE/ COUNTRY, WHEREFROM S/HE WILL PARTICIPATE IN REVERSE AUCTION	