TENDER SPECIFICATION YTPS: SCT: 202209-124

"Erection, Testing & Commissioning including Handling of materials at site BHEL stores/storage yard, transporting to site of erection and supply & application of final painting of Control and Instrumentation (C&I) works for Unit 1 & 2 of 5x800 MW Yadadri Thermal Power Plant at Veerlapalem Village, Damercherla Mandal, Nalgonda DT., TSGENCO, Telangana, India".

VOLUME - I



BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking) Power Sector – Southern Region

BHEL Site Office 5x800MW Yadadri TPS Damarcherla (M), Nalgonda (D) PIN – 508355 Telangana 2022

Volume-I: NOTICE INVITING TENDER

Bharat Heavy Electricals Limited



Tender Specification No. - YTPS: SCT: 202209-124

Ref: YTPS: SCT: 202209-124 Date: 16.09.2022

NOTICE INVITING TENDER (NIT)

To,

All Bidders

Dear Sir/Madam

Sub: NOTICE INVITING TENDER

Sealed offers in two-part bid system {National competitive bidding (NCB)} are invited from reputed & experienced bidders (meeting PRE QUALIFICATION CRITERIA as mentioned in Annexure-1) 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	YTPS: SCT: 202209-124					
ii	BROAD SCOPE OF JOB	Erection, Testing & Commissioning including Handling of materials at site BHEL stores/storage yard, transporting to site of erection and supply & application of final painting of Control and Instrumentation (C&I) works for Unit 1 & 2 of 5x800 MW Yadadri Thermal Power Plant at Veerlapalem Village, Damercherla Mandal, Nalgonda DT., TSGENCO, Telangana, India.					
iii	DETAILS OF TENDER	DOCUMENT					
а	Volume-IA	Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Procedures, Terms of payment, etc.	Applicable				
b	Volume-IB	Special Conditions of Contract (SCC) Electrical AND C&I works (30.03.2022, Rev 00)	Applicable				
С	Volume-IC	General Conditions of Contract (GCC) PS:MSX:GCC, Rev-2 ammendment 5 dated: 17.05.2022	Applicable				
d	Volume-ID	Forms and Procedures - F&P-SR Dt:18.05.2022 HSE for site operations by Sub contractors	Applicable				
е	Volume-II	Price Schedule (Absolute value). (Reverse Auction is not applicable for this tender)	Applicable				
iv	ISSUE OF TENDER DOCUMENTS	Tender documents will be available for downloading from BHEL website (www.bhel.com) as per schedule below:	Applicable				

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Registered Office: BHEL House, Siri Fort, New Delhi - 110 049, India

Website: www.bhel.com

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Tender Specification No. - YTPS: SCT: 202209-124

		Start – 16/09/2022, Time – 17:00 Hrs Closes - 30/09/2022, Time - 14:30 Hrs	
		Brief information of the tenders shall also be available at central public procurement portal. (https://eprocure.gov.in/epublish/app)	
v	DUE DATE & TIME	Date - 30/09/2022, Time - 15:00Hrs	Applicable
	OF OFFER SUBMISSION	Bid shall be submitted (By Post or Person) in the Tender Box available at following Address:	
		Finance Department – BHEL 5x800 MW Yadadri TPS Damarcherla (M), Nalgonda (D) – 508355 (Telangana)	
		or through E-mail at tender.yadadri@bhel.in	
vi	OPENING OF	Date - 30/09/2022, Time - 17:00Hrs	Applicable
	TENDER	Notes: 1. In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day.	
		2. Bidder may depute representative to witness the opening of tender.	
vii	EMD AMOUNT	Rs. 13,00,000/- (Rupees Thirteen Lakhs Only)	Applicable
viii	COST OF TENDER	Free	Not Applicable
ix	LAST DATE FOR	Date -26 /09/2022, Time - 17:00 Hrs	Applicable
	SEEKING CLARIFICATION	Clarification requirement will be sent to the officer inviting tender.	
x	SCHEDULE OF Pre Bid Discussion (PBD)	Date//2022, Time: Hrs onwards	Not Applicable
хi	INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)		Applicable
xii	Latest updates	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc. to Tender Specifications will be hosted in BHEL webpage (www.bhel.com → Tender Notifications → View Corrigendums) & Central Public Procurement portal (https://eprocure.gov.in/epublish/app). Bidders to keep themselves updated with all such information.	Applicable

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

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subsequent correspondences shall be submitted by them, duly signed & stamped, as part of offer. Rates/Price including discounts/rebates, if any, mentioned anywhere/in any form in the techno-commercial offer other than the Price Bid shall not be entertained.

3.0 Not used.

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

For Electronic Fund Transfer the details are as below-:

a) Name of the Beneficiary -: Bharat Heavy Electricals Limited

b) Bank Particulars

- Bank Name -: State Bank of India
- Bank Telephone No. (with STD code)-:
- Branch Address-: Damarcherla (M), Nalgonda (D)
- ➤ Bank Fax No. (with STD code) -:
- ➤ Branch Code -: 21956
- 9 Digit MICR Code of the Bank Branch -:
- Bank Account Number -: 31071530332
- Bank Account Type -: Current Account
- ➤ 11 Digit IFSC Code of Beneficiary Branch -: SBIN0021956

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

5.0 **Procedure for Submission of Tenders:** The bidder should respond by submitting their offer through E-mail at *tender.yadadri@bhel.in*. Offers are invited in two-parts only.

Documents Comprising in the Tender:

The tender shall be submitted through E-mail having attachment less than 20MB (In case, attachment is more than 20MB, 2 or 3 or so on mail may be submitted and should be indicated as 1 of 2, 2 of 2 or 1 of 3, 2 of 3, 3 of 3, etc.) EXCEPT EMD (in physical form) as mentioned below:

I. Technical Tender (UN priced Tender):

All Technical details (e.g. Eligibility Criteria requested (as mentioned below)) should be attached in E-mail. Bidders shall furnish the following information along with technical tender (preferably in pdf format):

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

II. Price Bid:

- (a) Prices are to be quoted in the attached Price Bid format (password protected) through E-mail. The password of the submitted Price Bid shall be asked from Bidder through E-mail for opening of the Price Bid.
- (b) The price should be quoted for the accounting unit indicated in the tender document.
- (c) **Note:** It is the responsibility of tenderer to go through the Tender document to ensure furnishing all required documents in addition to above, if any. Any deviation would result in REJECTION of tender and would not be considered at a later stage at any cost by BHEL.

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- (d) A person signing (digitally or manually) the tender form or any documents forming part of the contract on behalf of another shall be deemed to warrantee that he has authority to bind such other persons and if, on enquiry, it appears that the persons so signing had no authority to do so, the purchaser may, without prejudice to other civil and criminal remedies, cancel the contract and hold the signatory liable for all cost and damages.
- (e) A tender, which does not fulfil any of the above requirements and/or gives evasive information/reply against any such requirement, shall be liable to be ignored and rejected.

Bidders are requested to submit their completed bid as per laydown procedure either as per Sl. No. 5 or Sl. No. 6.

- 6.0 **Procedure for Submission of Tenders (To be used in case of Paper bid):** Tender to be submitted to Officer inviting Tender, as detailed below:
 - PART-I consisting of 'PART-I A (Techno Commercial Bid)' & 'PART-I B (EMD)' in two separate sealed and super-scribed envelopes (ENVELOPE-I & ENVELOPE-II)
 - PART-II (Price Bid) in sealed and super-scribed envelope (ENVELOPE-III)
 - One set of tender documents shall be retained by the bidder for their reference
 - The contents for ENVELOPES and the superscription for each sealed cover/Envelope are as given below. (All pages to be signed and stamped) (To be used in case of Paper bid):

SI. No.	Description	Remarks
	Part-I	
	ENVELOPE – I super-scribed as: PART-I (TECHNO COMMERCIAL BID) TENDER NO: NAME OF WORK: PROJECT: DUE DATE OF SUBMISSION:	
i.	CONTAINING THE FOLLOWING:-	
ii.	Covering letter/Offer forwarding letter of Tenderer. 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.	

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iv.	All Amendments/Correspondences/Corrigenda/Clarifications/Changes/ Errata etc. pertinent to this NIT.	
٧.	Integrity Pact Agreement (Duly signed by the authorized signatory)	
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)	
Χ.	Volume – I C: General Conditions of Contract (GCC)-Modified	
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 super-scribed as:	
PART-I (EMD)	
TENDER NO:	
NAME OF WORK:	
PROJECT:	
DUE DATE OF SUBMISSION:	
CONTAINING THE FOLLOWING:-	
Earnest Money Deposit (EMD) in the form as indicated in this Tender	

	PART-II					
	PRICE BID consisting of the following shall be enclosed					
	ENVELOPE-III super-scribed 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:	

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	CONTAINING THE FOLLOWING:	
i	 Envelopes I 	
	o Envelopes II	
	o Envelopes III	

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

- 7.0 Deviation with respect to tender clauses and additional clauses/suggestions in Techno-commercial bid / Price bid shall NOT be considered by BHEL. Bidders are requested to positively comply with the same.
- 8.0 BHEL reserves the right to accept or reject any or all Offers without assigning any reasons thereof. BHEL also reserves the right to cancel the Tender wholly or partly without assigning any reason thereof. Also BHEL shall not entertain any correspondence from bidders in this matter (except for the refund of EMD).
- 9.0 Assessment of Capacity of Bidders:
 - A. Bidder's capacity for executing the job under tender shall be assessed 'LOAD' wise and 'PERFORMANCE' wise as per the following:
 - I. <u>LOAD</u>: Load takes into consideration ALL the contracts of the Bidder under execution with BHEL Regions, irrespective of whether they are similar to the tendered scope or not. The cut off month for reckoning 'Load' shall be the 3rd Month preceding the month corresponding to the 'latest date of bid submission', in the following manner -

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

Total number of Packages in hand = Load (P)

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

- II. PERFORMANCE: Here 'Monthly Performance' of the bidder for all the packages (under execution/ executed during the 'Period of Assessment' in all Power Sector Regions of BHEL) <u>SIMILAR</u> to the packages covered under the tendered scope, excepting packages not commenced shall be taken into consideration. The 'Period of Assessment' shall be 6 months preceding and including the cut off month. The cut off month for reckoning 'Period of Assessment' shall be the 3rd Month preceding the month corresponding to 'latest date of bid submission', in the following manner:
 - (<u>Note</u>: For example, if 'latest date of bid submission' is in Jan 2017, then the 'performance' shall be assessed for a 6 months' period up to and inclusive of Oct 2016 (i.e. from May 2016 to Oct 2016), for all the unit wise identified packages (refer Table I))
 - i). <u>Calculation of Overall 'Performance Rating' for 'Similar Package/Packages' for the tendered scope under execution at Power Sector Regions for the 'Period of Assessment'</u>:

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

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

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- b) Number of Months 'T₁' for which 'Monthly Performance Evaluation' as per relevant formats, should have been done in the 'Period of Assessment' for the corresponding similar package P₁. Similarly T₂ for package P₂, T₃ for package P₃, etc. for the tendered scope. Now calculate cumulative total months 'T_T' for total similar Packages '**P**_T' for all Regions (i.e. **T**_T = T₁ + T₂ + T₃ + T₄ + ...T_N)
- c) Sum 'S₁ 'of 'Monthly Performance Evaluation' Scores (S₁₋₁, S₁₋₂, S₁₋₃, S₁₋₄, S₁₋₅.... S_{1-T1}) for similar package P₁, for the 'period of assessment' 'T₁' (i.e. S₁ = S₁₋₁+ S₁₋₂+ S₁₋₃+ S₁₋₄+ S₁₋₅+...S_{1-T1}). Similarly, S₂ for package P₂ for period T₂, S₃ for package P₃ for period T₃ etc. for the tendered scope for all Regions. Now calculate cumulative sum 'S_T' of 'Monthly Performance Evaluation' Scores for total similar Packages 'P_T' for all Regions (i.e. 'S_T'= S₁+ S₂+ S₃+ S₄+ S₅+.... S_N)
- d) Overall Performance Rating 'R_{BHEL}' for the Similar Package/Packages (under execution/ executed during the 'Period of Assessment') in all the Power Sector Regions of BHEL

Aggregate of Performance scores for all similar packages in all the Regions
-----Aggregate of months for each of the similar packages for which performance should have been evaluated in all the Regions
S_T

- = -----T_T
- e) Bidders to note that the risk of non-evaluation or non-availability of the 'Monthly Performance Evaluation' reports as per relevant formats is to be borne by the Bidder.
- f) Table showing methodology for calculating 'a', 'b' and 'c' above

SI. No.	Item Description		I	Details	for all F	Regions	i		Total
(i) 1	(ii) Similar Packages for all Regions → (under execution/ executed during period of assessment)	(iii) P ₁	(iv) P ₂	(v) P ₃	(vi) P ₄	(vii) P ₅	(viii) 	(ix) P _N	
2	Number of Months for which 'Monthly Performance Evaluation' as per relevant formats should have been done in the 'period of assessment' for corresponding Similar Packages (as in row 1)	T ₁	T ₂	T ₃	T ₄	T ₅		T _N	Sum (Σ) of columns (iii) to (ix) $= T_T$
3	Monthly performance scores for the corresponding period (as in Row 2)	S ₁₋₁ , S ₁₋₂ , S ₁₋₃ , S ₁₋₄ , S _{1-T1}	S ₂₋₁ , S ₂₋₂ , S ₂₋₃ , S ₂₋₄ , S _{2-T2}	S ₃₋₁ , S ₃₋₂ , S ₃₋₃ , S ₃₋₄ , S _{3-T3}	S ₄₋₁ , S ₄₋₂ , S ₄₋₃ , S ₄₋₄ , S _{4-T4}	S ₅₋₁ , S ₅₋₂ , S ₅₋₃ , S ₅₋₄ , S _{5-T5}		S _{N-1} , S _{N-2} , S _{N-3} , S _{N-4} , S _{N-TN}	

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SI. No.	Item Description		I	Details ¹	for all F	Regions			Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
4	Sum of Monthly Performance scores of the corresponding Package for the corresponding period (as in row-3)	S ₁	S ₂	S ₃	S ₄	S ₅		S _N	Sum (Σ) of columns (iii) to (ix) = \mathbf{S}_T

ii). <u>Calculation of Overall 'Performance Rating'</u> (**R**_{BHEL}) in case at least 6 evaluation scores for 'similar Package/Packages' for the tendered scope ARE NOT AVAILABLE, during the 'Period of Assessment':

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

- a) 'Period of Assessment' i.e. 6 months preceding and including the cut-off month
- b) 12 months preceding and including the cut-off month
- c) 24 months preceding and including the cut-off month

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

iii). Factor "L" assigned based on Overall Performance Rating (RBHEL) at Power Sector Regions:

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

III. 'Assessment of Capacity of Bidder':

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

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

- i). In case the value of P_{Max} results in a fraction, the value of P_{Max} is to be rounded off to next whole number
- ii). For $R_{BHEL} = 60$, $P_{Max} = 1$
- iii). For $R_{BHEL} \ge 80$, there will be no upper limit on P_{Max}

The Bidder shall be considered 'Qualified' as per 'Assessment of Capacity of Bidder' for the subject Tender if $P \le P_{Max}$

(Where P is calculated as per clause 'I' above)

IV. Explanatory note:

i). Similar package means Boiler or ESP or Piping or Turbine or Civil or Structure or Electrical or C&I etc. at the individual level irrespective of rating of Plant and irrespective of whether the subject tender is a single package or as part of combined/composite packages. Normally Boiler, ESP, Piping, Turbine, Electrical, C&I,

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Civil, Structure etc. is considered individual level of package. For example, in case the tendered scope is a Boiler Vertical Package comprising of Boiler, ESP and Power Cycle Piping (i.e. the 'identified packages as per Table-1 below), the 'PERFORMANCE' part against sl.no. II above, needs to be evaluated considering all the identified packages (i.e. Boiler, ESP and Power Cycle Piping) and finally the Bidder's capacity to execute the tendered scope is assessed in line with III above.

ii). Identified Packages (Unit wise)

Table-1

Civil Electrical and 0	C&I Mechanical
i). Enabling works ii). Pile and Pile Caps iii). Civil Works including foundations iv). Structural Steel Fabrication & Erection v). Chimney vi). Cooling Tower vii). Others (Civil)	i). Boiler & Aux (All types including CW Piping if applicable)

iii). Bidders who have not been evaluated for at least six package months in the last 24 months preceding and including the Cut-off month in the online BHEL system for contractor performance evaluation in BHEL PS Regions, shall be considered "NEW VENDOR".

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

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

The "FIRST TIMER" tag shall remain till completion of all the contracts against which vendor has been tagged as First Timer or availability of 6 evaluation scores within last 24 months preceding and including the Cut-off month in the online BHEL system for contractor performance evaluation in BHEL PS Regions.

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

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

iv). Consequent upon applying the criteria of 'Assessment of Capacity of Bidders' detailed above on all the bidders qualified against Technical and Financial Qualification criteria, if the number of qualified bidders reduces to less than minimum no. of bidders required for conducting RA as per extant RA Guidelines, then for further processing of the Tender, BHEL at its discretion reserves the right to also consider the bidders

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who are "not qualified" as per criteria of 'Assessment of Capacity of Bidders' and for this, procedure described in following three options shall be followed:

- a) All the bidders having Overall Performance Rating ('R_{BHEL}') ≥60 shall be considered qualified against criteria of 'Assessment of Capacity of Bidders'.
- b) If even after using option "a", the number of qualified bidders remains less than minimum no. of bidders required for conducting RA as per extant RA Guidelines, then in addition to bidders considered as per option "a", "First timer" bidders having average of available performance scores ≥60 upto and including the Cut Off month shall also be considered qualified against criteria of 'Assessment of Capacity of Bidders'.
- c) If even after using option "a" and "b", the number of qualified bidders remains less than minimum no. of bidders required for conducting RA as per extant RA Guidelines, then in addition to bidders considered as per option "a" and "b", "First timer" bidders for whom no performance score is available in the system upto and including the Cut Off month, shall also be considered qualified against criteria of 'Assessment of Capacity of Bidders'.

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

- v). 'Under execution' shall mean works in progress as per the following:
 - a. Up to execution of 90% of anticipated Contract Value in case of Civil, MM, Structural and Turbo Blower Packages
 - b. Up to Steam Blowing in case of Boiler/ESP/Piping Packages
 - c. Up to Synchronization in all Balance Packages

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

- vi). Contractor shall provide the latest contact details i.e. mail-ID and Correspondence Address to SCT Department, so that same can be entered in the Contractor Performance Evaluation System, and in case of any change/discrepancy same shall be informed immediately. Login Details for viewing scores in Contractor Performance Evaluation System shall be provided to the Contractor by SCT Department.
- vii). Performance Evaluation for Activity Month shall be completed in Evaluation Month (i.e. month next to Activity Month) or in rare cases in Post Evaluation Month (i.e. month next to Evaluation Month) after approval from Competent Authority. In case scores are not acceptable, Contractor can submit Review Request to GM Site/ GM Project latest by 25th of Evaluation Month or 3 days after approval of score, whichever is later. However, acceptance/rejection of 'Review Request' solely depends on the discretion of GM Site/GM Project. After acceptance of Review Request, evaluation score shall be reviewed at site and the score after completion of review process shall be acceptable and binding on the contractor.
- viii). Project on Hold due to reasons not attributable to bidder
 - a. Short hold: Evaluation shall not be applicable for this period, however Loading will be considered.
 - b. Long hold: Short hold for continuous six months and beyond or hold on account of Force Majeure shall be considered as Long Hold. Evaluation as well as Loading shall not be considered for this period.

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- ix). Performance evaluation as specified above in this clause is applicable to Prime bidder and Consortium partner (or Technical tie up partner) for their respective scope of work.
- 10.0 Since the job shall be executed at site, bidders must visit site/ work area and study the job content, facilities available, availability of materials, prevailing site conditions including law & order situation, applicable wage structure, wage rules, etc. before quoting for this tender. They may also consult this office before submitting their offers, for any clarifications regarding scope of work, facilities available at sites or on terms and conditions.
- 11.0 For any clarification on the tender document, the bidder may seek the same in writing or through e-mail, 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 Not used for this 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 have 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), <u>if applicable</u>, along with techno-commercial bid. This pact shall be considered as a preliminary qualification for further participation. <u>The names and other details of Independent External Monitor (IEM) for the subject tender is as given at point (1) above.</u>

"Integrity Pact (IP)"

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

SI. No.	IEM	Email
1.	Shri Otem Dai, IAS (Retd.)	lem1@bhel.in
2.	Shri Bishwamitra Pandey, IRAS (Retd.)	lem2@bhel.in
3.	Shri Mukesh Mittal, IRS (Retd.)	lem3@bhel.in

- (b) The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with technocommercial bid (Part-I, in case of two/ three part bid). Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.
- (c) Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to any of the above IEM(s). All correspondence with the IEMs shall be done through email only.

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

Details of contact person(s):

(1)	(2)
Name:	Name:
Deptt:	Deptt:
Address:	Address:
Phone: (Landline/ Mobile)	Phone: (Landline/ Mobile)
Email:	Email:
Fax:	Fax:

- 16.0 The Bidder has to satisfy the Pre-Qualifying Requirements stipulated for this Tender in order to be qualified. The Price Bids of only those bidders will be opened who will be qualified for the subject job on the basis of satisfying the Pre-Qualification Criteria specified in this NIT as per Annexure-I (as applicable), past performance etc. and date of opening of price bids shall be intimated to only such bidders. BHEL reserves the right not to consider offers of parties under HOLD.
- 17.0 In case BHEL decides on a `Public Opening', the date & time of opening of the sealed PRICE BID shall be intimated to the qualified bidders and in such a case, bidder may depute one authorized representative to witness the price bid opening. BHEL reserves the right to open 'in-camera' the 'PRICE BID' of any or all Unsuccessful/Disqualified bidders under intimation to the respective bidders.
- 18.0 Validity of the offer shall be for **three months** from the latest due date of offer submission (including extension, if any) unless specified otherwise.
- 19.0 Reverse Auction: Not used for this tender
- 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 Not used for this tender.
- 22.0 The bidders shall not enter into any undisclosed M.O.U. or any understanding amongst themselves with respect to tender.
- 23.0 Consortium Bidding is not applicable for this Tender.
- 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 The consultant / firm (and any of its affiliates) shall not be eligible to participate in tender(s) for the related works or services for the same project, if they were engaged for the consultancy services.
- 27.0 Guidelines/rules in respect of Suspension of Business dealings, Vendor evaluation format, Quality, Safety & HSE guidelines, Experience Certificate, etc. may undergo change from time to time and the latest one shall be followed. The abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' is available on www.bhel.com on "supplier registration page".

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- 28.0 The offers of the bidders who are on the banned/ hold list and also the offer of the bidders, who engage the services of the banned/ hold firms, shall be rejected. The list of banned/ hold firms is available on BHEL website http://www.bhel.com.
 - 28.1 Integrity commitment, performance of the contract and punitive action thereof:

28.1.1 **Commitment by BHEL:**

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

28.1.2 Commitment by Bidder/ Supplier/ Contractor:

- (i) The bidder/ supplier/ contractor commit to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally entitled to nor will act or omit in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India.
- (ii) The bidder/ supplier/ contractor will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to relevant guidelines issued from time to time by Govt. of India/ BHEL.
- (iii) The bidder/ supplier/ contractor will perform/ execute the contract as per the contract terms & conditions and will not default without any reasonable cause, which causes loss of business/ money/ reputation, to BHEL.

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

29.0 Micro and Small Enterprises (MSE) - Not used for this tender.

30.0 The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendors/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice.

31.0 PREFERENCE TO MAKE IN INDIA:

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

- 31.1 Compliance to Restrictions under Rule 144 (xi) of GFR 2017
 - Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if
 the bidder is registered with the Competent Authority. The Competent Authority for the purpose of this
 Clause shall be the Registration Committee constituted by the Department for Promotion of Industry and
 Internal Trade (DPIIT).
 - II. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling

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in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.

- III. "Bidder from a country which shares a land border with India" for the purpose of this Clause means:
 - a. An entity incorporated established or registered in such a country; or
 - b. A subsidiary of an entity incorporated established or registered in such a country; or
 - c. An entity substantially controlled through entities incorporated, established or registered in such a country; or
 - d. An entity whose beneficial owner is situated in such a country; or
 - e. An Indian (or other) agent of such an entity; or
 - f. A natural person who is a citizen of such a country; or
 - g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above
- IV. The beneficial owner for the purpose of (III) above will be as under:
 - In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.

Explanation

- "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent of shares or capital or profits of the company.
- "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholder's agreements or voting agreements.
- In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership.
- In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person has ownership of or entitlement to more than fifteen percent of the property or capital or profits of the such association or body of individuals.
- 4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
- In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.
- V. An Agent is a person employed to do any act for another, or to represent another in dealings with third person.
- VI. The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.

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- (i) The bidder shall provide undertaking for their compliance to this Clause, in the Format provided in Annexure-11.
- (ii) Registration of the bidder with Competent Authority should be valid at the time of submission as well as acceptance of the bids.
- 32.0 Bid should be free from correction, overwriting, using corrective fluid, etc. Any interlineation, cutting, erasure or overwriting shall be valid only if they are attested under full signature(s) of person(s) signing the bid else bid shall be liable for rejection.
 - All overwriting/cutting, etc. will be numbered by bid opening officials and announced during bid opening. (Clause applicable in case of Paper Bid only.)
- 33.0 In the course of evaluation, if more than one bidder happens to occupy L-1 status, effective L-1 will be decided by soliciting discounts from the respective L-1 bidders.
 - In case more than one bidder happens to occupy the L-1 status even after soliciting discounts, the L-1 bidder shall be decided by a toss/ draw of lots, in the presence of the respective L-1 bidder(s) or their representative(s).
 - Ranking will be done accordingly. BHEL's decision in such situations shall be final and binding.
- 34.0 The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
- 34.A A Bidder shall submit only one bid in a particular bidding process. In case of a holding company having more than one subsidiary having common business ownership/ management, only one business entity amongst the holding company and its subsidiaries should quote for a particular tender. Similar restrictions shall apply to closely related sister companies. Bidder's sister/ Associated/ Allied concern(s) participating or applying against the same tender, shall lead to disqualification of Bidders. Sister/ Associated/ Allied concern means a company, society, partnership firm or proprietorship firm having one or more common persons as Director/ Partner/ Member/ Owner. A Bidder who submits more than one bid will cause all the proposals submitted in the particular bid to be disqualified. In relation to the above, a person will include firm(s) of Proprietorship / Partnership Firm /Limited Liability Partnership / Private Limited / Limited company / Society registered under Society's Act / Statutory Bodies / any other legal entity, as the case maybe, & will be deemed to have submitted multiple bids in a particular bid if a person bids in any of the two formats given below:
 - i. individual or proprietorship format and/or
 - ii. a partnership or association of persons format and/or
 - iii. a company format

Whereby.

A company shall for this purpose include any artificial person whether constituted under the Indian laws or of any other country.

A person shall be deemed to have bid in a partnership format or in association of persons format if he is a partner of the firm which has submitted the bid or is a member of any association of persons which has submitted a bid.

A person shall be deemed to have bid in a company format if the person holds:

- i. more than 10% (ten percent) of the voting share capital of the company which has submitted a bid, or
- ii. is a director and / or Key Managerial Personnel of the company which has submitted a bid, or holds more than 10% (ten percent) of voting share capital in and/or is a director and / or Key Managerial Personnel of a holding company of that company which has submitted the bid.

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By making a bid pursuant to the Tender Documents, the bidder / tenderer shall be deemed to have declared that the bidder / tenderer has not made any other bid or multiple bids as understood or deemed in terms of this clause.

All the bids of a bidder who has submitted multiple bids, as per the clause, shall be rejected.

35.0 Order of Precedence:

In the event of any ambiguity or conflict between the Tender Documents, the order of precedence shall be in the order below:

- Amendments/Clarifications/Corrigenda/Errata etc. issued in respect of the tender documents by BHEL
- b. Notice Inviting Tender (NIT)
- c. Price Bid
- d. Technical Conditions of Contract (TCC)-Volume-1A
- e. Special Conditions of Contract (SCC) —Volume-1B
- f. General Conditions of Contract (GCC) —Volume-1C
- g. Forms and Procedures -- Volume-1D

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

for BHARAT HEAVY ELECTRICALS LTD (SCT)

Enclosure:

- (i) Annexure-1: Pre Qualifying Requirements.
- (ii) Annexure-2: Check List.
- (iii) Annexure-3: Certificate by Chartered Accountant
- (iv) Annexure-4: Reverse Auction Process Compliance Form
- (v) Annexure-5: Authorization of representative who will participate in the online Reverse Auction Process
- (vi) Annexure-6: RA Price Confirmation and Breakup
- (vii) Annexure-7: Integrity Pact
- (viii) Annexure-8: Undertaking as per C4 of Annexure-1 i.e. PQR
- (ix) Annexure-9: Declaration regarding Details of related firms and their area of activities
- (x) Annexure-9A:- Self declaration on multiple bids
- (xi) Annexure-10: Declaration regarding Minimum Local Content in Line With Revised Public Procurement (Preference To Make In India), Order 2017 Dated 04th June, 2020) And Subsequent Order(s)
- (xii) Annexure-11: Declaration Regarding Compliance to Restrictions Under Rule 144 (xi) of GFR 2017
- (xiii) Other Tender documents as per this NIT.

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ANNEXURE - 1

PRE-QUALIFYING REQUIREMENTS (PQR)

JOB	Erection, Testing & Commissioning including Handling of materials at site BHEL stores/storage yard, transporting to site of erection and supply & application of final painting of Control and Instrumentation (C&I) works for Unit 1 & 2 of 5x800 MW Yadadri Thermal Power Plant at Veerlapalem Village, Damercherla Mandal, Nalgonda DT., TSGENCO, Telangana, India.
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SL NO	PRE QUALIFICATION CRITERIA	Bidders claim in respect of fulfillin Criteria	ng the PQR
		Name and Description of qualifying criteria	Page no of supporting document. Bidder must fill up this column as per applicability
Α	Submission of Integrity Pact duly signed (if applicable)	Applicable	
	(Note: To be submitted by Prime Bidder & Consortium/Technical Tie up partner jointly in case Consortium bidding is permitted, otherwise by the sole bidder)		
B-1	<u>Technical</u>	Applicable	
	Bidder should have Executed similar work* for any one of the following in the last seven years from latest date of bid submission.		
	One (1) work of value not less than Rs 520 lakhs		
	(OR)		
	Two (2) works each of value not less than Rs.325 Lakhs		
	(OR)		
	Three (3) works each of value not less than Rs 260 Lakhs		
	Note:		
	1. For this criteria (B1), actual executed value wi	II be considered.	
	2. Value of work is to be updated as per procedu	ıre given below.	
	a) Value of work is to be updated with indices for workers" and "Monthly Whole Sale Price Index		

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of work execution and indexed up to three (3) months prior to the month of latest due date of bid submission as per following formula.

submission as per following formula.

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

Where

P = Updated value of work

R = Value of executed work

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

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

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

Y₀ = Monthly Whole Sale Price Index for All Commodities for last month of work execution

3. * 'Similar works' shall be Electrical or C&I or 'Electrical and C&I' works

(AND)

B-2 B2 TECHNICAL CRITERIA (SPECIALIZED CRITERIA) for C&I

Executed**:

1. "C&I works for BTG/GT" or "C&I works consisting of DCS/DDC/Station C&I" in one unit of ≥ 190 MW.

(OR)

- 2. One contract of C&I works consisting of DCS/DDC/Station C&I in any Industry with its executed value ≥ Rs. 190 Lakhs.
- ** The word **Executed** means achievement of milestones of "SYNCHRONISATION" in case of power project (excluding Nuclear projects) / "WORK EXECUTION of the value as defined in PQR" in case of industry & Nuclear projects.

COMMON EXPLANTORY NOTES FOR BOTH B1 & B2 TECHNICAL CRITERIA

- 1.For Evaluation of PQR, in case Bidder alone does not meet the pre-qualifying technical B1 above, bidder may utilize the experience of its Parent/Subsidiary Company along with its own experience, subject to the following:
- a. The parent company shall have a controlling stake of ≥50% in the subsidiary company (as per Format-1).
- b.The Parent Company/ Subsidiary Company of which experience is being utilized for bidding shall submit Security Deposit (SD) equivalent to 1% of the total contract value.
- c. The parent /subsidiary company and bidder shall provide an undertaking that they are jointly or severally responsible for successful performance of the contract (as per Format-2).
- d.Parent Company/Subsidiary Company of which experience is being used for bidding, cannot participate as a 'Standalone Bidder'.

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2. Completion date for achievement of the technical criterial specified in the Common QR should be in the last 7 years ending on the 'latest date of bid submission' of tender irrespective of date of the start of work. Completion date shall be reckoned from the "FY quarter of bid submission".

(for e.g. – Work completed on 01.01.2014 shall be considered even if latest date of bid submission is 20.03.2021)

- 3. "Executed" means the bidder should have achieved the technical criterial specified in the Common QR even if the Contract has not been completed or closed.
- 4.In case the Experience/PO/WO certificate enclosed by bidders do not have separate break up of prices for the E&C portion for Electrical and C&I works, (i.e. the certificates enclosed are for composite order for supply and erection of Electrical and C&I and other works if any), then value of Erection & Commissioning for the Electrical and C&I portion shall be considered as 15% of the price for supply & erection of Electrical and C&I.
- 5. Consortium is not permitted for this tender. However, after successful execution of one work with a consortium partner under direct orders of BHEL, the Prime Bidder shall be eligible for becoming a 'standalone' bidder for works similar to that for which consortium partner was engaged, for subsequent tenders.
- 6. Wherever the credential submitted for satisfying the Technical PQR is from direct order of BHEL, bidders to ensure that relevant certificate issued by respective contracting department of BHEL is provided as part of the offer. Certificates can be obtained from BHEL by submitting request through online portal i.e. https://siddhi.bhel.in.

C-1	Financial TURNOVER	Applicable	
	Bidder must have achieved an average annual financial turnover (Audited) of Rs. 195 Lakhs or more over three consecutive FY from immediate four previous FYs shall be reckoned. (FY to be considered shall be 2018-19, 2019-20 & 2020-21 or 2019-20,2020-21 & 2021-2022)		
C-2	NETWORTH (only in case of Companies)	Applicable	
	Net worth of the Bidder based on the latest Audited Accounts as furnished for 'C-1' above should be positive.		
C-3	PROFIT	Applicable	
	Bidder must have earned profit in any one of the three Financial Years as applicable in the last three Financial Years as furnished for 'C-1 above.		
C-4	Bidder must not be under Insolvency Resolution Process or Liquidation or Bankruptcy Code Proceedings (IBC) as on date, by NCLT or any adjudicating authority/authorities, which will render him ineligible for participation in this tender, and shall submit undertaking (Annexure-8) to this effect.	Applicable	
D	Assessment of Capacity of Bidder to execute the work as per sl. no. 9 of NIT (if applicable)	Applicable	By BHEL

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Е	Approval of Customer (if applicable)	Applicable	BY BHEL
	<u>Note:</u> Names of bidders (including consortium/Technical Tie up partners in case consortium bidding is permitted) who stand qualified after compliance of criteria A to D shall be forwarded to customer for their approval.		
F	Price Bid Opening	Applicable	BY BHEL
	<u>Note:</u> Price Bids of only those bidders shall be opened who stand qualified after compliance of criteria A to E		
G	Consortium criteria (if applicable)	Not Applicable	

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

Evaluation of financial PQR:

- 1. Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as indicated against C-1 above along with all annexures.
- 2. In case audited financial statements have not been submitted for all the three years as indicated against C-1 above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years i.e. total divided by three.
- 3. If Financial Statements are not required to be audited statutorily, then instead of audited financial statements, financial statements are required to be certified by Chartered Accountant.
- 4. C-2: NETWORTH: Shall be calculated based on the latest Audited Accounts as furnished for C-1 above. Net worth = Paid up share capital + Reserves. (Net worth is required to be evaluated in case of companies).
- 5. C-3: PROFIT: shall be NET profit (PBT) earned during any one of the three financial years as in C-1 above.
- 6. In case, where BHEL has awarded a particular work to Main Vendor and the Main Vendor in turn has awarded, the work awarded by BHEL in part / full to a sub vendor (known as bidder); and the bidder has now quoted to BHEL for the said tender floated by BHEL, citing the above work as a pre-qualification experience.
 - In such situation as above, the following documents shall be scrutinized by BHEL before qualifying the bidder.
 - i) Work Order from BHEL's main vendor in the name of bidder, indicating scope of work, Order value & Completion period.
 - ii) Completion certificate issued by BHEL's main vendor, indicating the Scope, Duration of work & Quantum of work completed.
 - iii) Copy of BHEL letter according permission by BHEL to sublet the work from BHEL's Main vendor to bidder.
 - iv) TDS certificate and any one of the documents in the name of bidder for the plant, like Labour license / BOCW registration / Workmen compensation insurance / Gate Pass for material or for T&P and Gate Pass for labour / any other relevant documentary evidence.

The bidder shall be disqualified if any one of the above points (i to iv) are not satisfied.

- Relevant documents, meeting above requirements at C & D, shall be submitted by bidders.
- The evaluation currency for this tender shall be INR.

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

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

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Format-1

Certificate for relationship	between Parent Company / Subsid	iary Company and the bidder
То,		
Dear Sir,		
Sub: Bid for NIT No	dated for "	" (name of the tender).
	the Parent Company in Subsidiary Com	sidiary Company of M/s(the pany as on(not earlier than
Name of Parent Company	Name of Subsidiary Company	Percentage of Equity Holding of Parent Company in Subsidiary Company

(Insert Name and Signature of Statutory Auditor or practicing Company Secretary of the Bidder)

Format-2

Undertaking from the Parent Company/ Subsidiary Company of the bidder

(On the Letter Head of Parent Company/ Subsidiary Company, as applicable)

From, Name: Full Address:
Telephone No.: E-mail address: Fax/No.:
То,
Dear Sir,
We refer to the NIT No dated for "" (name of the Tender).
'We have carefully read and examined in detail the NIT/Tender Terms and Conditions, including in particular, Clause of the NIT/Tender, regarding submission of an Undertaking, as per the prescribed Format 1 of the NIT/ Tender.
We confirm that M/s (the Bidder) has been authorized by us to use our Technical capability for meeting the Technical Criteria as specified in Clauseof the PQR of the NIT/Tender referred above.
We agree to submit the Security Deposit equivalent to 1% of the total contract value in addition to Security Deposit to be submitted by Bidder as per Clauseof the NIT/Tender for fulfilment of all obligations in terms of provisions of the contract, in the event of(the Bidder) being selected as the Successful Bidder.
We confirm that we along with M/s(the bidder), are jointly or severally responsible for successful performance of the contract.
We confirm that our company shall not participate in the above tender as a 'Standalone Bidder' or as a 'Consortium bidder' and also shall not authorize any other bidder to use our Technical capability for the above tender.
All the terms used herein but not defined, shall have the meaning as ascribed to the said terms under the referred NIT/Tender.

Signature of Managing Director/Authorized signatory of Parent/ Subsidiary Company

Head Office: BHEL PSSR, Tek Towers, No.11, Old Mahabalipuram Road, Okkiyam, Thoraipakkam, Chennai-600097

Registered Office: BHEL House, Siri Fort, New Delhi – 110 049, India

ANNEXURE - 2

CHECK LIST

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

1	Name and Address of the Tenderer			
2	Details about type of the Firm/Company			
3.a	Details of Contact person for this Tender	Name: Mr/Ms Designation: Telephone No: Mobile No: Email ID: Fax No:		
3.b	Details of alternate Contact person for this Tender	Name: Mr/Ms Designation: Telephone No: Mobile No: Email ID: Fax No:		
4	EMD DETAILS	ate: nount: applicable:- DR THIS TENDER		
5	Validity of Offer	TO BE VALID FOR THREE	MONTHS FROM	DUE DATE
			APPLICABILIT Y(BY BHEL)	ENCLOSED BY BIDDER
6	Whether the format for compliance with PRE C (ANNEXURE-I) is understood and filled with pr referenced in the specified format		Applicable	YES / NO
7	Audited profit and Loss Account for the last three	e years	Applicable	YES / NO
8	Copy of PAN Card		Applicable	YES / NO
9	Whether all pages of the Tender docume appendices etc. are read understood and signed	Applicable	YES / NO	
10	Integrity Pact		Applicable	YES / NO
11	Offer Forwarding Letter (as per Form-F01 of For	rms & Procedure)	Applicable	YES / NO

Head Office: BHEL PSSR, Tek Towers, No.11, Old Mahabalipuram Road, Okkiyam, Thoraipakkam, Chennai-600097

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12	Declaration by Authorized Signatory (as per Form-F02 of Forms & Procedure)	Applicable	YES / NO
13	No Deviation Certificate (as per Form-F03 of Forms & Procedure)	Applicable	YES / NO
14	Declaration confirming knowledge about Site Conditions (as per Form-F04 of Forms & Procedure)	Applicable	YES / NO
15	Declaration for relation in BHEL (as per Form-F05 of Forms & Procedure)	Applicable	YES / NO
16	Non-Disclosure Certificate (as per Form-F06 of Forms & Procedure)	Applicable	YES / NO
17	Bank Account Details for E-Payment (as per Form-F07 of Forms & Procedure)	Applicable	YES / NO
18	Capacity Evaluation of Bidder for current Tender	Applicable	YES / NO
19	Tie Ups/Consortium Agreement are submitted as per format	Not Applicable	YES / NO
20	Power of Attorney for Submission of Tender/ Signing Contract Agreement (as per Form-F25 of Forms & Procedure)	Applicable	YES / NO
21	Analysis of Unit rates	Applicable	YES / NO
22	Undertaking as per clause C4 of Annexure-1 to NIT i.e. PQR (as per Annexure-8 to NIT)	Applicable	YES / NO
23	Declaration regarding Minimum Local Content In Line With Revised Public Procurement (Preference To Make In India), Order 2017 Dated 04th June, 2020) And Subsequent Order(s) (as per Annexure-10 to NIT)	Applicable	YES / NO
24	Declaration Regarding Compliance to Restrictions Under Rule 144 (xi) of GFR 2017 (as per Annexure-11 to NIT)	Applicable	YES / NO

NOTE:

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

DATE:

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

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ANNEXURE - 3

Certificate by Chartered Accountant on letter head

(applicable up to 31st Dec'2021 in line with MSME notification no. S.O. 2119 (E), dated 26th June'2020 and gazette notification no. S.O. 2347(E) dtd. 16.06.2021))

Not applicable to this tender.

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ANNEXURE - 7

INTEGRITY PACT

Between

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

						and				
	ss), hereinaf f shall includ						pression unless re	cription of the epugnant to the o		
						<u>Preamble</u>				
The	Principal	intends	to	award,	under	laid-down	organizational	procedures,	contract/s	for
	and regulations Bidder(s)/		•	ciples of e		•	es full compliance es, and of fairnes			

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

Section 1- Commitments of the Principal

- 1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles: -
- 1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
- 1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
- 1.1.3 The Principal will exclude from the process all known prejudiced persons.
- 1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

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

- 2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.
- 2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he/ she is not legally entitled to, in order

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Registered Office: BHEL House, Siri Fort, New Delhi – 110 049, India

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- to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
- 2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
- 2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant Indian Penal Code (IPC) and Prevention of Corruption Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- 2.1.4 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- 2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- 2.3 The Bidder(s)/ Contractor(s) shall not approach the Courts while representing the matters to IEMs and will await their decision in the matter.

Section 3 - Disqualification from tender process and exclusion from future contracts

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

Section 4 - Compensation for Damages

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

Section 5 - Previous Transgression

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

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

6.1 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors. In case of sub-contracting, the Principal contractor shall be responsible for the adoption of IP by his sub-contractors and shall continue to remain responsible for any default by his sub-contractors.

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

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

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

Section 8 -Independent External Monitor(s)

- 8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.
- 8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/ Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Sub-contractor(s) with confidentiality in line with Non- disclosure agreement.
- 8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.
- 8.5 The role of IEMs is advisory, would not be legally binding and it is restricted to resolving issues raised by an intending bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.
- 8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process, the matter should be examined by the full panel of IEMs jointly as far as possible, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.
- 8.7 The IEMs would examine all complaints received by them and give their recommendations/ views to CMD, BHEL, at the earliest. They may also send their report directly to the CVO and the Commission, in case of suspicion of serious irregularities requiring legal/ administrative action. IEMs will tender their advice on the complaints within 10 days as far as possible.
- 8.8 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.
- 8.9 IEM should examine the process integrity; they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the organization should be looked into by the CVO of the concerned organisation.
- 8.10 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code/ Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to

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proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

- 8.11 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.
- 8.12 The word 'Monitor' would include both singular and plural.

Section 9 - Pact Duration

- 9.1 This Pact shall be operative from the date IP is signed by both the parties till the final completion of contract for successful bidder and for all other bidders 6 months after the contract has been awarded. Issues like warranty / guarantee etc. should be outside the purview of IEMs.
- 9.2 If any claim is made/ lodged during currency of IP, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 - Other Provisions

- 10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.
- 10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.
- 10.3 If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.
- 10.4 Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- 10.5 Only those bidders / contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

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

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ANNEXURE - 8

UNDERTAKING

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

To,
(Write Name & Address of Officer of BHEL inviting the Tender)
Dear Sir/Madam,
Sub: DECLARATION REGARDING INSOLVENCY/ LIQUIDATION/ BANKRUPTCY PROCEEDINGS
Ref: NIT/Tender Specification No:
I/We,
declare that, I/We am/are not under insolvency resolution process or liquidation or Bankruptcy Code Proceedings (IBC)
as on date, by NCLT or any adjudicating authority/authorities, which will render us ineligible for participation in this tender.
Sign. of the AUTHORISED SIGNATORY
(With Name, Designation and Company seal)
Place: Date:

Head Office: BHEL PSSR, Tek Towers, No.11, Old Mahabalipuram Road, Okkiyam, Thoraipakkam, Chennai-600097

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				ANNEXU	RE – 9
	DECLARATION				
				Date:	
To:					
Address	s: BHEL,				
					
					
email:					
Sub:	Details of related firms and their area of activities				
Dear Sir	r/ Madam,				
Dear Oil	maam,				
Please t	find below details of firms owned by our family members that are doir	na busine	ess/ registered	d for same ite	m with
	(NA, if not applicable)	.9 200	oo, rogiotoro		
-	, ,				
1	Material Category/ Work Description				
	Name of Firm				
	Address of Firm				
	Nature of Business				
	Name of Family Member				
2	Material Category/ Work Description				
	Name of Firm				
	Address of Firm				
	Nature of Business				
	Name of Family Member				
	Relationship				
Note:	I certify that the above information is true and I agree for penal ac	tion fron	n BHEL in ca	se any of the	above
informa	ation furnished is found to be false.				
				Re	egards,
			,		,
			()
	_	rom:	M/s		
	Γ	TOTTI.	141/2		

Head Office: BHEL PSSR, Tek Towers, No.11, Old Mahabalipuram Road, Okkiyam, Thoraipakkam, Chennai-600097

Supplier Code: Address:

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ANNEXURE - 9A

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DECLARATION

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

(Write Name & Address of Officer of Dear Sir/Madam, Sub: One Bid per Bidder w.r.t. Claus	Ç ,
Ref: NIT/Tender Specification No:	
I/ We, M/s (Name of t	he bidder) certify the following with reference to the subject

- 1) I/ We have not submitted multiple bids, in any of the two formats given below:
 - a) individual or proprietorship format and/or
 - b) a partnership or association of persons format and/or
 - c) a company format

wherein,

TΛ

- A company shall for this purpose include any artificial person whether constituted under the Indian laws
 or of any other country.
- A person shall be deemed to have bid in a partnership format or in association of persons format if he is
 a partner of the firm which has submitted the bid or is a member of any association of persons which has
 submitted a bid.
- A person shall be deemed to have bid in a company format if the person holds:
 - i. more than 10% (ten percent) of the voting share capital of the company which has submitted a bid, or
 - ii. is a Director and / or Key Managerial Personnel of the company which has submitted a bid, or
 - iii. holds more than 10% (ten percent) of voting share capital in and/or is a director and/or Key Managerial Personnel of a holding company of that company which has submitted the bid.
 - 2) None of our Sister/ Associated/ Allied concerns (i.e, a company, society, partnership firm or proprietorship firm having one or more common persons as Director/ Partner/ Member/ Owner) have submitted any other bid for this Tender.

I/We understand that all the bids of a bidder who has submitted multiple bids, in terms of Clause No. 34A of NIT, shall be rejected.

Signature of the AUTHORISED SIGNATORY

Head Office: BHEL PSSR, Tek Towers, No.11, Old Mahabalipuram Road, Okkiyam, Thoraipakkam, Chennai-600097

Annexure 10

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

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

To, (Write Name & Address of Officer of BHEL i	nviting the Tender)
Dear Sir,	
Sub : Declaration reg. minimum local conter Revision, dated 04th June, 2020 and subsection	t in line with Public Procurement (Preference to Make in India), Order 2017- uent Orders)
Ref : 1) NIT/Tender Specification No:	,
of % and this meets the local con	ces offered by <u>(SPECIFY ORGANIZATION NAME HERE)</u> has a local content requirement for 'Class-I local supplier' / 'Class II local supplier' ** as to Make in India), Order 2017-Revision dated 04.06.2020 issued by DPIIT and
The details of the location(s) at which the lo	cal value addition is made are as follows:
1 3	2 4
Thanking you, Yours faithfully,	(Signature, Date & Seal o Authorized Signatory of the Bidder

** - Strike out whichever is not applicable.

Note:

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

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Annexure 11

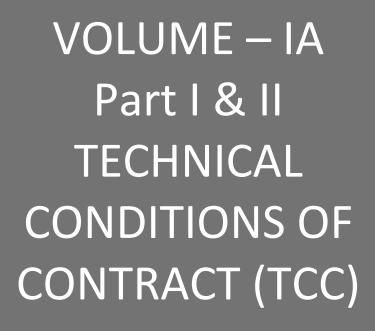
DECLARATION REGARDING COMPLIANCE TO RESTRICTIONS UNDER RULE 144 (xi) OF GFR 2017

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

To, (Write Name & Address of Officer of BHEL inviting the Tender)
Dear Sir,
Sub: Declaration regarding compliance to Restrictions under Rule 144 (xi) of GFR 2017
Ref : 1) NIT/Tender Specification No:, 2) All other pertinent issues till date
I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries. I certify that
I hereby certify that we fulfil all requirements in this regard and is eligible to be considered.
Thanking you, Yours faithfully,
(Signature, Date & Seal of Authorized Signatory of the Bidder)
Note: Bidders to note that if the above certification given by a bidder, whose bid is accepted, is found to be false, then this would be a ground for immediate termination and further action in accordance with law and as per BHEL guidelines

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Registered Office: BHEL House, Siri Fort, New Delhi – 110 049, India Website: www.bhel.com



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BHARAT HEAVY ELECTRICALS LIMITED



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VOLUME-IA PART – I CHAPTER – I PROJECT INFORMATION

1.1.0.0	Project Information		
01	Name of the Project	YADADRI Thermal Power Station	
02	Station Capacity	5X800 MW (Coal based)	
03	Owner	Telangana State Power Generation Corporation Limited (TSGENCO)	
04	Site Location	Site is located 7 km from the NH565 (SH2). Veerlapalem village, Dameracherla Mandal, NALGONDA DISTRICT, TELANGANA STATE	
05	Latitude	16° 42'20.40 N	
06	Longitude	79° 34'41.56 E	
07	Nearest Town	30 Km Miryalaguda	
08	Nearest Railway Station	6.5 Km Damercherla	
09	Nearest Airport	130 Kms (Vijayawada)	
10	Site Conditions		
a.	Ambient Temperature		
i.	Daily minimum (average)	10°C	
ii.	Daily maximum (average)	47°C	
iii.	Design Ambient Temperature	50°C	
iv.	Ambient temperature (performance)	38°C	
b.	Relative Humidity for design / efficiency	48-84 %	
C.	Annual rainfall, mm	600 mm	
d.	Plant Elevation above MSL	85 m above MSL	
e.	Mean Wind Speed	8 km/h	
f.	Wind Pressure	As per the latest revision of IS 875/1987	

VOLUME-IA PART – I CHAPTER – II C&I WORKS SCOPE OF WORKS

1.2.1.0	SCO	OPE OF WORKS-GENERAL:		
1.2.1.1	The scope of works covers C&I works of Main Plant (1 & 2) and identified BOP areas of 5x800 MW Yadadri TPS as mentioned below, including supply of labour, tools and plants. The Scope of the works is indicative but not limited to the given below.			
	٠,	the works mentioned hereunder shall be carried out within the accepted rate ess otherwise specified.)		
1.2.1.2	BR	OAD SCOPE OF C&I WORKS:		
	A.	Preassembly, Erection, Testing and Commissioning, Trial operation and reliability operation of :		
	1.	Erection and commissioning of all types of Field Instruments (Gauges/Switches/Transmitters/Elements) like Temperature, Pressure, Flow (Paddle Wheel/DP/Ultrasonic, etc types of Local/Remote), Level, Density instruments (Local & remote) and special instruments like PD type Mass Flowmeters.		
	2.	Erection of all Analyzers-Oxygen, HF, Flue Gas (SOX/NOX/CO), Mercury, NH3, CO, SOX, NOX & Opacity		
	3.	Erection of Vibration Monitoring System, Turbine Supervising Control and Monitoring System. Please refer the detailed scope of works in relevant chapters.		
	4.	Erection of SWAS system with analyzers i.e. (Conductivity, Sodium, Iron, Silica, Chloride, Turbidity, Dissolved Oxygen, pH)		
	5.	E&C of Microprocessor based flame scanner system, H.E.A Exciter system, Acoustic Steam Leak Detector, Coal Bunker Level Monitor system		
	6.	Erection of Master Clock system		
	7.	Erection & Commissioning of Large Video Screen System,		

- 8. E&C of HART Management System under the Supervision of OEM
- 9. Management Information System, Dynamic Simulator System
- 10. Erection of UPS & Battery System of different kVA & AH ratings
- 11. Installation & Commissioning of Wireless communication, Station LAN, OPC Connectivity to all PLC (or) off site DCS wherever required
- 12. All type of Control Room instruments like Recorders, Indicators, Microprocessor based panels, DCS system and its accessories like system panels (Valmet Control Cabinets of SG/TG/BOP/CPU/EIS/T&AVT), Network Panels, Network Enclosures, PCs, Laptops, Printers, Computer Furniture etc.
- 13. Control & Instrumentation works associated with Fire Protection System (FPS) such as WBFPS/MVWSS/HVWSS/FBFPS/FDA/IGES systems i.e. PLC Panels, Remote IO panels, Fire Alarm Panels, Repeater Panels, FDA/FPS panels, Fire Detectors, Modules, Power, Control & OLHS/LHS cables, OFC & Splicing, Instruments, OWS/EOWS, Printers, etc.
- 14. All type of Pneumatic Power Cylinders, Controllers, Limit Switches, etc.
- 15. All type of Hardware like impulse pipes, Cable trays & tray supports, instrument airline, etc.
- 16. Laying, termination & testing of all types of power/control/instrumentation cables/Special Cables, etc.
- 17. Laying & Splicing of Optical Fiber Communication Cables with conduits
- 18. ACDB, Battery Chargers, Battery Health Monitoring panels, DCDB, Power Distribution Boards etc.
- 19. All type of Local/Remote control panels and LGB,LIE,LIR, Network Enclosures, Junction Boxes, Pushbutton stations.
- 20. Installation of any other items that have not been specifically indicated, but required for completing installation.

- B. Testing & Commissioning of the following Erected by other contractors (includes cabling, tubing, removing, calibrating, testing, etc as required)
 - 1. All types of Pneumatic/Motor Operated Valves/ Actuators/Power Cylinders/Controllers and Relief Valves.
 - 2. Temperature Elements of all the HT Drives
 - 3. Bidirectional Drives and Unidirectional Drives (HT/LT Drives) & Limit Switches
 - 4. Removal, Calibration and fixing of the instruments in various systems as specified in the BOQ
 - 5. Dosing Systems (Oxygen, NaOH, Ammonia & Hydrazine)
 - 6. Demonstration of the Mechanical and C&I Lab instruments
 - 7. Calibration of instruments at site with the contractor's own calibration and testing equipment under the supervision of BHEL/TSGENCO Engineers.

C. Others:

- 1. Final Painting including supply of paints, as detailed in scope of respective item/ equipment.
- 2. Supply of all consumables required for installation as detailed elsewhere in the specification.
- 3. Embossing Permanent nomenclature on equipment erected/Trays/panels/wherever required as per site requirement.
- 4. Necessary arrangements for Protecting and safe guarding the Erected equipment from any damages and pilferages.
- 5. Installation of any other items that have not been specifically indicated, but required for completing installation.

Note:

- 1. If any peripheral C&I item associated with the above said main equipment which was not erected by other contractor but it is required for complete commissioning shall be erected and commissioned by the contractor. Contractor shall have valid license to carry out the work indicated in the BOQ.
- 2. BHEL will provide OEM's technical support for commissioning of various proprietary type special instruments/systems like Vibration Monitoring System, SWAS, Flue Gas Analyzers, Master Clock System, Coal Bunker Level Monitor, LVS System, HART Management System, Furnace Flame Viewing System, C&I Lab, Wireless Communication, Station LAN, OPC Connectivity to all PLC, etc. The contractor shall carry out the works as per instructions of BHEL/ OEM's Engineer.

1.2.3.0 | **EXCLUSIONS**:

The following are specific exclusions from this work.

- a. Erection of Dampers, Pneumatic/Motor Operated Valves, Electrical Actuators, HT/LT Drives
- b. Attachment welding of thermocouple pads, Flow Nozzle, Orifice Plates and Control Valves
- c. Root Valves on the instruments tapping points
- d. Seal Welding on temperature stub on piping before hydra test.
- e. Removal of seal welding on temperature stub on piping after successful completion of hydra test. Height of the temp stub to be maintained as per piping drawing.

Note:

The above exclusions shall not be concluded as final. They are meant for general guidelines. BHEL reserves the right to include or exclude any item which is required for completing the job as per rates indicated in rate schedule. Contractor shall carry out all such jobs as per the instructions of BHEL Site Engineer.

1.2.4.0	The scope of work covers identification of items at stores / yards, checking, reporting the damages if any, loading, transportation, unloading at Contractor's stores / working yard, keeping in safe custody in contractor's stores, preassembly, calibration, checking, erection, testing and commissioning, supply of consumables like electrodes, gas, cable dressing materials, tag plates, PVC sleeves for wire marking, lugs (specific sizes), specific type of fasteners, paints and its consumables. Deployment of skilled / unskilled manpower, engineers / supervisors, T & P, Material handling equipment's, Testing instruments, returning of un-used materials / items to BHEL stores.
1.2.5.0	It is not the intent to specify herein all details of material. Any item related to this work not covered by this but necessary to complete the system will be deemed to have been included in the scope of the work.
1.2.6.0	The scope of specification covers the material receipt from BHEL stores, transportation to erection site, installation, testing and commissioning of the electrical equipment, hardware, software (data concentrator) communication along with accessories as detailed in Bill of Materials.
1.2.7.0	If any item or equipment not covered but requires be erected / commissioned, the same shall be carried out by the contractor. Equivalent unit rate for those item or equipment shall be considered wherever possible from the BOM. The rates quoted by the contractor shall be uniform as far as possible for similar items appearing in rate schedule.
1.2.8.0	Note: FOR BOQ& FURTHER DETAILED SCOPE OF WORKS REFER RELEVANT CHAPTERS IN THIS BOOK

Note: Detailed BOM in systems wise and BHEL unit wise with detailed specification of various equipment's and items are given in the **VOLUME-IA PART-I CHAPTER-IX**. The rate schedule is the summary of BOM i.e. consolidated list of BOM. Contractor shall go through the detailed BOM and specification before filling the rate in the rate schedule.

VOLUME-IA PART – I CHAPTER – III FACILITIES & CONSUMABLES IN THE SCOPE OF CONTRACTOR / BHEL

1.3.1.0	PART-A-	ESTABLISHMENT			
	SI. No.	Description	Scope of BHEL	Scope of Bidder	Remarks
1.3.1.1	Α	FOR CONSTRUCTION PURPOSE:			
	1	Open space for office	Yes		
	2	Open space for storage	Yes		
	3	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
	4	Bidder's all office equipment, office / store / canteen consumables		Yes	
	5	Canteen facilities for the bidder's staff, supervisors and engineers etc.		Yes	
	6	Firefighting equipment like buckets, extinguishers etc.		Yes	
	7	Fencing of storage area, office, canteen etc. of the bidder		Yes	
1.3.1.2	В	FOR LIVING PURPOSES OF THE BIDDER			
	1	Open space	Yes		
	2	Living accommodation		Yes	
1.3.1.3	С	ELECTRICITY			
	1	Electricity For construction purposes (to be specified whether chargeable or free)	Yes		
	1.a	Single point source	Yes		Free of Charges

	1				į.
	1.b	Further distribution for the work to be done which include supply of materials and execution		Yes	
	2	Electricity for the office, stores, canteen etc. of the bidder which include		Yes	
	2.a	Distribution from single point including supply of materials and service		Yes	
	2.b	Supply, installation and connection of material of energy meter including operation and maintenance		Yes	Calibration certificate to be provided
	2.c	Duties and deposits including statutory clearances for the above		Yes	
	2.d	Demobilization of the facilities after completion of works		Yes	
	3	Electricity for living accommodation of the bidder's staff, engineers, supervisors etc. on the above lines.(in case BHEL provides this facility, the scope should be given without ambiguity)		Yes	
1.3.1.4	D	WATER SUPPLY			
	1	For construction purposes:	Yes		Free of Charges
	1.a	Making the water available at single point	Yes		Free of Charges
	1.b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
1.3.1.5	E	Water supply for bidder's office, stores, canteen etc.			
	1	Making the water available at single point		Yes	

	2	Further distribution as per the requirement of work including supply of materials and execution		Yes	
1.3.1.6	F	LIGHTING			
	1	For construction work (supply of all the necessary materials) At office storage area, At the preassembly area, At the construction site/area		Yes	
	2	For construction work (Execution of the lighting work/ arrangements) At office Storage Area, At the preassembly area, at the construction site/area		Yes	
		COMMUNICATION FACILITIES			
1.3.1.7	G	for site operations of the			
		bidder			
	1	Telephone, Fax, internet, internet, email etc. (min 2 Nos of PC & Printer) – 2 Data entry operator with computer knowledge		Yes	
1.3.1.8	Н	COMPRESSED AIR SUPPLY			
	1	Supply of Compressor and all other equipment required for compressor & compressed air system including pipes, valves, storage systems etc		Yes	
	2	Installation of above system and operation & maintenance of the same		Yes	
	3	Supply of the all the consumables for the above system during the contract period		Yes	
1.3.2.0	PART-B	-ERECTION FACILITIES			
	1	Engineering works for construction	Yes		
	2	Providing the erection drawings for all the equipment covered under this scope	Yes		In consultation with BHEL

	3	Drawings for construction methods		Yes	In consultation with BHEL
	4	As-built drawings — wherever deviations observed and executed and also based on the decisions taken at site- example — routing of small bore pipes	Yes	Yes	In consultation with BHEL
	5	Shipping lists etc for reference and planning the activities	Yes	Yes	In consultation with BHEL
	6	Preparation of site erection schedules and other input requirements		Yes	
	7	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments	Yes		In consultation with BHEL
	8	Weekly erection schedules based on SI No. 6		Yes	In consultation with BHEL
	9	Daily erection / work plan based on SI No. 7		Yes	In consultation with BHEL
	10	Periodic visit of the senior official of the bidder to site to review the progress so that works is completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two months.		Yes	In consultation with BHEL
	11	Preparation of preassembly bay		Yes	
	12	Laying of racks for gantry crane if provided by BHEL or brought by the contractor/bidder themselves			Not Applicable
1.3.3.0	LAND				
1.3.3.1	the plant	Open space will be provided at free premises or adjacent to the plant bouled, contractor's stores shed(s). Contractor	ndary for	construct	ion of temporary

	pre-fabricated constructions made of steel with single / double skin, insulated for un- insulated roof and wall coverings (fabricated out of permanently color coated metal sheets) for their site office, covered store or any other temporary building. Alternatively, contractor can adopt readymade 'porta cabin" or similar construction.
1.3.3.2	BHEL shall not provide to the contractor any residential accommodation to any of their staff and the contractor has to make their own arrangements. Only Land for Labour colony and staff colony will be provided by BHEL adjacent to the plant boundary to contractor at free of cost. Contractor has to make their own arrangements for labour colony.
1.3.3.3	Contractor has to furnish the details of requirements of area of space for their office, stores, storage shed, labour colony etc. at site before starting the work to BHEL Site Engineer.
1.3.3.4	Location and area requirement for office / storage sheds / fabrication yard shall be discussed and mutually agreed to.
1.3.4.0	ELECTRICITY:
1.3.4.1	The construction power (415V) will be provided at a single point for construction purpose free of charge. Construction power shall be provided from the nearest Substation / tapping point within the plant premises. For the purpose of measurement of power consumed, the contractor shall provide Energy meter with valid calibration certificate. Distribution from this source to different locations is to be arranged by the bidder at their cost.
1.3.4.2	Electricity for labour colony and staff colony will be provided at single point on chargeable basis at the prevailing rate of TSGENCO. Distribution from this source to different locations is to be arranged by the bidder at their cost.
1.3.4.3	Any duty, deposit involved in getting the Electricity shall be borne by the bidder. As regards to contractor's office shed also, all such expenditure shall be borne by the contractor. Demand charges if any to be borne by the contractor.
1.3.4.4	Provision of distribution of electrical power from the given points to the required places with proper distribution boards, approved cables and cable laying including supply of all materials like cables, switch boards, pipes etc., observing the safety rules laid down by electrical authority of the State/ BHEL / their customer with appropriate statutory requirements shall be the responsibility of the tenderer / contractor.
1.3.4.5	BHEL is not responsible for any loss or damage to the contractor 's equipment as a result of variations in voltage / frequency or interruptions in power supply.

1.3.4.6	Necessary "Capacitor Banks" to improve the Power factor to a minimum of 0.8 shall be provided by the contractor at their cost. Penalty if any levied by customer on this account will be recovered from contractor's bills.
1.3.4.7	Contractor has to make their own arrangements for their electricity requirement for their labour colony at their cost incase Electricity is not provided by TSGENCO.
1.3.4.8	As there are bound to be interruptions in regular power supply, power cut/load shedding in any construction sites, contractor should make their own arrangement for alternative source of power supply through deployment of adequate number of DG sets at their cost during the power breakdown /failure to get urgent and important work to go on without interruptions. No separate payment shall be made for this contingency
1.3.5.0	CONSTRUCTION WATER
1.3.5.1	Water (Raw water) required for construction purposes will be provided at one single point within the plant area at free of charge for construction purpose and bidder has to make their own arrangement for further distribution by arranging required pipes, valves, pumps, etc.
1.3.5.2	Water (Raw water) for labour colony and staff colony shall be provided at single point on chargeable basis at the prevailing Government Tariff and bidder has to make their own arrangement for further distribution by arranging required pipes, valves, pumps, etc.
1.3.5.3	Incase non-availability of water, the contractor shall make their own arrangements of water suitable for construction purpose to have uninterrupted work. No separate payment shall be made for any contingency arrangement made by contractor, due to delay / failure for providing water supply. Contractor has to make their own arrangements for their water requirement for their labour colony at their cost.
1.3.6.0	DRINKING WATER: Bidder shall provide drinking water at the work spot at their cost.
1.3.7.0	ONLINE SITE CONSTRUCTION MANAGEMENT SYSTEM [SCMS]
1.3.7.1	Contractor has to provide at BHEL office, minimum two (02) computers and printers along with refilling of cartridges whenever required (along with one operator per PC) for online material management, reporting of daily progress, billing and other similar activities, within the quoted rate. Computers shall have minimum configuration of minimum Windows 7 OS, 4GB RAM and Internet Explorer 8 or above.
1.3.8.0	CONSUMABLES:

1.3.8.1	Such of those consumables as indicated as consumables provided by BHEL alone will be provided to the contractor by BHEL free of charge for erection activities. Other required consumables like electrodes, all gases, and other materials for this scope of work are to be arranged by the contractor at their cost.
1.3.8.2	All the required electrodes (in their scope) as approved by BHEL shall be arranged by contractor at their cost. It shall be the responsibility of the contractor to obtain prior approval of BHEL, before procurement regarding, suppliers, type of electrodes etc. On receipt of the electrodes at site, it shall be subject to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch number and date of expiry etc.
1.3.8.3	All electrodes including stainless steel electrodes required for shall be arranged by the contractor at their cost. The bidder shall use the Customer approved quality welding electrodes only.
1.3.8.4	The contractor shall provide within finally accepted price / rates, all consumables like welding electrodes (including alloy steel and stainless steel), all gases (inert, welding, and cutting), soldering material, dye penetrants, radiography films. Other erection consumables such as tapes, jointing compound, grease, mobile oil, M-seal, Araldite, petrol, CTC / other cleaning agents, grinding and cutting wheels are to be provided by the contractor. Steel, H&S, packers, shims, wooden planks, scaffolding and pre-assembly materials, hardware items etc. required for temporary works such as supports, scaffoldings, bed are to be arranged by them. Sealing compounds, gaskets, gland packing, wooden sleepers, for temporary work, required for completion of work except those which are specifically supplied by manufacturing unit are also to be arranged by them.
1.3.8.5	All the shims, gaskets and packing, which go finally as part of equipment, shall be supplied by BHEL free of cost.
1.3.8.6	In the event of failure of contractor to bring necessary and sufficient consumables, BHEL shall arrange for the same at the risk and cost of the contractor. The entire cost towards this along with standard BHEL overhead shall be deducted from the contractor's immediate due bills.
1.3.9.0	MATERIAL SUPPLY:
1.3.9.1	BHEL will supply the materials/equipment indicated in the weight schedule, supplied from their respective manufacturing units which are to be executed/incorporated in the permanent system.
1.3.10.0	POSSESSION OF GENERATORS:

1.3.10.1	As there are bound to be interruptions in regular power supply, power cut/ load shedding in any construction sites, suitable extension of time, if found necessary only be given and contractor is not entitled for any compensation. It shall be the responsibility of the tenderer / contractor to provide, and maintain the complete installation on the load side of the supply with due regard to safety requirements at site. It shall be responsibility of the contractor to have at least (2 to 4) diesel operated generator sets for welding to get urgent and important work to go on without interruptions. The consumables required to operate the generators are to be provided by tenderers. This may also be noted while quoting. No separate payment shall be made for this contingency.
1.3.11.0	LIGHTING FACILITY (with ELCB):
1.3.11.1	Adequate lighting facilities such as flood lamps, hand lamps and area lighting shall be arranged by the contractor at the site of construction, pre assembly yard and contractor's material storage area etc. at their cost.
1.3.12.0	GASES:
1.3.12.1	All the required gases like Oxygen / Acetylene / argon /Nitrogen required for work shall be supplied by the Contractor at their cost. It shall be the responsibility of the contractor to plan the activities and store sufficient quantity of these gases. Non-availability of gases cannot be considered as reason for not attaining the required progress.
1.3.12.2	BHEL reserves the right to reject the use of any gas in case required purity is not maintained.
1.3.12.3	The contractor shall submit weekly / fortnightly / monthly statement report regarding consumption of all consumables for cost analysis purposes.
1.3.12.4	The contractor shall ensure safe keeping of the inflammable cylinder at a separate place away from normal habit with proper security etc.
1.3.13.0	ELECTRODES SUPPLY AND STORAGE:
1.3.13.1	The bidder shall use the BHEL / Customer approved quality welding electrodes only.
1.3.13.2	It shall be the responsibility of the contractor to obtain prior approval of BHEL, before procurement, regarding suppliers, type of electrodes etc. On receipt of the electrodes at site, it shall be subject to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch number and date of expiry etc.

1.3.13.3	Shortage of any of the electrodes or the equivalent suggested by BHEL shall not be quoted as reason for deficiency in progress or for additional rate. Contractor shall submit weekly/ fortnightly/ monthly statement/ report regarding consumption and available stock of all types of electrodes for avoiding stoppage of work on consumable scarcity.	
1.3.13.4	Storage of electrodes shall be done in an air conditioned / controlled humidity room as per requirement, at their own cost by the contractor.	
1.3.13.5	All low hydrogen electrodes shall be baked / dried in the electrode drying oven (range 375 deg. C - 425 deg. C) to the temperature and period specified by the BHEL Engineer before they are used in erection work and each welder should be provided with one portable electrode drying oven at the work spot. Electrode drying oven and portable drying ovens shall be provided by contractor at their cost.	
1.3.13.6	In case of improper arrangement of procurement of above electrodes BHEL reserves the right to procure the same from any source and recover the cost from the contractor's first subsequent bills at market value plus departmental charges of BHEL communicated from time to time. Postponement of such recovery is not permitted.	
1.3.13.7	BHEL reserves the right to reject the use of any electrodes at any stage, if found defective because of bad quality, improper storage, date expiry, unapproved type of electrodes etc. It shall be the responsibility of the contractor to replace at their cost without loss of time.	
1.3.14.0	OTHER FACILITIES:	
1.3.14.1	Adequate waterless urinals [at least 2 nos per level] shall be arranged by the	
1.3.15.0	MATERIALS /CONSUMABLES TO BE ARRANGED BY THE CONTRACTOR AT THEIR COST FOR ERECTION AND COMMISSIONING OF RESPECTIVE EQUIPMENTS/ITEMS.	
1.3.15.1	All welding electrodes, filler wires, gases shall be arranged by the contractor at their cost.	
1.3.15.2	Supply of paints, Ferrules, lugs for sizes up to 2.5 sq mm shall be in the scope of the contractor within the quoted rate.	
1.3.15.3	Other items:	
	Provision for Temporary scaffoldings	
	2. Insulation tapes	

	3. Paints required for primer coating & final coating and for protective coating. paint of approved colour, consumables like thinner brushes, emery paper etc.,			
	4. Solder wire (Lead 60/40)			
	5. Protocol / calibration report sheets as per BHEL format			
	6. PVC wire marker sleeves and tag pla			
	7. Panel / JB sealing compound materi	al (for cab	ble entry from bottom / top of	
	panel)	/CL / Alum	sisium Flata DVC Cable tica	
	8. Materials required for cable dressing etc)	(GI / Alun	illinium Flats, PVC Cable ties,	
	9. Anchor fasteners for wall mounted ca	hle travs 8	2. IBs wherever required	
	10.PVC wire marker sleeves and tag pla	•	x obo whorever required.	
	11. Lugs of size 2.5 sq.mm and below	1100		
	12. "U" clamps with nuts and washers fo	r impulse	nines and GI nine clamping	
	13. Tag Plats-Al/Fiberglass/Stainless St		pipos and or pipo diamping.	
	14. Insulation Tapes	001		
	15. Teflon Tap for GI pipe coupling			
	16. Protocol/Calibration report sheets as	per BHFI	format	
	17. Fastener for mounting JB, Local PB	•		
•	18. PVC cable tie, Aluminium or GI strip		•	
	and other dressing materials required for			
	cables.			
1.3.16.0				
	CABLE LUGS:		Coldorloss Crimping Type	
	Type Material		Solderless Crimping Type Copper/ Aluminium	
1.3.16.1	Whether Tinning required (for copper cable lugs)		Yes	
	Thickness of Tinning	abio lago _j	10 Microns	
	Applicable Standard for LT cables		IS:8309	
	FERRULES:		•	
1.3.16.2	Colour of Ferrules Yellow/W		/hite	
	Colour of Engraving	Black		
	TAGS:			
1.3.16.3	Material		lass/Stainless Steel	
	Markings Engraving/Embossing/Printing		g/Embossing/Printing	
1.3.17.0	POWER REQUIREMENT:			
	For the purpose of planning, Contractor		•	
1.3.17.1	of Power (month wise) for execution of			
12100	before starting the work at site to BHEL Site Engineer. 3.0 CONTRACTOR'S OBLIGATION ON COMPLETION:			
1.3.18.0	CONTRACTOR 3 UBLIGATION ON CO		JIN.	

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

VOLUME-IA PART – I CHAPTER – IV T&PS AND MMES TO BE DEPLOYED BY CONTRACTOR

1.4.0.0 T&Ps and MMEs TO BE DEPLOYED BY CONTRACTOR:

Major T&P and testing equipment given in the below list is tentative requirement considering parallel working in all areas mentioned in scope of work. However, mobilization schedule and quantity/ numbers as mutually agreed at site for major T&Ps, have to be adhered to.

1.4.1.0 The following minimum Instruments / T&P shall be arranged by contractor in sufficient number to carry out the job simultaneously in more than one area.

A. List of Recommended Instruments for Erection, Testing & Commissioning.

SI.No.	Description	Quantity
Dead Weight tester rated 600 kg/sq.cm with weights & test gauges facility.		02 Nos.
02	Oil temperature bath suitable to calibrate upto 400° C	02 Nos.
03	Furnace range 600 Deg C	01 No.
	Standard Pressure Gauges as below :	
	0 to 1 kg/Sq.cm	01 No.
	0 to 5/6 kg/Sq.cm	01 No.
	0 to 10 kg/Sq.cm	01 No.
04	0 to 16 kg/Sq.cm	01 No.
	0 to 25 kg/Sq.cm	01 No.
	0 to 60 kg/Sq.cm	01 No.
	0 to 100 kg/Sq.cm	01 No.
	0 to 250 kg/Sq.cm	01 No.
	Standard Temperature Gauges as below:	
05	0 to 100 Deg C	02 No.
US	0 to 200 Deg C	02 No.
	0 to 600 Deg C	02 No.
06	Standard compound pressure gauge -1 to +3 kg/Sq.cm	02 No.
07	Standard Vacuum Gauge -760 mm Hg to 0 kg/Sq.cm	01 No.
08	Portable air compressor with drier and regulator rated for 10 kg/Sq.cm	01 No.
09 Manometer 0 to 1000 mm WC with hand bulb		03 Nos.
10	Vacuum pump with standard vacuum gauge	01 No.
11	Standard Milliamps Source (Digital)	03 Nos.
12	03 Nos.	
13	04 Nos.	

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TENDER SPECIFICATION

14	DC Power Supply, 24 V; 5A	03 Nos.
15	Single Phase Variac 250V; 10A	01 Nos.
16	Glass Thermometers of ranges in Deg C as below: 0-120; 0-200; 0-600	02 Nos. each
17	Tong tester AC 5/10/25 ; KEW Snap Make	01 No. each
18	Function Generator	01 No.
19	Hand Operated Megger 500V ; 2.5 kV / 100 M Ohms	Each type As required
20	Torque wrench	As required
21	AC Voltmeter 0-125 ; 250 ; 625V	01 No. each
22	AC Ammeter 0-2A; 10A	01 No. each
23	Analog Multimeter Motwane Make	03 Nos.
24	Digital Multimeter 3 1/2 Digit	08 Nos.
25	Digital Multimeter 4 1/2 Digit	03 Nos.
26	Wire wrapping tool	As required
27	Oscilloscope	01 Nos.
28	Soldering irons, soldering pump, Vacuum cleaner, Air blower etc.	As required

B. List of Recommended Tools & Plants

S.No.	DESCRIPTION	QUANTITY
01	Steel wire ropes	As required
02	Chain pulley block / turfer	As required
03	2 " size pipe bending machine	As required
04	Grinding machine	As required
05	Drilling machines: 1/4", 1/2", 3/4", 1 "	As required
06	Ttube bender and cutter sizes 6 mm;8 mm;1/2",1/4"	As required
07	Dye sets for threading upto 2 " pipe	As required
08	Set of spanners	As required
09	Allenkey sets	As required
10	Bench vice	1 No.
11	Spirit level	As required
12	Tap sets for both BSP & NPT threads upto 1 "	1 Set each
13	Measuring instruments like micrometers, calipers etc.	1 each
14	Welding generator	1 No.
15	Welding transformer	As required
16	TIG Welding set	1 No.
17	Mechanical tool kit for fitters	As required
18	Electrician tool kit	As required
19	Crimping tool	As required
20	Flood light fittings	As required

2	1	Fire extinguishers	As required
22		Distribution boards with power cable complete as	As required
	2	required with energy meter	
2	3	Hydraulic test pump rating 750 kg/sq.cm	As required
24	4	Painting brush	As required
2	5	Fire proof tarpaulin	As required
20	6	Safety belts & safety helmets	As required
2	7	As required	

Note:

- a. T & Ps and their quantity as mentioned in above list are the suggestive requirement considering parallel working. However, its mobilization, quantity and period of T&Ps deployment will be mutually agreed at site as per actual requirement.
- b) Numbers / time of requirement will be reviewed from time to time at site and contractor will provide required T&Ps / equipment to ensure completion of entire work within schedule / target date of completion without any additional financial implication to BHEL.
- c) Vendor will give advance intimation prior to its dispatch. Also on completion of the respective activity, demobilization of T&Ps in total or in part can be done with the due approval of engineer in charge. Retaining of the T&Ps during the contract period will be mutually agreed in line with construction requirement.

1.4.2.0 ACCURACY REQUIREMENT OF TESTING INSTRUMENTS

SI.No.	Instrument / Tool	Range	Accuracy	Dial Size
	Digital Multimeter	Voltage 200 mV to 1000 V DC	± 1% + 1 digit	
		Philips Voltage 200 mV to 1000 V AC	± 1% + 1 digit	
		Philips Current 20 mA to 20 A AC	± 0.8% + 1 digit	
		Resistance (HCI) 2120 200* to 20 M*	± 0.5% + 1 digit	
01		Resistance (Hcl) 2105 200* to 200M*	± 0.25% + 3 digits	
		Hcl Voltage 200 mV to 750 V	± 0.8% + 1 digit	
		Philips Current 20 mA to 20 A DC	± 0.5% + digit	
		Hcl Current 200 mA to 010 A AC	± 1% + digit	
02	Analog	Voltage 2.5 to 2500V AC	± 1.0%	
02	Multimeter	Current 100 mA to 10A AC	± 2.0%	

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		Current 250 micro A to 1A DC	± 1.5%	
		Resistance upto 100 ohms	± 3.0%	
		Voltage 2.5 V to 2500 V	±1%	
03	MV/mV Source	0 to 200 mA / 200mV	0.2%	
04	Hand operated Megger 500V /1000 V	Upto 200 m Ohms	± 5% at Centre scale	10"
	Standard Pressure Gauges	0 to 1 kg/cm ²	±0.25% LC- 0.02 kg/ cm ²	10"
	, and the second	0 to 6 kg/cm ²	±0.25% LC- 0.1 kg/ cm ²	10"
		0 to 10 kg/ cm ²	±0.25% LC- 0.02kg/ cm ²	10"
		0 to 25 kg/ cm ²	±0.25% LC– 0.25kg/ cm ²	10"
05		0 to 60 kg/ cm ²	±0.25% LC- 0.1kg/ cm ²	10"
		0 to 250 kg/ cm ²	±0.25% LC– 2.5kg/ cm ²	10"
		0 to 400 kg/ cm ²	±0.25% LC– 2.5 kg/ cm ²	10"
		0 to 600 kg/ cm ²	±0.25% LC- 2.5 kg/ cm ²	10"
		0 to 1000 kg/ cm ²	±0.25% LC– 1.0 kg/ cm ²	10"
06	Dead Weight Tester	0 to 400	LC – 5 kg/cm2	
00		0 to 600	LC – 5 kg/cm2	
	Standard Hg		LC - 1ºC	
		0 to 110°C	LC - 1ºC	
07	Thermometer	0 to 250°C	LC - 1ºC	
		0 to 150°C	LC - 1ºC	
		0 to 360°C	LC - 1ºC	

_				
			0 to 420°C	LC - 1ºC
	08	Single Phase	15 A Capacity	N/A
	00	Variac		
	09	Power Pack	0 to 50 V DC, 3A	± 2%
		Vibration	Velocity up to 50 mm/sec	± 0.5%
	10	Measuring		mm/sec
	10	Equipments	Displacement upto 300	± 2 microns
			microns	
	11	Tongue	0/300/600 A AC	± 5%
	' '	tester	0 to 300 A DC	± 5%
	12	Tacho Meter	0 to 4000 rpm	± 5%
		(Hand held)		
		Phase		N/A
	13	Sequence		
		Meter		
		Earth Megger	0 to 1, 10, 100 Ohms	± 5% at
	14	(Tester)		Centre
				Scale range
	15	DC Ammeter	0 to 300 A	± 10%
	16	DC Voltmeter	0 to 500 V	± 10%

Note:

1. For loading and transportation, all necessary T & P such as Trailers, Cranes, Winches, welding generators, slings, jacks, sleepers, rails etc., are to be arranged by the contractor. All the tools & plants required for this scope of work, except the tools & plants provided by BHEL are to be arranged by the contractor within the quoted rates.

2. Note for Contractor's Instruments:

- a. The contractor shall arrange all the above T&P, equipment and instruments as indicated except testing instruments which are proprietary in nature.
- b. The contractor at their cost shall arrange all cranes and truck / tractor, trailers required for material handling purpose and also cranes required for erection.
- c. Any other tools and plants instruments and equipment required in addition to the above for the successful completion of this job will have to be arranged by the contractor at their cost.
- d. Necessary accessories for the above shall also be provided by the contractor.

e. The above instruments / equipment will be sent for testing and calibration wherever from time to time and maintained by contractor as required by BHEL. f. All testing instruments shall have calibration certificate issued by recognized / accredited agencies. g. List of such agencies and periodicity of calibration required for different instruments will be furnished by BHEL at site. h. Contractor shall maintain calibration records as per the BHEL format and produce them whenever called for by BHEL Engineers. i. Contractors shall arrange experienced/qualified persons for using these calibration instruments at laboratory and also at work spot. Wherever frequent calibration is required; contractor shall arrange adequate number of instruments such that the work does not suffer for want of test instruments. 1.4.3.0 T&Ps mentioned above is tentative requirement considering parallel working in all areas mentioned in scope of work. However, mobilization schedule and quantity / numbers as mutually agreed at site for major T&Ps, have to be adhered to. Numbers / time of requirement of T&Ps will be reviewed time to time by BHEL site and contractor will provide required T&Ps / equipment to ensure completion of entire work within schedule / target date of completion without any additional financial implication to BHEL. Vendor will give advance intimation and certification regarding capacity etc. prior to dispatch of heavy equipment. Also on completion of the respective activity, demobilization of T&P in total or in part can be done with the due approval of engineer in charge. Retaining of the T&P's during the contract period will be mutually agreed in line with construction requirement. Computerized ferrules printing machine (min - 01 No.) shall be provided for 1.4.4.0 making printed ferrules for all the cables. 1.4.5.0 PROTECTION / HANDLING OF TOOLS AND PLANT ARRANGED BY THE CONTRACTOR 1.4.5.1 Equipment, vehicles, tools and plants and materials brought to site by the contractor from their resources shall have distinctive identification marks and the contractor shall intimate the description and quantity to BHEL in writing. 1.4.5.2 All construction materials brought by the contractor shall have prior approval regarding quality and quantity by BHEL. The contractor shall also provide without extra cost necessary enclosures containers and protective materials for proper storage of materials inside, whenever so instructed by the purchaser without any

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extra cost.

1.4.5.3	No material or equipment or tools etc., shall be taken out of the work-site without the written consent of BHEL.
1.4.5.4	BHEL shall not be responsible for the safety and protection of the materials of the contractor and the contractor shall make their arrangements for proper watch and ward for their materials.
1.4.5.5	Until such time the work is taken over by BHEL, the contractor shall be responsible for proper protection including proper fencing, guarding, lighting, flagging, and watching. The contractor shall during the progress of work properly cover up and protect any part of the work liable to damage by exposure to the weather and shall take every reasonable precaution against accident or damage to the work from any cause.
1.4.5.6	In the event of non-mobilisation of Tools, Plants, Machinery, Equipment, Material or non-availability of the same owing to breakdown and as a result progress of work suffered, BHEL reserves the right to make alternative arrangement (available or higher capacity) in line with SCC clause no. 4.2.1.7 and hire charges shall be applicable as under:
	i. BHEL provides its own Capital T&P: If BHEL provides owned T&P then BHEL, hire charges (as per BHEL norms) will be recovered from the contractor as per the prevailing BHEL Corporate hire charges applicable (as enclosed in Volume I Book I TCC- Volume IA Part II) as per following cases:
	 In case the T&P is specifically listed in "T&Ps to be deployed by Contractor", 'Rates of hire charges applicable to outside agencies other than contractors working for BHEL' will apply.
	 In case the T&P is not specifically listed in "T&Ps to be deployed by Contractor", 'Rates of hire charges applicable to contractors working for BHEL' will apply.
	The hire charges of Capital Tools & Plants are exclusive of operating expenses e.g., Operator, fuel & Consumables and the same shall be arranged by the contractor at their cost.
	 ii. BHEL provides hired T&P: In all cases other than that specified in SI. No. (i) above, actual expenses incurred by BHEL along with applicable overheads will be back-charged to the contractor.
1.4.6.0	CALIBRATION RECORD OF SUB-CONTRACTOR'S INSTRUMENTS

	Format No. CP:PEX:FC Name of Site: Name of Sub-Contractor:				
SI.No.		Instrument REGN.No.	Entry /	Periodicity of Calibration	Calibration Detail
					Date of Cal: Cal. Agency: Next Due Date:
					Date of Cal: Cal. Agency: Next Due Date:
					Date of Cal: Cal. Agency: Next Due Date:

VOLUME-IA PART – I CHAPTER – V T&Ps AND MMEs TO BE DEPLOYED BY BHEL ON SHARING BASIS

1.5.0.0	T&Ps AND MMEs TO BE DEPLOYED BY BHEL ON SHARING BASIS		
1.5.1.0	List of T&Ps to be made available by BHEL to contractor free of hire charges on sharable basis.		
	1. EOT Crane at the respective TG Hall without operator– 01 No.		
1.5.2.0	EOT crane without operating personnel shall be made available in the TG Hall free of charge. The contractor has to arrange operator for EOT Crane. EOT crane will be allocated for execution of C&I work including shifting the panels within power house building on sharing basis at free of hire charges. The decision of BHEL Engineers will be final with regard to allotment of crane.		
1.5.3.0	Experienced Crane operator for EOT crane to be arranged by the bidder at their cost.		
1.5.4.0	Providing manpower assistance required for free movement of Trailing cable of EOT Crane is also scope of the bidder at their cost.		
1.5.5.0	The availability of crane is likely to be hampered from time to time due to routine preventive maintenance or breakdown maintenance. Contractor has to make alternative arrangement or plan / modify / alter their activities to suit the above conditions and the contractor will not be liable for any compensation or extension of time due to this non-availability, for maintaining the erection schedule.		
1.5.6.0	In the event of the crane not available for longer duration due to major breakdown or any other reasons, BHEL will reschedule the work in consultation with bidder and direct the bidder to concentrate on other areas till such time the cranes are made available.		
1.5.7.0	Crane operators deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes.		
1.5.8.0	All the distribution boards, connecting cables, hoses etc., and temporary connection work including electrical connections for the BHEL issued T & Ps shall have to be arranged by the contractor at their cost.		

1.5.9.0	Contractor shall make good any loss or damage to the equipment's supplied to them and day to day maintenance and operations of equipment's shall be borne by the contractor including all consumables like petrol, oil and air filters etc.,
1.5.10.0	BHEL may provide either BHEL owned or hired 75T (or above capacity) cranes as per site requirement for erection at the discretion of BHEL.
1.5.12.0	In the event of providing BHEL owned cranes:
1.5.12.1	BHEL shall provide crane operator at free of charges.
1.5.12.2	Fuel and lubricants are to be arranged by the contractor within the quoted rate.
1.5.12.3	Maintenance for the BHEL own cranes shall be carried out by BHEL. However, all the consumables for the maintenance of BHEL own cranes shall be provided by the contractor within the quoted rates. The Tentative List of consumables required to be provided by contractor from the BHEL/OEM recommended supplier is as below:
	 a. Engine Oil b. Fuel Filters c. Air Filters d. Hydraulic Oil e. Hydraulic Filters f. Gear Oil g. Engine Oil Filter h. Oil Separator Filter i. Rope j. Grease k. Maintenance for the BHEL cranes shall be carried out by BHEL. The bidder shall extend support if required for routine maintenance works without any additional cost.
1.5.13.0	In the event of providing hired cranes:
1.5.13.1	Crane Operators for hired cranes will be provided by BHEL, free of charges.
1.5.13.2	Fuel and lubricants are to be arranged by the contractor within the quoted rate.
1.5.14.0	Cranes provided by BHEL are only for erection purpose and shall not be available for material handling or transportation purpose. Contractor shall make their own arrangements for material transportation to erection site.
1.5.15.0	Besides the T & P mentioned above, which is being made available to the contractor on free of hire charges, any additional T & Ps which may be required for successful and timely execution of the work covered within the

	scope of this tender shall be arranged and provided at site by the contractor at their cost. In case if the contractor fails to provide such equipment, BHEL will arrange for the same and the cost will be recovered from the contractor's bill with BHEL overheads, as applicable from time to time which may vary even during contract period.
1.5.16.0	Any loss / damage to any or part of the BHEL T&Ps by the contractor shall have to be replaced or otherwise cost thereof shall be recovered from the contractor.
1.5.17.0	All the distribution boards, connecting cables, hoses etc., and temporary connection work including electrical connections shall have to be arranged by the contractor at their cost.
1.5.18.0	Necessary electrical / water / air connection required for operation of any of the tools & tackles shall be in the Contractor's scope.
1.5.19.0	Apart from the above mentioned tools, any other tools and plants including suitable Jacks / Hydraulics jacks required for satisfactory completion of the work has to be arranged by the contractor. However, bidders may note that the Hydraulic jacks that are supplied by manufacturing units for alignment of Generator Stator, if any shall be made available to TG contractor for the said purpose.
1.5.20.0	For the cranes, the required consolidation and preparation for placing crane for operation (civil work) is under bidder scope and also necessary plates / sleepers required for marching operation shall be provided by the contractor within quoted rates.
1.5.21.0	For movement of cranes etc., it may become necessary to lay sleeper bed for obtaining leveled safe approach for usage of equipment. It shall be the responsibility of the contractor to lay necessary sleeper's. The sleepers shall be arranged by the contractor at their cost.
1.5.22.0	The contractor at their cost shall arrange for grouting of anchor points of T&Ps issued to them. Necessary grout materials are to be arranged by the contractor at their cost.
1.5.23.0	In case of non-availability of any of these equipment, due to any reason i.e., unavoidable breakdown, major overhaul or any other reason etc., the contractor should make arrangement at their cost to meet the erection targets. No extra claim will be admitted due to non-availability of any of the above equipment. No delay in execution of work shall be accepted on this account.

VOLUME-IA PART – I CHAPTER-VI TIME SCHEDULE

4 C O O TIME SCHEDULE				
1.6.0.0	TIME SCHEDULE			
1.6.1.1	The entire work of erection testing and commissioning as detailed in the Tender Specification shall be completed within 20 (Twenty) months from the date of commencement of work at site.			
1.6.1.2	During the total period of contract, the contractor has to carry out the activities in a phased manner as required by BHEL and the program of milestone events.			
1.6.1.3	The erection work shall be commenced on the mutually agreed date between the bidder and BHEL engineer and shall be deemed as completed in all respect only when the unit is in operation. The decision of BHEL in this regard shall be final and binding of the contractor. The scope of work under this contract is deemed to be completed only when so certified by the site Engineer.			
1.6.1.4	The contractor is required to refer Form 15 in Volume 1- BOOK 2 for all the instructions to be taken immediately after receipt of LOI.			
1.6.2.0	COMMENCEMENT OF CO	NTRACT PERIOD		
1.6.2.1	The date of commencement of contract period shall be the mutually agreed date between the bidder and BHEL engineer to start the work. In case of discrepancy the decision of BHEL engineer is final.			
1.6.3.0	MOBILIZATION FOR ERECTION, TESTING, ASSISTANCE FOR COMMISSIOING ETC.,			
1.6.3.1	The activities for erection, testing etc. shall be started as per directions of Construction manager of BHEL. The contractor has to augment their resources in such a manner that following major milestones of erection & commission are achieved on specified schedules:			
		A. Major Milestones		
	Milestone Activity	Unit # 1	Unit # 2	
	 Start of work 	1st Month	1st Month	
	2. Readiness for Boiler Light Up	3rd month	3rd month	
	3. Readiness for Synchronization	9 th Month	9th Month	
	4. Trial Operation	14th Month	14 th Month	
	Balance work completion, pending points, punch points liquidation	20 th Month	20 th Month	

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	B. Intermediate Milestones			
	Milestone	Unit # 1	Unit # 2	
	1. Readiness for	3 rd Month	3 rd Month	
	Boiler Light Up (M1)			
	2. Readiness for	9 th Month	9 th Month	
	Synchronization (M2)	o mona	o worter	
1.6.3.2	In order to meet above scl targets set, to meet custom shall arrange & augment all instructions of BHEL Engine	ner / project schedule re I necessary resources fro	quirements, contractor	
1.6.3.3	In case the project is to be a contractor is to be advance payment whatsoever shall be	dvanced, the erection wo	•	
1.6.4.0	PENALTY FOR INTERMED		R FACH UNIT	
1.6.4.1	M1 and M2 shall be interme			
1.6.4.2	In case of slippage of these identified Intermediate Milestones, Delay Analysis shall be carried out on achievement of each of these two Intermediate Milestones with reference to Form 14.			
1.6.4.3	Incase delay in achieving M1 milestone is solely attributable to the contractor, 0.5% per week of executable contract value* limited to Maximum 2% executable contract value will be withheld.			
1.6.4.4	Incase delay in achieving M2 milestone is solely attributable to the contractor, 0.5% per week of executable contract value* limited to maximum 3% of executable contract value will be withheld.			
1.6.4.5	Amount already withheld, if released only if there is no of M2 milestone.			
1.6.4.6	Amount required to be withheld on account of slippage of identified intermediate milestone(s) shall be withheld out of respective milestone payment and balance amount (if any) shall be withheld @ 10% of RA Bill amount from subsequent RA bills.			
1.6.4.7	Final deduction towards LD to contractor shall be based of contract. Withheld amo milestones shall be adjusted	on final delay analysis count, if any due to slip	on completion / closure opage of intermediate	
1.6.4.8	In case of termination of con- before completion of work, t intermediate milestones sh recovery.	he amount already withh	eld against slippage of	

1.6.4.9	Note: * Executable contract value-value of work for which inputs/fronts were made available to contractor and were scheduled for execution till the date of achievement of that milestone.
1.6.5.0	CONTRACT PERIOD
1.6.5.1	The contract period for completion of entire work for each unit under scope shall be 20 (Twenty) months from the "COMMENCEMENT OF CONTRACT PERIOD" as specified earlier.
1.6.6.0	GUARANTEE PERIOD
1.6.6.1	The guarantee period of 12 months shall commence from the date of handing over of the later Unit to Customer (or) Six months from the date of first synchronization of the later unit, whichever is earlier. (Provided all erection, testing, commissioning and pending points works are completed in all respects).

VOLUME-IA PART – I CHAPTER-VII TERMS OF PAYMENT

1.7.0.0	Terms of Payment: The progressive payment for erection, testing and commissioning on accepted rate / price of contract value will be released as mentioned below.		
1.7.1.0	Progressive Payment against monthly running bills will be made % of the value of the completed erection on Pro rata basis as no 1.7.2.1.1 to 1.7.2.12.1 of the following table.		
SI. No.	Activity / Work Description	% of unit rate	
1.7.2.0	PRO RATA PAYMENTS (85%)		
1.7.2.1	For all type of Instruments including Power Cylinder/Actuator		
1.7.2.1.1	Receipt, transport to erection site, assembly, checking, calibration, fixing and clamping Adjustment, Alignment, on prorata basis and protocol signed	60%	
1.7.2.1.2	Pre-commissioning tests, checks,and making ready for energisation pro rata basis and protocol signed		
1.7.2.1.3	Completion of commissioning	10%	
	Total =		
1.7.2.2	Cable laying including Earthing wires		
1.7.2.2.1	Laying/tagging/termination of cables / Wires	65%	
1.7.2.2.2	Checking, Dressing and Clamping	10%	
1.7.2.2.3	Loop Checking and Commissioning	10%	
	Total =	85%	
1.7.2.3	AC&DCDB/MMI/PLC system and all types of control panels including MMIPIS(DCS) Related Instrumentation other than Valmet DCS control panels Erection		
1.7.2.3.1	Receipt transport to erection site, placement, assembly, fixing and clamping adjustment, alignment, grouting and electrical interconnections on prorata basis and protocol signed		
1.7.2.3.2	Pre-commissioning tests, checks and making ready for energisation on prorata basis and protocol signed	10%	
1.7.2.3.3	Completion of Commissioning	10%	
	Total =	85%	

1.7.2.4	Valmet DCS control panels Erection	
1.7.2.4.1	Receipt, Transport to Unit Control Room, Placement, assembly and Erection of Valmet DCS control panels on prorate basis and protocol signed	95%
	Reconciliation and Final bill	5%
	Total =	100%
1.7.2.5	Valmet DCS control panels Commissioning	
1.7.2.5.1	Aligning & Electrical Interconnections on prorata basis and protocol signed	65%
1.7.2.5.2	Pre-Commissioning tests, checks and making ready for energisation on prorata basis and protocol signed	10%
1.7.2.5.3	Completion of Commissioning	10%
	Total =	85%
1.7.2.6	For fabrication and installation of steel materials including LIR/LIE	
1.7.2.6.1	Fabrication / Pre assembly and applying primer paint	45%
1.7.2.6.2	Erection, Alignment, welding/bolting and if applicable chipping/grouting/painting	40%
	Total =	85%
1.7.2.7	For UPS/Battery sets/charger	
1.7.2.7.1	Receipt, transport to erection site, checking, placement, assembly, grouting, mounting and wiring of loose components	50%
1.7.2.7.2	Adjustment, alignment, inter connections and pouring of Alkali	20%
1.7.2.7.3	Pre-commissioning test checks and making ready for energization	15%
	Total =	85%
1.7.2.8	For cable trays, tray supports, Rigid and flexible conduits & copper tubes, earthing	
1.7.2.8.1	On satisfactory completion of work on prorata basis	70%
1.7.2.8.2	On completion of drawing or area wise on prorata basis	15%
	Total =	85%
1.7.2.9	For Impulse Pipes	
1.7.2.9.1	On laying and welding on prorata basis and protocol signed	50%
1.7.2.9.2	On clamping and painting on prorata basis and protocol signed	20%
1.7.2.9.3	System Charging	15%

	Total =	85%
1.7.2.10	Testing / Commissioning of Equipment erected by other Agencies	
1.7.2.10.1	On completion of commissioning of individual racks / skid / actuators / Loop checking/Instruments etc. on prorata Basis	60%
1.7.2.10.2	On completion of commissioning of main equipment/system on prorata basis	15%
1.7.2.10.3	Final completion of the system along with customer handing over protocols	10%
	Total =	85%
1.7.2.11	Other items (Misc Item) – EPBAX, Wireless communication, C&I lab, firefighting, water treatment packages, etc.	
1.7.2.11.1	Completion of work(erection, alignment & testing) of the respective item/equipment	75%
1.7.2.11.2	Completion of Commissioning of the respective item/equipment -on pro rata basis.	10%
	Total =	85%
1.7.2.12	For Supply Items (If applicable)	
1.7.2.12.1	On submission of running bill along with the Stores Receipt /Voucher/Stores endorsement issued by BHEL on prorata basis	85%
	Total =	85%
1.7.2.13	STAGE / MILESTONE PAYMENTS (15%) except for Valmet DCS control panels Erection	% of unit rate
1.7.2.13.1	Boiler Light Up	1%
1.7.2.13.2	ABO/Chemical/EDTA cleaning	1%
1.7.2.13.3	Safety Valve floating (Electromatic Relief Valves)	1%
1.7.2.13.4	Rolling and Synchronization	2%
1.7.2.13.5	Coal Firing	1%
1.7.2.13.6	Full Load	2%
1.7.2.13.7	Trial Operation of Unit	2%
1.7.2.13.8	Area cleaning, temp structure cutting/ removal and return of scrap	1%
1.7.2.13.9	Punch List points / pending points liquidation	1%
1.7.2.13.10	Submission of 'As Built Drawings'	1%
1.7.2.13.11	Monthly Material Reconciliation	1%

1.7.2.13.12	Completion of Contractual Obligation	1%				
	Total for Stage / Milestone Payments (15%)	15%				
NO CLAIM V	VHAT SO EVER MAY BE, WILL BE ENTERTAINED UNDER THI	S				
CONTRACT	CONTRACT, AFTER DULY SIGNING THE FINAL BILL ALONG WITH					
MEASUREN	MENT BOOKS AND ACCEPTED BY BHEL.					

VOLUME-IA PART – I CHAPTER VIII TAXES AND OTHER DUTIES

1.8.0.0 TAXES

TAXES and DUTIES

18. 1Goods and service Tax (GST) & Cess

- 18.1.1 The successful bidder shall furnish proof of GST registration with GSTN Portal in the State in which the Project is being executed, covering the services under this contract. Registration should also bear endorsement for the premises from where the billing shall be done by the successful bidder on BHEL for this project/ work.
- 18.1.2 Contractor's price/rates shall be exclusive of GST & Cess (if applicable) (herein after termed as GST). Contractor shall submit to BHEL the GST compliant tax invoice/debit note/revised tax invoice on the basis of which BHEL will claim the input tax credit in its return. Since this is a works contract, the applicable rate shall be @ 18% GST, as applicable presently.
- 18.1.3 Bidder shall note that the GST Tax Invoice complying with GST Invoice Rules wherein the 'Bill To' details will as below:

BHEL GSTN -

NAME -

ADDRESS -

- 18.1.4 GST charged in the tax invoice/debit note/revised tax invoice by the contractor shall be released separately to the contractor only after contractor files the outward supply details in GSTR-1 on GSTN portal and input tax credit of such invoice is matched with corresponding details of outward supply of the contractor and has paid the GST at the time of filing the monthly return.
- 18.1.5 In case BHEL has to incur any liability (like interest / penalty etc.) due to denial/reversal / delay of input tax credit in respect of the invoice submitted by the contractor, for the reasons attributable to the contractor, the same shall be recovered from the contractor.
- 18.1.6 Further, In case BHEL is deprived of the Input tax credit due to any reason attributable to contractor, the same shall not be paid or Recovered if already paid to the contractor.
- 18.1.7 Tax invoice/debit Note/revised tax invoice shall contain all such particulars as prescribed in GST law and comply to the timelines for issue of the same. Invoices shall be submitted on time to the concerned BHEL Engineer In Charge.
- 18.1.8 TDS under GST (if/ as & when applicable) shall be deducted at prevailing rates on gross invoice value from the running bills.
- 18.1.9 E-way bills / Transit passes / Road Permits, if required for materials / T&P etc., bought into the project site is to be arranged by the Contractor only.
- 18.1.10 BHEL shall not reimburse any amounts towards any interest / penalty etc., incurred by contractor. Any additional claim at a later date due to issues such as wrong rates / wrong classification by contractor shall not be paid by BHEL.

All taxes and duty other than GST & Cess and BOCW Cess

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The contractor shall pay all (except the specific exclusion viz GST &Cess and BOCW Cess) taxes, fees, license charges, deposits, duties, tools, royalty, commissions, Stamp Duties, or other charges / levies, which may be levied on the input goods & services consumed and output goods & services delivered in course of his operations in executing the contract and the same shall not be reimbursed by BHEL. 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.

18.2 Statutory Variations

Statutory variations are applicable under the GST Acts, against production of proof. The changes implemented by the Central / State Government during the tenure of the contract viz. increase / decrease in the rate of taxes, applicability, etc. and its impact on upward revision / downward revision are to be suitably paid/ adjusted from the date of respective variation. The bidder shall give the benefit of downward revision in favour of BHEL. No other variations shall be allowed during the tenure of the contract.

18.3 New Taxes/Levies –

In case Government imposes any new levy / tax after submission of bid during the tenure of the contract, BHEL shall reimburse the same at actual on submission of documentary proof of payment subject to the satisfaction of BHEL that such new levy / tax is applicable to this contract.

18.4 Direct Tax

BHEL shall not be liable towards Income Tax of whatever nature including variations thereof arising out of this contract as well as tax liability of the bidder and their personnel. Deduction of tax at source at the prevailing rates shall be effected by BHEL before release of payment as a statutory obligation, unless exemption certificate is produced by the bidder. TDS certificate will be issued by BHEL as per the provisions of Income Tax Act.

VOLUME-IA PART – I CHAPTER - IX WEIGHT SCHEDULE/BOQ

1.9.0.0 C&I - BILL OF QUANTITY (BOQ)

1.9.1.0 BOQ of Unit # 1 & 2

		ZOI UIIIL#			UNIT#	UNIT#
SL.NO.			DESCRIPTION	UOM	1	2
Α			EDN SCOPE			
A.1.0			Shifting from Stores to UCR, placement, Alignment & erection of SG Package- Valmet DNA Control Cabinets			
A.1.1	,	A.1.1,	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CJF75&CJF 76, CJF34&35	Nos	2	2
A.1.2	,	A.1.2,	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CAF41& CAF42	Nos	1	0
A.1.3	,	A.1.3,	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CAF46& CAF47	Nos	1	0
A.1.4	,	A.1.4,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg.CJF06,07,08	Nos	1	1
A.1.5	,	A.1.5,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg.CAF43,44,45 & CAF50,51,52	Nos	2	0
A.1.6	,	A.1.6,	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CJF23/24-CAF20/21, CJF25/26- CAF22/23 & CJF27/28-CAF24/25 & CJF29/30-CAF26/27	Nos	4	4
A.1.7	,	A.1.7,	Suit of five Cubicles Size: 3750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 2000 kg. CJF01,02,03,04,05 & CJF58,59,60,61,62	Nos	2	2
A.1.0.1	,		Minor Alignment, Electrical Interconnection, Testing and Commissioning of SG Package- Valmet DNA Control Cabinets			
A.1.1.1	,	A.1.1.1,	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CJF75&CJF 76, CJF34&35	Nos	2	2
A.1.2.1	,	A.1.2.1,	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CAF41& CAF42	Nos	1	0
A.1.3.1	,	A.1.3.1,	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CAF46& CAF47	Nos	1	0
A.1.4.1	,	A.1.4.1,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg.CJF06,07,08	Nos	1	1

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A.1.5.1	,	A.1.5.1,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg.CAF43,44,45 & CAF50,51,52	Nos	2	0
A.1.6.1	,	A.1.6.1,	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CJF23/24-CAF20/21, CJF25/26- CAF22/23 & CJF27/28-CAF24/25 & CJF29/30-CAF26/27	Nos	4	4
A.1.7.1	,	A.1.7.1,	Suit of five Cubicles Size: 3750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 2000 kg. CJF01,02,03,04,05 & CJF58,59,60,61,62	Nos	2	2
A.2.0	,		Shifting from Stores to UCR, placement, alignment & erection of TG Package- (Non-Core) Valmet DNA control cabinets			
A.2.1	,	A.2.1,	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CJJ08, CJJ41 & CWW01	Nos	3	3
A.2.2	,	A.2.2,	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CCA10 & CCA 11	Nos	1	1
A.2.3	,	A.2.3,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CJJ03,CJJ04 & CJJ53	Nos	1	1
A.2.4	,	A.2.4,	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CJJ01,02,05,06, CCA01,02,03,04, CJJ20,21,22,23 & CJJ30,31,32,33	Nos	4	4
A.2.0.1	,		Minor Alignment, Electrical Interconnection, Testing and Commissioning of TG Package- (Non-Core) Valmet DNA control cabinets			
A.2.1.1	,	A.2.1.1,	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CJJ08, CJJ41 & CWW01	Nos	3	3
A.2.2.1	,	A.2.2.1,	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CCA10 & CCA 11	Nos	1	1
A.2.3.1	,	A.2.3.1,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CJJ03,CJJ04 & CJJ53	Nos	1	1
A.2.4.1	,	A.2.4.1,	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CJJ01,02,05,06, CCA01,02,03,04, CJJ20,21,22,23 & CJJ30,31,32,33	Nos	4	4
A.3.0	,		Shifting from Stores to UCR, placement, alignment & erection of STN C&I Valmet DNA Control Cabinets			
A.3.1	,	A.3.1,	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CRE61/CTE01/CTE02/CTE03	Nos	4	4
A.3.2	,	A.3.2,	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CTE04	Nos	1	0

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A.3.3	,	A.3.3,	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CRE51/52, CRE81/82, CRE53/54, CRE83/84, CRE55/56, CRE57/58, CRE59/60	Nos	7	7
A.3.4	,	A.3.4,	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CRE85/86	Nos	1	0
A.3.5	,	A.3.5,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRE41/42/43, CRE48/49/50, CRE62/63/64, CRE65/66/67, CRE68/69/70	Nos	5	5
A.3.6	,	A.3.6,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRW01-03, 04-06, 11-13, 71-73, 74-76	Nos	5	0
A.3.7	,	A.3.7,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRR91-93,94-96 & 97-99	Nos	3	0
A.3.8	,	A.3.8,	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CRE 01-04,05-08, 09-12,13-16,17-20,21-24,25-28,29-32,33-36,37-40,44-47	Nos	11	11
A.3.9	,	A.3.9,	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CRW07-10	Nos	1	0
A.3.0.1	,		Minor Alignment, Electrical Interconnection, Testing and Commissioning of STN C&I Valmet DNA Control Cabinets			
A.3.1.1	,	A.3.1.1,	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CRE61/CTE01/CTE02/CTE03	Nos	4	4
A.3.2.1	,	A.3.2.1,	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CTE04	Nos	1	0
A.3.3.1	,	A.3.3.1,	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CRE51/52, CRE81/82, CRE53/54, CRE83/84, CRE55/56, CRE57/58, CRE59/60	Nos	7	7
A.3.4.1	,	A.3.4.1,	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CRE85/86	Nos	1	0
A.3.5.1	,	A.3.5.1,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRE41/42/43, CRE48/49/50, CRE62/63/64, CRE65/66/67, CRE68/69/70	Nos	5	5
A.3.6.1	,	A.3.6.1,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRW01-03, 04-06, 11-13, 71-73, 74-76	Nos	5	0

A.3.7.1	,	A.3.7.1,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRR91-93,94-96 & 97-99	Nos	3	0
A.3.8.1	,	A.3.8.1,	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CRE 01-04,05-08, 09-12,13-16,17-20,21-24,25-28,29-32,33-36,37-40,44-47	Nos	11	11
A.3.9.1	,	A.3.9.1,	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CRW07-10	Nos	1	0
A.4.0	,		Shifting from Stores to UCR, placement, alignment & erection of CPU C&I Valmet DNA Control Cabinets			
A.4.1	,	A.4.1,	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CTE11, CTE12,CTE14 & CTE15	Nos	4	0
A.4.2	,	A.4.2,	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CRA10/11	Nos	1	0
A.4.3	,	A.4.3,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRA01-03, 04-06, 12-14	Nos	3	0
A.4.0.1	,		Minor Alignment, Electrical Interconnection, Testing and Commissioning of CPU C&I Valmet DNA Control Cabinets			
A.4.1.1	,	A.4.1.1,	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CTE11, CTE12,CTE14 & CTE15	Nos	4	0
A.4.2.1	,	A.4.2.1,	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CRA10/11	Nos	1	0
A.4.3.1	,	A.4.3.1,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRA01-03, 04-06, 12-14	Nos	3	0
A.5.0	,		Shifting from Stores to UCR, placement, alignment & erection of SCR C&I Valmet DNA Control Cabinets			
A.5.1	,	A.5.1,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CBB01-03 & 04-06	Nos	2	2
A.5.2	,	A.5.2,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CBB11-13 & 14-16	Nos	2	0
A.5.0.1	,		Minor Alignment, Electrical Interconnection, Testing and Commissioning of SCR C&I Valmet DNA Control Cabinets			
A.5.1.1	,	A.5.1.1,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CBB01-03 & 04-06	Nos	2	2

A.5.2.1	j	A.5.2.1,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CBB11-13 & 14-16	Nos	2	0
A.6.0	,		Shifting from Stores to UCR, placement, alignment & erection of T&AVT/EIS Control Cabinets & Network Panels/Network Enclosures			
A.6.1	,	A.6.1,	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CFA01	Nos	1	0
A.6.2	,	A.6.2,	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CXA01-02 & 03-04	Nos	1	0
A.6.3	,	A.6.3,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CXA03-05	Nos	1	0
A.6.4	,	A.6.4,	EIS Control Panel of Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CYJ01	Nos	1	1
A.6.0.1	,		Minor Alignment, Electrical Interconnection, Testing and Commissioning of T&AVT/EIS Control Cabinets & Network Panels/Network Enclosures			
A.6.1.1	,	A.6.1.1,	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CFA01	Nos	1	0
A.6.2.1	,	A.6.2.1,	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CXA01-02 & 03-04	Nos	1	0
A.6.3.1	,	A.6.3.1,	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CXA03-05	Nos	1	0
A.6.4.1	,	A.6.4.1,	EIS Control Panel of Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CYJ01	Nos	1	1
A.6.0.2	,		Shifting from Stores to UCR, placement, alignment, erection, testing and commissioning of Network Panels and Network Enclosures.			
A.6.0.2.1	,	A.6.0.2.1,	Network Panel of Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CNP11/21/41	Nos	3	3
A.6.0.2.2	,	A.6.0.2.2,	Network Panel (LAN-I/II) of Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg.CNP51/52	Nos	1	0
A.6.0.2.3	,	A.6.0.2.3,	Network Panel (Common System) of Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg.CNP31/32/33/35/36/37	Nos	2	0
A.6.0.2.4	,	A.6.0.2.4,	Network Enclosures for LAN & BOP Systems of Size: 600 mm(W) X 500 mm(D) x 600 mm(H); Approx. weight 20 kg.	Nos	18	0

A.7.0	,		TURBINE SUPERVISORY SYSTEM FOR MAIN TURBINE			
A.7.1	3	A.7.1,	Meggitt VM600 system with 19" Rack Control Cabinet- 2 Nos. (with power supply unit, back panel, CPU module,I/O cards, relay cards, protection cards), TFT monitors, server, A3 Colour printer, Ethernet to FO convertor, interconnecting cables, etc. Approx. Size and Weight of the Panel 750 x 800 x 2117 mm; 400 kg.	Set	1	1
A.7.2	,	A.7.2,	Collection of materials from stores, Preparation of mounting surface and mounting arrangement to suit the surface of the machine, Installation of JBs- 12 Nos., Laying & Terminations of Instrumentation cable from Lcal JB and Cabinet, Laying and termination of Power cable to TSS panel, Laying and termination of ethernet cables (as applicable), Laying and Termination of FO cables. (Mounting sensors on the Machines, Laying and termination of cables between sensors to Local JB, Pre-commissioning check, energizing cabinets & PC (as applicable), Commissioning, Installation of software packages, handing over to the enduser are in the scope of OEM).	Set	1	1
A.8.0	,		Erection, Testing and Commissioning of HART MANAGEMENT SYSTEM under the Supervision of OEM)			
A.8.1	,	A.8.1,	Hart Management System (HMS) Comprising of the following: HART Panel- 02 Nos., Workstation PC with 24" TFT Monitor-02 Nos., Colour laser Printer 01 No., and other loose supplied items like Hart / back plane communication modules, Patch cards/ 20 way FRC intra panel cables 69 set, RS485/RS232 Convertor, interconnecting Cables, etc. Approx. Size and Weight ofthe Panel 800(L) x 800(W) x 2415(H) mm; 400 Kg each.	Set	1	1
A.9.0	,		Erection, Testing, Calibration and Commissioning of Field Instruments			
A.9.1	,	A.9.1,	Pressure Transmitter	Nos	297	195
A.9.2	,	A.9.2,	Differential Pressure Transmitter	Nos	147	128
A.9.3	,	A.9.3,	Ultrasonic type level transmitter	Nos	69	27
A.9.4	,	A.9.4,	Flow Transmitter (DP type)	Nos	129	121
A.9.5	,	A.9.5,	Guided Wave Radar Type Level Transmitter	Nos	24	24
A.9.6	,	A.9.6,	Temperature Elements	Nos	330	330
A.9.7	,	A.9.7,	Pressure Gauge	Nos	244	151
A.9.8	,	A.9.8,	Differential Pressure Gauge	Nos	24	20
A.9.9	,	A.9.9,	Pressure and Differential Pressure switches	Nos	60	60

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A.9.10	,	A.9.10,	Temperature Gauge	Nos	130	130
A.9.11	,	A.9.11,	Level Gauge	Nos	1	1
A.9.12	,	A.9.12,	Level Switch- Conductivity Type for CRH drain pots consists of two nos of level probes, field mounted electronic control units-1 No., interconnecting cables 10 mtr	Nos	4	4
A.9.13	,	A.9.13,	Coal Bunker Level Monitoring System - 3D Scanner on Bunker top, 2 Nos. Panel at Bunker Floor/Unit, 1 No. Computer in CER/Unit.	Set	8	8
A.9.14	,	A.9.14,	I/P Coverters for Burner Tilt & SADC	Nos	31	31
A.10.0	,		Erection of FLUE GAS ANALYZERS (Commissioning by OEM)			
A.10.1	,	A.10.1,	High temperature Oxygen Analyzer (in situ type) make: SECO; Consisting of insitu,flange mounted zirconium oxide type probe and electronics-1 cabinet, Verification gas cylinder and anlyser accessories such as Ref.air+Verification gas kit cabinet, signal and power cables (10m), SS tubings and fittings, Junction box, Glands for Electronics and JB, mounting flanges. App.weight of analyser is 22 Kg	Set	2	2
A.10.2	,	A.10.2,	Low temperature Oxygen Analyzer (in situ type) make: AICPL; Consisting of insitu,flange mounted zirconium oxide type probe and electronics-1 cabinet, Auto Calibration unit for three calibration cylinders, Zero span and one span cylinders along with accessories, 2/1 metre probe proctectors and wall mounted panel for Analyzer. App.weight of analyser is 22 Kg	Set	11	9
A.10.3	,	A.10.3,	CO Analyser (In-Situ type) Consisting of CO Sensor head, High Temperature Probe (1800 mm app.), Protection tube (1800 mm app.), Temperature/Pressure Transmitters, Digital Display Unit, Air Dryer panel (App. size 760x760x210 mm), Power Supply Unit, Calibration Gas Cylinder filled with CO & Nitrogen, Pressure Switch for purge air blower, Air compressor-1 No. & connecting cables. App. weight of anlyser is 22 kg.	Set	6	6

A.10.4	,	A.10.4,	HF analyser Consists of Process & Purge tubes (1500 mm app.)-02 Nos, Transmitter/Receiver units-02 Nos, HF Gas Analyser Unit-01 No., Analyser Panel (App.Size 600x600x2000 mm)-01 No. (Wt. 200 kg), Air Purification unit-01 No., Power Supply unit-01 No., Canopies for Transmitter/Receiver/Power Supply unit (as applicable), Purge air unit-01 No., fail safe shutter with 10 mtr cable, Air Compressor Unit 2 nos with air distribution Hose for purge air connection, inter connecting power & control cables etc. The analyser mounting at elevation 65 mts and temperature transmitter at 64.75 mtrs on chimney. Location of cross duct monitor is at about 106 mtr elevation in chimney.	Set	1	1
A.10.5	,	A.10.5,	Opacity Analyser (In Situ type) Consisting of Transceiver unit -02 No each with air purge connections, Signal processor unit, power supply unit, display control unit, fail safe shutter with 10 mtr cable against power or purge air failure, Air Compressor Unit 2 nos with air distribution Hose for purge air connection, inter connecting power & control cables etc. The analyser mounting at elevation 65 mts and temperature transmitter at 64.75 mtrs on chimney. Location of cross duct monitor is at about 106 mtr elevation in chimney.	Set	1	1
A.10.6	,	A.10.6,	SOX/NOX/CO (Combined) analyser system Consisting of in-situ dilution Probe (long 1500 mm) flange mounted, umbilical cord 1x1/4 inch teflon & 3 x 1/4th nylon pvc jacketing 100 mtr long , span/back flush, dilution air, Dilution control unit with auto calibration solenoids, pressure gauges, flow meter, air dryer with filter arrangement, calibration gas cylinders 10 ltr capacity 4 sets with rack stand, Analyser panel (800mm x 800m x 1915mm) fitted air condition & 19 inch racks, tubing & sampling panel + analysers. The tubing/ signal, control, power cabling between probe and Analyser panel is approx 100 mtrs long, 800 mmx 2100 mm (H). The probe is located at approx. 82 mt Elevation on chimney+ flue. Local PC based DAS consist of 24-inch monitor, i3 processor with key board and accessories.	Set	1	1

A.10.7	,	A.10.7,	Mercury analyser consist of sample probe with heated filter, mounting flange, heated sample tubes with RTD (length 50 mtrs), span zero gas calibration cylinders, peristatic pumps 2 nos, outdoor PLC panel size 1200mm(w) x 600mm (d) x 2000mm (h) aprox weight of panel 300 Kg, mounted on chimney at 41 mtr elevation.	Set	1	1
A.10.8	,	A.10.8,	Gas Flow analyser (InSitu non-contact Cross duct type) Consisting of Transceiver unit -02 No each with air purge connections, Signal processor unit, power supply unit, display control unit, fail safe shutter with 10 mtr cable against power or purge air failure, Air Compressor Unit 2 nos with air distribution Hose for purge air connection, inter connecting power & control cables etc. The analyser mounting at elevation 65 mts and temperature transmitter at 64.75 mtrs on chimney. Location of cross duct monitor is at about 106 mtr elevation in chimney.	Set	1	1
A.11.0	,		STEAM AND WATER ANALYSIS (SWAS): The scope of work includes erection of main system along with the equipments and loose items indicated below, if any, interconnection pipes between cooler, chiller and wet panel, cooling water connection pipes between cooler, chiller and wet panel etc. Commissioning of the system by OEM.			

A.11.1	,	A.11.1,	Sample Handing System: Sampling handling system consisting of: a. Primary Rack # 1: 01 Nos.Dim.1500(L)x800(D)x2100(H) in mm) App.overall weight 400 kg. b. Primary Rack # 2: 01 Nos.Dim.700(L)x800(D)x2000(H) in mm) App.overall weight 200 kg. c. Self Standing Racks # 3/4: 02 Nos. (App. Dim.600(L)x600(D)x1800(H) in mm) App.overall weight 150 kg. d. Wet panel:01 No.(App.Dim.5000 (L)x1600 (D)x2115(H) in mm) App.weight: 3000 kg. e. Analyser panel:01 No.(App. Dim.6500(L)x800(D)x2115(H) in mm) App.overall weight 2000 kg. f. Self Standing Rack (Sampling Skid) # 5: 01 Nos. (App. Dim.2500(L)x1500(D)x2200(H) in mm) App.overall weight 850 kg. g. Self Standing Racks # 6: 01 Nos. (App. Dim.800(L)x800(D)x2000(H) in mm) App.overall weight 200 kg. h. Chiller unit (redundant):01 No. (App. Dim 2200(L)x1200(D)x1275(H) in mm) and App.Overall weight: 850 kg.	Set	1	1
A.11.2	,	A.11.2,	Sampling Sensors and Devices: The following analysers and sensors are to be assembled in the above said panels (or) as per the direction of BHEL Site engineer. a. Specific Conductivity Analysers: 08 Sets b. Cation Conductivity Analysers: 5 Sets c. pH Analysers: 10 Sets d. Dissolved O2 Analysers: 5 Sets e. Silica Analysers: 02 Sets f. Sodium Analysers: 01 Sets g. Chloride Analysers: 01 Set h. Turbidity Analysers: 01 Set i. Iron Analysers: 01 Sets j. Degassed Cation Conductivity Analyzers-02 Sets k. Hydrazine Analyser - 02 Sets	Set	1	1
A.11.3	,	A.11.3,	A 106 Gr. 2" NB SCH 40 for Cooling water for SWAS includes Tees and bends	Mtrs	140	140
A.11.4	,	A.11.4,	SS316, 2" NB SCH 40 for Cooling water for SWAS includes Tees and bends	Mtrs	60	60

A.11.5	,	A.11.5,	Tubing with connectors (SS316 1/4" OD) Between wet and dry panel	Mtrs	420	420
A.11.6	,	A.11.6,	Special cables for sensors between wet and dry panel	Mtrs	1100	1100
A.11.7	,	A.11.7,	Laying and Termination of Power Cables to SWAS Panel/Chiller	Mtrs	50	50
A.12.0	,		Erection of VIBRATION MONITORING SYSTEMS- Commissioning by OEM			
A.12.1	,		Vibration Monitoring System for SG&TG at CER:			
A.12.1.1	,	A.12.1.1,	Junction boxes	Nos	127	127
A.12.1.2	,	A.12.1.2,	Vibration monitoring racks with modules: (To be mounted in the VMS panels)	Set	8	8
A.12.1.3	,	A.12.1.3,	Single Bay VMS panel App. Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg.	Nos	2	1
A.12.1.4	,	A.12.1.4,	Three Bay VMS panel App. Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg.	Nos	1	1
A.12.1.5	,	A.12.1.5,	VMS Server/User PC	Nos	2	2
A.12.1.6	,	A.12.1.6,	Printer	Nos	1	1
A.12.1.7	,	A.12.1.7,	Ethernet Cable	Mtrs	200	200
A.12.2	,		Vibration Monitoring System for CWP/ACWP at CWP Control Room:			
A.12.2.1	,	A.12.2.1,	Junction boxes	Nos	37	37
A.12.2.2	,	A.12.2.2,	Vibration monitoring racks with modules: (To be mounted in the VMS panels)	Set	2	2
A.12.2.3	,	A.12.2.3,	Single Bay VMS panel App. Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg.	Nos	1	1
A.12.2.4	,	A.12.2.4,	FO Cable	Mtrs	1200	1200
A.12.2.5	,	A.12.2.5,	Ethernet Cable	Mtrs	100	100
A.12.3	,		Vibration Monitoring System for APH Wash Pumps at Clarified Water Pump House and RW Pumps at RWPH Control Room:			
A.12.3.1	,	A.12.3.1,	Junction boxes	Nos	49	0
A.12.3.2	,	A.12.3.2,	Vibration monitoring racks with modules: (To be mounted in the VMS panels)	Set	6	0
A.12.3.3	,	A.12.3.3,	Single Bay VMS panel App. Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg.	Nos	2	0
A.12.3.4	,	A.12.3.4,	FO Cable	Mtrs	6300	0
A.12.3.5	,	A.12.3.5,	Ethernet Cable	Mtrs	100	0
A.13.0	,		Erection of UPS WITH ACDB & BATTERY BANK (Commissioning by OEM)			

A.13.1	,	A.13.1,	Main Plant & St-I & II: 2 X180 KVA UPS parallel redundant comprising of the following: UPS-1, UPS 2, Rectifier Panel, inverter panels and Aux panel 1,2, with Input also. Transformer overall size 6400 mm (L) x 1000 mm(W) x 2100 mm(H) aprox weight 8000 Kg. wall mounted Battery isolation JBs size 600mm x 300mm x800mm weight 80 Kg aprox. Wall mounted BHMS Display boxes aprox size 450mm x 500mm x 150mm and accessories.	Set	2	1
A.13.2	,	A.13.2,	415 V ACDB of size app. 6400(L)x1000(W)x2100(H) in mm and app. Wt. 850 kg.	Nos	2	2
A.13.3	,	A.13.3,	Laying of cable size UN 0000 - Uninyvin Cable (Equivalent to 1Cx109 Sqmm Copper Cable) from UPS to Battery	Mtrs	600	600
A.13.4	,	A.13.4,	Laying of cable size UN 0000 - Uninyvin Cable (Equivalent to 1Cx109 Sqmm Copper Cable) UPS to ACDB	Mtrs	1200	1200
A.13.5	,	A.13.5,	Laying and termination of 4C Shielded communication cable from MODBUS to TCP/IP	Mtrs	50	50
A.13.6	,	A.13.6,	Laying and termination of 4C Shielded communication cable from UPS to Battery Monitoring System	Mtrs	5460	5460
A.13.7	,	A.13.7,	Battery Health Monitoring System Panels of App.size 600 (L)x 400(W) x 600(H) and Wt. 200 kg	Nos	2	2
A.13.8	,	A.13.8,	UPS BATTERY: 1285 AH/ 360 V Lead Acid Plante Batteries (two banks) each bank is made up of 110 cells, housed in wooden racks along with inter cell connectors, inter block connectors, inter row connectors, cell mounting insulators, petroleum jelly and Ms lead plated fasteners, Discharge resistor bank, Each Cell dimension: 433(L) x 368(W) x 682(H). App.Cell weight without electrolyte: 134 Kg & 204 kg with electrolyte. Total Qty of electrolyte: 21000 litre.	Set	2	2
A.13.9	,	A.13.9,	RWPH: 2 X10 KVA UPS parallel redundant comprising of thefollowing: UPS-1, UPS 2, Rectifier Panel, inverterpanels and Aux panel 1,2, with Input Iso. Transformeroverall size 2200 mm (L) x 900 mm(W) x 1870 mm(H)aprox weight 3000 kg. wall mounted Battery isolation JBssize 600mm x 300mm x800mm weight 80 Kg aprox. Wallmounted BHMS Display boxes aprox size 450mm x 500mmx 150mm and accessories.	Set	1	0
A.13.10	,	A.13.10,	415 V ACDB of size app. 750(L)x300(W)x1250(H) in mm and app. Wt. 200 kg.	Nos	2	0

A.13.11	,	A.13.11,	Laying of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) from UPS to Battery	Mtrs	160	0
A.13.12	3	A.13.12,	Laying of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) UPS to ACDB	Mtrs	60	0
A.13.13	,	A.13.13,	Laying and termination of 4C Shielded communication cable from MODBUS to TCP/IP	Mtrs	50	0
A.13.14	,	A.13.14,	Laying and termination of 4C Shielded communication cable from UPS to Battery Monitoring System	Mtrs	3360	0
A.13.15	,	A.13.15,	Battery Health Monitoring System Panels of App.size 600 (L)x 400(W) x 600(H) and Wt. 200 kg	Nos	2	0
A.13.16	,	A.13.16,	UPS BATTERY: 200 AH/ 220 V Lead Acid Plante Batteries (two banks) each bank is made up of 110 cells, housed in wooden racks along with inter cell connectors, inter block connectors, inter row connectors, cell mounting insulators, petroleum jelly and Ms lead plated fasteners, Discharge resistor bank, Each Cell dimension: 134(L) x 203(W) x 406(H). App.Cell weight without electrolyte: 13.5 Kg & 21 kg with electrolyte. Total Qty of electrolyte: 1600 litre.	Set	1	0
A.13.17	,	A.13.17,	FOPH/FOUS: 2 X10 KVA UPS parallel redundant comprising of the following: UPS-1, UPS 2, Rectifier Panel, inverter panels and Aux panel 1,2, with Input Iso. Transformer overall size 2200 mm (L) x 900 mm(W) x 1870 mm(H) aprox weight 3000 kg. wall mounted Battery isolation JBs size 600mm x 300mm x800mm weight 80 Kg aprox. Wall mounted BHMS Display boxes aprox size 450mm x 500mm x 150mm and accessories.	Set	1	0
A.13.18	,	A.13.18,	415 V ACDB of size app. 750(L)x300(W)x1250(H) in mm and app. Wt. 200 kg.	Nos	2	0
A.13.19	,	A.13.19,	Laying of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) from UPS to Battery	Mtrs	160	0
A.13.20	,	A.13.20,	Laying of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) UPS to ACDB	Mtrs	60	0
A.13.21	,	A.13.21,	Laying and termination of 4C Shielded communication cable from MODBUS to TCP/IP	Mtrs	50	0
A.13.22	,	A.13.22,	Laying and termination of 4C Shielded communication cable from UPS to Battery Monitoring System	Mtrs	3360	0
A.13.23	,	A.13.23,	Battery Health Monitoring System Panels of App.size 600 (L)x 400(W) x 600(H) and Wt. 200 kg	Nos	2	0

		1	i	1	1	
A.13.24	,	A.13.24,	UPS BATTERY: 200 AH/ 220 V Lead Acid Plante Batteries (two banks) each bank is made up of 110 cells, housed in wooden racks along with inter cell connectors, inter block connectors, inter row connectors, cell mounting insulators, petroleum jelly and Ms lead plated fasteners, Discharge resistor bank, Each Cell dimension: 134(L) x 203(W) x 406(H). App.Cell weight without electrolyte: 13.5 Kg & 21 kg with electrolyte. Total Qty of electrolyte: 1600 litre.	Set	1	0
A.13.25	,	A.13.25,	Power Distribution Boards for Gas Cl2/PT Plant App.Dimension 400(L)x300(W)x600(H) and app. Wt. 500 kg.	Nos	2	0
A.13.26	,		E&C of SMALL UPS SYSTEM			
A.13.26.1 A.14.0	,	A.13.26.1,	1 kVA UPS System 230 V output, 30-90 min back up with 2/3 pin power socket with auto voltage regulator E&C of LOCAL INSTRUMENT ENCLOSURES/RACKS	Nos	5	0
A.14.1	,	A.14.1,	Local Instrument Enclosures (Type - A)-Size: 1450(W) x 1000(D) x 2200 (H)mm; Approximate weight: 900 kg each	Set	22	20
A.14.2	,	A.14.2,	Local Instrument Enclosures (Type - B)-Size: 1100(W) x 1000(D) x 2200 (H)mm; Approximate weight: 600 kg each	Set	40	36
A.14.3	,	A.14.3,	Local Instrument Enclosures (Type - C)-Size: 700(W) x 1000(D) x 2200 (H)mm; Approximate weight: 400 kg each	Set	26	20
A.14.4	,	A.14.4,	Local Instrument Racks (Type - A)-Size: 1400(W) x 650(D) x 2200(H) mm; Approximate weight: 600 kg each	Set	26	24
A.14.5	j	A.14.5,	Local Instrument Racks (Type - B)-Size: 1100(W) x 650(D) x 2200(H) mm; Approximate weight: 400 kg each	Set	47	42
A.14.6	,	A.14.6,	Local Instrument Racks (Type - C)-Size: 800(W) x 650(D) x 1500(H) mm; Approximate weight: 250 kg each	Set	24	18
A.14.7	,	A.14.7,	Local Instrument Racks (Type - D)-Size: 1600(W) x 650(D) x 2200(H) mm; Approximate weight: 700 kg each	Set	7	6
A.15.0	,		LAYING AND TERMINATION OF CABLES			
A.15.1	,		Thermocouple Extension Cables			
A.15.1.1	,	A.15.1.1,	2 Pair, 16 AWG, KX Type TC Extension Cable	Mtrs	10620	10620
A.15.1.2	,	A.15.1.2,	6 Pair, 16 AWG, KX Type TC Extension Cable	Mtrs	29295	29295
A.15.1.3	,	A.15.1.3,	2 Pair, 16 AWG, RX Type TC Extension Cable	Mtrs	2000	2000
A.15.2	,		Extruded HRPVC with FRLS, Armoured, Over All Shielded, Copper Cables			
A.15.2.1	,	A.15.2.1,	2 pair x 0.5 sqmm	Mtrs	9270	9270
A.15.2.2	,	A.15.2.2,	4 pair x 0.5 sqmm	Mtrs	25290	25290

A.15.2.3		A.15.2.3,	8 pair x 0.5 sgmm	Mtrs	14535	13770
	,	71.10.2.0,	Extruded HRPVC with FRLS, Armoured, Individually	IVIUS	1-7000	10110
A.15.3	j		and overall shielded, Copper Cables			
A.15.3.1	,	A.15.3.1,	2 pair x 0.5 sqmm	Mtrs	11970	10890
A.15.3.2	,	A.15.3.2,	4 pair x 0.5 sqmm	Mtrs	37876	36526
A.15.3.3	,	A.15.3.3,	6 pair x 0.5 sqmm	Mtrs	600	600
A.15.3.4	,	A.15.3.4,	8 pair x 0.5 sqmm	Mtrs	8055	8055
A.15.3.5	,	A.15.3.5,	12 pair x 0.5 sqmm	Mtrs	2000	2000
A.15.3.6	,	A.15.3.6,	2 Troid x 0.5 sqmm	Mtrs	11677	11677
A.15.4	,		Extruded HRPVC with FRLS, Armoured, Copper control Cables			
A.15.4.1	,	A.15.4.1,	3 C x 2.5 sqmm	Mtrs	6615	2520
A.15.4.2	,	A.15.4.2,	5 C x 2.5 sqmm	Mtrs	3330	3330
A.15.5	,		TG Special Cables			
A.15.5.1	j	A.15.5.1,	Special Cable 5 x1.5 sqmm	Mtrs	1000	1000
A.15.5.2	,	A.15.5.2,	FEP Insulated 2x2x0.5 sqmm type-1 Cable	Mtrs	5400	5400
A.15.5.3	j	A.15.5.3,	FEP Insulated 2x4x0.5 sqmm type-2 Cable	Mtrs	2000	2000
A.15.5.4	,	A.15.5.4,	CAT 6/Ethernet UTP Cable	Mtrs	17700	12200
A.15.5.5	,	A.15.5.5,	Laying of Optic Fiber cable for offsite PLC/ DCS systems and MIS connectivity	Mtrs	30000	10000
A.15.5.6	,	A.15.5.6,	HDPE Conduits for laying OFC cables	Mtrs	6000	6000
A.15.5.7	,	A.15.5.7,	Splicing of Optical Fibre Cable	Nos	350	200
A.16.0	,		Installation of CABLE TRAYS			
A.16.1	,	A.16.1,	50 mm Perforated Trays with Cover	Mtrs	1500	1500
A.16.2	,	A.16.2,	100 mm Perforated Trays with Cover	Mtrs	1500	1500
A.16.3	,	A.16.3,	50 mm Perforated Trays without Cover	Mtrs	2000	2000
A.16.4	,	A.16.4,	100 mm Perforated Trays without Cover	Mtrs	2000	2000
A.17.0	,		E&C of JUNCTION BOXES			
A.17.1	,	A.17.1,	12 way JB	Nos	23	16
A.17.2	,	A.17.2,	24 way JB	Nos	68	54
A.17.3	j	A.17.3,	36 way JB	Nos	30	30
A.17.4	,	A.17.4,	48 way JB	Nos	32	22
A.17.5	,	A.17.5,	64 way JB	Nos	5	5
A.17.6	,	A.17.6,	72 way JB	Nos	2	2
A.17.7		A.17.7,	96 way JB	Nos	6	6
A.17.8	,	A.17.8,	128 way JB	Nos	5	5
A.18.0	,	7,	E&C of IMPULSE PIPES, FITTINGS, MANIFOLDS AND ACCESSORIES.			
A.18.1	,	A.18.1,	ASTM A335 P91 - 1/2" NB 160	Mtrs	1000	1000
A.18.2	,	A.18.2,	ASTM A106 Gr C - 1/2" NB SCH 160	Mtrs	2800	2800
A.18.3	,	A.18.3,	ASTM A106 Gr C - 1/2" NB SCH 80	Mtrs	9500	9500

A.18.4		A.18.4,	ASTM A106 Gr C - 1" NB SCH 80	Mtrs	300	300
A.18.5	,	A.18.5,	ASTM A106 Gr C - 3/4" NB SCH 80	Mtrs	7600	7600
A.18.6	,	A.18.6,	ASTM A335 P22 - 3/4" NB SCH 80	Mtrs	1200	1200
A.18.7	,	A.18.7,	ASTM A312 TP316- 1/2" NB SCH 40	Mtrs	280	280
A.18.8	,	A.18.8,	ASTM A312 TP316H - 1/2" NB SCH 80	Mtrs	700	700
A.18.9	,	A.18.9,	ASTM A312 TP316H - 1/2" NB SCH 160	Mtrs	1100	1100
A.19.0	,	7 10.10,	E&C of INSTRUMENT VALVES AND ACCESSORIES		1100	1100
A.19.1	,	A.19.1,	FGV A105 :1/2" NB-SW 800	Nos	7	7
A.19.2	,	A.19.2,	FGV ASTM A182 F91 :1/2"NB-SW 3000SPL	Nos	5	5
A.19.3	,	A.19.3,	FGV ASTM A182 F22 :1/2"NB-SW, CL-1500	Nos	11	11
A.20.0	,		ERECTION OF MASTER AND SLAVE CLOCK SYSTEM (Commissioning by OEM)			
A.20.1	,	A.20.1,	Reduntant GPS Based Master Clock System (Card Rack System) along with Fully wired Master clock System Panel (App.Size: 800 x 800 x 2415 mm; wt. 300 kg) - 01 No., power supply unit, battery system, signal boosters, Signal Conditioners, multiplexer, FO Accessories (LIU, Duplex etc.)	Set	1	0
A.20.2	,	A.20.2,	42 U Panel of size 800(L)x1000(W)x2115(H)for housing the servers, network switches	Nos	1	0
A.20.3	,	A.20.3,	Slave clock (Rs 485 based)/NTP based Approximate Size: 750(W) x56(D) x 170(H) mm for various locations	Nos	25	0
A.20.4	7	A.20.4,	Reduntant GPS antenna (built in LA) along with around 200 Mtrs antenna cable from antenna to GPS receiver unit and antenna fixing accessories.	Set	2	0
A.20.5	,	A.20.5,	Reduntant GPS Receiver/Master Clock-A and Master Clock-B with comparator and out put cards.	Set	1	0
A.20.6	,	A.20.6,	Laying and termination of RG 58 Coaxial Cable FRLS armoured (Clock panel to IRIG B interfacing equipment and Clock panel to various pulses interfacing equipments)	Mtrs	5000	0
A.20.7	,	A.20.7,	Laying and termination of Armoured Power Cable 3Cx2.5 sqmm	Mtrs	3600	0
A.20.8	,	A.20.8,	Laying and termination of Armoured Signal Cable 2Px0.5 sqmm	Mtrs	5400	0
A.20.9	,	A.20.9,	Cable - CAT 5e/CAT6 for NTP / SNTP output	Mtrs	280	0
A.20.10	,	A.20.10,	FO Cable (4F) connecting FO NTP outpus multimode armoured cable	Mtrs	3500	0
A.20.11	,	A.20.11,	Splicing of Optical Fibre Cable	Nos	10	0
A.20.12	,	A.20.12,	Flexible GI conduit Pipe	Mtrs	200	0
A.20.13	,	A.20.13,	Junction Boxes	Nos	8	0
A.21.0	ij		E&C OF LARGE VIDEO SCREEEN SYSTEMS			

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A.21.1	,	A.21.1,	67" - 80" Large Video Screen having resolution 1920X1080 pixels with LED based rear projection along with CPU and other loose supplied items like Video display controller, Border binder, interconnecting power & communication cables, Mounting stand 1200 mm height / arrangement etc. in Unit Control room	Set	11	5
A.21.2	,	A.21.2,	67" - 80" Large Video Screen having resolution 1920X1080 pixels with LED based rear projection along with CPU and other loose supplied items like Video display controller, Border binder, interconnecting power & communication cables, Mounting stand 1200 mm height /arrangement etc. for AHP system.	Set	4	0
A.21.3	,	A.21.3,	67" - 80" Large Video Screen having resolution 1920X1080 pixels with LED based rear projection along with CPU and other loose supplied items like Video display controller, Border binder, interconnecting power & communication cables, Mounting stand 1200 mm height /arrangement etc. for CHP system.	Set	4	0
A.21.4	,	A.21.4,	67" - 80" Large Video Screen having resolution 1920X1080 pixels with LED based rear projection along with CPU and other loose supplied items like Video display controller, Border binder, interconnecting power & communication cables, Mounting stand 1200 mm height /arrangement etc. for FOPH system.	Set	2	0
A.22.0	j		E&C OF HMI & PIS SYSTEM PACKAGE			
A.22.1	,		HMIPIS for Unit DDCMIS			
A.22.1.1	,	A.22.1.1,	Operator WorkStation	Nos	40	10
A.22.1.2	,	A.22.1.2,	Historical Storage & Retrieval (Information) WorkStation	Nos	2	2
A.22.1.3	,	A.22.1.3,	Programmer cum documentation station	Nos	2	2
A.22.1.4	,	A.22.1.4,	LaserJet Colour Printer (A4 size)	Nos	3	3
A.22.1.5	,	A.22.1.5,	LaserJet B/W Printer (A4 size)	Nos	3	3
A.22.2	,	A 00 0 4	HMIPIS for AHP DDCMIS	N.		0
A.22.2.1	,	A.22.2.1,	Operator WorkStation	Nos	2	0
A.22.2.2	,	A.22.2.2,	Programmer cum documentation station	Nos	2	0
A.22.2.3 A.22.3	,	A.22.2.3,	LaserJet Colour Printer (A4 size) HMIPIS for CHP DDCMIS	Nos	1	0
A.22.3.1	,	A.22.3.1,	Operator WorkStation	Nos	2	0
A.22.3.1 A.22.3.2	,	A.22.3.1, A.22.3.2,	Programmer cum documentation station	Nos	2	0
11.44.0.4	,	/ 1.22.0.2,	<u> </u>	1103		-
-		A 22 3 3	LLaser, let Colour Printer (A4 size)	Nos	1 1	0
A.22.3.3	,	A.22.3.3,	LaserJet Colour Printer (A4 size) HMIPIS for Mill Reject System	Nos	1	0
-		A.22.3.3, A.22.4.1,	LaserJet Colour Printer (A4 size) HMIPIS for Mill Reject System Operator WorkStation	Nos Nos	1	0

A.22.4.3	,	A.22.4.3,	LaserJet Colour Printer (A4 size)	Nos	1	0
A.22.5	,		HMIPIS for FOPH			
A.22.5.1	,	A.22.5.1,	Operator WorkStation	Nos	2	0
A.22.5.2	,	A.22.5.2,	Programmer cum documentation station	Nos	2	0
A.22.6	,		HMIPIS for CPU			
A.22.6.1	,	A.22.6.1,	Operator WorkStation	Nos	1	0
A.22.6.2	,	A.22.6.2,	Programmer cum documentation station	Nos	1	0
A.22.7	,		HMIPIS for CW/ACW SYSTEM			
A.22.7.1	,	A.22.7.1,	Operator WorkStation	Nos	4	0
A.22.7.2	,	A.22.7.2,	Programmer cum documentation station	Nos	3	0
A.22.7.3	,	A.22.7.3,	LaserJet Colour Printer (A4 size)	Nos	3	0
A.22.8	,		HMIPIS for Compressed Air System			
A.22.8.1	,	A.22.8.1,	Operator WorkStation	Nos	1	0
A.22.8.2	,	A.22.8.2,	Programmer cum documentation station	Nos	1	0
A.22.8.3	,	A.22.8.3,	LaserJet Colour Printer (A4 size)	Nos	1	0
A.23.0	,		Performance Analysis Diagnostices and Optimization (PADO) Package			
A.23.1	,	A.23.1,	Computer Table	Set	3	3
A.23.2	,	A.23.2,	Chairs	Nos	3	3
A.23.3	,	A.23.3,	Printer Table	Set	1	1
A.24.0	,		LAB INSTRUMENTS - To be demonstrated and handing over to Customer			
A.24.1	,	A.24.1,	Lab Instruments - I:-Mecahnical Under the Supervision of OEM			

A.24.2.1	,	A.24.2.1,	Digital Multimeter - 2 Nos, Function Generator - 2 Nos, Chartless Recorder - 2 Nos, Variable DC Stabilized Power Supply (0-260 V, 10A) - 2 Nos, Step Down Transformer (110V, 2A) - 2 Nos, Continuity Tester - 2 Nos, Fixed Power Supply (+-48 V DC, 3A, +-24V DC, 6A, +-12V DC, 10A, +-5 V DC, 5A) - 2 Nos, Electronically Operated Air Gun - 2 Nos, Digital LCR-Q Bridge - 2 Nos, Card IC Tester - 2 Nos, Soldering Station & Desoldering Station - 2 Nos, Power meter with Harmonic Analysis - 2 Nos, One set of tool box with screw driver set, Spanner, Plier Cutter - 2 Nos, Portable digital multimeter - 10 Nos, Field Transmitter Calibrator - 2 Nos, Soldering Iron with Solder Sucker - 8 Nos, DE Soldering Station - 1 Nos, VARIAC - 1 Nos, Power Pack - 2 Nos, Vibration Analyzer Balancer Instrument - 2 Nos, Portable Meter Calibrator - 2 Nos, Digital Cable Identification System - 6 Nos, Dual Beam Portable Digital Storage Oscilloscope - 2 Nos, Hand Held Thermocouple and PT-100 Ohm Simulator and Indicator - 1 Nos, Insertion and Extraction tools for various Pin Numbers 14,16 and 48 - 2 Nos, Rheostats - 1 Nos, Desktop Digital Multimeter - 2 Nos, Phase Sequence Meter - 1 Nos, Vibration Meter Sould Level Monitor - 1 Nos, Portable pH Calibrator - 2 Nos, Module Tester - 1 Nos, DC Regulated Power Source - 2 Nos, Auto Transformer - 1 Nos, Nickel Cadmium Cell - 1 Nos, Scanner - 1 Nos, Torximitor - 2 Nos, Laptop - 2 Nos, Portable mA Calibrator - 3 Nos, Table Mounted mA Calibrator - 2 Nos, Portable mV Calibrator - 2 Nos, Test RTD - 2 Nos, Frequency counter/Timer - 1 Nos. COMPUTER FURNITURES-HANDLING & TRANSPORTATION TO THE LOCATION-ASSEMBLY REQUIRED FOR OF CONTROL DESKS/UNIT OPERATOR DESKS WILL BE DONE BY OEM	SET	1	0	
		Chartless Recorder - 2 Nos, Variable DC Stabilized Power Supply - 2 Nos, Variable AC Stabilized Power					

A.25.1	,	A.25.1,	Unit Operator Desk (8 Section) Angular installation dimension 7960mm (W) x 1050mm (D) x 750mm (H) including fixing of power Sockets, MCBs, ethernet switches hardware etc	Set	1	1
A.25.2	7	A.25.2,	Common Operator Desk (8 Section) Straight installation dimension 7600mm (W) x 1050mm (D) x 750mm (H) including fixing of power Sockets, MCBs, ethernet switches hardware etc	Set	2	0
A.25.3	7	A.25.3,	Simulator Operator Desk (6 Section) Straight installation dimension 5700mm (W) x 1050mm (D) x 750mm (H) including fixing of power Sockets, MCBs, ethernet switches hardware etc	Set	1	0
A.25.4	,	A.25.4,	Simulator Operator Desk (3 Section) Straight installation dimension 2850mm (W) x 1050mm (D) x 750mm (H) including fixing of power Sockets, MCBs, ethernet switches hardware etc	Set	1	0
A.25.5	7	A.25.5,	Common & other area Operator Desk (2 Section) Straight installation dimension 1900mm (W) x 1050mm (D) x 750mm (H) including fixing of power Sockets, MCBs, ethernet switches hardware etc	Set	7	0
A.25.6	,	A.25.6,	Computer tables with Shelf for each Unit 1000mm(L)X1650MM(H)X950MM(D)	Set	31	31
A.25.7	,	A.25.7,	Computer tables with Shelf for Common & Other areas 1000mm(L)X1650MM(H)X950MM(D)	Set	5	0
A.25.8	,	A.25.8,	Computer tables with Shelf for common areas 1000mm(L)X1650MM(H)X950MM(D)	Set	35	0
A.25.9	,	A.25.9,	Computer tables with Shelf for MIS Clients 1000mm(L)X1650MM(H)X950MM(D)	Set	40	40
A.25.10	,	A.25.10,	Computer tables without Shelf 1000mm(L)x750mm(H)x1050mm(D)	Set	8	2
A.25.11	,	A.25.11,	PC Rack 1000mm(L)x1900mm(H)x900mm(D) including fixing of power sockets, MCBs, Ethernet Switches hardware, etc	Set	2	2
A.25.12	,	A.25.12,	Printer Tables 735mmx900mmx600mm including fixing of power sockets, MCBs, Ethernet Switches , hardware,etc	Set	13	13
A.25.13	,	A.25.13,	Printer Tables 900mm(L)x735mm(H)x590mm(D) including fixing of power sockets, MCBs, Ethernet Switches , hardware,etc	Set	18	0
A.25.14	,	A.25.14,	Printer Tables for Simulator 900mm(L)x735mm(H)x590mm(D) including fixing of power sockets, MCBs, Ethernet Switches , hardware,etc	Set	2	0

A.25.15	,	A.25.15,	Printer Tables for MIS Clients 900mm(L)x735mm(H)x590mm(D) including fixing of power sockets, MCBs, Ethernet Switches , hardware,etc	Set	40	40
A.25.16	,	A.25.16,	Printer Tables for MIS Servers 900mm(L)x735mm(H)x590mm(D) including fixing of power sockets, MCBs, Ethernet Switches , hardware,etc	Set	2	2
A.25.17	,	A.25.17,	Computer Chair Medium back with cushioned arms	Nos	105	55
A.25.18	,	A.25.18,	Computer Chair Medium back with cushioned arms for MIS Clients	Nos	40	40
A.25.19	,	A.25.19,	Almira 1780mm x 839mm x 380mm with glass window	Set	1	1
A.25.20	,	A.25.20,	Safety lock key pad 350mm x 250mm x 250mm weight 10 kg, safety rack 1830mm x 410mm x 457mm	Set	1	1
A.26.0	,		TERMINATION OF POWER CABLES			
A.26.1	,	A.26.1,	Termination of cable size UN 0000 - Uninyvin Cable (Equivalent to 1Cx109 Sqmm Copper Cable) from UPS to Battery	Nos	14	14
A.26.2	,	A.26.2,	Termination of cable size UN 0000 - Uninyvin Cable (Equivalent to 1Cx109 Sqmm Copper Cable) UPS to ACDB	Nos	26	26
A.26.3	,	A.26.3,	Termination of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) from UPS to Battery	Nos	4	0
A.26.4	,	A.26.4,	Termination of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) UPS to ACDB	Nos	2	0
A.26.5	,	A.26.5,	Termination of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) from UPS to Battery	Nos	4	0
A.26.6	,	A.26.6,	Termination of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) UPS to ACDB	Nos	2	0
A.27.0	,		COMMISSIONING OF THE FOLLOWING			
A.27.1	,	A.27.1,	Commissioning of Transducers- Removal and recalibration of Power, Voltage, Current, Frequency out put 4-20 mA	Nos	25	25
A.28.0	,		STRUCTURAL MATERIALS & MISCELLENEOUS ITEMS			
A.28.1	,	A.28.1,	ISMC 100, ANGLE 50X50X6 & 2.5MM THICK Plates	MT	10.8	10.4
A.28.2	,	A.28.2,	Duct Tray - 60x60x1000 mm	Mtrs	108	108
A.28.3	,	A.28.3,	Duct Tray - 180x100x1000 mm	Mtrs	73	73
A.28.4	,	A.28.4,	Duct Tray - 250x100x1000 mm	Mtrs	90	90

A.28.5	,	A.28.5,	Assembly and Installation of Mounting frames with loose supplied prefabricated materials like slotted angles, channels, etc.	Nos	10	10
A.28.6 B	,	A.28.6,	Fire protection switches & Emergency Push Buttons BHEL TRICHY SCOPE OF SUPPLY	Nos	8	8
B.1.0	,		FUEL OIL SYSTEM			
B.1.1	,	B.1.1,	PD Type Mass flow meter in HFO,LDO/HSD & HFO return line with mounting flanges, electronics amplifier box, inter connecting cabling, etc.	Set	3	3
B.1.2	,	B.1.2,	Pressure Gauges	Nos	68	45
B.1.3	,	B.1.3,	Temperature Indicator	Nos	16	6
B.1.4	,	B.1.4,	Pressure Switches	Nos	22	22
B.1.5	,	B.1.5,	Level Indicator	Nos	2	1
B.1.6	,	B.1.6,	Temperature Elements	Nos	2	0
B.1.7	,	B.1.7,	FSSS Local Oil Gun Maintenance Switch Box	Nos	16	16
B.1.8	,	B.1.8,	H.E.A Exciter box 240 V AC alongwith retractor assembly 240 V AC solenoid, flexible spark rod 133 inch, spark top, flexible cable asembly 3 mtr long, SS hose 6.35mmx1000mmm, Air Filter Regulator 1/4 inch etc.	Set	16	16
B.1.9	1	B.1.9,	Flame Scanner Head Assembly consisting fibre optic cable L130" lense barrel, flame processor module, Flame module, pigtail cable, pico fuse, card extender module, power supply module, 6 way JB, etc	Set	32	32
B.1.10	,	B.1.10,	Microprocessor based flame scanner amplifier 8 Nos. of 19" racks of size 482x263x134 (WxDxH) to be mounted in flame scanner panel (CJF49/CJF50) supplied by EDN	Set	8	8
B.2.0	,		ACOUSTIC STEAM LEAK DETECTOR			
B.2.1	,	B.2.1,	ASLD panel assembly and computer with monitor panel size 800mmx2315mmx800mm & App.Wt. 200 kg	Set	1	1
B.2.2	,	B.2.2,	ASLD sensor assembly -30 Nos + Sonic Tube + Field Amplifier box with Module- 32 Set+ Power Supply Units-4 Nos+ JB- 1No, Calibrator-1 No, Sensor Pig tail cable-450 mtr	Set	1	1
B.3.0	,		FURNACE CCTV SYSTEM			
B.3.1	,	B.3.1,	High Temperature Furnace Camera CCTV head assembly with advance retract mechanism and Local Control Unit panels (800mmx1000mmx300mm) with inter connecting pipes, air filter regulators, ss hose mounted at boiler 45 M elevation. Remote Control Box (600 mm x500 mmx 300 mm) with 24" monitor and accessories at CCR, 40" LED monitor & Multiplexer.	Set	2	2

B.4.0			PNEUMATIC POWER CYLINDERS (REGULATING			
D.4.0	,		TYPE) Installation and Commissioning			
B.4.1	,	B.4.1,	Pneumatic Power Cylinders with Position Transmitters controlled from SADC (App.Weight 20 kg each)	Set	132	132
B.4.2	,	B.4.2,	Pneumatic Power Cylinders with SMART Positioners controlled from DDCMIS (App.Weight 20 kg each)	Set	16	16
B.4.3	,	B.4.3,	PA/ID/FD Fans Blade Pitch Control Damper with SMART Positioner controlled from DDCMIS (App.Wt. 90 kg)	Set	6	6
B.4.4	,	B.4.4,	Cold Air Regulating Dampers with SMART positioner alongwith linkage rod (App.Wt. 95 kg)	Set	8	8
B.4.5	,	B.4.5,	Hot Air Regulating Dampers with SMART positioner alongwith linkage rod (App.Wt. 175 kg)	Set	8	8
B.4.6	,	B.4.6,	Dynavane Filter Pressure Control Damper with SMART positioner	Set	1	1
B.5.0	,		GRAVIMETRIC FEEDER PANEL			
B.5.1	,	B.5.1,	Gravimetric Feeder Remote Power Cabinet Size 1200x2315x600 and Wt.300 kg	Nos	8	8
B.5.2	,	B.5.2,	Feeder Coal flow monitor assembly flange mounted	Set	8	8
B.6.0	,		STEAM/WATER/PULVERIZER/AIR/FLUE GAS LINE INSTRUMENTS			
B.6.1	,	B.6.1,	Pressure Indicators	Nos	15	15
B.6.2	,	B.6.2,	DP Switches	Nos	1	1
B.6.3	,	B.6.3,	Temperature Indicator	Nos	8	8
B.6.4	,	B.6.4,	K-Type MTM Thermocouple 8MM OD & 8 M DUPLEX	Nos	8	8
B.6.5	,	B.6.5,	K-Type MTM Thermocouple 8MM OD & 10 M DUPLEX	Nos	33	33
B.6.6	,	B.6.6,	K-Type MTM Thermocouple 8MM OD & 12 M DUPLEX	Nos	38	38
B.6.7	,	B.6.7,	K-Type MTM Thermocouple 8MM OD & 14 M DUPLEX	Nos	41	41
B.6.8	,	B.6.8,	K-Type MTM Thermocouple 8MM OD & 16 M DUPLEX	Nos	37	37
B.6.9	,	B.6.9,	K-Type MTM Thermocouple 8MM OD & 18 M DUPLEX	Nos	40	40
B.6.10	,	B.6.10,	K-Type MTM Thermocouple 8MM OD & 20 M DUPLEX	Nos	63	63
B.6.11	,	B.6.11,	K-Type MTM Thermocouple 8MM OD & 22 M DUPLEX	Nos	57	57
B.6.12	,	B.6.12,	K-Type MTM Thermocouple 8MM OD & 24 M DUPLEX	Nos	47	47
B.6.13	,	B.6.13,	K-Type MTM Thermocouple 8MM OD & 26 M DUPLEX	Nos	57	57
B.6.14	,	B.6.14,	K-Type MTM Thermocouple 8MM OD & 28 M DUPLEX	Nos	16	16
B.6.15	,	B.6.15,	K-Type MTM Thermocouple 8MM OD & 30 M DUPLEX	Nos	12	12
B.6.16	,	B.6.16,	DP Switches	Nos	2	2
B.6.17	,	B.6.17,	Level Switches High/Low	Nos	20	20
B.6.18	,	B.6.18,	DP Switches High/Low	Nos	17	17
B.6.19	,	B.6.19,	ERV Controller with Pressure Switch App.Dimension(mm): 400x350x190; App.Wt: 10 kg	Set	4	4

B.7.0	,		LAYING AND TERMINATION OF CABLES (PVC,FRLS,ARMOURED CABLES FOR SCANNER, MILL FEEDER, AC CONTROLS AND INSTRUMENTATION)			
B.7.1	,	B.7.1,	FLAME SCANNER CABLE-P/O SHIELDED	Mtrs	8280	8280
B.7.2	,	B.7.2,	2P X 0.5 SQMM O/A SHIELDED INST.CABLE	Mtrs	1500	1500
B.7.3	,	B.7.3,	4P X 0.5 SQMM O/A SHIELDED INST.CABLE	Mtrs	4950	4950
B.7.4	,	B.7.4,	8P X 0.5 SQMM O/A SHIELDED INST.CABLE	Mtrs	32400	32400
B.7.5	,	B.7.5,	12P X 0.5 SQMM O/A SHIELDED INST.CABLE	Mtrs	5850	5850
B.7.6	,	B.7.6,	2P X 1.5 SQMM P/O SHIELDED INST.CABLE	Mtrs	9900	9900
B.7.7	,	B.7.7,	2P X 0.5 SQMM P/O SHIELDED INST.CABLE	Mtrs	3150	3150
B.7.8	,	B.7.8,	4P X 0.5 SQMM P/O SHIELDED INST.CABLE	Mtrs	8820	8820
B.7.9	,	B.7.9,	8P X 0.5 SQMM P/O SHIELDED INST.CABLE	Mtrs	7200	7200
B.7.10	,	B.7.10,	12P X 0.5 SQMM P/O SHIELDED INST.CABLE	Mtrs	4320	4320
B.7.11	,	B.7.11,	3C X 2.5 SQ.MM. ARM. CONTROL CABLE	Mtrs	500	500
B.7.12	,	B.7.12,	5C X 2.5 SQ.MM. ARM. CONTROL CABLE	Mtrs	500	500
B.7.13	,	B.7.13,	7C X 2.5 SQ.MM. ARM. CONTROL CABLE	Mtrs	1000	1000
B.7.14	,	B.7.14,	9CX 2.5 SQ.MM. ARM. CONTROL CABLE	Mtrs	1000	1000
B.7.15	,	B.7.15,	12CX 2.5 SQ.MM. ARM. CONTROL CABLE	Mtrs	1000	1000
B.7.16	j	B.7.16,	12P X 1.31 SQ. MM. EXTN. CABLE - KX	Mtrs	2700	2700
B.7.17	j	B.7.17,	2P X 0.5 SQ.MM PTFE INST. CABLE - G	Mtrs	2700	2700
B.7.18	j	B.7.18,	4P X 0.5 SQ.MM PTFE INST. CABLE - G	Mtrs	2880	2880
B.7.19	ij	B.7.19,	8P X 0.5 SQ.MM PTFE INST. CABLE - G	Mtrs	2000	2000
B.7.20	ij	B.7.20,	4P X 0.5 SQ.MM PTFE INST. CABLE - F	Mtrs	750	750
B.7.21	,	B.7.21,	3C X 2.5 SQ.MM PTFE CONTROL CABLE	Mtrs	550	550
B.7.22	ij	B.7.22,	5C X 2.5 SQ.MM PTFE CONTROL CABLE	Mtrs	2000	2000
B.7.23	,	B.7.23,	2P X 0.5 SQ.MM PTFE INST. CABLE - F	Mtrs	2600	2600
B.7.24	,	B.7.24,	2P X 1.31 SQ.MM PTFE EXTENSION CABLE	Mtrs	3600	3600
B.8.0	,		CABLE TRAY			
B.8.1	j	B.8.1,	CABLE TRAY-50 MM WIDTH	Mtrs	1750	1750
B.8.2	,	B.8.2,	CABLE TRAY-100 MM WIDTH	Mtrs	5875	5875
B.8.3	,	B.8.3,	CABLE TRAY-150 MM WIDTH	Mtrs	3750	3750
B.9.0	,	-	JUNCTION BOXES			
B.9.1	,	B.9.1,	24 WAY FRP JUNCTION BOX WITH CANOPY	Nos	80	80
B.9.2	,	B.9.2,	48 WAY FRP JUNCTION BOX WITH CANOPY	Nos	65	65
B.9.3	,	B.9.3,	72 WAY FRP JUNCTION BOX WITH CANOPY	Nos	60	60
B.9.4	,	B.9.4,	24 WAY MTM FRP JUNCTION BOX WITH CANOPY	Nos	5	5
B.9.5	,	B.9.5,	48 WAY MTM FRP JUNCTION BOX WITH CANOPY	Nos	35	35
B.9.6	,	B.9.6,	72 WAY MTM FRP JUNCTION BOX WITH CANOPY	Nos	10	10
B.10.0	,		MISCELLENEOUS RACKS/PANELS			

B.10.1	,	B.10.1,	Local Instrument Enclosures/Racks with Junction Boxes, App. Size: 1650x2150x800 (mm) and App.Wt: 500 kg	Set	15	15
B.10.2	,	B.10.2,	Pulveriser Dynamic Classifier - VFD Cabinet App. Size: 900x2100x700 (mm) and App.Wt: 100 kg	Nos	8	8
B.10.3	,	B.10.3,	HWL-1&2 and MEF Controller JB App. Size: 600x600x250 (mm) and App.Wt: 50 kg	Nos	3	3
B.10.4	,	B.10.4,	HWL-1&2 and MEFCV - Skid Instrumentation	Set	1	1
B.10.5	,	B.10.5,	HP Bypass Valve - Skid Instrumentation	Set	1	1
B.11.0	,		HARDWARES TUBING/PIPING			
B.11.1			TUBES			
B.11.1.1	,	B.11.1.1,	1/4" Air Filter Regulators (for mill system)	Nos	8	8
B.11.1.2	,	B.11.1.2,	1" Air Filter Regulators (for SADC System)	Nos	8	8
B.11.1.3	,	B.11.1.3,	Purge Meter cum DP Regulator	Nos	16	16
B.11.1.4	ij	B.11.1.4,	1" OD SS TUBE	Mtrs	40	40
B.11.1.5	,	B.11.1.5,	1/4" OD SS TUBE	Mtrs	4800	4800
B.11.1.6	,	B.11.1.6,	3/4" OD SS TUBE	Mtrs	20	20
B.11.1.7	j	B.11.1.7,	3/8" OD SS TUBE	Mtrs	55	55
B.11.1.8	,	B.11.1.8,	1/4" TEFLON HOSE- 2 METER PER PIECE	Nos	135	135
B.11.1.9	,	B.11.1.9,	1" TEFLON HOSE- 3 METER PER PIECE	Nos	5	5
B.11.1.10	,	B.11.1.10,	1/2" TEFLON HOSE- 1 METER PER PIECE	Nos	18	18
B.11.2	,	,	SEAMLESS PIPES			
B.11.2.1	,	B.11.2.1,	Seamless Pipe-Matl : SA335P91-Size: 1/2" Sch XXS	Mtrs	65	65
B.11.2.2	,	B.11.2.2,	Seamless Pipe-Matl : SA335P22-Size: 1/2" Sch 80	Mtrs	125	125
B.11.2.3	,	B.11.2.3,	Seamless Pipe-Matl : SA335P22-Size: 3/4" Sch 80	Mtrs	200	200
B.11.2.4	,	B.11.2.4,	Seamless Pipe-Matl : SA335P22-Size: 3/4" Sch 80	Mtrs	220	220
B.11.2.5	,	B.11.2.5,	Seamless Pipe-Matl : SA106Gr B-Size: 3/4" Sch 80	Mtrs	850	850
B.11.2.6	,	B.11.2.6,	Seamless Pipe-Matl : SA106Gr B-Size: 3/4" Sch 80	Mtrs	165	165
B.11.2.7	,	B.11.2.7,	Seamless Pipe-Matl : SA106Gr B-Size: 1" Sch 80	Mtrs	1050	1050
B.12.0	,	,	MISCELLENEOUS ITEMS			
B.12.1	,	B.12.1,	Structural Steel for fabrication of Supports consisting of angles, channels (ISA ISMC 100x50x6 wt 1250 kg, ISA 50x50x6 Wt. 800 kg,etc)	MT	2	2
B.12.2	,	B.12.2,	1/2" GI Pipe	Mtrs	1215	1215
B.13.0	,		Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
B.13.1	,	B.13.1,	Heavy Duty Limit Switches for Burner Tilt Shear Pin Failure Indication Purpose	Nos	32	32
B.13.2	,	B.13.2,	HWL 1 & 2 & MEFCV Motor Starter Panel	Set	1	1
B.13.3	,	B.13.3,	Motor Operated Valves (MOV) Actuators (On/Off) in Various Applications	Nos	78	78

B.13.4	,	B.13.4,	Motor Operated Valves Actuators (MOV) (inching) in Various Applications	Nos	35	35
B.13.5	,	B.13.5,	Electric Actuators for Various Dampers (Open/Close)	Nos	16	16
B.13.6	,	B.13.6,	Pneumatic Actuators for Various Dampers(Open/Close)	Nos	17	17
B.13.7	,	B.13.7,	Limit Switches (Cabling and Checking) for manually operated dampers	Nos	44	44
B.13.8	,	B.13.8,	Solenoids (different ratings) of Pneumatic Valves of Various applications - tubing, Cabling & Commissioning	Nos	213	213
B.13.9	1	B.13.9,	Burner Tilt Shear Pin failure indication junction box App.Dimension: 280(H)x600(L)x200(D): weight 12 kg each	Nos	16	16
B.13.10	1	B.13.10,	Calibration/Commissioning of Gravimetric Feeder Comprising of Feeder C&I Equipment like motion monitor sensor, micro switches, etc. along with Feeder Integral Cabinet of App.Size 600x750x350 and Wt.75 kg , LT Motors, etc.	Set	8	8
B.14	,		SCR PACKAGE			
B.14.1	,		INSTRUMENTS			
B.14.1.1	,	B.14.1.1,	Pressure Indicators	Nos	13	3
B.14.1.2	,	B.14.1.2,	Level Switches H/HH	Nos	10	6
B.14.1.3	,	B.14.1.3,	Level Transmitters	Nos	10	6
B.14.1.4	,	B.14.1.4,	Differential Pressure Transmitters	Nos	10	8
B.14.1.5	,	B.14.1.5,	Pressure Transmitters	Nos	49	25
B.14.1.6	,	B.14.1.6,	Temperature Elements	Nos	42	28
B.14.1.7	,	B.14.1.7,	Temperature Indicator	Nos	5	3
B.14.1.8	3	B.14.1.8,	Ammonia Leak Detector	Nos	9	4
B.14.1.9	,	B.14.1.9,	Density Analyzer	Nos	2	2
B.14.1.10	,	B.14.1.10,	pH Analyzer	Nos	1	1
B.14.1.11	,	B.14.1.11,	Oxygen Analyzer: Consisting of insitu,flange mounted probe and electronics-1 cabinet, Verification gas cylinder and anlyser accessories such as Ref.air+Verification gas kit cabinet, signal and power cables (10m), SS tubings and fittings, Junction box, Glands for Electronics and JB, mounting flanges. App.weight of analyser is 22 Kg	Set	4	4
B.14.1.12	,	B.14.1.12,	NoX Analyzer: Consisting of insitu, flange mounted probe and electronics-1 cabinet, Verification gas cylinder and anlyser accessories such as Ref.air+Verification gas kit cabinet, signal and power cables (10m), SS tubings and fittings, Junction box, Glands for Electronics and JB, mounting flanges. App.weight of analyser is 22 Kg	Set	6	6

B.14.1.13	,	B.14.1.13,	SoX Analyzer:Consisting of insitu,flange mounted probe and electronics-1 cabinet, Verification gas cylinder and anlyser accessories such as Ref.air+Verification gas kit cabinet, signal and power cables (10m), SS tubings and fittings, Junction box, Glands for Electronics and JB, mounting flanges. App.weight of analyser is 22 Kg	Set	4	4
B.14.1.14	,	B.14.1.14,	NH3 Analyzer:Consisting of insitu,flange mounted probe and electronics-1 cabinet, Verification gas cylinder and anlyser accessories such as Ref.air+Verification gas kit cabinet, signal and power cables (10m), SS tubings and fittings, Junction box, Glands for Electronics and JB, mounting flanges. App.weight of analyser is 22 Kg	Set	2	2
B.14.1.15	,	B.14.1.15,	Flow Elements	Nos	14	14
B.14.1.16	,	B.14.1.16,	Flow Transmitters	Nos	20	20
B.14.2	,		CABLES			
B.14.2.1	,	B.14.2.1,	4P X 0.5 SQ.MM. O/A SHIELDED INST. CABLE	Mtrs	7200	7200
B.14.2.2	,	B.14.2.2,	8P X 0.5 SQ.MM. O/A SHIELDED INST. CABLE	Mtrs	5400	5400
B.14.2.3	,	B.14.2.3,	12P X 0.5 SQ.MM O/A SHIELDED INST. CABLE	Mtrs	900	900
B.14.2.4	,	B.14.2.4,	2P X 0.5 SQ.MM. P/O SHIELDED INST. CABLE	Mtrs	2200	2200
B.14.2.5	,	B.14.2.5,	4P X 0.5 SQ.MM. P/O SHIELDED INST. CABLE	Mtrs	7200	7200
B.14.2.6	ij	B.14.2.6,	8P X 0.5 SQ.MM. P/O SHIELDED INST. CABLE	Mtrs	5760	5760
B.14.2.7	,	B.14.2.7,	3C X 2.5 MM² ARMOURED CONTROL CABLE	Mtrs	2430	2430
B.14.2.8	,	B.14.2.8,	5C X 2.5 MM² ARMOURED CONTROL CABLE	Mtrs	8100	8100
B.14.2.9	,	B.14.2.9,	9C X 2.5 MM² ARMOURED CONTROL CABLE	Mtrs	1500	1500
B.14.2.10	,	B.14.2.10,	12C X 2.5 MM ² ARMOURED CONTROL CABLE	Mtrs	5400	5400
B.14.2.11	,	B.14.2.11,	2P X 1.31 MM ² EXTENSION CABLE - KX	Mtrs	100	100
B.14.2.12	,	B.14.2.12,	4P X 1.31 MM ² EXTENSION CABLE - KX	Mtrs	800	800
B.14.3	,		JUNCTION BOXES			
B.14.3.1	,	B.14.3.1,	24 WAY JUNCTION BOX	Nos	12	12
B.14.3.2	,	B.14.3.2,	48 WAY JUNCTION BOX	Nos	17	17
B.14.3.3	,	B.14.3.3,	24 WAY JUNCTION BOX-FLAME PROOF	Nos	10	10
B.14.3.4	,	B.14.3.4,	48 WAY JUNCTION BOX-FLAME PROOF	Nos	10	10
B.14.3.5	,	B.14.3.5,	72 WAY JUNCTION BOX-FLAME PROOF	Nos	6	6
B.14.4	,		PUSHBUTTON STATIONS			
B.14.4.1	,	B.14.4.1,	E-STOP PUSH BUTTON STATION	Nos	10	10
B.14.4.2	,	B.14.4.2,	FOGGING PUSH BUTTON STATION	Nos	5	5
B.14.5	,		CABLE TRAYS			
B.14.5.1	,	B.14.5.1,	Cable Trays - 50mm Perforated with accessories	Mtrs	250	250
B.14.5.2	,	B.14.5.2,	Cable Trays - 100mm Perforated with accessories	Mtrs	125	125
B.14.6	,		MISCELLENEOUS RACKS/PANELS			
B.14.6.1	,	B.14.6.1,	Local Instrument Enclosures/Racks with Junction Boxes, App. Size: 1650x2150x800 (mm) and App.Wt: 1000 kg	Set	7	7

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TENDER SPECIFICATION

B.14.7	,	1	SUPPORTING MATERIALS			<u> </u>
B.14.7.1	,	B.14.7.1,	ANGLE (50X50X6)/CHANNEL(100X50)	MT	3	3
B.14.8	,	,	EARTHING MATERIALS		-	-
B.14.8.1	,	B.14.8.1,	Earth Flat (50x6)	Mtrs	125	125
B.14.8.2	,	B.14.8.2,	Earth Wire 1.219 mm GI	Mtrs	350	350
B.14.9	,	B.14.9,	IMPULSE TUBE OD 6.35X1.6X9500-SA213TP304H with accessories	Mtrs	320	320
B.14.10	,		Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
B.14.10.1	,	B.14.10.1,	Motor Operated Valve (MOV) Actuators (On/Off) in various locations	Nos	12	8
B.14.10.2	,	B.14.10.2,	Motor Operated Valves Actuators (MOV) (Regulating) in Various Locations	Nos	3	1
B.14.10.3	,	B.14.10.3,	Unit Directional Drives	Nos	19	19
B.14.10.4	,	B.14.10.4,	Pneumatic Operated On/Off/Control Valves with accessories	Set	44	11
С	,		BHEL-PIPING CENTRE SCOPE OF SUPPLY			
C.1.0	,		Local Instruments			
C.1.1	,	C.1.1,	Pressure Gauges	Nos	40	40
C.1.2	,	C.1.2,	Temperature Gauges	Nos	104	104
C.1.3	,	C.1.3,	Averaging Pitot Tube	Set	3	3
1	,		Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
C.2.1	,	C.2.1,	Control Valves - for LP Start Up Systems & SCAPH Sysyems - including Air Filter Regulators, Positioners, Testing upto DCS	Set	5	5
C.2.2	,	C.2.2,	MOV Actuators for SCAPH, CW Aux Steam,etc	Nos	16	16
C.2.3	,	C.2.3,	LT Drives: Condensate Drain Pumps, Emergency Fill Pumps	Nos	5	5
D	,		BHEL RANIPET SCOPE OF SUPPLY			
D.1	,		OPACITY MONITOR (Installation and Commissioning)			
D.1.1	,	D.1.1,	Opacity Monitoring System consisting of Sender/Receiver/Ref/Control Unit 1 No. each, 5 Metre Slave wire cable-1 No., Purge Air Blower with filter-1 No., Power JB-1 No., Weather Hood Cover for Purge Air Blower JB-1 No.Fully auto. Electric Operated Fail Safe Shutter-2 Nos., Differential Pressure Switch-2 Nos., Mounting Flange With Pipe - 2 Nos., Weather Hood Cover for Sender/Receiver Units - 2 Nos., Weather Hood Cover for Power JB-2 Nos. & Purge Air Hose	Set	4	4

TENDER SPECIFICATION

D.2.0	,		AUTOMATIC LEAKAGE CONTROL SYSTEM-Air Pre Heater			
D.2.1	,	D.2.1,	ALCS DCS panel 750x750x2067 mm. App. Wt.90 kg	Nos	1	1
D.2.2	,	D.2.2,	ALCS Drive Control Panel 680x400x1053 mm App.Wt.50 kg	Nos	6	6
D.2.3	,	D.2.3,	ALCS Controller with panel 370x210x520 mm App. Wt. 5 kg	Nos	6	6
D.2.4	,	D.2.4,	Sensor Electronic with Enclosure 140x100x70 mm	Nos	6	6
D.2.5	,	D.2.5,	Interfacing Box 140x100x70 mm App.Wt.5 kg.	Nos	6	6
D.2.6	,	D.2.6,	Shielded Teflon Cable for ALCS	Mtrs	30	30
D.3.0	,		Instruments of APH/Fans/Gates & Dampers			
D.3.1	,	D.3.1,	Pressure Switches	Nos	4	4
D.3.2	,	D.3.2,	Pressure Indicators	Nos	24	24
D.3.3	,	D.3.3,	RTD With Thermowell	Nos	8	8
D.3.4	,	D.3.4,	Temperature Indicator	Nos	10	10
D.3.5	,	D.3.5,	Flow Indicating Switch	Nos	4	4
D.3.6	,	D.3.6,	Go Switch	Nos	2	2
D.3.7	,	D.3.7,	Dial Thermometer	Nos	2	2
D.3.8	,	D.3.8,	Temperature Elements	Nos	12	12
D.3.9	,	D.3.9,	Thermocouple with Thermowell	Nos	56	56
D.3.10	,	D.3.10,	On/Off Switch Box including light assembly and interconnecting heat resistant cable	Set	2	2
D.3.11	,	D.3.11,	Temperature Indicators-Fans	Nos	24	24
D.3.12	,	D.3.12,	RTDs with Thermowell-Fans	Nos	64	64
D.3.13	,	D.3.13,	Pressure Gauges-Fans	Nos	2	2
D.3.14	,	D.3.14,	Pressure Transmitters-Fans	Nos	2	2
D.3.15	,	D.3.15,	Angular Position Transmitters-For FD/ID/PA Fans	Nos	6	6
D.3.16	,	D.3.16,	Pressure Switches-GAD	Nos	10	10
D.4.0	,		Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
D.4.1	,	D.4.1,	Electric Actuators for Various Dampers (Open/Close)	Nos	76	76
D.4.2	,	D.4.2,	Pneumatic Actuators for Various Dampers (Open/Close)	Nos	27	27
D.4.3	,	D.4.3,	Solenoid Valves for APH	Nos	2	2
D.4.4	,	D.4.4,	Lub Oil Skids for Air Preheater: The scope of work includes removal of instruments, calibration, refixing, checking cable connection from JB to instruments etc. The app. Quantity of instruments for each skids given below: Pressure Gauges-2 Nos. Temperature Gauges-2 Nos., Flow Switches-2 Nos.	Set	4	4
D.4.5	,	D.4.5,	Fan Motor Bearing Temperature Indicators for all fans (Removal, Calibration and refixing only)	Nos	24	24

D.4.6		D.4.6,	Fan Motor Bearing/Winding RTDs (Checking of	Nos	64	64
D.4.7	,	D.4.7,	healthiness only) Lub Oil Skids for FD Fans: The scope of work includes removal of instruments calibration, refixing, checking cable connection from JB to instruments etc. The approximate total quantityof instruments for the skid put together is given below: Tank instrumenation Level transmitters (contact type guided wave)-3 Nos. Temperature Sensing Elements: -3 Nos, Temp. Gauge -2 Nos, DP Transmitter - 1 No., DP Indicator-01 No., Pr. Gauge-3 Nos, Pr. Transmitters-2 Nos, Flow Indicator with flow transmitters - 02 No.	Set	2	2
D.4.8	,	D.4.8,	Lub Oil Skids for ID Fans: The scope of work includes removal of instruments for calibration, refixing, checking cable connection from JB to instruments etc. The approximate total quantityof instruments for the skid put together is given below: Tank instrumenation Level transmitters (contact type guided wave)-3 Nos. Temperature Elements - 3 Nos, Temp. Gauge - 2 Nos, DP Transmitter - 1 No., DP Indicator-1No.,Pr. Gauge-6 Nos, Pr. Transmitters-2 Nos, Flow Indicator with flow transmitters - 05 Nos.	Set	2	2
D.4.9	,	D.4.9,	Lub Oil Skids for PA Fans: The scope of work includes removal of instruments calibration, refixing, checking cable connection from JB to instruments etc. The approximate total quantityof instruments for the skid put together is given below: Tank instrumenation Level transmitters (contact type guided wave)-3 Nos. Temperature Elements- 3 Nos, Temp. Gauge - 2 Nos, DP Transmitter - 1 No., DP Indicator-1 No., Pr. Gauge-6 Nos, Pr. Transmitters-2 Nos, Flow Indicator with flow transmitters - 05 Nos.	Set	2	2
Е	,		BHEL-HYDERABAD SCOPE OF SUPPLY			
E.1.0	,		DRIVE TURBINE INSTRUMENTS			
E.1.1	,	E.1.1,	Pressure Gauges	Nos	54	54
E.1.2	,	E.1.2,	Differential Pressure Gauges	Nos	6	6
E.1.3	,	E.1.3,	Pressure Transmitters	Nos	78	78
E.1.4	,	E.1.4,	Pressure Switches	Nos	4	4
E.1.5	,	E.1.5,	RTDs with Thermowell	Nos	40	40
E.1.6	,	E.1.6,	Chromel alumel Type Thermocouple	Nos	30	30
E.1.7	,	E.1.7,	Level Transmitters (Guide Wave Radar Type, top mounted)	Nos	4	4
E.1.8	,	E.1.8,	Speed Measuring Loop with probe	Nos	6	6

TENDER SPECIFICATION

E.1.9	,	E.1.9,	Proximeter Units, Local Field Cable etc. for Governing Sytem	Set	40	40
E.1.10	,	E.1.10,	Position Transmitters	Nos	4	4
E.1.11	,	E.1.11,	Temperature Guages	Nos	40	40
E.2.0	,	,	DRIP PUMP/CWP/TDBFP/CEP INSTRUMENTS			
E.2.1	,	E.2.1,	Temperature Elements (RTDs)	Nos	102	102
E.2.2	,	E.2.2,	Thermowells	Nos	6	6
E.2.3	,	E.2.3,	Solenoid Valves	Nos	5	5
E.3.0			PULVERSING SYSTEM – E&C			
E.3.1	,	E.3.1,	Temperature Elements -Planetary Gear Box	Nos	48	48
E.3.2	,	E.3.2,	Level Switches (Mill Seal Air)	Nos	8	8
E.3.3	,	E.3.3,	Junction Boxes (48 Way)	Nos	16	16
E.3.4	,	E.3.4,	Erection of MDV Solenoids with Manifolds and tubing	Set	8	8
E.4.0			HEAT EXCHANGERS (LP & HP Heaters) &DEAERATORS			
E.4.1	,	E.4.1,	Pressure Gauges	Nos	12	12
E.4.2	,	E.4.2,	Level Switches	Nos	3	3
E.4.3	,	E.4.3,	Thermowell	Nos	8	8
E.4.4	,	E.4.4,	Bimetallic Temperature Gauges	Nos	6	6
E.5.0	,		Erection & Commissioning of PANEL/FIELD MOUNTED INSTRUMENTS (Supervision by OEM)			
E.5.1	,	E.5.1,	TSI System for BFP Drive Turbine and gear box consisting of the following: Configuration of Laptop with software-1 No., Monitor Rack with Modules (to be mounted on CWW panel) app. Wt. 40 kg per rack-1 Set, relative shaft vibration sensor probes 8mm reverse mounted Turbine and gear box-8 Nos, Axial Displacement Probes-3 Nos., Eccentricity Probe-1 No., Zero Speed Probe - 1 No., Key phasor-1 No., Bearing housing vibration Probes-4 Nos., Differential Expn. Probe -1 No., Casing Expansion-1 No., with probe extension cables-18 Nos., Probe drivers for VIBR-17 Nos., Driver Housing -12 No., JB - 3 Nos., Flexible conduits-150 Mtr., Cable seal, Cable connectors, Mounting brackets for vibration/differential exp/brg housings, RS485 cable with connector for DCS 35 Mtr long etc and calibration kit.	Set	2	2
E.5.2	,	E.5.2,	Fabrication of Local Instrument Racks, each of size 1500x1700mm with the following materials Channel (100x50mm), Angle (50x50x6mm), 4mm Thick Sheet (400x120mm) and 10mm Thick Plate (375x770mm).	MT	2	2

E.5.3	,	E.5.3,	Temperature Indicators of BFP, CEP (Removal, Calibration & Refixing only)	Nos	8	8
E.6.0	,		LOCAL GAUGE BOARD (LGB) / LOCAL I NSTRUMENT RACK (LIR) (including removal, calibration and re-fix ing of LGB mounted instruments)/JB			
E.6.1	,	E.6.1,	LGB (LGB -1)Assembly for Feed Water Service for TDBFP/MD BFP including instruments, tubing, valves, fittings, junction boxes and wiring from switches to JBs. Approximate Size 1100 x900 x 2200 mm; Weight = 600 kg each.Quantity of instruments per set is Pressure Gauge: 4 Nos.DP Gauges: 2 Nos.Temperature Gauges: 2 Nos.	Set	3	3
E.6.2	,	E.6.2,	LGB (LGB-2) Assembly for SW & Cooling Water Service of TD/MD Booster Pump & BFP including instruments, tubing, valves, fittings, junction boxes and wiring from switches to JBs. Approximate Size 1100 x 900 x 2200 mm; Weight = 600 kg each.Quantity of instruments per set is Temperature Gauges: 8 Nos. Pressure Gauge - 1 Nos. DP Gauges - 3	Set	3	3
E.6.3	,	E.6.3,	LGB (LGB-2) Assembly for Lub oil service of TD / MD Booster Pump & BFP including instruments, tubing, valves, fittings, junction boxes and wiring from switches to JBs.Approximate Size 1100 x 900 x 2200 mm; Weight = 600 kg each.Quantity of instruments per set is Temperature Gauges: 4 Nos. Pressure Gauge - 4 Nos.	Set	3	3
E.6.4	,	E.6.4,	LGB (LGB-1) Assembly for 3 Nos. CEP instruments, tubing, valves, fittings, junction boxes and wiring from switches to JBs.Quantity of instruments per set is Pressure Gauges: 6 NosDiff. pressure Gauges: 3 Nos.temp. gauge qty 3 nos Approximate Size 1100 x 900 x 2200 mm; Weight = 600 kg each	Set	1	1
E.6.5	,	E.6.5,	Local instrument rack (LIR) assembly for TDBFP/MDBFP Transmitters. This LIR includes PT & DPTs,tubing , fittings, JBs, Main-fold valves and wiring from JBs to transmitters. Approximate Size 2000 x 650 x 2150 mm; Weight = 350 kg. Quantity of instruments per set is DP transmitters: 05 Nos.Pressure transmitter: 05 Nos.	Set	3	3

E.6.6	,	E.6.6,	Local Instrument Rack (LIR) assembly for CEP-A,B&C pumps to mount Pr. Transmitters. This LIR includes Transmitters, tubing, fittings, JBs, Manifolds Valves Approximate Size: 2000 x 600 x 2150 mm;and wiring from JBs to transmitters Weight = 300 kg Quantity of instruments per set is Pressure transmitters: 9 Nos, DP transmitters: qty 3 nos	Set	1	1
E.6.7	,	E.6.7,	24 Terminals JB for Thrust Bearing RTDs	Nos	10	10
E.7.0	,		SUPPORT MATERIALS			
E.7.1	,	E.7.1,	Structural steel (ISMC 100 x 50 mm qty 20 mtrs, Angle 45 x 45 x 5 mm-qty 24 mtrs etc.)	MT	0.5	0.5
E.7.2	,	E.7.2,	Impulse Tube Dia 16X2.6 (CS) for BFP/CEPs	Mtrs	1900	1900
E.7.3	,	E.7.3,	SS tube 12.7x2.1	Mtrs	750	750
E.7.4	,	E.7.4,	SS tube 6x1.5	Mtrs	35	35
E.8.0	,		Cables/Cable Trays for BFP/CEPs			
E.8.1	,	E.8.1,	4 Pair x 0.5 sqmm cable	Mtrs	500	500
E.8.2	,	E.8.2,	Perforated Cable Tray 50 mm Wide	Mtrs	80	80
E.8.3	,	E.8.3,	Perforated Cable Tray 150 mm Wide	Mtrs	45	45
E.9.0	,		Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
E.9.1	,	E.9.1,	Mills Lub Oil System: - Removal, Calibration and refixing of following instruments, Checking of Wiring from skid Junction Box to Equipment in Lub Oil skid. Equipment per Set: Level Transmitter-03 Nos., Temperature Elements-09 Nos., Temp.Gauges-02 Nos., DP Transmitters- 01 No., DP Indicator-01 No., Pressure Gauge-3 Nos., Pressure Transmitters- 03 Nos. and Flow Transmitter-06 Nos.	Set	8	8
E.9.2	,	E.9.2,	LT Drives of Lub Oil Skid of Mills	Nos	16	16
E.9.3	,	E.9.3,	Turbine Lub Oil Purification Skid: - Removal, Calibration and re-fixing of following instruments, Checking of Wiring from skid Junction Box to Equipment in Lub Oil skid. Equipment per Set: Level Switch-02 Nos., Temperature Elements-02 Nos., Temp.Gauges-03 Nos., DPI with Switch- 01 No., Pressure Gauge-04 Nos.	Set	2	2
E.9.4	,	E.9.4,	LT Drives of Oil Purification Skid of Turbine	Nos	2	2
E.9.5	,	E.9.5,	Control Valves with Smart Positioner, AFR, Limit Switches, inbuilt Postion Transmitters, Junction Box,etc	Set	8	8
E.9.6	,	E.9.6,	LT Drives of TDBFP System	Nos	18	18
E.9.7	,	E.9.7,	MOV Actuators for TDBFP System	Nos	26	26
E.9.8	,	E.9.8,	LT Drives of MDBFP System	Nos	9	9

E.9.9	,	E.9.9,	Hydraulic Coupling of MDBFP: The scope of work convers a) Removal, calibration & refixing of following instruments. Pressure Indicators: 2 Nos. DP Indicator: 1 No. Temperature Indicators: 14 Nos. Pressure Transmitters: 6 Nos. Level transmitter: 1 No. DP transmitter: 1 No. RTDs (Checking only): 18 Nos. B) Fixing of I/P Convertors, Air filter, Copper tubing & feedback transmitter, adjustment and calibration of scoop mechanism etc. C) Commissioning of Speed Indicators etc.	Set	1	1
E.9.10	,	E.9.10,	Governing Console Board: The scope includes removal, calibration and refixing of Instruments, wiring etc. Size of panel 1200 x 1650 x 450 mm The approximate quantity of instruments is Pressure Gauges: 10 Nos. Pressure Switches: 24 Nos.	Set	2	2
E.9.11	,	E.9.11,	Commissioning of Mill fire fighting and Burge Air Valves (Pneumatic Operated)	Nos	16	16
E.9.12	,	E.9.12,	Commissioning of Pneumatic Actuators of Mill Discharge Valves (MDV)	Nos	40	40
F	,	F,	BHEL-BHPV VIZAG SCOPE OF SUPPLY			
F.1	,	F.1,	Erection and Commissioning of the following Instrumentation items			
F.1.1	,	F.1.1,	Flame Scanner Head Assembly, mounting flange accessories, flexible hoes, fibre optic cable, Lens Barrel Assembly, Miniature 6 way Junction box,etc	Set	1	0
F.1.2	,	F.1.2,	Microprocessor based flame scanner amplifier 19" racks of size 482x263x134 (WxDxH) to be mounted in flame scanner panel supplied by BHEL-EDN	Set	1	0
F.1.3	,	F.1.3,	H.E.A Exciter box alongwith retractor assembly, flexible spark rod, spark tip, flexible cable asembly, maintenance switch, SS hose, Air Filter Regulator, etc.,	Set	1	0
F.1.4	,	F.1.4,	Pressure Gauges	Nos	28	0
F.1.5	,	F.1.5,	Temperature Gauges	Nos	10	0
F.1.6	,	F.1.6,	Reflex Type Level Gauges	Nos	4	0
F.1.7	,	F.1.7,	Direct Water Level Gauges	Nos	2	0
F.1.8	,	F.1.8,	24 Way Junction Boxes	Nos	3	0
F.1.9	,	F.1.9,	48 Way Junction Boxes	Nos	1	0
F.1.10	,	F.1.10,	Cable Tray 50 mm Width Perforated type	Mtrs	100	0
F.1.11	,	F.1.11,	Cable Tray 150 mm Width Perforated type	Mtrs	100	0
F.1.12	,	F.1.12,	Impulse Pipes and fittings 21.3x3.73-SA106Gr B	Mtrs	110	0
F.1.13	,	F.1.13,	Structural Steel for fabrication of Supports consisting of angles, channels (ISA ISMC 100x50x6, ISA 50x50x6)	MT	1	0

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F.1.14	,	F.1.14,	Pneumatic actuator with feedback smart positioner and transmitter for FD Fan inlet damper with linkage rod	Set	2	0
F.2	,		Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
F.2.1	,	F.2.1,	Trip Valves, Control Valves along with Positioner, AFR etcLO PC, SB Drain, Feed Water CV, DM Water CV, Spray CV	Set	14	0
F.2.2	,	F.2.2,	Furnace to WB DP Control Damper with feedback smart positioner and transmitter	Set	2	0
F.2.3	,	F.2.3,	Sootblower/LO Trip valve with solenoids, AFR etc	Set	2	0
F.2.4	,	F.2.4,	Electric Actuators for FD Fan outlet	Nos	2	0
F.2.5	,	F.2.5,	LT Drives (0.27 kW to 132 kW)	Nos	13	0
F.2.6	,	F.2.6,	MOV Actuators	Nos	16	0
G	,		BHEL-HARIDWAR SCOPE OF SUPPLY			
G.1.0	,		GENERATOR AUXILIARY CONTROL CABINETS- INSTALLATION AND COMMISSIONING			
G.1.1	,	G.1.1,	Moisture Measurement System cabinet for Generator, including indicator cum controller placed in control room 144 x 72 and sampling system in field 760 x 600 x 210 . Weight: 100 Kg	Set	2	2
G.1.2	1	G.1.2,	Gen end vibration monitoring cabinet (CXW01E) dimention 800mm(W) x 600mm (D) x 2200mm (H) Including preamlifier units, special cables interconnecting, PC based monitor and printer computer table etc.aprox weight 150 kg	Set	1	1
G.1.3	,	G.1.3,	Grounding Brush Monitor (Wall mounted) Approx. size & weight : 235 x 235 x 285 mm; 100 Kg.	Set	1	1
G.1.4	,	G.1.4,	H2 Gas Analyzer Cabinet 1000x600x2000 (mm). Weight : 450 kg	Set	2	2
G.2.0	,		INSTALLATION AND COMMISSIONING OF GENERATOR INSTRUMENTS:			
G.2.1	,	G.2.1,	Thermocouples (NiCrNi) (Generator Bearing Temp: 4 Nos.& Exciter Bearing Temp: 2 Nos.) -CHECKING THE HEALTHINESS ONLY	Nos	6	6
G.3.0	,		REMOVAL, CALIBRATION & REFIXING OF GENERATOR INSTRUMENTS			
G.3.1	,	G.3.1,	Checking the healthiness of the RTDs/Thermocouples	Nos	140	140
G.4.0	,		LAYING AND TERMINATION OF POWER CABLES FOR 24 V SOLENOIDS			
G.4.1	,	G.4.1,	4Cx2.5 Sqmm	Mtrs	14400	14400

G.5.0	,		LOOSE SUPPLIED INSTRUMENTS TO BE INSTALLED AND COMMISSIONED ON GENERATOR PIPINGS			
G.5.1	,	G.5.1,	Vacuum Switches	Nos	2	2
G.5.2	,	G.5.2,	Pressure Gauges	Nos	4	4
G.5.3	,	G.5.3,	Pressure Transmitters	Nos	3	3
G.5.4	,	G.5.4,	PT RTD, Duplex Type	Nos	3	3
G.5.5	,	G.5.5,	Dial Thermometer	Nos	3	3
G.5.6	,	G.5.6,	Level Switches (capacitance type)	Nos	19	19
G.6.0	,		LOOSE SUPPLIED INSTRUMENTS TO BE INSTALLED AND COMMISSIONED ON H2 COOLER PIPINGS			
G.6.1	,	G.6.1,	Pressure Gauges	Nos	8	8
G.6.2	,	G.6.2,	Pressure Transmitter	Nos	1	1
G.6.3	,	G.6.3,	PT RTD, Duplex Type	Nos	7	7
G.6.4	,	G.6.4,	Dial Thermometer	Nos	6	6
G.7.0	,		TURBINE INSTRUMENTATION GAUGES AND SENSORS			
G.7.1	,	G.7.1,	RTDs for Cooling Water for LP Bypass, MOT, Control fluid	Nos	6	6
G.7.2	,	G.7.2,	Thermocouples (for MAV,LBA,LBB,LBG,PGB,MAW,MAA,MAB,MAN etc	Nos	80	80
G.7.3	,	G.7.3,	Thermocouples routed alongwith innercasing as per drawing only installation and healthiness checking for TSE, IPC exhaust, LPC outer, LPC-2 outer etc	Nos	7	7
G.7.4	,	G.7.4,	Temperature Gauges	Nos	14	14
G.7.5	,	G.7.5,	Pressure Transmitters / Absolute Pressure Transmitters/Differential Pressure Transmitter	Nos	60	60
G.7.6	,	G.7.6,	Pressure Gauges	Nos	15	15
G.7.7	,	G.7.7,	Positon Transmitters for Extraction NRV Position	Nos	10	10
G.7.8	,	G.7.8,	Speed Sensors	Nos	6	6
G.8.0	,	G.8.0,	PRESSURE INSTRUMENTS RACKS			
G.8.1	,	G.8.1,	Instrument rack TYPE A 2150mm(W) x 700mm(D) x 2150mm(H)	Set	6	6
G.8.2	,	G.8.2,	Instrument rack TYPE B 1250mm(W) x 700mm(D) x 880mm(H)	Set	4	4
G.9.0	,		IMPULSE PIPES - TURBINE			
G.9.1	,	G.9.1,	SEAMLESS C.S.TUBE 21.3X2.3 ST-BQ-A1-CDS-TUBE	Mtrs	200	200
G.9.2	,	G.9.2,	CARBON STEEL TUBE 88.9x4 ST-B-HFSPIPES (RACK OF COND.INST.)	Mtrs	80	80
G.9.3	,	G.9.3,	SEAMLESS C.S. TUBE 21.3X2.3 ST-BQ-A1-CDS-TUBE (RACK OF EXT & GLAND SEAL INS)	Mtrs	150	150

G.9.4	,	G.9.4,	SEAMLESS C.S.TUBE 21.3x2.3 ST-BQ-A1-CDS-TUBE (RACK OF WATER INJECTION INST.)	Mtrs	120	120
G.9.5	,	G.9.5,	SEAMLESS A.S. TUBE D=13.5X2.6 ST-2.25 CR-1MO- TUBE (TEMP. & PR. CONNECTION)	Mtrs	20	20
G.9.6	,	G.9.6,	S.L TUBES (GR.T22)21.3X2.77 ST-2.25 CR-1MO-TUBE (RACK OF EXT & GLAND SEAL INS)	Mtrs	60	60
G.9.7	,	G.9.7,	GR:T91 (13.5X2.6) HTS -ALY- ST-TUBE (TEMP. &PR. CONNECTION)	Mtrs	10	10
G.9.8	,	G.9.8,	SEAMLESS TUBE GR.T91 21.3x7.47 HTS -ALY- ST- TUBE (RACK OF MS PR.INSTRUMENTS)	Mtrs	350	350
G.9.9	,	G.9.9,	SEAMLESS A.S. TUBE 21.3X2.77 HTS -ALY- ST-TUBE (RACK OF HRH/MS PR.INSTRUMENTS)	Mtrs	200	200
G.10.0	,		JUNCTION BOXES-TO BE INSTALLED AND COMMISSIONED			
G.10.1	,	G.10.1,	Junction Box (to be mounted as per BHEL-Hardwar drg)	Nos	16	16
G.10.2	,	G.10.2,	JB for thermocouple HPT, IPT, LPT1&2, TSE, IPC exhaust, LPC outer etc	Nos	12	12
G.10.3	,	G.10.3,	Push button for TG and lube oil room	Nos	12	12
G.10.4	,	G.10.4,	STRUCTURAL STEEL (for both turbine and generator instruments) 50x50x6 angle	MT	1	1
G.11.0	,		INSTRUMENTS FOR HEAT EXCHANGERS (CONDENSER, GSC, LP HEATER-1, TOC, CFC)-TO BE COMMISSIONED			
G.11.1	,	G.11.1,	Level Switches (Float type)	Nos	7	7
G.11.2	,	G.11.2,	Temperature Gauges	Nos	16	16
G.11.3	,	G.11.3,	Pressure Gauges	Nos	4	4
G.11.5	,	G.11.5,	MIS type Thermometer	Nos	16	16
G.11.6	,	G.11.6,	Thermowell (125/175/325)	Nos	40	40
G.12.0	,		Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
G.12.1	,	G.12.1,	Condenser Vacuum Pump Removal, calibration and commissioning of CVP skid mounted instruments including CVP PLC and motor mounted on the skid. The approximate quantity of skid mounted instruments shall be Pressure Transmitters - 02 Nos., Pressure Indicators – 04 Nos., Temperature Transmitters - 03 Nos., Temperature Indicators - 04 Nos., Flow Indicator cum Switch – 01 No., Level Indicator-1 No., Rotameter-01 No., Level Switches – 02 Nos., DP Switch – 1, Diff. Pr.Indicator-01 No., Junction Box-1 No. & Temperature Element-02 Nos., Pneumatic Butterfly Valve-01 No.,	Set	2	2

G.12.2	,	G.12.2,	LT drives for Vaccum pump, Recirculation pump,	Nos	4	4
G.12.3	,	G.12.3,	Oil Centrifuge Unit - Removal, calibration and refixing of all instruments mounted on centrifugal unit, checking and commissioning of the system.	Set	2	2
G.12.4	,	G.12.4,	NRV Valves, Stop Valves, Control Valves, HP/LP Bypass Valves with accessories	Set	40	40
G.12.5	,	G.12.5,	Position Transmitters (Removal, calibration and re-fixing)	Nos	19	19
G.12.6	,	G.12.6,	Limit Switch (checking only)	Nos	76	76
G.12.7	,	G.12.7,	Solenoid Valves (checking only) (steam turbine ext.valves & condenser)	Nos	61	61
G.12.8	,	G.12.8,	Motorized temperature control valve with accessories for cold gas	Set	1	1
G.12.9	,	G.12.9,	Motorized temperature control valve with accessories for primary water	Set	1	1
G.12.10	,	G.12.10,	Governing System Control rack: Removal, calibration and refixing of rack mounted instruments, checking solenoid valves, drives, including wiring on the rack etc. The approximate quantity of instruments is as below: Pressure Gauges: 9 Nos. Pressure Switches: 4 Nos.	Set	2	2
G.12.11	,	G.12.11,	Main Oil Tank: Removal, calibration and refixing of rack mounted instruments, checking solenoid valves, drives, including wiring on the rack etc. The approximate quantity of instruments is as below: Pressure Gauges: 9 Nos. Pressure Switches: 4 Nos	Set	1	1
G.12.12	,	G.12.12,	LP Bypass Control Rack/Skid: Removal, calibration and refixing of rack mounted instruments, checking solenoid valves, drives, including wiring on the rack etc. The approximate quantity of instruments is as below Transmitters(Pressure, Temp &Level)-7 Nos. Switches(Pressure, DP& Flow)-6 Nos. Pressure gauges:5 Nos	Set	1	1
G.12.14	,	G.12.14,	Seal Oil Rack consists of differential pressure regulating valves, equalising valves & flow regulators including Pressure Indicators- 13 Nos., DP Indicators-02 Nos., DP Switch-2 Nos., Pressure Switch- 01 Nos. & Flow Indicators-06 Nos. and Temperature indicators/Elements-14 Nos.	Set	1	1
G.12.15	,	G.12.15,	Stator Water Rack consists of Conductivity meter-3 Nos., Level indicator cum switch-01 No., Flow meters-04 Nos, Flow Transmitters-02 Nos., Pressure gauges-03 Nos, Pressure Transmitters-04 Nos, DP Transmitters- 01 Nos., DP Switches-03 Nos., Temperature Elements-04 Nos., Temperature Indicators-03 Nos. & Sight Glass-03 Nos.	Set	1	1

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G.12.16	,	G.12.16,	Seal Oil Level / PrTxr Instrument Rack consists of Level Switches- 04 Nos., Level Indicators- 01 Nos., Pressure Transmitters-12 Nos.	Set	1	1
G.12.17	,	G.12.17,	Stator Water DP Instrument Rack consists of Pressure Transmitters - 04 Nos., DP Transmitter-01 Nos., DP Switches-03 Nos., Pressure Gauges-03 Nos.	Set	1	1
G.12.18	,	G.12.18,	H2 Dryer Unit consists of Temperature Gauge, DP Indicator, DP Transmitter, Pressure Gauge	Set	1	1
G.12.19	,	G.12.19,	MOV Actuators	Nos	30	30
G.16.0	,		LAYING AND TERMINATION OF INSTRUMENTATION CABLES			
G.16.1	,		Overall Shielded Cable			
G.16.1.1	,	G.16.1.1,	2P x 0.5 sqmm	Mtrs	15000	15000
G.16.1.2	,	G.16.1.2,	4P x 0.5 sqmm	Mtrs	10500	10500
G.16.1.3	,	G.16.1.3,	8P x 0.5 sqmm	Mtrs	3500	3500
G.16.1.4	,	G.16.1.4,	12P x 0.5 sqmm	Mtrs	1500	1500
G.16.1.5	,	G.16.1.5,	2P x 0.5 sqmm (Cu braided)	Mtrs	6500	6500
G.16.1.6	,	G.16.1.6,	4P x 0.5 sqmm (Fire Survival)	Mtrs	3500	3500
G.16.2	,		Individual & Overall Shielded Cable			
G.16.2.1	,	G.16.2.1,	4P x 0.5 sqmm	Mtrs	7000	7000
G.16.2.2	,	G.16.2.2,	8P x 0.5 sqmm	Mtrs	13000	13000
Н	,		BHEL-BHOPAL SCOPE OF SUPPLY			
H.1.0	,		Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
H.1.1	,	H.1.1,	PT 100 Simplex/Duplex - 3 Wire/4 Wire RTD Sensors for winding/bearings of MDBFP/Drip Pump/CEP/CWP/Mill/DMCW/ACW,etc Motors	Nos	901	757
H.1.2	,	H.1.2,	Motor Temperature Indicators (Removed, Calibrated & Re-fixing)	Nos	46	46
H.1.3	,	H.1.3,	Electric Actuators for various sizes of Valves	Nos	68	39
H.1.4	,	H.1.4,	11 kV HT Drives ID/FD/PA/MDBFP - Each 2 Nos., CW Pump- 5 Nos	Nos	7	7
H.1.5	,	H.1.5,	3.3 kV HT Drives DMCW(TG)/CEP/ACW - 3 Nos each., Mills-8 Nos, BCW-1 No., Drip Motor 2 Nos.	Nos	22	22
H.1.6	,	H.1.6,	3.3 kV HT Drives of other applications (Stage wise)	Nos	17	0
I	,		VOID			
J	,		BHEL-PEM SCOPE OF SUPPLY			
J.1.0	,		Instruments			
J.1.1	,	J.1.1,	Ultrasonic Flow Transmitter with Controller (Raw Water/Ash Water/CW & ACW)	Nos	9	0

J.2.0	,		Laying and Termination of I/O Shielded, Screened, Twisted Pair, Type F Armoured Instrumentation Cables			
J.2.1	,	J.2.1,	4 Pair x 0.5 sqmm	Mtrs	66000	66000
J.2.2	,	J.2.2,	8 Pair x 0.5 sqmm	Mtrs	45000	45000
J.2.3	,	J.2.3,	12 Pair x 0.5 sqmm	Mtrs	9600	9600
J.2.4	,	J.2.4,	20 Pair x 0.5 sqmm	Mtrs	9600	9600
J.3.0	,		Laying and Termination of Overall Shielded, Screened, Twisted Pair, Type G Armoured Instrumentation Cables			
J.3.1	,	J.3.1,	2 Pair x 0.5 sqmm	Mtrs	56200	56200
J.3.2	,	J.3.2,	4 Pair x 0.5 sqmm	Mtrs	45200	45200
J.3.3	,	J.3.3,	8 Pair x 0.5 sqmm	Mtrs	114400	114400
J.3.4	,	J.3.4,	12 Pair x 0.5 sqmm	Mtrs	23000	23000
J.4.0	,		Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
J.4.1	,	J.4.1,	Control Valves with Smart Positioner, AFR, Air Lock Valve etc., LO TCV, Gland Steam inlet and dump	Set	29	29
J.4.2	,	J.4.2,	Electric Actuators for Butterfly Valves	Nos	2	2
J.4.3	,	J.4.3,	Oxygen Dosing Skid for CPU/Dearator O/L - Approximate qty of instruments per skid is Pressure Gauges: 03 Nos., Mass flow controllers- 02 Nos., Pressure Safety Valve - 2 nos. Pressure Transmitter: 6 Nos., Solenoid Valves: 5 No. Junction boxes: 2 Nos, oxygen cylinders - 8 Nos + 11 loose cylinders	Set	2	2
J.4.4	,	J.4.4,	Ammonia Dosing Skid - Approximate qty of instruments per skid is Pressure Gauges: 08 Nos., Level Gauge- 04 Nos, Pressure Transmitter: 04 Nos, level Transmitter: 06 Nos Differential Pressure indicating Transmitter - 02 Nos & Solenoid Operated Gate Valves - 06 Nos.	Set	1	1
J.4.5	,	J.4.5,	NaOH Dosing Skid - Approximate qty of instruments per skid is., Pressure Gauges-03 Nos., Level Gauge- 01 Nos, Level Transmitters: 02 Nos. Pressure transmitter-02 Nos. & Solenoid Operated Gate Valves - 02 Nos.	Set	1	1
J.4.6	,	J.4.6,	Hydrazine dosing system Approximate qty of instruments per skid is Pressure Gauges: 08 Nos., Level Gauge- 04 Nos, Pressure Transmitter: 04 Nos, level Transmitter: 06 Nos Differential Pressure Transmitter-02 Nos. & & Solenoid Operated Gate Valves - 06 Nos.	Set	1	1
J.5.0	,		Citric Acid Cleaning for Boiler - Installation and Removal			

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J.5.1	,	J.5.1,	Temp. Gauges	Nos	2	2
J.5.2	,	J.5.2,	Pressuer Gauges	Nos	2	2
J.5.3	,	J.5.3,	Thermocouple Stem type and MTM	Nos	8	8
J.5.4	,	J.5.4,	Junction Boxes	Nos	3	3
K			BHEL-PESD SCOPE OF SUPPLY FOR FIRE FIGHTING AND FIRE PROTECTION SYSTEMS			
K.1			Water Based Fire Protection System (WBFPS)- Erection and/or Commissioning of items as detailed below.			
K.1.1	,	K.1.1,	Commissioning of LT Electrical Unidirectional Drive for Hydrant Pump	Nos	3	0
K.1.2	,	K.1.2,	Batteries of Diesel Engine driven Hydrant Pumps- 6 cells per battery (12 V each)-180 AH, Size of each battery is app. 521x278x270 (mm) and nominal wt. is 55.1 kg.	Set	2	0
K.1.3	,	K.1.3,	Commissioning of LT Electrical Unidirectional Drive for Spray Pump	Nos	2	0
K.1.4	,	K.1.4,	Batteries of Diesel Engine driven Hydrant Pumps-6 cells per battery (12 V each)-180 AH, Size of each battery is app. 521x278x270 (mm) and nominal wt. is 55.1 kg.	Set	1	0
K.1.5	,	K.1.5,	Commissioning of LT Electrical Unidirectional Drive for Jockey Pump	Nos	2	0
K.1.6	,	K.1.6,	Commissioning of LT Electrical Unidirectional Drive for Hydrant Booster Pump	Nos	2	0
K.1.7	,	K.1.7,	Batteries of Diesel Engine driven Hydrant Booster Pump 6 cells per battery (12 V each)-180 AH, Size of each battery is app. 521x278x270 (mm) and nominal wt. is 55.1 kg.	Set	1	0
K.1.8	,	K.1.8,	Commissioning of LT Electrical Unidirectional Drive for Spray Booster Pump	Set	1	0
K.1.9	,	K.1.9,	Batteries of Diesel Engine driven Spray Booster Pump 6 cells per battery (12 V each)-180 AH, Size of each battery is app. 521x278x270 (mm) and nominal wt. is 55.1 kg.	Set	1	0
K.1.10	,	K.1.10,	Commissioning of LT Electrical Unidirectional Drive for Air Compressors	Nos	2	0
K.1.11	,	K.1.11,	Erection and Commissioning of following Control Panels (of Hydrant Pumps/Spray Pumps/Hydrant booster Pumps/Spray Booster Pumps) of size 1200(H)x600(W)x300(L) and wt. of 60 kg for Diesel Engine cum Battery Charger panel as follows.	Set	5	0
K.1.12	,	K.1.12,	Laying and termination of 10C x 2.5 Sqmm Cu Armoured Control cable between Control panel and Diesel Pump	Mtr	15	0

K.1.13 ,	K.1.13,	Laying and termination of 4C x 6 Sqmm Cu Armoured Control cable between Control panel and Switch Box	Mtr	15	0
K.1.14 ,	K.1.14,	Laying of 1C x 90 Sqmm Cu Armoured Power cable between Switch Box and Diesel Pump	Mtr	15	0
K.1.15 ,	K.1.15,	End Termination of Power Cables of1Cx90 Sqmm armoured cable	Nos	4	
K.1.16 ,	K.1.16,	Erection and Commissioning of Switch Box for Diesel Pump of App. Dimension360(L)x225(W)x400(H) and Appr. Wt. 50 kg. including two sets of SMPS charger based Batteries and necessary cabling.	Set	5	0
K.1.17 ,	K.1.17,	Laying and termination of 2Cx2.5 Sqmm Copper Armoured Control Cable	Mtr	2000	0
K.2	K.2	Instruments of WBFPS			
K.2.1 ,	K.2.1,	Pressure Transmitters	Nos	30	0
K.2.2 ,	K.2.2,	Pressure Gauges	Nos	30	0
K.2.3 ,	K.2.3,	Level Transmitters	Nos	8	0
K.2.4 ,	K.2.4,	Level Gauges	Nos	3	0
K.2.5 ,	K.2.5,	Differential Pressure Transmitters	Nos	1	0
K.2.6 ,	K.2.6,	Flow Transmitter	Nos	2	0
K.3	K.3	Instruments of Medium Velocity Water Spray System (MVWSS)			
K.3.1 ,	K.3.1,	Pressure Switches	Nos	486	0
K.3.2 ,	K.3.2,	Pressure Gauges	Nos	266	0
K.3.3 ,	K.3.3,	Solenoid Valves	Nos	266	0
K.3.4 ,	K.3.4,	Erection and Commissioning of Deluge Valve Control Panels of App. Dimension 400(L)x150(D)x400(H) and App. Wt 25 kg.	Nos	266	0
K.3.5 ,	K.3.5,	Laying and Termination of 2Cx1.5 sqmm armoured copper control cable	Mtr	2945	0
K.3.6 ,	K.3.6,	Q.B Detector - 79 °	Nos	9298	0
K.4	K.4	C&I of High Velocity Water Spray System (HVWSS)			
K.4.1 ,	K.4.1,	Pressure Switches	Nos	100	0
K.4.2 ,	K.4.2,	Pressure Gauges	Nos	50	0
K.4.3 ,	K.4.3,	Solenoid Valves	Nos	52	0
K.4.4 ,	K.4.4,	Erection and Commissioning of Deluge Valve Control Panels of App. Dimension 400(L)x150(D)x400(H) and App. Wt 25 kg.	Nos	50	0
K.4.5 ,	K.4.5,	Laying and Termination of 2Cx1.5 sqmm armoured copper control cable	Mtr	777	0
K.4.6 ,	K.4.6,	Q.B Detector - 79 °	Nos	2162	0
K.5	K.5	Foam based Fire Protection System (FBFPS)- Erection and Commissioning of items as detailed below.			

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K.5.1	, K.5.1,	LT Electrical Unidirectional Drive for Foam Pump	Nos	1	0
11.0.1	, 13.1,	· ·	1403	'	
K.5.2	, K.5.2,	Batteries of Diesel Engine driven foam pump-6 cells per battery (12 V each)-180 AH, Size of each battery is app. 521x278x270 (mm) and nominal wt. is 55.1 kg.	Set	1	0
K.5.3	, K.5.3,	Solenoid valves	Nos	3	0
K.5.4	, K.5.4,	Erection and Commissioning of Deluge Valve Control Panels of App. Dimension 400(L)x150(D)x400(H) and App. Wt 25 kg.	Nos	3	0
K.5.5	, K.5.5,	Pressure Switch	Nos	5	0
K.5.6	, K.5.6,	Pressure Transmitter	Nos	10	0
K.5.7	, K.5.7,	Level Transmitters	Nos	2	0
K.5.8	, K.5.8,	Pressure Gauges	Nos	2	0
K.5.9	, K.5.9,	Level Indicator	Nos	2	0
K.5.10	, K.5.10,	Laying of Power Cables of 1Cx90 Sqmm armoured cable	Mtr	100	0
K.5.11	, K.5.11,	End Termination of Power Cables of1Cx90 Sqmm armoured cable	Nos	20	0
K.5.12	, K.5.12,	Laying and termination of Control Cables of 10Cx2.5 Sqmm armoured cable	Mtr	90	0
K.6	K.6	Fire Detection & Alarm System (FDA)-Erection and Commissioning of items as detailed below.			
K.6.1	, K.6.1,	Fire Alarm Panels (with Optical Fibre Card and Batteries) of App. Size: 1000(H)x600(W)x300(D) in mm and App. Wt 100 kg each.	Set	10	0
K.6.2	, K.6.2,	Repeater Panels of App. Size: 1000(H)x600(W)x300(D) in mm and App. Wt 100 kg each.	Set	6	0
K.6.3	, K.6.3,	Multisensor Detectors	Nos	2550	0
K.6.4	, K.6.4,	Air Sampling Detectors	Nos	7	0
K.6.5	, K.6.5,	Laying and fixing of PVC Pipes for Air Sampling Detectors (No separate payment for this item. Rate may be included in Air Sampling Detectors)	Mtr	1500	0
K.6.6	, K.6.6,	Probe Detectors	Nos	7	0
K.6.7	, K.6.7,	Beam Detectors	Nos	12	0
K.6.8	, K.6.8,	Infra Red Ember Detectors with Air Purge Unit	Nos	115	0
K.6.9	, K.6.9,	Infra Red Flame Detector	Nos	12	0
K.6.10	, K.6.10,	Manual Call Points (Indoor, Outdoor, Flamproof)	Nos	425	0
K.6.11	, K.6.11,	Optical LHS Cable of OD app. 3.8 mm. (Please refer the details for handling and erection)	Mtr	75000	0
K.6.12	, K.6.12,	Optical LHS Controllers of size 100 (W) x 450 (D) x 370 (H) and app. Wt. 10 kg each.	Nos	7	0
K.6.13	, K.6.13,	Modules of size 130 (W) x 60 (D) x 95 (H) and app. Wt. 0.1 kg each.	Nos	1150	0

TENDER SPECIFICATION

K.6.14	,	K.6.14,	Hooter cum Strobe	Nos	250	0
K.6.15	,	K.6.15,	Power Supply Modules (230 V to 24 V DC Converters) of size 400 (W) x 250 (D) x 120 (H) and app. Wt. 15 kg each.	Nos	75	0
K.6.16	,	K.6.16,	Response Indicators	Nos	600	0
K.6.17	,	K.6.17,	Exit Sign (Backlit)	Nos	250	0
K.6.18	,	K.6.18,	Erection and Commissioning of Siren (10 km) of app. Wt. 25 kg AND its Control Panel of size 380(W) x 210 (D) x 430 (H) and app. Wt 10 kg.	Set	1	0
K.6.19	,	K.6.19,	PC of 24" TFT Monitor, Min. I5 processor, 4 GB RAM, 500 GB Hard Disk, Keyboard & Optical Mouse,	Nos	4	0
K.6.20	,	K.6.20,	A4 color printer	Nos	4	0
K.6.21	,	K.6.21,	Furniture for PC	Nos	4	0
K.6.22	,	K.6.22,	Furniture for Printer	Nos	4	0
K.6.23	,	K.6.23,	Establishment of OPC Connectivity (for Main fire alarm panel)	Set	1	0
K.6.24	,	K.6.24,	Laptop	Nos	1	0
K.6.25	,	K.6.25,	Establishment of MODBUS/Network Connectivity among FDA panels	Set	1	0
K.6.26	,	K.6.26,	Graphics Software with 2 Licences	Nos	4	0
K.6.27	,	K.6.27,	Laying and Termination of Loop Cables 3Cx2.5 Sqmm	Mtr	127500	0
K.6.28	,	K.6.28,	Laying and Termination of Power Cables 3Cx2.5 Sqmm	Mtr	60000	0
K.6.29	,	K.6.29,	Laying and Termination of Optical Fibre Cable	Mtr	22500	0
K.6.30	,	K.6.30,	Splicing of OFC	Nos	100	0
K.6.31	,	K.6.31,	Cable Tray - 200 mm (Perforated Type)	Mtr	250	0
K.6.32	,	K.6.32,	Cable Tray - 100 mm (Perforated Type)	Mtr	1000	0
K.6.33	,	K.6.33,	Cable Tray - 50 mm (Perforated Type)	Mtr	3000	0
K .7		K .7	PLC AND HMI-Erection and Commissioning of items as detailed below.			
K.7.1	,	K.7.1,	Erection and Commissioning of PLC based panel for Fire Protection System in Fire Water Pump House of App. Dimension 1600 (W) x 600 (D) x 2200 (H) and App. Wt 600 kg.	Set	1	0
K.8		K.8	Fire Water Pump House			0
K.8.1	,	K.8.1,	Operator Work station (OWS) -24" TFT-LCD with all inbuilt sets of licensed softwares for Fire Water Pump House	Nos	2	0
K.8.2	,	K.8.2,	Laser Printer (Color) for A4 size papers	Nos	1	0
K.8.3	,	K.8.3,	Computer Tables	Nos	2	0
K.8.4	,	K.8.4,	Computer Chairs	Nos	2	0

	I	1	Operator CUM Enga Work station (OEMS) 24" TET			
K.8.5	,	K.8.5,	Operator CUM Engg. Work station (OEWS)-24" TFT- LCD with all inbuilt sets of licensed softwares for Fire Water Pump House	Nos	2	0
K.8.6	,	K.8.6,	Laser Printer (Color) for A4 size papers	Nos	1	0
K.8.7	,	K.8.7,	Computer Tables	Nos	2	0
K.8.8	,	K.8.8,	Computer Chairs	Nos	2	0
K.8.9	,	K.8.9,	OPC Work station (OEWS) -24" TFT-LCD with all inbuilt sets of licensed softwares for Fire Water Pump House	Nos	1	0
K.8.10	,	K.8.10,	Computer Tables	Nos	1	0
K.8.11	,	K.8.11,	Computer Chairs	Nos	1	0
K.9		K.9	CCR			
K.9.1	,	K.9.1,	Operator Work station-24" TFT-LCD with all inbuilt sets of licensed softwares for CCR	Nos	3	0
K.9.2	,	K.9.2,	Laser Printer (Color) for A4 size papers	Nos	1	0
K.9.3	,	K.9.3,	Computer Tables	Nos	3	0
K.9.4	,	K.9.4,	Computer Chairs	Nos	3	0
K.9.5	,	K.9.5,	Remote IO Panel of Size 1600 (W) x 600 (D) x 2000 (H) and app. Wt 200 kg each	Set	2	0
K.9.6	,	K.9.6,	Armoured FO cable (Connection between FPS PLC and FDA Panel)	Mtr	2000	0
K.9.7	,	K.9.7,	2" Rodent proof HDPE conduits	Mtr	2000	0
K.9.8	,	K.9.8,	Splicing of OFC	Nos	25	0
K.9.9	,	K.9.9,	Armoured FO cable (Connection between PLC,OWS & RIO Panel)	Mtr	8800	0
K.9.10	,	K.9.10,	2" Rodent proof HDPE conduits	Mtr	8800	0
K.9.11	,	K.9.11,	Splicing of OFC	Nos	25	0
K.9.12	,	K.9.12,	Video Wall of size 4200 (W)x1600(H) having resolution 2688x1080 pixels with LED/LCD based rear projection along with CPU and other loose supplied items like Video display controller, Border binder, interconnecting power & communication cables, Mounting stand / arrangement etc. in Unit Control room app. Wt. 100 kg.	Set	2	0
K.11		K.11	Inert Gas Extinguishing System (IGES)-Erection and Commissioning of items as detailed below.			
K.11.1	,	K.11.1,	Contact Pressure Gauge Unit with inbuilt Pressure Switch	Nos	115	0
K.11.2	,	K.11.2,	Release Device MX1230/200 Electrical (24V DC Operated)	Nos	12	0
K.11.3	,	K.11.3,	Release Device MX1230/200 Pneumatic Operated	Nos	102	0
K.11.4	,	K.11.4,	Disable Device MX	Nos	1	0
K.11.5	,	K.11.5,	Limit Switch Disable Device	Nos	1	0
K.11.6	,	K.11.6,	Pneumatic Release Device PAE - CO2 Electrical	Nos	2	0

K.11.7	,	K.11.7,	Limit Switch Pneumatic operated	Nos	15	0
K.11.8	,	K.11.8,	Pressure Transmitter	Nos	5	0
K.11.9	,	K.11.9,	Abort Switch	Nos	15	0
K.11.10	,	K.11.10,	Manual Release Switch	Nos	15	0
K.11.11	,	K.11.11,	Discharge Indicator 135 (L) x 130 (W) x 40 (D); App. Wt. 5 kg each.	Nos	15	0
K.11.12	,	K.11.12,	Pre-Discharge Indicator 135 (L) x 130 (W) x 40 (D); App. Wt. 5 kg each.	Nos	15	0
K.11.13	,	K.11.13,	Gas Release Panels of size 2040 (W) x 1460 (H) x 400 (D) with Ni-Cd Batteries; App. Wt. 150 kg each.	Set	1	0
K.11.14	,	K.11.14,	Laying and termination of Control Cables of 2C x 1.5 Sqmm armoured Control Cable	Mtr	5600	0
K.11.15	,	K.11.15,	300 mm Cable Tray & Accessories	Mtr	75	0

NOTE:

- 1. The BOQ Ref. no given above may be linked with the BOQ Ref no in Price bid.
- 2. The Price bid contains the consolidated list of BOQ with brief description of items.
- 3. Rates are to be filled only in the Price bid.
- 4. Before filling the Rates in the Price bid, the bidder shall go through the detailed specification of all items of BOQ as well as Scope of Work as specified in relevant Clause of this document.
- 5. The quantity indicated in the BOQ / Price bid is approximate only and is liable for variation. Payment will be as per actual quantity erected / commissioned as certified by BHEL Engineer.

VOLUME-IA PART –I CHAPTER –X GENERAL

1.10.0.0	GENERAL
1.10.1.0	The scope of the work will comprise of but not limited to the following. All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.
1.10.1.1	Bidders are requested to furnish the following at PSSR-SITE immediately after release of Letter of Indent (LOI).
	a. Security Deposit and Additional Security Deposit
	b. Unqualified Acceptance of Detailed LOI/Work Order.
	c. Rs.100/- Stamp paper for preparation of Contract Agreement
1.10.1.2	Bidders are requested to furnish the proof of documents for the following at PSSR-Site.
	a. Provident Fund (PF) Registration Number
	b. Labour License Number
	c. Workmen Insurance Policy Number
1.10.1.3	In addition to the clause 2.8 of General Conditions of Contract (Volume-1C of Book-II) the contractor shall comply with the following.
1.10.2.0	BOCW ACT & BOCW WELFARE CESS ACT
1.10.2.1	The Contractor should register their establishment under BOCW Act 1996 read with rules 1998 by submitting Form I (Application for Registration of Establishment) and Form IV (Notice of commencement / completion of building other construction Work) to the respective labour authorities i.e.,
	a) Assistant Labour Commissioner (Central) in respect of the project premises which is under the purview of Central Govt.–NTPC, NTPL etc.
	b) Inspector of Factories in respect of the project premises which is under the purview of State Govt.
1.10.2.2	The Contractor should comply with the provisions of BOCW Welfare Cess Act 1996 in respect of the work awarded to them by BHEL.
1.10.2.3	The contractor should ensure compliance regarding Registration of Building Workers as Beneficiaries, Hours of work, welfare measures and other conditions of service with particular reference to Safety and Health measures like Safety Officers, safety committee, issue of Personal protective equipment's, canteen, rest room, drinking water, Toilets, ambulance, first aid center etc.

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1.10.2.4	The contractor irrespective of their nature of work and manpower (Civil, Mechanical, Electrical works etc) should register their establishment under BOCW Act 1996 and comply with BOCW Welfare Cess Act 1996.
1.10.2.5	Contractor shall make remittance of the BOCW cess as per the Act in consultation with BHEL as per the rates in force (presently 1%). BHEL shall reimburse the same upon production of documentary evidence. However, BHEL shall not reimburse the fee paid towards the registration of establishment, fees paid towards registration of Beneficiaries and contribution of Beneficiaries remitted.
1.10.2.6	Non-compliance to Provisions of the BOCW Act & BOCW Welfare Cess Act is not acceptable. In case of any non-compliance, BHEL reserves the right to withhold any sum as it deems fit. Only upon total compliance to the BOCW Act and also discharge of total payment of Cess under the BOCW Cess Act by the Contractor, BHEL shall consider refund of the Amounts
1.10.2.7	In case of non-compliance to BOCW Act & BOCW Welfare Cess Act, BHEL reserves the right to effect recoveries as applicable.
1.10.3.0	PROVIDENT FUND & MINIMUM WAGES
1.10.3.1	The contractor is required to extent the benefit of Provident Fund to the labour employed by them in connection with this contract as per the Employees Provident Fund and Miscellaneous Provisions Act 1952. For due implementation of the same, contractor is hereby required to get themselves registered with the Provident Fund authorities for the purpose of reconciliation of PF dues and the code number allotted to them by the Provident Fund authorities shall be furnished to our office within one month from the date of issue of this letter of indent. In case contractor are exempted from such remittance, an attested copy of authority for such exemption is to be furnished. Please note that in the event of their failure to comply with the provisions of said Act, if recoveries therefore are enforced from payments due to BHEL by the customer or paid to statutory authorities by BHEL, such amount will be recovered from payments due to the contractor.
1.10.3.1	The contractor shall ensure the payments of minimum labour wages to the workmen under them as per the rules applicable from time to time in the state.
1.10.3.2	The final bill amount would be released only on production of clearance certificate from PF / ESI and labour authorities as applicable.
1.10.4.0	OTHER STATUTORY REQUIREMENTS
1.10.4.1	The Contractor shall submit a copy of Labour License obtained from the Licensing Officer (Form VI) u/r25 read with u/s 12 of Contract Labour (R&A) Act 1970 & rules and Valid WC Insurance copy or ESI Code (if applicable) and PF code no along with the first running bill.

1.10.4.2	The contactor shall submit monthly running bills along with the copies of monthly wages (of the preceding month) u/r78(1)(a)(1) of Contract Labour Rules, copies of monthly return of PF contribution with remittance Challans under Employees Provident Fund Act 1952 and copy of renewed WC Insurance policy or copies of monthly return of ESI contribution with Challans under ESI Act 1948 (if applicable) in respect of the workmen engaged by them.
1.10.4.3	The Contractor should ensure compliance of Sec 21 of Contract Labour (R&A) Act 1970 regarding responsibility for payment of Wages. In case of "Non-compliance of Sec 21 or non-payment of wages" to the workmen before the expiry of wage period by the contactor, BHEL will reserve its right to pay the workmen under the orders of Appropriate authority at the risk and cost of the Contractor.
1.10.4.4	The Contractor shall submit copies of Final Settlement statement of disbursal of retrenchment benefits on retrenchment of each workman under I D Act 1948, copies of Form 6-A (Annual Return of PF Contribution) along with Copies of PF Contribution Card of each member under PF Act and copies of monthly return on ESI Contribution – Form 6 under ESI Act1948 (If applicable) to BHEL along with the Final Bill.
1.10.4.5	In case of any dispute pending before the appropriate authority under I D act 1948, WC Act 1923 or ESI Act 1948 and PF Act 1952, BHEL reserve the right to hold such amounts from the final bills of the Contractor which will be released on submission of proof of settlement of issues from the appropriate authority under the act.
1.10.4.6	In case of any dispute prolonged/pending before the authority for the reasons not attributable to the contractor, BHEL reserves the right to release the final bill of the contractor on submission of Indemnity bond by the contractor indemnifying BHEL against any claims that may arise at a later date without prejudice to the rights of BHEL.
1.10.5.0	DEPLOYMENT OF SKILLED / SEMI-SKILLED TRADESMEN
	The following clause is applicable in case the contract value / contract price is Rs. Five crores and above.
1.10.5.1	The contractor shall, at all stages of work deploy skilled / semi-skilled tradesmen who are qualified and possess certificate in particular trade from CPWD Training Institute / Industrial Training. Institute / National Institute of Construction Management and Research (NICMAR), National Academy of Construction, CIDC or any similar reputed and recognized Institute managed / certified by State / Central Government. The number of such qualified tradesmen shall not be less than 20% of total skilled / semi-skilled workers required in each trade at any stage of work. The contractor shall submit number

	of man days required in respect of each trade, its scheduling and the list of qualified tradesmen along with requisite certificate from recognized Institute to Engineer-in- Charge for approval. Notwithstanding such approval, if the tradesmen are found to have inadequate skill to execute the work of respective trade, the contractor shall substitute such tradesmen within two days of written notice from Engineer-in-Charge. Failure on the part of contractor to obtain approval of Engineer-in-Charge or failure to deploy qualified tradesmen will attract a compensation to be paid by contractor at the rate of Rs. 100 per such tradesman per day. Decision of Engineer-in- Charge as to whether particular tradesman possesses requisite skill and amount of compensation in case of default shall be final and binding.
1.10.6.0	OTHER GENERAL REQUIREMENTS
1.10.6.1	The scope of specification covers the installation, testing and commissioning of the erected equipment / instrument along with accessories as detailed in Bill of Quantity.
1.10.6.2	Identification of equipment at storage yard, technical assistance for checking and making the shortage/damage reports, taking delivery at storage yard and pre-assembly of equipment wherever required, erecting the equipment, aligning, fastening, supporting, cleaning, checking and carrying out statutory tests as required, trial operation, pre-commissioning, commissioning and post-commissioning activities up to the time of completion of commissioning activities and commercial operation of the unit and handing over to customer or till completion contract period (including extended period) whichever is earlier, along with the supply of all consumables, tools and tackles and testing instruments.
1.10.6.3	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 their possession. He shall also have adequate trained, qualified and experienced engineers, supervisory staff and skilled personnel. The manpower deployment identified by contractor shall match with above scope of works.
1.10.6.4	It is not the intent to specify herein all details of material. Any item related this work not covered by this but necessary to complete the system will be deemed to have been included in the scope of the work.
1.10.6.6	The contractor shall have valid ELECTRICAL LICENCE as required to carry out the scope of work indicated in the BOQ.

1.10.6.7	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.
1.10.6.8	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.
1.10.6.9	Site testing wherever required shall be carried out for all items / materials installed by the contractor to ensure proper installation and functioning in accordance with drawings, specifications and manufacturer's recommendations and Field quality plans of BHEL.
1.10.6.10	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.
1.10.6.11	During the course of erection, testing and commissioning 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. Payments for such works shall be governed by Cl. No. 1.10.6.13 of TCC and Cl. No. 2.16.1 of GCC.
1.10.6.12	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 their personnel shall co-operate with the personnel of other agencies, co-ordinate their work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.
1.10.6.13	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.
1.10.6.14	After completing all the works, contractor shall hand over all remaining extra materials with proper identification tags in a 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.
1.10.6.15	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.
1.10.6.16	Contractor shall retain all T&P / Testing instrument / Material handling equipment 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.
1.10.6.17	Contractor shall remove all scrap materials periodically generated from their 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.
1.10.6.18	The scrap generated after executing the work shall be returned to BHEL earmarked area every week and the same shall be vetted by the Engineer-in-charge, to be produced along with the running bill.
1.10.6.19	The contractor at their cost shall arrange necessary security measures for adequate protection of their 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 their machinery equipment tools etc.,
1.10.6.20	The contractor shall ensure that their 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.
1.10.6.21	The Contractor may have to execute work in such a place and condition where other agencies also will be under such circumstances. However, completion time for erection agreed will be subject to the condition that contractor's work is not hampered by the agencies.
1.10.6.22	All the surplus, damaged, unused materials, package materials, containers, special transporting frames, gunny bags etc. shall be returned to the BHEL stores / customer's stores by the contractor.

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1.10.6.23	If required by BHEL, the contractor shall change the sequence of their operation so that work on priority sectors can be completed within the projects schedule. The contractor shall afford maximum assistance to BHEL in this connection without causing delay to agreed completion date.
1.10.6.24	Any wrong erection shall be removed and re-erected promptly to comply with the design requirements to the satisfaction of Site Engineer.
1.10.6.25	Contractor has to work in close co-ordination with other erection agencies at site. BHEL engineer will co-ordinate area clearance. In a project of such magnitude, it is possible that the area clearance may be less/more at a particular given time. Activities and erection program have to be planned in such a way that the milestones are achieved as per schedule/ plans. Contractor shall arrange & augment the resources accordingly.
1.10.6.26	The contractor must obtain the signature and permission of the security personnel of the customer for bringing any of their materials inside the site premises. Without the Entry Gate Pass these materials will not be allowed to be taken outside.
1.10.6.27	The contractor is strictly prohibited from using BHEL's regular components like angles, channels, beams, plates, pipe/tubes, and handrails etc for any temporary supporting or scaffolding works. Contractor shall arrange themselves all such materials. In case of such misuse of BHEL materials, a sum as determined by BHEL engineer will be recovered from the contractor's bill. The decision of BHEL engineer is final and binding on the contractor.
1.10.6.28	The contractor will be responsible for the safe custody and proper accounting of all materials in connection with the work. If the contractor has drawn materials in excess of design requirements, recoveries will be effected for such excess drawls at the rate prescribed by manufacturing units.
1.10.6.29	No member of the already erected structure/ platform, pipes, grills, platform, other component and auxiliaries should be cut without specific approval of BHEL engineer.
1.10.6.30	Contractors shall ensure that all their Staff/Employees are exposed to periodical training program conducted by qualified agencies/ personnel on ISO 9001 /2015 Standards.
1.10.6.31	For other agencies, such as piping, Boiler, ESP, TG, Instrumentation, insulation etc., to commence their work from/on the equipment's coming under this scope, Contractor has to clear the front, expeditiously and promptly as instructed by BHEL Engineer. Some time it may be required to re-schedule the activities to enable other agencies to commence/continue the work so as to keep the overall project schedule.

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1.10.6.32	The terminal points decided by BHEL are final and binding on the contractor for deciding the scope of work and effecting the payment for the work done up to the terminals.
1.10.6.33	For the purpose of planning, contractor shall furnish the estimated requirement of power (month wise) for execution of work in terms of maximum kW demand.
1.10.6.34	On Completion of work, all the temporary buildings, structures, pipe lines, cable etc. shall be dismantled and leveled and debris shall be removed as per instruction of BHEL by the contractor at their cost. In the event of their failure to do so, the expenditure towards clearance of the same will be recovered from the contractor. The decision of BHEL Engineer in this regard is final.
1.10.6.35	Prior to erection of any components inspection to be done for any foreign materials and damages and they are to be attended as per directions of BHEL engineer.
1.10.6.36	All the equipment /material to be taken inside the plant building shall be cleaned thoroughly before taking them inside and erect.
1.10.6.37	It is the responsibility of the contractor to do the alignment, checking, etc., if necessary, repeatedly to satisfy BHEL Engineer / Customer Engineers with all the necessary tools and tackles, manpower etc. without any extra cost. The alignment will be completed only when jointly certified so, by the BHEL Engineer & Customer. Also the contractor should ensure that the alignment is not disturbed afterwards.
1.10.6.38	No temporary supports shall be welded on the pressure parts of piping. Welding of temporary supports, cleats, etc. on the boiler columns shall be avoided. In case of absolute necessity contractor shall take prior approval from BHEL Engineer. Further, any cutting or alternation of member of the structure of platform or other equipment shall not be done without specific prior approval of BHEL Engineer.
1.10.6.39	In electrical MCC's the fixed and moving contacts in contactors & Copper strips shall be removed and kept in safe custody. The same shall be re-erected during commissioning of the system.
1.10.6.40	Whenever cable glands are supplied along with MCC'/JB's/ PB's/etc. they shall be removed and kept in safe custody. The same shall be re-erected during cable termination.
1.10.6.41	Permanent nomenclature/identification on LPBS/Junction boxes/Local Motor Starter boxes/AC Fuse DB/DC Fuse DB/Heater JB/Control panel, LT panel & individual feeders, SP Bus duct, heater JB, Transformers are to be done by the contractor as per the requirement decided BHEL Engineer at site.

1.10.6.42	All the necessary certificates and licenses required to carry out this scope of work are to be arranged by the contractor then and there is no extra cost in this regard.
1.10.7.0	Any modification work required by inspector shall be attended by the contractor. Modifications which had raised due to execution deficiencies are at the cost of contractor whereas modifications which are due design change shall be treated as extra work.
1.10.8.0	SITE INSPECTION
1.10.8.1	Various Inspection / quality control / quality assurance procedures/methods at various stages of erection and commissioning will be as per BHEL / Customer quality control procedure / codes and other statutory provisions and as per BHEL Engineer's instructions.
1.10.8.2	The owner / employer or their authorized agents may inspect various stages of work during the currency of the contract awarded to them. The contractor shall make necessary arrangements for such inspection and carry out the rectification pointed out by the owner / employer without any extra cost to the owner / employer. No cost whatsoever such duplication of inspection of work be entertained.
1.10.8.3	BHEL / Customer will have full power and authority to inspect the works at any time, either on the site or at the contractor's premises. The contractor shall arrange every facility and assistance to carry out such inspection. On no account will the contractor be allowed to proceed with work of any type unless such work has been inspected and entries are made in the site inspection register by customer / BHEL.
1.10.8.4	Wherever the performance of work by the contractor is not satisfactory in respect of workmanship, deployment of sufficient labour or equipment, delay in execution of work or any other matter, BHEL shall have the right to engage labour at normal ruling rates and get the work executed through other agency and debit the cost to the contractor and the contractor shall have no right to claim compensation thereof. In such a case, BHEL shall have the right to utilize the materials and tools brought by the contractors for the same work.
1.10.9.0	MANPOWER REQUIREMENT
1.10.9.1	Manpower requirement for Erection and Commissioning shall be as follows:
	a. There shall be a Resident manager as Site In Charge at site, under whom there shall be sufficient area engineers who shall take care of the erection activities.
	b. Resident Engineer should have a minimum qualification of Electrical/Electronics/C&I Engineering Degree with minimum 5 years'

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	experience or Diploma in Electrical/Electronics/C&I Engineering with minimum 10 years of experience in Thermal Power Station.
	c. Area Engineer should have minimum qualification of Diploma in Engineering or any graduate with minimum 3 years of experience in Thermal Power Station.
	d. Supervisor should have a minimum qualification of Diploma in Electrical/Electronics/C&I engineering or any graduate with minimum 5 years of experience in Thermal Power Station.
	e. Lab Technicians should have 2 years experience in Thermal Power Stations.
	f. Contractor should have one Store Keeper, one Transport Supervisor for the safe transportation of materials.
	g. Planning / safety Engineers should be available and they should have experience in construction field especially in power plant.
	h. Dedicated commissioning engineer should be deployed for commissioning of the equipment.
1.10.9.2	There shall be three separate Erection In-charges, each for Boiler, TG Station C&I. They shall work independently with required manpower, T&P etc., including storage facilities. Each Erection In-charge shall have minimum two erection engineers with adequate Supervisors and Technicians.
1.10.9.3	There shall be separate engineers for Planning, Safety and Quality.
1.10.9.4	Planning/Safety Engineers should have experience in construction field especially in power plant.
1.10.9.5	Each area engineer shall be provided with minimum four (04) supervisors and adequate number of Technicians / electricians and other erection staff and T&P etc. The testing Engineers / supervisors / electricians shall be identified separately for each unit and the minimum requirement shall be as indicated in previous Clause. Besides, there shall be separate engineers for Planning, Safety and Quality.
1.10.9.6	The above manpower is only tentative and for any additional manpower as per site requirement the same shall be arranged by the contractor.
1.10.9.7	The testing Engineers/supervisors/electricians shall be identified separately for each unit as per the site requirement.
1.10.9.8	The Site in charge shall be provided with PCs and good communication facilities like telephone, fax, email etc. at the cost and expense of the contractor. Lack of communication facilities will not be an excuse for extension of completion date.

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 1.10.9.9 All instructions from BHEL / Customer will be directed to the contractor the Site in-charge and he shall be responsible for all the contractor's act at site. The contractor shall name their authorized representative prior immediately on commencement of operations at site. 1.10.9.10 The Site In charge shall be present at site during all normal working hour their contact address after normal working hours shall be made availant BHEL so that if any emergency arises, the presence of the contractor Representative at site can be called for. 1.10.9.11 The contractor shall not change the site Representative without the constitution. 	tivities to or rs and able to site sent of
their contact address after normal working hours shall be made availant BHEL so that if any emergency arises, the presence of the contractor Representative at site can be called for.	ible to 's site
1.10.9.11 The contractor shall not change the site Representative without the cons	
BHEL. Should BHEL require the replacement of the contractor's Representative for justifiable reasons (including inadequate progress of the contractor shall ensure that replacement is made as soon as possib work is not allowed suffering delay on this account.	work)
1.10.9.12 The contractor shall provide to the satisfaction of BHEL sufficient and questaff for the execution of works. If and whenever any of the contractor's second guilty of any misconduct or be incompetent or insufficiently quality the performance of their duties the contractor shall remove them from second directed by Site Engineer.	staff is fied in
1.10.9.13 The contractor shall ensure that all their supervisor's staff and workmen contractor in a proper manner. They shall all be persons who are familiated and skilled at the jobs allocated to them. Any misconduct / inefficiency not the part of the contractor's personnel shall be brought to the attention contractor's site representative who shall immediately take such actinecessary including the removal of such misconducting / inefficient person required by the Engineer-in-Charge.	ar with ted on of the on as
1.10.9.13 The contractor shall ensure that replacement for such persons removed site is provided immediately and the work is not allowed to suffer delay caccount.	
1.10.10.0 DOCUMENTATION	
1.10.10.1 The following information shall be furnished by the bidder within two we award of contract for purchaser's approval.	eks of
a. Bar chart covering planned activities at site	
b. Detailed organization chart	
c. Details of T&P available with contractors with documents proofs.	
1.10.10.2 The following information shall be furnished by the bidder after testin inspection:	g and

- f. Test certificates of various tests conducted at site. All inspection and test certificates shall be signed by customer's representative also, wherever called for as per field quality plan.
- g. As built drawings: After successful completion, testing and commissioning of installation work, Purchaser's drawings / documents shall be updated in line with the actual work carried out and as built drawings / documents shall be submitted by the contractor as agreed for the project.

VOLUME-IA PART –I CHAPTER –XI FOUNDATIONS AND GROUTING

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

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

Outlet wise s	
1.11.1.0	FOUNDATIONS, GROUTING AND CIVIL WORKS
1.11.1.1	Foundation for the equipment to be erected shall be provided by BHEL/ clients of BHEL. The dimension of the foundation and anchor bolt pits shall be checked by the contractor for their correctness as per drawings. Further, top elevation of foundations shall be checked with respect to bench mark etc. All adjustments of foundations surfaces, enlarging the pockets in foundations etc. as may be required for the erection of equipment plants shall be carried out by the contractor.
1.11.1.2	Cleaning of foundation surfaces, pocket holes and anchor bolt pits etc., dewatering, making them free of oil, grease, sand and other foreign materials by soda wash, water wash, compressed air or any other approved methods etc., form/shuttering work are within the scope this work.
1.11.1.3	The contractor at their cost shall arrange for grouting of foundation bolt holes of equipment as specified in the drawings / specification or as advised by the Engineer of BHEL after preparing the foundation top surface for grouting, all the materials for grouting (sand, gravel & cement including special Cement) shall be arranged by the contractor. The grouting has to be done up to basement level. The required consumables like Portland cement, gravel, sand etc., have to be provided by the contractor at their cost. The required special cement like conbextra, GP1, GP2, PAGAL, shrinkomp etc., or its equivalent as approved by BHEL if required shall be arranged by the contractor at their cost. It shall be the responsibility of the contractor to obtain prior approval of BHEL, regarding suppliers, type of grouting cements before procurement of grouting cements.
1.11.1.4	It shall be contractor's responsibility to check the various equipment foundations for their correctness with respect to level, orientation, dimensions etc., and ascertained dimensions shall be measured and submitted to BHEL for approval before erection. Also minor chipping, dressing of foundations up to 30 mm for obtaining proper face for packer plates/shims, and may be required for the erection of the equipment/plants will have to be carried out by the contractor without extra cost.
1.11.1.5	The surface of foundations shall be dressed to bring the surface of the foundations to the required level and smoothness prior to placement of equipment.
1.11.1.6	Foundation pockets are to be cleaned thoroughly before placing the equipment. Verticality of foundation bolts to be checked along with correctness of the

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	threads and freeness of the nuts movement. If required cleaning of the threads
	to be done with proper dies.
1.11.1.7	The concrete foundation, surfaces shall be properly prepared by chipping, as required to bring the top of such foundation to the required level to provide the necessary roughness for bondage and to ensure enough bearing strength. All laitance and surface film shall be removed and cleaned and the packers placed with suitable mortar prior to erection of the equipment. Packer plates should not only be blue matched with foundation but also inter-packer contact surfaces between the packers and foundation frame etc., shall also be blue matched by Prussian Blue match checks and required percentage contact shall be achieved by chipping and scrapping as per BHEL Engineers instructions.
1.11.1.8	The certificates of the grout are to be submitted to BHEL. If necessary, test cubes are to be made and tested at site to ensure the quality of the grout as per relevant IS standards. In case grouting with Portland cement is approved, necessary cement, sand etc to be arranged by the contractor including the fine aggregates.
1.11.1.9	Certain packer plates and shims over and above the quantity received as part of supplies from manufacturing units of BHEL will have to be cut out from steel plates/sheets at site by the contractor to meet site requirement. However, machining of the packers, wherever necessary, will be arranged by BHEL at free of cost.
1.11.1.10	Shims and packer plates required for temporary use are to be arranged by the contractor within the quoted rate.
1.11.1.11	The contractor at their cost shall arrange for grouting of anchor points of T & Ps issued to them. Necessary grout materials are to be arranged by the contractor at their cost.
1.11.1.12	Works such as minor rectification of foundation bolts, reaming of holes, drilling of dowels, matching of bolts and nuts, making new dowel pin etc. are covered in the scope of work.
1.11.1.13	Minor civil works like drilling, chipping and punching holes on slabs and brick-walls and grouting related to installation of LIR / LIE / Local Gauge Board, control panels, Junction boxes etc., shall be included in the erection cost of such items. No separate payment is applicable. The scope also includes supply of grouting material. More details regarding scope of civil are given in the respective equipment erection.
1.11.1.14	PROCEDURE FOR GROUTING: Contractor has to carry out the grouting as per the work instructions for grouting available at site.

VOLUME-IA PART –I CHAPTER -XII MATERIAL HANDLING, TRANSPORTATION AND SITE STORAGE

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

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

4 40 4 0	otherwise specified.)
1.12.1.0	COLLECTION OF BHEL SCOPE OF SUPPLY MATERIALS
1.12.1.1	BHEL shall issue materials covered in BHEL scope from their stores at site. The
	contractor shall collect such materials from BHEL stores and transport to site of work at their cost.
1.12.1.2	
1.12.1.2	The contractor shall inspect such materials as soon as received by the contractor and shall bring to the attention of the Engineer-in-Charge any
	shortage / damage or other defects noticed before taking over the materials.
	Materials once taken over will be deemed to have been received in good
	condition and in correct quantities except for intrinsic defects which cannot be
	observed by visual and dimensional inspection and weighing.
1.12.1.3	Upon receipt by the contractor the responsibility for any loss, damage and / or
	misuse of such materials shall rest with the contractor.
1.12.1.4	All materials issued by BHEL shall be properly stored and systematic records
	of receipts, issue and disposal will be maintained. Periodic inventory shall be
4 40 4 =	made available to BHEL Engineer-in-Charge.
1.12.1.5	All materials issued by BHEL shall be utilized as directed by Engineer-in-
	Charge or most economically in the absence of such direction. The contractor
	shall be responsible for the return to BHEL Stores of all surplus material, as
1.12.1.6	determined by the Engineer-in-Charge. If the materials issued by BHEL are lost, damaged or unaccounted, the cost of
1.12.1.0	such items shall be recovered from payments to the contractor. However, the
	contractor shall raise FIR and inform BHEL all details.
1.12.2.0	STORAGE
1.12.2.1	Materials shall be stacked neatly, preserved and stored in the contractor's shed/
	work area in an orderly manner. In case it is necessary to shift and re-stack the
	materials kept at work area/ site to enable other agencies to carry out their work,
	same shall be done by the contractor at no extra cost.
1.12.2.2	The equipment should be preferably in its original package and should not be
	unpacked until it absolutely necessary for its installation. The equipment should
4.40.00	be best protected in its cases. It should be arranged away from walls.
1.12.2.3	The wooden pallet provided for packing itself can be retained for raised platform
	to protect equipment from ground damps, sinking into around and to circulate
	air under the stored equipment. This will also help in lifting the packing with fork
	lift truck.

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1.12.2.4	Periodic inspection of silica gel placed inside the equipment is necessary. It has to be replaced when decolonization takes place or regenerated. BHEL shall supply the material and contractor shall replace.
1.12.2.5	Due care should be taken to ensure that the equipment is not exposed to fumes gases etc. which can affect electrical contacts of relays and terminal boards.
1.12.2.6	The storage room and the equipment should be checked at regular interval of three months to ensure protection from termites, mound growth, condensation of water etc. which can damage the equipment.
1.12.2.7	Contractor shall keep BHEL informed about such problem and try to rectify the problem at their risk and cost.
1.12.2.8	All the instrument, materials and goods kept in the store room should be identified and registered in a book. Inspection report should be recorded. Any discrepancy observed should be communicated to site.
1.12.2.9	Packing material shall be retained if the cubicle to be repacked after inspection
1.12.2.10	The loose items supplied for the main equipment falls into various categories like tools, modules, prefabricated cables, console inserts, recorders, modules and display units, printers, sensors and transducers, PCs, monitors, cable glands, cable ducts, frames etc. are to be categorized and stored separately with proper identification.
1.12.2.11	Sub-Assemblies: a. All sub-assemblies should be kept in a separate place where it is easily accessible. b. Sub-assemblies should have a protective cover in case it is stored without wooden packing / case to prevent accumulation of dust. Silica gel packets should also be kept along with it. c. Sub-assemblies should not be stacked one above the other.
1.12.2.12	Loose items (wherever applicable): The loose items supplied for the main equipment falls into various categories like tools, modules, prefabricated cables, console inserts, recorders, modules and display units, printers, sensors and transducers, PCs, monitors, cable glands, cable ducts, frames are to be categorized and stored separately.
1.12.2.13	Materials shall be stacked neatly, preserved and stored in the contractor's shed / work area in an orderly manner. In case it is necessary to shift and re-stack the materials kept at work area / site to enable other agencies to carry out their work, same shall be done by the contractor at no extra cost.
1.12.2.14	Sometimes it may become necessary for the contractor to handle certain unrequired components at Customer's / BHEL's stores in order to take out the required materials. The contractor has to take this contingency also into account. No extra payment is payable for such contingencies.
1.12.2.15	The contractor shall provide any fixtures, concrete blocks & wooden sleepers, which are required for temporary supporting / storage of the components at site.

1.12.2.16	Contractor has to arrange required fire resistant tarpaulins to protect the machined components / assembled parts drawn from BHEL before and after erection at their cost.
1.12.2.17	The contractor shall take delivery of item, materials and consumables from the storage yard / stores / sheds of BHEL / customer which are within a radius of 5 kms, after getting approval of engineer / customer in the prescribed indent forms of BHEL / customer. He shall also make arrangements for safe custody, watch and ward of equipment after it has been handed over to them till they are fully erected, tested and commissioned.
1.12.2.18	Loading at BHEL / Customer stores and storage yard, transport to site, unloading at site / working area of equipment placement on respective foundation/location, fabrication yard, pre-assembly bay or at working area are in the scope of work. The scope includes taking materials / Equipment from customer stores / storage yard also. Contractors Quoted / Accepted rate shall be inclusive of the same. Required cranes, tractors, trailer or trucks / slings / tools and tackles / labour including operators, Fuel lubricants etc for loading & unloading of materials will be in the scope of contractor.
1.12.2.19	The equipment / materials from the storage yard shall be moved in sequence to the actual site of erection / location at the appropriate time as per the direction of BHEL Engineer so as to avoid damage / loss of such equipment at site.

VOLUME-IA PART – I CHAPTER- XIII SCOPE OF C&I WORKS-DETAILED

1.13.0.0	THE SCOPE OF THE WORKS WILL COMPRISE OF BUT NOT LIMITED TO
	THE FOLLOWING:
	(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)
	It is not the intent to specify herein all details of material. Any item related to
	this work, not covered by this but necessary to complete the system will be
	deemed to have been included in the scope of the work.
1.13.1.0	DETAILED SCOPE OF C&I WORK
1.13.1.1	The scope of work for C&I items like Instruments, Panels, Hardware etc. covers identification of items at stores / yards, checking, reporting the
	damages if any, loading, transportation, unloading at Contractor's stores /
	working yard, keeping in safe custody in contractor's stores, preassembly,
	calibration, checking, erection, testing, loop checking & commissioning, supply
	of consumables like electrodes, gas, cable dressing materials, tag plates,
	ferrules, lugs (specific sizes), specific types of fasteners, paints and
	consumables. deployment of skilled / unskilled manpower, engineers / supervisors, T & P, Material handling equipments, Testing instruments
	(excepting proprietary type instruments), returning of un-used materials / items
	to stores are also covered in the scope of work.
1.13.2.0	SCOPE OF WORK FOR C&I PANELS / CONTROL DESK:
1.13.2.1	The different types of Microprocessor based panels like VALMET DCS / PLC
	Panels, Instrument Panels, unit control desk etc. are covered in the scope of
	work for erection and commissioning.
1.13.2.2	The unit rate quoted for Installation of control panels shall include fixing of anti-
	vibration pads, levelling and alignment, welding, grouting, drilling of bottom
	gland plates for cable entry as required, closing control panels bottoms with
	suitable flame proof compounds wherever required and checking of internal
	wiring, instruments, components etc. Unit rate shall also include Testing,
	Calibration and adjustment of relays, electronic cards and instruments mounted on the panels except the Instruments identified in the BOQ.
1.13.2.3	Panels are normally supplied in suite of one / two / three/ four cubicles with
1.10.2.0	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. The structural steel material for the above will be supplied by BHEL.
	For fabrication and erection of frame, unit rate shall be paid be as quoted in
	rate schedule, on tonnage basis.
1.13.2.4	For panels to be mounted on trenches, if any channel supports are required,
	the same shall be provided across the cable trenches over which the base

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	frames of the panels shall be mounted. Similarly for the panels to be mounted on false flooring, if mounting frames are not provided, same shall be fabricated at site. The contractor shall carry out fabrication and erection of these support structures on tonnage rate basis. For fabrication and erection of frame, unit rate shall be paid be as quoted in rate schedule, on tonnage basis.
1.13.2.5	The panels which are supplied for various control systems have to be erected at different places like unit control room/ near the equipment/ various operating floors as per site layout. The contractor shall take the panels to the desired locations either through floor openings or temporary openings. No claims will be entertained for taking the panels to the location owing to change of route or non-availability of openings as per nearest route.
1.13.2.6	If any minor grinding is to be carried out on the cut-outs provided in the panels for mounting instruments like recorders, indicators, console etc., the same shall be carried out by the contractor at no extra cost.
1.13.2.7	All the panels and JBs shall be electrically earthed to the nearest earth grid by means of GI wire/Flats as per the instructions of BHEL engineer.
1.13.2.8	Painting of fabricated parts and earthing conductors of panels shall be part of the work. Touch up painting for panels, including supply of paints shall be carried out by the contractor within the quoted rate.
1.13.2.9	Closing the Panel openings and unused drilled holes with non-flammable sealant materials, including supply of above material, shall be part of erection work.
1.13.2.10	For panels/ equipment erected by other agencies, commissioning work and troubleshooting are to be carried out by the contractor as per the rate quoted in the schedule.
1.13.2.11	Normally the panels shall be supplied with instruments / modules mounted and wired. No separate payment shall be made for commissioning of any instrument/ cards/ components. If dismantling of the above such instruments and rewiring is needed at site, the same shall be carried out at no extra cost. If any instruments/ cards/ components supplied as loose items for safe transit, the same shall be mounted and wired at no extra cost unless specified otherwise in the BOQ. Similarly, if any loose supplied instruments /modules are to be mounted and wired on customer panels or any other panels not erected by contractor, the same shall be carried out at no extra cost unless otherwise specified in the BOQ. However, if any major installation/modification/wiring are involved, the same may be carried out as extra work. The decision of BHEL Engineer shall be final in respect of above extra works.
1.13.2.12	Dimensions & weights indicated in the BOQ against various panels are approximate only. There may be variations in the weight and dimensions. Any variation within ±20% shall not be considered for payment. However, for variations beyond ±20%, payment shall be considered proportional to the

	length of the panel. Variations in depth, height or weight of the panel shall not
	be considered for payment.
1.13.2.13	UPS, AC & DC DB AND OTHER ELECTRICAL CONTROL PANELS:
	The erection & commissioning scope of above panels will be in line with
	clauses above in 1.13.2.0
1.13.3.0	SCOPE OF WORK OF DCS PACKAGE / HMI/STATION LAN/PADO SYSTEM /
	SCADA etc WITH RELATED INSTRUMENTATION:
1.13.3.1	BHEL will supply sophisticated VALMET-DNA DCS system. The tentative
	details of are furnished in the BOQ.
1.13.3.2	The scope of DCS system includes erection of sophisticated microprocessor
	based systems, Valmet DNA control panels, I/O panels, Ethernet switching
	panels, Network Enclosure cabinets, CPU, Engineers workstations, operator
	workstations, CRTs, server, printers, portable UPS power supply, furniture and
	interconnecting cables like Ethernet/Fibreoptic etc.
1.13.3.3	The scope of work for DCS Panels will generally be in line with that for C&I
	Panels as detailed in Clause 1.13.2.0
1.13.3.4	Unit rate quoted for DCS equipment shall cover installation & integration of all
	the above said equipment and providing necessary commissioning
	assistance. No separate unit rate applicable for installation of loose items/
	modules/ components or accessories including furniture etc, which is not
	explicitly mentioned in the BOQ, but comes as part of the system.
1.13.3.5	Laying and termination of all cables including Ethernet and fibre optic cables
1.10.0.0	as detailed in the scope of work for cabling. Splicing/Termination of fibre optic
	cables is included in the scope of this contract.
1.13.3.6	If any underground C&I works for firefighting systems the earth excavation and
1.10.0.0	earth filling is in the scope of civil.
1.13.3.7	SCOPE OF WORK OF PLC FOR FIRE PROTECTION/FIRE FIGHTING
11101011	SYSTEMS:
1.13.3.7.1	BHEL will supply PLC Panels and accessories required for FPS/FFS . The
	tentative details of are furnished in the BOQ. The scope of works for PLC
	related systems are inline with Cl.No. 1.13.3.1 to 1.13.3.6.
1.13.4.0	SCOPE OF WORKS FOR UPS, BATTERY AND BATTERY CHARGER:
11101110	GENERAL
1.13.4.1	The charger and batteries are of heavy duty type, capable of providing normal
	and emergency DC loads. The cells will be mounted on insulators carried on
	suitable wooden stands. Tentative details are given in the BOM.
1.13.4.2	BHEL will provide vendor's technical support for commissioning of Battery and
1.10.7.2	Battery charger/ UPS. The contractor shall carry out the works as per
	instructions of BHEL/ Vendor Engineer.
1.13.4.3	Lump sum price shall be quoted for Erection and commissioning of Battery.
1.10.4.0	No additional payment shall be made for any variation in the number of cells.
	The rate quoted for erection of battery will include the following works.
	The rate quoted for election of battery will include the following works.

1.13.4.4	Collecting the batteries and all the accessories like cable connectors, inter cell
	connectors, equalizing connectors, rack insulators, fuse box, loop cables etc.
	from stores and assembling on the racks and fixing all loose supplied items as
	per drawings.
1.13.4.5	Filling the individual cells with Acid/alkali – as applicable.
1.13.4.6	Arranging suitable resistive load banks for charging and discharging during
	charging and discharging cycles.
1.13.4.7	Arranging manpower in shift during battery charging and discharging cycles
	that may be carried out round the clock as per the code of practice, and
	conducting other routine tests as per IS under the supervision of BHEL
	Engineer/Vendor Engineer.
1.13.4.8	Modifications or changes if any for the loose supplied items or any minor
	changes in wiring.
1.13.4.9	Arranging necessary tools, T&P, Testing equipment required for erection and
4 40 4 40	commissioning of the battery.
1.13.4.10	For laying and termination of cables of battery/ battery charger system,
4 40 4 44	separate rate shall be applicable as per rates in Rate Schedule.
1.13.4.11	SCOPE OF WORK FOR BATTERY CHARGER PANELS: The scope of work
	will be in line with scope of work for electrical control panels, as detailed under
1.13.5.0	Cl.No. 1.13.2.0 above. SCOPE OF WORK FOR INSTRUMENTS:
1.13.5.0	
1.13.3.1	The type of instruments to be erected and commissioned shall be detailed below:
	a. Panel mounted Instruments like indicators, recorder, electronic modules etc.
	b. All types of transmitters like temperature, pressure, flow, level and position
	feedback transmitters etc.
	c. 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.
	d. Air filter regulator sets, Air lock off valve, Power cylinders etc.
	e. Panel/ Control desk mounted Instruments like indicators, recorder, console
	and electronic modules etc.
	f. I/P converters and local controllers.
	g. Special instruments like vibration sensors, proximity sensors, electronic
	water level indicator, Steam and water analysis system (SWAS), Gas
	analyser, Coal Flow Monitor, PC based instruments etc.
	h. Pneumatic operated control valves, trip valves, solenoid valves, and
1.13.5.2	electrically operated valves. (commissioning only).
1.13.3.2	Prior to installation, all the Instruments (local & remote), I/P converters, etc. shall be calibrated. Similarly, the healthiness of RTDs and thermocouples, limit
	switches, flow switches, level switches, solenoid valves, air filter regulator,
	purge meters, etc. shall be checked for proper operation.
	purge meters, etc. small be effected for proper operation.

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1.13.5.3	Unit rate quoted 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. In case any instrument requires recalibration to achieve the expected performance, the same shall be carried out at no extra cost. If any re-calibration or replacement of instruments and rechecking of cable termination is found necessary during commissioning, the same shall be done at no extra cost. The unit rate shall also cover marking Tag numbers of instruments or Racks, either by paint or a separate tag plate as per BHEL Engineer's directive.
1.13.5.4	Unit rates have been asked item-wise for instruments, gauges, switches, indicators, recorders etc. as indicated in BOQ. The rates quoted by the contractor shall be uniform as far as possible for similar items of work of the rate schedule.
1.13.5.5	Unit rate quoted for erection of pressure/ differential pressure transmitters, gauges, switches, shall include fixing the instruments on the racks / supports along with manifolds, and associated fittings and clamps.
1.13.5.6	Unit rate quoted 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.
1.13.5.7	Unit rate quoted 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.
1.13.5.8	Unit rate quoted 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. Welding of MTM pads shall be carried out by mechanical contractor. Necessary tray supports for routing of MTM thermocouples shall be erected as part of tray erection covered in the tender. Proper care shall be taken during cleaning the crevices where MTM Thermocouples are inserted.
1.13.5.9	Unit rate quoted for erection and checking of thermocouple, RTD etc. shall include cleaning of thermowell stubs threads using tap sets, fixing of thermowells.
1.13.5.10	Unit rate quoted for erection and checking of temperature switches, gauges, thermocouple, RTD etc. shall include cleaning of thermowell stubs threads using tap sets, fixing of thermowells.
1.13.5.11	If any instrument is to be relocated for reasons not attributable to the contractor, but required for satisfactory performance, the same shall be carried out on extra works basis.
1.13.5.12	Level switches supplied shall be of different types- float type or fixed contact type (Electronic type). The scope of work for float type Level switches shall

1.13.5.13	include fixing of switches on float chambers and fixing of float chambers on stand pipe, providing supports wherever required etc. The scope of work for Electronic type Level switches includes fixing of Electrode standpipe, Electrodes, Electronic unit, integration of all loose supplied items etc Any minor modification require to match Float chamber / Electrode standpipe with tapping point same shall be carried out at no extra cost. Uniform unit rate shall be quoted for Erection and commissioning of various types of level switches, irrespective of their type. The unit rate quoted for erection and commissioning of 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.
1.13.5.14	Unit rate quoted for erection / commissioning of special instruments like, Flame scanner, H.E.A Igniters systems, Vibration monitoring System, Smart wall blowers, Large video screen, Sonic Tube Leak Detection system, Automatic leakage controller for air preheater, SWAS, Flue Gas analyzers, Station LAN / HMI plant management system, PC based instruments, C&I lab, EPABX, Wireless communication, Plant security system, Hart management system, UPS with battery and charger, GPS clock system, Graphical interphase system, Video conference network as per configuration, operator training simulator, computer furniture, 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. Lump sum rate shall be quoted as mentioned in the BOQ. No separate rate shall be payable for loose items including furniture. The quantity of loose supplied items is approximate only. No proportional rate will be applicable for any variation in quantity or for any additional items supplied as part of equipment.
1.13.5.15	If any surface finishing / tapping is required to fix the sensors for Vibration Monitoring System, the same shall be arranged by the contractor at no extra cost.
1.13.5.16	Some of the Flue Gas Analysers are to be installed at Chimney 65 Mtrs and above as indicated in the erection drawings. For the erection of associated hardware for these analysers, like cables, trays, GI pipe etc. that are to be routed from the analyser panels at 65 Mtrs of Chimney to zero meter level, payment will be made at twice the unit rate quoted against each item.
1.13.5.17	For Coal Bunker level monitor supply, fixing / erection of the sensors onto legs of Bunkers is in the scope of contractor. However, the contractor shall provide necessary approach platforms with ladders and any other assistance for erection of these sensors.
1.13.5.18	Canopy shall be provided for field-mounted instruments as per site requirements. Necessary materials like MS Plate shall be provided by BHEL. Rate for fabrication and installation of canopy shall be on tonnage basis.

1.13.5.19 Temporary protection by thermocol, polythene sheet, GI sheets shall provided by the contractor for safe guarding the instruments against dama. The protective materials shall be supplied by the contractor at no extra contractor. In case the Instruments are mounted and supplied along with main equipment and the BOQ calls for Erection & Commissioning, the contractor shall contract and supplied along with main equipment.	ges.			
1.13.5.20 In case the Instruments are mounted and supplied along with main equipment and the BOQ calls for Erection & Commissioning, the contractor shall contract the contractor shall contract the contract of the contract	CT .			
and the BOQ calls for Erection & Commissioning, the contractor shall of				
	out removal, calibration, re-fixing and commissioning of same. Payment shall			
	be made only for removal, calibration, re-fixing and commissioning, in line with			
rate quoted for removal, calibration and re-fixing of Instrument of similar to				
1.13.5.21 In case the Instruments are supplied as loose items, and the BOQ calls				
removal, calibration, re-fixing and commissioning, the contractor shall c	•			
out erection and commissioning of the same. Payment shall be made only				
Erection and commissioning in line with rate quoted for Erection	and			
Commissioning of Instruments of similar type.	t'			
1.13.5.22 The scope of work for panels for TSS System, Sonic Tube Leak Detection of Systems Systems Master Clark Systems Signature				
System, Furnace Flame Viewing System, Master Clock System, Siemens				
turbine panel etc. will be in line with the scope of work of C&I panels covered to the scope of the	erea			
under clause above in 1.13.2.0 1 13 6 0 SCOPE OF WORK FOR IMPULSE PIPES:				
11101010	4 1			
1.13.6.1 Different types of impulse pipes, like alloy steel, carbon steel, stainless s				
of different sizes and thickness shall be supplied with suitable fittings				
	coupling, sockets, root valves, drain valves, manifold, condensing pots,			
syphons, tees, bends, nut and tail piece.	, ,			
1.13.6.2 Unit rate quoted for impulse piping shall include site routing using reducer	•			
root valve) unions, connector Nuts and tail pieces, sockets, nipples, e	•			
tees, couplings, condensing pots, siphons, root valves, isolation valves				
	bending, tig / arc welding. etc., fixing of manifolds and supporting with suitable			
	fixtures and 'U' clamps and painting as per BHEL specification and site			
engineer's instructions. No separate rate shall be paid for the Impulse				
fittings. The unit rate also includes supply of U clamps, fasteners, paints,				
For impulse pipe support materials viz. Angles/ Channels, the rate shall				
paid on tonnage basis. The above support materials shall be supplied	•			
BHEL. For scope of painting, please refer Scope of Painting clause. Wel-	_			
of impulse pipe for High Pressure Lines shall be carried out by High Press				
welder. Suitable root valves will be provided by BHEL on the tapping p	oint			
wherever required				
1.13.6.3 TIG-welding sets, welding transformer/generator rectifier, Hydraulic ben	•			
machines, DPT kits, Hydraulic testing pumps required for pressure testing	•			
impulse pipes shall be arranged by the contractor. Similarly, consuma				
such as welding electrodes, gas, Tungsten rods, filler wire etc., shal	be			
arranged by the contractor within the quoted rate.				
1.13.6.4 For longer route lengths of impulse pipes, the contractor shall provide	Tag			
numbers at appropriate locations as directed by BHEL site engineer.				

1.13.6.5	Hydraulic test shall be conducted for all impulse pipes after completion of erection as per site engineer's directive, as part of the work.			
1.13.6.6	The contractor shall obtain necessary approval for welding electrodes, filler			
4 40 0 7	wire from BHEL welding engineer at site.			
1.13.6.7	Impulse pipes Welder shall undergo test and get approval from BHEL welding engineer according to the nature of welding.			
1.13.7.0	SCOPE OF WORK FOR PRE-FABRICATED/ SEMI-FABRICATED LIR/ LIE/			
11.10.7.10	GAUGE BOARDS CABLES TERMINATION			
1.13.7.1	If the frame or rack is supplied as a pre-fabricated item like LIR, same shall be			
	erected, grouted and painted as per site requirement.			
1.13.7.2	If any frame or support or rack supplied as semi fabricated item, same shall			
	be assembled at site either by welding or bolting and erected, grouted and			
	painted as per site requirement.			
1.13.7.3	Unit rate quoted for such pre-fabricated /semi fabricated items like LIE/LIR and			
	enclosure shall be on Number basis. Unit rate shall cover installation, grouting,			
	painting and supply of nuts, bolts, anchor fasteners, grouting materials such			
	as cement, sand etc as required. Unit rate shall also include full painting of			
	impulse line fitted and supplied along with LIR/LIE/LGB.			
1.13.7.4	Wherever LIR/LGB/LIE are supplied with instruments mounted on them, the			
1.10.7.1	rate quoted for LIR/LGB/LIE shall include calibration of all the instruments			
	mounted on them as detailed in the BOQ. However if the instruments supplied			
	as loose items, the instruments shall be calibrated and mounted on the			
	LIR/LGB/LIE and separate calibration/erection /commissioning charges shall			
	be applicable in line with other instruments erection.			
1.13.8.0	SCOPE OF WORK FOR COPPER/STAINLESS STEEL TUBES:			
1.13.8.1				
1.13.0.1	Different sizes of copper tubes of different thickness with or without PVC			
	coating shall be supplied in standard lengths of 15 meter Coils and Stainless Steel tube shall be supplied in standard length of 6meter. The connectors and			
4 42 0 0	tees will be of brass / Stainless Steel of different sizes as per site requirement.			
1.13.8.2	The unit rate quoted on meter basis shall cover site routing, bending, providing			
	supports, fixing of connectors, unions, valves, tees, etc. and connecting to the			
	instrument air line instruments. The unit rate shall also include providing tag			
4 40 2 2	plates on instruments / power cylinders.			
1.13.8.3	If copper / Stainless Steel tube length is more than half meter, suitable support			
	shall be provided either by angle or trays. Protective angles to be used for			
	copper tube routing. The support materials shall be supplied by BHEL. For			
	fabrication and installation of steel supports and frames, the rate shall be as			
	quoted in BOQ for fabrication and installation of steel Tonnage basis.			
1.13.8.4	Copper / Stainless Steel tubes shall be clamped with suitable clamping			
	materials. Supply of suitable Aluminium clamps and tag plates are under			
	contractor's scope. The unit rate quoted for laying of copper tube shall cover			
	the supply of clamping materials also. For SADC system copper tube, tag			

	plates shall be provided near instruments, Tees and Power cylinders. Leak				
1.13.9.0	test shall be carried out after completion of tubing works as per guidelines. SCOPE OF WORK FOR INSTRUMENT AIR LINES (GI PIPES):				
1.13.9.1	Different type of GI pipes of different thickness class shall be supplied along				
	with GI fitting accessories like union, coupling, tee, reducers, elbow, valves,				
	etc.				
1.13.9.2	Unit rates on length basis for erection of instrument air lines includes site				
	routing, providing supports, fixing "U" clamps, fixing of loose supplied GI				
	accessories mentioned as above as per the drawings, providing fresh threading as required for jointing with unions, valves and all type of other				
	fittings as required in the system. Unit rate also shall include supply of U				
	clamps, Teflon tapes and bolts, etc.				
1.13.9.3	Teflon tapes shall be used for tightening all the joints. No bending, welding				
	etc. is allowed. No separate rate shall be paid for erection of GI fittings / accessories and U clamps.				
1.13.9.4	After installation of instrument airlines, the line shall be blown and leak test				
	shall be conducted for all the joints as per the guidelines given elsewhere in				
	this tender.				
1.13.10.0	SCOPE OF WORK OF ELECTRIC & PNEUMATIC ACTUATORS:				
1.13.10.1	Different types of pneumatic actuators like regulating type, on-off type, of different stroke length shall be supplied. Some of them may be fitted and				
	supplied with main equipment.				
1.13.10.2	The unit rate quoted for erection & commissioning scope of electrical and				
	pneumatic actuators includes fabrication and installation of base frame,				
	modification of linkage mechanism wherever required and connecting the				
	same with driven equipment, fixing of all accessories like air sets, Solenoid valves, air lock off valves, limit switches, if supplied loose item as part of power				
	cylinders, replacing the damaged copper tubes or any other accessories like				
	gauges, solenoid valves, limit switches, etc. connecting to air line, and				
	adjusting the stroke length. No separate rate shall be paid for the above works.				
	For all pneumatic and electrical actuators, the necessary Linkage Mechanism shall be supplied by BHEL as part of actuators. No separate rate shall be paid				
	for erection of linkage mechanism. For fabrication and erection of steel				
	supports and frames, the rate shall be paid on Tonnage basis.				
1.13.10.3	The link rods have to be adjusted to suit the opening and closing position. This				
	adjustment has to be repeated number of times till proper operation is				
	obtained. If BHEL site engineer desires to remove the accessories like position transmitters, air locks, positioners, limit switches, solenoids etc. prior to				
	erection either at BHEL stores or at site to avoid damages/pilferage, keep in				
	safe custody and remount the same prior to commissioning, this shall be part				
	of scope of work for power cylinders.				

1.13.10.4	For calibration of any Pneumatic Actuator at field, temporary air supply if required shall be arranged by the contractor.				
1.13.10.5	In case the power cylinder is supplied in assembled condition along with main equipment and the BOQ calls for Erection & Commissioning of the same, payment shall be made only for commissioning, in line with rate quoted for commissioning of pneumatic power cylinder of similar type.				
1.13.10.6	In case the power cylinder is supplied as loose item, and the BOQ calls only for commissioning, the contractor shall carry out erection and commissioning of the same. Payment shall be made in line with rate quoted for Erection and Commissioning of power cylinder of similar type.				
1.13.10.7	Erection and Commissioning of MCCs and laying of power cables to bi- directional electrical actuators shall be done by other agency. The C&I Contractor shall provide necessary support for checking the remote operation of Electric actuators and loop checking of command and feedback signals from DCS to the actuator. The Contractor shall co-ordinate with the other agencies to ensure that all feedback and command signals and settings are made available for bi-directional.				
1.13.11.0	SCOPE OF WORK FOR CABLES:				
1.13.11.1	BHEL will supply LT, 1.1 kV, armoured/ unarmoured, Copper PVC FRLS insulation, Power, Control and Instrumentation cables of different sizes. The special cables supplied shall be Compensating cable, Ethernet cables and Fibre-optic cable of different sizes and type.				
1.13.11.2	The cables covered in the BOQ may be appearing either in BHEL's C&I cable schedule or in BHEL's Electrical cable schedule. The contractor shall lay and terminate all the cables covered in the BOQ, as per directive of BHEL Engineers.				
1.13.11.3	The scope of work includes laying & termination of cables, fixing of glands, ferrules, tag plates with necessary numbering and dressing of cable, as per BHEL specification and BHEL engineer's instructions. A composite rate covering laying and termination shall be applicable for cables, except for higher size cables. Separate rate will be applicable for termination of higher size cables and the same will be indicated specifically in the Rate Schedule / price bid / BOQ.				
1.13.11.4	Unit rate quoted for cable shall cover laying, termination, drilling of holes on the gland plates of the panels/JB or Enlargement of cable entry holes by tapping or any modification required, fixing of cable glands, fixing of glands, ferrules, termination and providing tag plates and dressing.				
1.13.11.5	Unit rates quoted for cabling shall also include supply of clamping/ dressing materials such as Aluminium/GI strips or PVC ties, ferrules, tag plates, lugs upto 2.5 sq.mm. apart from the work mentioned above. Supply of above material shall conform to the specification detailed elsewhere in this tender.				

1.13.11.6	Uniform unit rate shall be quoted for the cables whether laid on cable trays or			
1.13.11.7	routed through duct bank, conduits, underground, cable shafts etc. Ethernet cables and Fibre optic cables shall be isolated from other cables and laid in a separate cable tray as directed by site Engineer. Wherever required I/O Box shall be installed for Ethernet cable termination and Punch Down			
	crimping tools shall be used for Ethernet cable termination.			
1.13.11.8	The scope of work for Fibre Optic cable shall be laying and termination including fixing of fibre optic components and termination kits LIU, space splits cabinets, couplers, grounding etc. Wherever required, the Fibre optic cable shall be laid through HDPE Conduit.			
1.13.11.9	The contractor shall provide Tools/ equipment required for the connections and termination of cable wherever necessary. No separate rate shall be paid for cable terminations. For cable joining, if any, separate rate shall be considered on extra works basis.			
1.13.11.10	The contractor shall carry out cable dressing and clamping for all the cables laid by the contractor. However, if any other agency laid cables of lesser quantity for which no separate trays have been allotted, the contractor shall do clamping along with the cables.			
1.13.11.11	Wherever cable entry holes have not been provided for equipment installed by another agency, the contractor shall co-operate to get the same done.			
1.13.11.12	During testing and commissioning, if the equipment on which the cables are terminated (including electrical drives) is not functioning, it is the responsibility of the contractor to check and establish in coordination with the commissioning agencies that there is no defect in the cabling. The contractor shall promptly depute their supervisor or technicians to assist the commissioning agencies to check the interconnecting cables at no extra cost.			
1.13.11.13	Contractor shall carefully plan the cutting schedule for each cable drum in consultation with Engineer such that wastage is minimized and any resultant short lengths can be used where appropriate route lengths are available.			
1.13.11.14	If the cables are to be laid on the angles or routed in conduit pipe as per site condition, the unit rate for erection of angles and conduit pipes shall be as per the rate quoted elsewhere in the tender.			
1.13.11.15	Any fabrication required at site for cable support shall be carried out at the rate quoted for fabrication.			
1.13.11.16	Cable installation shall be properly coordinated at site with other services and wherever necessary suitable adjustment shall be made in the cable routings with a view to avoid interference with any part of the building, structures, equipment, utilities and services any such adjustment shall be done with the approval of Engineer.			
1.13.11.17	The approximate number of termination for the purpose of estimation to be assumed as follows: The average RUN length shall be considered as 150			

	metres. However, for 10% of the 2 pair and below, the average length shall be				
1.13.12.0	considered as 30 metres. SCOPE OF CABLE TERMINATION:				
1.13.12.1	Laying and termination of all cables including Ethernet, fibre optic cable is part of the scope.				
1.13.12.2	The scope of termination shall include termination of cables on various panels / JBs / Push buttons / equipment etc. including those installed by other agencies.				
1.13.12.3	Re-termination, if required during testing/ commissioning shall be carried out without additional cost.				
1.13.12.4	Scope of termination shall include supply of insulating sleeves. The sleeves shall be fire resistant, long enough to over pass conductor insulation and properly sized.				
1.13.12.5	Contractor shall arrange all type of termination and crimping Tools/ equipments required for the connections/terminations.				
1.13.12.6	Only printed ferrules should be used and contractor shall arrange necessary ferrules printer.				
1.13.12.7	After cable terminations, the debris shall be removed then & there. Also refer Cl.No. 1.13.11.0 above.				
1.13.13.0	SCOPE OF WORK FOR CABLE TRAYS/CONDUITS/FLEXIBLE CONDUITS/HOSE:				
1.13.13.1	CABLE TRAYS: Scope of cable tray works covers erection of various sizes of perforated trays with accessories mostly for branch trays in Power House building. All type of cable trays including, standard trays accessories shall be supplied by BHEL. The scope of work for cable trays shall be as follows: a. Different Junction The unit rate for erection of trays shall be on meter basis. The unit rate quoted for erection of tray shall also include erection of all tray accessories such as elbow, cross, Tees, bends such as vertical and Horizontal, reducers, coupler plates/fixing plates, anchor bolts, fasteners etc. b. For routing of trays standard tray accessories supplied by BHEL shall be used. However if above standard tray accessories are not supplied, the same shall be fabricated and installed at no extra cost. c. If standard tray accessories like Tees, Reducers, Bends, cross etc. require any modification to suit the tray routing, the same shall be carried out at no extra cost. d. The unit rate quoted for trays shall also cover making of offsets by means of cutting standard tray sections and inserting suitable trays to match with the existing arrangement. e. Site fabrication / modification of trays or on tray accessories will be paid				

	f. The contractor shall quote a uniform rate on meter basis for erection of				
	trays and Tray accessories like Tees, Reducers, Bends, cross etc.				
	g. Tray covers are to be erected after completion of cable laying and no separate payment will be made for fixing these covers. Gl strip clamps				
	are to be used for fixing the tray covers.				
	h. Welded Joints of trays shall be painted with red lead and aluminium paint				
	in turn with bitumen as per IS 3043. The unit rate shall also include				
	supply of paints, thinner, other consumables and brush etc.				
1.13.13.2	RIGID & FLEXIBLE CONDUITS:				
	a. Cables shall normally be laid on cable trays. However, in case of shorter routes where trays are not possible, suitable GI pipe/flexible conduits supplied by BHEL shall be used. Unit rate shall be paid on running meter basis.				
	b. Unit quoted on meter basis 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. No separate payment will be made for fixing of end connectors.				
	Unit quoted on meter basis for GI rigid conduit includes supply of suitable				
	clamps / fasteners / tag plates etc. The scope of work includes drilling of holes on the plates, fixing of end				
	connectors, providing suitable supports and fixing tag plates as required				
	by BHEL. Supply of suitable clamps, fasteners and tag plates are				
1 10 10 0	covered in the unit rate.				
1.13.13.3	SCOPE OF WORK FOR JUNCTION BOXES/CJCBs /PUSH BUTTON BOXES:				
1.13.13.4	Different Junction Boxes/ Push Button boxes with gland plates shall be supplied by BHEL.				
1.13.13.5	The unit rate quoted for erection of junction boxes/push button boxes shall				
	cover the following also.				
	a. Providing necessary supports b. Drilling of bottom gland plates for cable glands as required				
	b. Drilling of bottom gland plates for cable glands as requiredc. Painting the tag Nos. or fixing a separate tag plate on junction				
	boxes/push button boxes				
	d. Minor chipping, grouting as required for mounting the JBs/PB				
	e. Supply of all bolts and nuts (Fasteners) including grouting bolts as				
	required for mounting the junction box/push button. f. Closing all unused holes on the gland plates using grommet or any				
	f. Closing all unused holes on the gland plates using grommet or any other suitable materials.				
	g. Any modification like replacement of terminals, enlarging gland holes				
	etc. that may be required to accommodate power cables.				
1.13.13.6	All bolts and nuts (Fasteners) required for mounting the junction box shall be				
	arranged by the contractor.				

1.13.13.7	For CJCBs/ RJCBs, the rate for Junction Boxes similar size, as per Rate Schedule, will be applicable.				
1.13.13.8	For fabrication and fixing of supports/Frame, rate shall be paid on tonnage				
	basis.				
1.13.14.0	SCOPE OF WORK FOR FABRICATION & ERECION OF STEEL				
	MATERIALS:				
1.13.14.1	Scope of steel fabrication and installation covers, fabrication and installation				
	of various type of supports for cable tray, instruments, impulse pipes, GI pipes,				
	support angles for copper tubing, mounting frames for JB, Control Box/Panel,				
	local PB Stations, canopy for local instruments and local instrument rack etc.				
	wherever required.				
1.13.14.2	The fabrication steel materials such as angles, channels, plates, etc shall be				
	supplied in standard lengths by BHEL. Fabrication shall be carried out by the				
	contractor as per schemes in consultation with site engineers.				
1.13.14.3	Immediately after fabrication, primer shall be applied to prevent corrosion. The				
	installation shall be carried out only after applying the primer as detailed in				
	painting clause.				
1.13.14.4	All fabricated steel materials shall be painted as detailed in the scope of				
1.10.14.4	painting.				
1.13.14.5	A composite rate shall be quoted for fabrication and installation of steel, on				
1.10.14.0	tonnage basis. The above rate shall include supply of paints and painting,				
	grouting and grouting material as required.				
1.13.15.0					
1.13.13.0	SCOPE OF EARTHING:				
1.13.15.1	The scope of earthing covered in this contract is above ground earthingi.e				
	equipment earthing. Scope of earthing covers earthing of field Instruments,				
	JBs, Branch trays, LIR/LIE, JB, Push Button boxes etc. All DCS and its				
	accessories, PLC/Instrumentation panels/systems etc, shall be earthed to a				
	separate Electronic earth grid.				
1.13.15.2	Different type of earthing materials shall be supplied and same shall be				
	erected as per site requirement.				
1.13.15.3	The scope of work shall include supply of fasteners, lugs, minor civil works				
1.10.10.0	etc.				
1.13.15.4	All connections from the equipment to the main earthing conductors shall be				
1.10.10.4	made as illustrated in earthing drawings. A copy of earthingdrawing shall be				
	provided to the contractor at site.				
1.13.15.5	1				
1.13.13.3	The unit rate shall be quoted for earthing on metre basis. The rate shall cover				
4 42 40 0	supply of fasteners, lugs, minor civil works, painting the welded joint etc.				
1.13.16.0	SCOPE OF CALIBRATION:				

1.13.16.1	The contractor shall calibrate all the local instruments, panel mounted instruments including transducers, protective relays, recorders, Indicators etc.				
1 10 10 0	that will be supplied along with equipments mounted in or in loose.				
1.13.16.2	Contractor has to calibrate all the instruments covered in their scope at site				
	with their own calibration and testing equipment's under the supervision of				
	BHEL / Customer Engineers and maintain the calibration records as per the				
	BHEL prescribed format / relevant FQP formats.				
1.13.16.3	All testing Instruments / Equipment deployed for calibration shall be calibrated				
	before taking into service. All testing instruments shall have calibration				
	certificate issued by recognized /accredited agencies. A copy of calibration				
	certificate shall be submitted to the engineer for their verification and approval.				
1.13.16.4	BHEL shall provide vendor supports for proprietary type of microprocessor –				
	based instruments, protective relays, which requires software loading and				
	programming etc. However overall responsibility lies with contractor and				
	contractor shall provide all supports like manpower ,standard T&P,				
	Instruments etc., for calibration and testing of above proprietary instruments.				
1.13.16.5	If BHEL is unable to provide or arrange vendor support for proprietary				
	instruments, contractor shall carry out the calibration through authorized				
	agency, at extra cost. The actual cost of such calibration carried out by the				
	outside agency shall be reimbursed by BHEL. However if above such				
	calibrator is available with BHEL at site, the calibration shall be carried out by				
	the contractor with in quoted rate.				
1.13.17.0	MEASUREMENTS, WASTAGE & CUTTING ALLOWANCES:				
1.13.17.1	For all payment purposes, measurement shall be made on the basis of the				
	execution of drawings/physical measurements. Physical measurements shall				
	be made by the contractor in the presence of the Engineer.				
1.13.17.2	The measurement for cable, impulse pipes/tubes, GI pipe, conduits, flexible				
	conduits, trays etc. shall be made on the basis of length actually laid.				
1.13.17.3	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.				
1.13.17.4	All materials returned to stores should carry an aluminium tag indicating the				
	size and type. More than 5 metres length 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.				
1.13.17.5	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				
1	1				

1.13.17.6	categories and the balance quantity(ies) will be taken as the net quantity(ies) issued to the contractor. Material appropriation shall be done and allowable scrap quantity calculated as per wastage allowance specified below. 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.				
1.13.17.0	For all site-fabricated steel items such as supports, racks, frames, 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.				
1.13.17.7	Every month the contractor shall submit an account for all the materials issued to them by BHEL in the standard proforma prescribed for this purpose by the site in charge.				
1.13.17.9	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 the type of cable required for various destinations, the cable drums shall be suitably selected for cable laying. Jointing of cable, if any shall be approved by the BHEL engineer. All the cut pieces / bits of cables which are not used / unused shall be returned to the BHEL stores for accounting towards wastage. The cables damaged by the contractor shall have to be replaced by the contractor at their own cost. The erection contractor shall make every effort to minimize wastage during erection work. The wastage allowances as permissible for various items are indicated in the following table. Cutting and wastage allowance shall be computed on the lengths and weight of materials actually used, measured and accepted. In any case, the wastage shall not exceed the following limits.				
	SI.No.	Item	% wastage on issued quantity		
	01	Fabrication Steel	2		
	02	Each size of power cables	1		
	03	Each size of control / instrumentation cables	2		
	04	Impulse pipe / tubes / GI Pipes / Copper Tubes	1		
	 NOTE: 1. Salvageable scrap shall mean lengths of pipes, multicables, other cables etc., that can be used one time or other at a later date and normally they are recovered from the cut-pieces of tubes, pipes, multicore cables, cables etc. 				

	 Non - Salvageable scrap means the lengths of tubes, pipes, multicore cables, cables etc., and they are from cut-pieces of tubes, pipes, multicore cables, cables etc., that cannot be used at all one time or other.
1.13.17.10	Following E&C works are covered under Contractor scope under the supervision of OEM. i) Erection of Junction box & Driver housing. ii) Erection of VMS Panel in Control Room. Power supply extension to VMS
	Panels. iii) Erection of cable from JB to VMS Panel; including both end cable termination.
	iv) Erection of cable from VMS Panel to DCS Panel; including both end cable termination.
	Following are excluded from the scope of contractor: 1. Checking and calibration of sensors
	Mounting of sensors (Vibration/phase/proximity,etc)
	 Sensor Cabling up to JB Healthiness checking and complete commissioning of the system. Loop Checking between panel to DCS
4 40 40 40	6. Handover of the system to End user
1.13.18.10	TURBINE SUPERVISORY CONTROL SYSTEM (TSS): For Main Turbine:
	Collection of materials from stores, Preparation of mounting surface and mounting arrangement to suit the surface of the machine, Installation of JBs-12 Nos., Laying & Terminations of Instrumentation cable from Lcal JB and Cabinet, Laying and termination of Power cable to TSS panel, Laying and termination of ethernet cables (as applicable), Laying and Termination of FO cables. (Mounting sensors on the Machines, Laying and termination of cables between sensors to Local JB, Pre-commissioning check, energizing cabinets & PC (as applicable), Commissioning, Installation of software packages, handing over to the enduser are in the scope of OEM).

VOLUME-IA PART – I CHAPTER – XIV PROGRESS OF WORK

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

	otherwise specifica.
1.14.0.0	PROGRESS OF WORK
1.14.1.0	Refer forms F -14 to F-18 of volume I D (Forms & Procedure) of volume -I book-II. Plan and review will be done as per the formats.
1.14.2.0	The progress reports shall indicate the progress achieved against plan, indicating reasons for delays, if any. The report shall also give remedial actions which the contractor intends to make good the slippage or lost time so that further works can proceed as per the original plan the slippages do not accumulate and affect the overall program.
1.14.3.0	It is the responsibility of the contractor to provide all relevant information on a regular basis regarding erection progress, labour availability, equipment deployment, testing, etc.
1.14.4.0	During the course of erection, if the progress is found unsatisfactory, or if the target dates fixed from time to time for every milestone are to be advanced, or in the opinion of BHEL, if it is found that the skilled workmen like fitters, operators, technicians employed are not sufficient BHEL will induct required additional workmen to improve the progress and recover all charges incurred on this account including all expenses together with BHEL overheads from contractor's bills.
1.14.5.0	Contractor is required to draw mutually agreed monthly erection programs in consultation with BHEL well in advance. Contractor shall ensure achievement of agreed program and shall also timely arrange additional resources considered necessary at no extra cost to BHEL.
1.14.6.0	Progress review meetings will be held at site during which actual progress during the week vis-a-vis scheduled program shall be discussed for actions to be taken for achieving targets. Contractor shall also present the program for subsequent week. The contractor shall constantly update / revise their work program to meet the overall requirement. All quality problems shall also be discussed during above review meetings. Necessary preventive and corrective action shall be discussed and decided upon in such review meetings and shall be implemented by the contractor in time bound manner so as to eliminate the cause of nonconformities.
1.14.7.0	The contractor shall maintain a record in the format as prescribed by BHEL of all operations carried out on each weld and maintain a record indicating the number of welds, the names of welders who welded the same, date and time of start and completion, preheat temperature, radiographic results, rejection if any,

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	percentage of rejection etc. and submit copies of the same to the BHEL
	Engineer as required.
1.14.8.0	The contractor shall submit daily, weekly and monthly progress reports,
	manpower reports, materials reports, consumables (gases / electrodes /
	ferrules / lugs) report, cranes availability report and other reports as per
	Performa considered necessary by the Engineer as per the BHEL formats.
1.14.9.0	The contractor shall submit weekly / fortnightly / monthly statement report
	regarding consumption of all consumables for cost analysis purposes.
1.14.10.0	The manpower reports shall clearly indicate the manpower deployed, category
	wise specifying also the activities in which they are engaged.
1.14.11.0	. , ,
1.11.1.1.0	and shall contain the following details:-
	a. Colour photographs of the works progress.
	b. Erection progress in terms of tonnage, percentage of work completion,
	welding joints, radiography, stress relieving, etc., completed as relevant
	· · · · · · · · · · · · · · · · · · ·
	to the respective work areas against planned.
	c. Site Organization chart of engineers & supervisors as on the last day of the month with further mobilization plan
	d. Category- wise man hours engaged during the previous month under
	the categories of fitters, welders, riggers, khalasis, grinder-men, gas-
	cutters, electricians, crane operations, store keepers, lab technicians,
	helpers, security etc. Data shall be split up under the work areas like
	Boiler (pressure parts, structures) Rotating machines, Electro static
	precipitator, Insulation, Piping, Steam turbine, Condenser, Generator
	etc.
	e. Consumables report giving consumption of all types of gases and
	electrodes during the previous month.
	f. Availability report of cranes & T&Ps
	g. Safety implementation report in the format
	h. Pending material and any other inputs required from BHEL for activities
	planned during the subsequent month.
1.14.12.0	The contractor to reflect actual progress achieved during the month and shall
	be submitted to BHEL, so that slippages can be observed and necessary action
	taken in order to ensure that the situation does not get out of control will update
	the construction schedule forming part of this contract each month.
	O I

VOLUME-IA PART - I CHAPTER- XV TESTING AND COMMISSIONING

TESTING, PRE-COMMISSIONING & COMMISSIONING AND POST COMMISSIONING

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

	of the work will comprise of but not limited to the following:			
1.15.1.0	The scope of commissioning works covers commissioning of all instruments covered in the BOQ including loop checking and establishing the operation of			
	instruments / systems to meet plant commissioning / operation. The contractor			
	shall be responsible for overall commissioning of all the instruments and systems covered in the BOQ.			
1.15.2.0	SCOPE OF PRE-COMMISSIONING / COMMISSIONING AND POST			
1.13.2.0	COMMISSIONING WORKS:			
	Scope of pre-commissioning / commissioning starts with the commissioning of various equipment erected by the contractor and making them available to commission various materials / systems and main power plant. The scope of work of various commissioning activities of the main plants is referred below:			
	a. Trial run of various equipment			
	b. Light up of boiler			
	c. Boiler EDTA/chemical cleaning			
	d. Boiler alkali boil out			
	e. Turbine barring gear f. Steam blowing of piping			
	g. Turbine rolling			
	h. Safety valve floating			
	i. First synchronization			
	j. Heavy oil firing and synchronization			
	k. Coal firing			
	I. Trial Operation/Full Load			
	The above 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.			
1.15.2.1	The contractor shall co-ordinate with BHEL and other contractor's during the main plant commissioning to ensure successful commissioning of total plant.			
1.15.2.2	The pre-commissioning activities of the main power plant will start with			
	energizing of startup power supply systems followed by trial run of various			
	drives prior to light up of boiler. Commissioning operations shall continue till trial			
	operation of the unit. The contractor shall simultaneously start checking cables			
	erected by them to match with the various milestone activities /commissioning program of the project. All these works need specialized testing engineers,			
	program or the project. All those works need specialized testing engineers,			

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	supervisors including electricians in each area to co-ordinate with BHEL Engineers and other agencies round the clock to match with commissioning schedule of unit. Contractor shall earmark separate manpower for various commissioning activities. The manpower shall not be disturbed or diverted for erection work. It shall be specifically noted that above personnel of the contractor may have to work round the clock along with BHEL commissioning engineers which may involve over time payment which forms part of Contractors Scope
1.15.2.3	The mobilization of testing team shall be planned in time and shall be undertaken round the clock. Contractor shall discuss on day to day / weekly / monthly basis the requirement of testing 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 the cost will be recovered from contractor.
1.15.2.4	After erection of various equipment prior to commissioning and after commissioning, protocols have to be made with BHEL / Customer. The formats will be given by BHEL and have to be printed by the contractor in adequate numbers.
1.15.2.5	For electrical works, 415 volts and above, the contractor has to bring qualified electricians and the total work has to be certified by electrical license holder. The expenditures towards work certificate and all statutory requirements connected towards the high voltage system shall be borne by the contractor.
1.15.2.6	In case any rework / rectification / modification is required to be done because of contractor's faulty erection, which is noticed during commissioning at any stage, the same has to be rectified by the contractor at their cost. During commissioning, any improvement rework / rectification / modification due to design improvement / requirement is involved, the same shall be carried out promptly and expeditiously. Claims if any, for such works from the contractor shall be governed by clauses covered elsewhere.
1.15.2.7	During commissioning activities and carrying out various tests, if any of the instruments has to be temporarily erected and commissioned to suit the commissioning activities, the contractor have to carry out the erection of the same. After completion of activities the temporary systems have to be removed and returned to stores and no extra rate shall be paid for this.
1.15.2.8	All the T&P instruments required for commissioning are to be arranged by the contractor. However, any special instruments, which are of proprietary nature, shall be arranged by BHEL.
1.15.2.9	It shall be the responsibility of the contractor to arrange and complete all the testing, pre-commissioning and commissioning activities for the particular equipment as per relevant standard, code of practice, manufacturer's instructions and BHEL norms. All the above will be witnessed by the BHEL engineers and reports signed shortly. Contractor shall follow checklist of BHEL

	and testing & com	missioning a	activities sh	all be carried	d out in acco	ordance with
1.15.2.10	The scope of co	mmissioning	shall also	o cover the	commission	ning of the
	equipment / drives					•
	BOQ)				,	
1.15.2.11	The mobilization of testing team shall be planned in time and shall be undertaken round the clock. The contractor shall discuss on day to day / week					
					•	•
	/ monthly basis the tackles with BHE	•	_	•		
	requisite manpow	•	•			•
	make alternate arr				•	
1.15.2.12	Prior to commissioning and after commissioning, protocols have to be made					
	with BHEL / custo			•	•	
	printed by the cont		•		•	•
	above personnel of BHEL commission					
	forms part of Cont			ay involve o	voi tiirio pa	ymont windi
1.15.2.13	Any rework / rect			is required	to be done	because of
	contractor's faulty erection, which is noticed during commissioning at any stage,					
4.45.0.44	the same has to be	•				1 '1 1
1.15.2.14	Commissioning Engineers also shall be identified separately for each unit and the minimum requirement shall be as indicated below (Requirement given					
	below is per unit).	irement snai	i de as iliuit	cated below	(Requireme	nt given
		Boiler	TG	Station	BOP and	TOTAL
				C&I	Misc	
	Engineer (C&I)	01 No.	01 No.	01 No.	01 No.	04 Nos.
	Supervisor (C&I)	03 No.	03 No.	03 No.	03 No.	12 Nos.
	Technician (C&I/Electrical)	08 No.	06 No.	08 No.	08 No.	30 Nos.
1.15.2.15	The above commi		•			•
	and commissioni	•			• • •	
	knowledge of vari adequate experier	•	s referred i	in the tende	r and also	snould have
1.15.2.16	The above manpo		entative and	d for any add	litional manr	ower as per
	site requirement t	•		•		•
	above, there will be	e separate e	ngineers for	r Planning, S	afety and Q	uality. For all
	practical purposes			charges sha	Il be provide	ed with a PC
4 45 0 47	and good commun			F		Ta alaminia a a C
1.15.2.17	If the contractor fa			-	-	
	appropriate time	OI COMMINISS	ioning, bn	nginee	wiii Have	uie rigiil lo

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	withhold the payment towards commissioning activities as defined in terms of payment.
1.15.2.18	T& P / instruments required for testing are to be arranged by the contractor.
1.15.2.19	All commissioning / testing activities shall be carried out as per relevant standard, code of practice, manufacturer's instructions and BHEL norms. The contractor shall follow the checklist of BHEL prior to taking up testing & commissioning activities and the activities shall be carried out in accordance with the checklist. All the above shall be witnessed by BHEL engineer and the reports signed jointly.
1.15.2.20	The scope of commissioning assistance to be provided by the contractor shall cover the equipment / drives erected by the mechanical contractors as detailed in the BOQ.
1.15.2.21	Scope of commissioning of equipment erected by the mechanical contractor:
	a. The scope of commissioning assistance to be provided by the contractor will cover the equipment / drives erected by the mechanical contractors as detailed in the BOQ.
	b. The scope of work also includes collecting the replacement instruments / parts from BHEL / customer stores, stockyard etc.
	c. Separate group shall be identified for commissioning. The above group shall be available right from Trial run to full load operation including shift operation.
1.15.2.22	PNEUMATIC (ALL TYPES OF VALVES AND POWER CYLINDERS)
	a) Calibration and checking of instruments mounted on the actuators and setting stroke length of the actuator.
	b) Servicing of positioners, position transmitters, limit switches, solenoid valves, air lock-off valves, removing/replacement of defective components, copper tubes etc., if necessary.
	c) If the actuator is to be removed for attending to any mechanical problems, removing of copper tubes, cables etc. reconnecting and re-commissioning of the actuators is to be done.
	d) Testing and checking the remote / local operation in Auto as well as Manual mode.
	e) Fixing of instruments if supplied as loose items.
	f) Attending to any defects till the contract period.
1.15.2.23	FLOW METERS / SWITCHES a) Checking the calibration and servicing if required.
	b) Setting the alarm value
	c) Replacement of defective components if any

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1.15.2.24	LIMIT SWITCHES & LEVEL SWITCHES a) Checking the operation		
	b) Replacing defective components if required		
1.15.2.25	SOLENOID VALVES a) Checking the healthiness of coil		
	b) Checking the operation		
	c) Replacement of defective components if required.		
1.15.2.26	TEMPERATURE ELEMENTS (MOTORS AND GENERATORS WINDING AND BEARING) a) Checking the healthiness		
	b) Replacement of defective element (only for bearing)		
1.15.2.27	DIRECT WATER LEVEL GAUGES (REMOTE & LOCAL) a) Checking the calibration		
	b) Fixing of bulbs and extending Power supply		
	c) Replacing defective components		
1.15.2.28	INSTRUMENTS MOUNTED ON THE EQUIPMENTS / SKIDS / PANELS Scope of work covers removal, re-calibration, re-fixing, and re-termination of cables, checking the continuity, replacing any defective parts or replacing the total instrument, if required.		
1.15.2.29	All testing activities shall be carried out as per relevant standard, code of practice, manufacturer's instructions and BHEL norms. The contractor shall follow the checklist of BHEL prior to taking up testing & commissioning activities and the activities shall be carried out in accordance with the checklist. All the above will be witnessed by BHEL engineer and the reports signed jointly.		
1.15.2.30	All required tests (Mechanical and electrical) indicated by BHEL and their clients for successful commissioning are included in the scope of these specifications. These tests / activities may not have been listed in these specifications. Specialized test equipment, if any, shall be provided by BHEL / its client free of hire charges. However contractor has to take proper care of the equipment issued to them.		
1.15.2.31	All the tests at various stages shall be repeated till all the equipment satisfy the requirement of BHEL / Customer. Any rectifications required shall have to be done / redone by the contractor at their cost.		
1.15.2.32	It shall be the responsibility of the contractor to provide various categories of workers in sufficient numbers along with Supervisors during pre commissioning, commissioning and post commissioning of equipment and attending any problem in the equipment erected by the contractor till handing over. The contractor will provide necessary consumables, T&Ps, IMTEs etc., and any		

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	other assistance required during this period. Association of BHEL's / Client's
1.15.2.33	staff during above period will not absolve contractor from above responsibilities. It shall be specifically noted that the contractor and employees of the contractor may have to work round the clock during the pre-commissioning, commissioning and post-commissioning period along with BHEL Engineers / customer officials. Hence contractor's quoted rate shall take into consideration of all expenses that will be incurred for such arrangement of personnel including engineers / supervisors.
1.15.2.34	In case, any rework is required because of contractor's faulty erection, which is noticed during pre-commissioning and commissioning, the same has to be rectified by the contractor at their cost. If any equipment / part is required to be inspected during pre-commissioning and commissioning, the contractor will dismantle / open up the equipment / part and reassemble / redo the work without any extra claim.
1.15.2.35	Contractor to provide necessary commissioning assistance from pre- commissioning state onwards and up to continuous operation of the unit & handing over to customer. The category of personnel to be as per site requirement and to meet the various pre-commissioning and commissioning programmes made to achieve the schedule agreed with customer.
1.15.2.36	After synchronization, the commissioning activities will continue. It shall be the responsibility of the contractor to provide manpower including necessary consumables, hand tools and supervision as part commissioning assistance till handing over of sets to customer.
1.15.2.37	The contractor shall carryout any other test as desired by BHEL Engineer on erected equipment covered under the scope of this contract during testing, precommissioning, commissioning, and operation, to demonstrate the completion of any part or whole work performed by the contractor.
1.15.2.38	The contractor shall carryout any other test not listed in the tender as desired by BHEL Engineer on erected equipment covered under the scope of this contract during testing, pre-commissioning, commissioning, and operation, to demonstrate the completion of any part or whole work performed by the contractor.
1.15.2.39	It is the responsibility of the contractor to provide necessary manpower, tools, tackles and consumable till the completion of work under these specifications including for trial operation, even if commissioning of equipment is delayed due to reasons not attributable to the contractor.

VOLUME-IA PART- I CHAPTER-XVI PAINTING

PAINTING		
1.16.0.0	PAINTING	
1.16.1.0	FINAL PAINTING	
	The scope of the work will comprise of but not limited to the following:	
1.16.1.1	The scope of work shall also include supply and application of final painting of	
	all the components, other equipment's etc., erected under the scope of this	
	tender. The painting shall be as required and specified in the painting	
	schedule for power plant equipment, structures, piping etc. which forms the	
	part of this tender book.	
1.16.1.2	The scope of painting generally includes painting of all steel items such as	
	supports, racks, frames, canopy, LIE/LIR/LGB, impulse pipes, etc. carried out	
4 40 4 0	by the contractor. Painting shall be carried out for any bare copper tubes also.	
1.16.1.3	The scope also includes supply of paints, primers, tools/consumables like	
4 40 4 4	brushes, rollers, emery papers, thinner etc., at no additional cost.	
1.16.1.4	In the case of steel fabricated items, raw steel after fabrication has to be surface	
4 40 4 5	cleaned and subsequent painting to be carried out.	
1.16.1.5	All the exposed metal parts of the equipment including bus ducts, transformers,	
	structures, etc., wherever applicable after installation unless otherwise specified the surface protected, are to be first painted with at least one coat of	
	suitable primer and required number of finish coats as indicated in the Painting	
	Specification which matches the shop primer paint used, after thoroughly	
	cleaning the dust, rust, scales, grease oil, and other foreign materials by wire	
	brushing scrapping and chemical cleaning and the same being inspected and	
	approved by BHEL engineers for painting. Afterwards the above parts shall be	
	finished with as per the instructions of BHEL/Customer official.	
1.16.1.6	All welded joints should be painted with anti-corrosive paint, once radiography	
	and stress relieving works are over.	
1.16.1.7	Paint shall be applied by brushing or by spray painting as per the instruction of	
	BHEL Engineer. It shall be ensured that brush marks are minimal.	
1.16.1.8	Spray painting has to be carried out within the Quoted wherever required/asked	
	for. Spray painting gun and compressed air arrangement has to be made by	
	the contractor themselves.	
1.16.1.9	Before applying the subsequent coats, the thickness of each coat shall be	
	measured and recorded with BHEL / Customer.	
1.16.1.10	Paint used shall be stirred frequently to keep the pigment in suspension. Paint	
	shall be of the ready mix type in original sealed containers as packed by the	
	paint manufacturer. No thinners shall be permitted. Paint manufacturer's	
	instructions shall be followed in method of application, handling, drying time	
	etc.,	

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4.40.4.44	
1.16.1.11	The scope of painting includes application of colour bands, lettering the names
	of the systems equipment; tag Nos of valves, marking the directions of flow and
	other data required by BHEL within the quoted rate.
1.16.1.12	All surfaces shall be thoroughly cleaned, free from scales, dirt and other foreign
	matter. Each coat shall be applied in an even & uniform film free from lumps,
	streaks, runs, sags and uncoated spots. Each coat (Primer, intermediate, finish)
	shall have a minimum thickness of dry film thickness (DFT) in microns and the
	DFT of finish paint shall not be less than the specified. Necessary instrument
	for measuring the thickness of paint applied is to be arranged by the contractor.
1.16.1.13	Finish coat paint, No of coat and DFT shall be as indicated in the painting
	specification enclosed in this tender / relevant BHEL document/ customer's
	specifications. The painting specification which is forming part of this tender as
	in TCC shall be used as guidelines to be followed.
1.16.1.14	The actual colour to be applied shall be approved by the customer before
	starting of actual painting work.
1.16.1.15	Primer & finish paint shall be of reputed paint supplier approved by BHEL /
	Customer. Contractor has to procure paints from the BHEL / Customer
	approved agencies only, and the paints should be as per the customer painting
	specification. The quality of the finish paint shall be as per the standards of IS
	or equivalent as approved by BHEL / Customer. Before procurement of paint
	the contractor has to obtain the clearance from BHEL authorities.
1.16.1.16	No paint shall be applied when the surface temp is above 55 deg. Centigrade
	or below 10 deg. Centigrade, and when the humidity is greater than 90% to
	cause condensation on the surface or frost / foggy weather.
1.16.1.17	Before commencement of final painting, contractor has to obtain written
	clearance from BHEL / Customer for effective completion of surface
	preparation.
1.16.2.0	PRESERVATION / TOUCH UP PAINTING
1.16.2.1	Due to atmospheric conditions erected materials are likely to get rusted more
	frequently. It is the responsibility of the contractor to preserve the erection
	materials drawn from stores for erection till these are commissioned and
	handed over to customer. The required consumables for this purpose like paint,
	thinner, rust converter compound (Ruskill or Ferropro) or any other equivalent
	shall be arranged by bidder. However, the contractor should also arrange other
	consumables like wire brushes, emery paper, cotton waste, cloth etc., at their
	cost. The contractor should ensure that the materials are not rusted on any
	account till they are handed over to customer. The decision of the BHEL
	Engineer is final with regard to frequency of application of paint and rust
	converter compound.
1.16.2.2	Mostly the equipment / items/ components will be supplied with one coat of
	primer paint and one coat of finish paint. However during storage and handling,
	the same may get peeled off / deteriorate. All such surfaces are to be thoroughly
-	

	cleaned and to be touch up painted with suitable approved primer and finish paint matching with shop paint / approved final colour. Besides above two coats of approved primer paint is to be applied on all the bare / unpainted surfaces. Touch up painting is generally required for trays, control panels.
1.16.2.3	All damaged galvanized surfaces including cable trays shall be coated with cold galvanizing paint.
1.16.2.4	Contractor shall carryout cleaning and preservation / touch up painting for the materials / equipment under this tender specification right from pre- assembly stage to till the equipment is cleared for final painting.
1.16.2.5	Any equipment which has been given the shop coat of primer shall be carefully examined after its erection in the field and shall be treated with touch up coat of red oxide primer wherever the shop coat has been abraded, removed or damaged during transit / erection, or defaced during welding.
1.16.2.6	Equipment / items/ components supplied during storage and handling, may get peeled off / deteriorate. All such surfaces are to be thoroughly cleaned and to be touch up painted with suitable approved primer and finish paint matching with shop paint / approved final colour.

VOLUME-IA PART – II CHAPTER 1 CORRECTIONS / REVISIONS IN GENERAL CONDITIONS OF CONTRACT AND FORMS & PROCEDURES

SI. No.: 1

The following para of Clause No. 10.5 on RA Bill Payments, in Special Conditions of Contract (SCC), Volume-IB, Book-II, stands deleted for this tender:

"60% of RA Bills complete and correct in all respects and certified by BHEL Engineer, shall be paid within 15 days of receipt. Balance payment shall be within 30 days."

SI. No.: 2

Document "HSE Plan for Site Operations by Subcontractor" (Document No. HSEP: 14 Rev 01) referred in SCC(Volume IB, Book II) is enclosed

SI. No.: 3

The chapter Reverse auction procedure published in 'Forms and Procedures' of Volume I Book-II stands deleted. (Explanation: Reverse auction is not applicable for this Tender).

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VOLUME-IA PART – II CHAPTER 2 DATA SHEET

		2 7 (17 (3 112	- -
2.3.1.0	SPECIFIC TECHNIC	AL REQUIREMEN	NTS FOR SUPPLY ITEMS
2.3.1.1	CLAMPS:		
	A. Material type: B. Sizes:	mentioned in Charact (Volume To meet the requ	ng ties Aluminium strips clamps as apter-3 of Technical Conditions of e-IA Part-II in Book-I) sirements mentioned in Chapter-3 of ions of Contract (Volume-IA Part-II in
2.3.1.2	FERRULES: As me	ntioned in Chapt	er-III of Technical Conditions of
	Contract (Volume-I/	A Part-I in Book-I)	
2.3.1.3	TAGS:		
	A. Material:		e / Stainless Steel
	B. Markings:	Engraving / Emb	ossing / Printing
	C. Size:	As required	
2.3.1.4	CABLE LUGS: Cop	per / Aluminium (C	Crimping Type)
2.3.1.5	CLAMP SPACING:		
	A. Power Cable	es:	
	Above 35 mm OD		
	i) Horizontal Runs:		Individually clamped at 3000 mm Interval (max)
	ii) Vertical Runs		Individually clamped 3000mm intervals (max)
	Up to 35 mm OD		,
	i) Horizontal Runs:		Collectively clamped at 3000 mm intervals (max)
	ii) Vertical Runs:		Collectively clamped at 2000 mm interval (max)
	B. Control Cab	les:	
	i) Horizontal Runs:		Collectively clamped at 3000 mm interval (max)
	ii) Vertical Runs:		Collectively clamped at 3000 mm interval (max)
	C. Spacing for supported a ceiling	Cables long structure /	
	i) Horizontal Runs:		750 mm (max)
	ii) Vertical Runs:		750 mm (max)
	iii) Spacing betweer Note:	ı cables:	30 mm (min)

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	a Supports shall also	n he nroved at each hend	
	a. Supports shall also be proved at each bend.b. For any change in above spacing, prior approval of Engineer shall be		
	taken.		
	CABLE TERMINATION	J.	
	Type of Lugs		
	a. Power Cables:	Copper / Aluminium / Both	n crimning type
	b. Control Cables:	• •	
	b. Control Cubico.	termination	orow typo, biroot
	c. Special Cables:	Pin type, maxi-termi type	
	Wastage Allowance:		
2.3.1.1	Material		Allowance
	<u>material</u>		permitted
	Structural Steel:		2% (by weight)
	Cable Tray:		2%
	LT Cable:		1%
	Control, Instrumentation	on & Special Cable:	2%
	Fire Survival Cables:		1 %
	Impulse Pipe/Tubes/G	I Pipes/ Copper Tube:	1%
	Earth flats:		2%

VOLUME-IA PART – II CHAPTER 3 GENERAL TECHNICAL REQUIREMENTS AND GUIDELINES FOR INSTALLATION, TESTING, COMMISSIONING AND SUPPLY ITEMS OF C&I PACKAGES

2.3.1.0	GUIDELINES FOR INSTALLATION OF C&I EQUIPMENT
2.3.1.1	Instruments location shall be decided to the convenience of operation and maintenance. The location shall have least mechanical vibration and placed where corrosive, toxic and explosive gases and dust particles will not deposit and the place is not subject to high-temperature atmosphere or radiation. However, actual location shall be decided in consultation with customer / consultant.
2.3.1.2	Maintenance platforms & approach facilities shall be provided for all sensing & primary devices wherever possible Instruments shall be located in weatherproof enclosures and wherever required suitable canopy shall be provided.
2.3.1.3	High & Low pressure impulse lines shall not be grouped and run together. Also impulse lines for explosive & inert gases shall not run together.
2.3.1.4	Impulse lines of high pressure steam, harmful gases, etc. shall not be brought into the control room, as far as possible.
2.3.1.5	Intrinsically safe circuits shall be used for explosion hazardous areas.
2.3.1.6	Separate cable routing shall be followed for high and low voltage lines.
2.3.1.7	All electrical equipments shall meet the requirements of Indian Electricity Rules.
2.3.1.8	Wherever severe vibrations are expected, shock absorbers shall be provided
2.3.1.9	Installation of instruments with radioactive isotopes, mercury and other toxic substances shall be as per statutory regulations provided by authorities.
2.3.1.10	Compensating cables should be connected directly to instruments, i.e. no junction boxes shall be used if CJCBs are not provided.
2.3.1.11	Orifice plates or flow nozzles must be provided with at least 10D upstream and 5D downstream straight length of pipe from bends tees, branch pipes & control valves.
2.3.1.12	Pressure gauges shall be provided with snubbers, syphons (for more than 100°C), three way valve manifolds wherever applicable.
2.3.1.13	For pneumatic instruments, air shall be dry & free from oil. Air must be supplied from oil-free compressors specially erected for this purpose. After drying, air must be restored in receiver. Pressure gauges must be provided on each supply line and after the pressure reducer.
2.3.1.14	Correct level (height) between detecting element and tapping point and transmitter shall be maintained.

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2.3.1.15	The equipment shall maintain its normal posture (level, perpendicular, front and back).
2.3.1.16	Connection between detecting element/tapping point and transmitter shall be maintained at short distances wherever practicable to avoid any time lag.
2.3.1.17	Orifice plates and control valves shall be mounted on process piping, only after completion of cleaning of the process piping in order that these instruments may not suffer damage from metal waste, etc.
2.3.1.18	For details of installing each measuring instruments, instruction manual issued by the respective manufacturer of instruments may be referred to, wherever necessary.
2.3.1.19	The drain pipes shall be terminated in a common closed header and finally the common header shall be connected to plant open drain.
2.3.1.20	Impulse pipe material shall be identified for each individual pipe prior to its use at site. For this purpose coloring is to be done immediately after receipt.
2.3.2.0	GUIDELINES FOR ERECTION OF IMPULSE LINES
2.3.2.1	All impulse lines burrs and airlines shall be thoroughly cleaned of any foreign matter by cleaning with compressed air and the same shall be done before installation.
2.3.2.2	The routing of pipelines shall include sufficient flexibility near tappings to allow for thermal expansion of the process equipment.
2.3.2.3	The pipes shall be cold bent using hydraulic bending machines only.
2.3.2.4	The horizontal impulse lines shall be laid with proper slopes towards the tapping point.
2.3.2.5	Supports for piping and tubing shall be adequate and in no case exceed limits shown below: a) 1/4" OD / 3/8" OD Copper - Continuous b) 1/2" NB Pipe / Tube - 5' c) 3/4" NB Pipe / Tube - 5' d) 1" NB Pipe / Tube - 8'
2.3.2.6	All impulse line welding shall be done through welding generator/rectifier and only structural welding could be done through welding transformer.
2.3.2.7	Impulse pipe of Alloy Steel / Stainless Steel / Carbon Steel shall be TIG welded wher-ever required. Welding of impulse pipe shall be carried out in accordance with BHEL welding procedure. The welding electrodes shall be approved by BHEL welding Engineers. Impulse pipes welders shall undergo welding Test and approved by BHEL welding engineer at site.
2.3.2.8	Minimum number of fittings shall be used on all lines wherever possible, to keep threaded joints to a minimum wherever thread connections are to be made.
2.3.2.9	The impulse pipe laying is recommended to be limited to a maximum of 10 metres (each limb) generally, unless otherwise specified, to have optimum response from the transmitter. However, this will depend upon plant layout.

2.3.2.10	Where the tapping point is subjected to mechanical shift due to heating / cooling of main equipment, care should be taken to route the impulse pipe in such a way as to absorb the shift of tapping point without straining the impulse
	piping. To accommodate this, sufficient loop for the impulse pipes can be provided near to the tapping point.
2.3.2.11	Alternatively hose assembly - S.S. flexible may be used for connection between tapping point and impulse pipe.
2.3.2.12	The expansion bends are to be avoided as far as possible, as these act as air/sedimentation traps hampering the system performance.
2.3.2.13	Impulse piping shall be arranged as short as possible with a minimum of bends.
2.3.2.14	Horizontal piping shall be avoided and 1/10 slope shall be maintained.
2.3.2.15	Pipes shall not be laid parallel to high temperature process piping.
2.3.2.16	Pipe joints shall be carried out using sockets and flanges. Union fittings may be used when pressure is low. In the case of D.P. instruments both piping on low side and high side shall be maintained at same length and in the same route.
2.3.3.0	IMPULSE PIPING FOR AIR & FLUE GAS SYSTEM
2.3.3.1	For furnace pressure and furnace flue gas, suitable piping for air and furnace
	flue gas pressure, the impulse pipe shall be arranged to rise vertically from the tapping point to a distance at least of 300 mm before a change of direction is made.
2.3.3.2	Arrangements should be made for air purge in the impulse piping system at the end of the instrument airline or roding facilities may also be provided with suitable tees and cross.
2.3.3.3	In order to take care of the boiler expansion, suitable flexible connecting pipes can be arranged either at the tapping point end or at the instrument end.
2.3.4.0	IMPULSE PIPING FOR VACUUM MEASUREMENT:
	The measuring instruments used on vacuum measurement should always be installed above the level of the tapping point in order to minimise measuring errors as much as possible. A suitable condensing chamber can be arranged which will eliminate the condensate or any blocking in the impulse pipe.
2.3.5.0	IMPULSE PIPING FOR STEAM AND WATER SYSTEM
2.3.5.1	As a rule, instrument installation position for steam and water shall be downward from root valves.
2.3.5.2	Impulse pipes shall have a minimum slope of 1:10 and shall be supported at every 2 metres length.
2.3.5.3	At the transmitter end, the connection can be either through 2 way valve manifold or nipple with coupling.
2.3.5.4	In case 2 way manifold used and connected with nipple and coupling, it is necessary to provide tee with plug for purging or venting. The impulse pipe

	connection to the transmitter from the main pipe may be either upper side or lower side of the transmitter. In any case sufficient slope shall be maintained.
2.3.5.5	Some supplier recommends capillary type tube for transmitter connection from the impulse pipe to instrument by using S.S. tube and compression fittings.
2.3.5.6	It is always preferable to mount the instrument below the tapping points because the condensate shall protect the instruments against high temperature. In any case, the temperature entering the instrument should not exceed 150 F. In case the instrument is installed above tapping, before opening the process root valves, the impulse pipe shall be filled with water.
2.3.5.7	In the case of high temperature steam applications, sufficient length or siphon shall be provided to ensure certain length of condensate is formed thereby protecting breaking the measuring instruments from high temperature. Snubbers can also be provided if there is likely to be any pulsating of the medium measured.
2.3.6.0	BENDING
2.3.6.1	It is recommended for cold bend for the impulse pipes with the help of a hydraulic bending machine to achieve a particular shape.
2.3.6.2	Use of 45° elbow and 90° bends (ready-made) is restricted to bare minimum to minimise the number of joints in a system. Hot bending is not to be used as this leads to flattening of pipes at the bends and also results in thinning of walls, apart from introducing changes in metallurgical properties of the pipe material.
2.3.6.3	Hot bending may be permitted for carbon steel pipe for low pressure service as instructed by supervisor only when it cannot be avoided. In the case of 90° bending radius shall be more than 3 times the outside diameter of pipe and in the case of 'u' bending, radius of bending shall be 5 times the outside diameter of pipe. When the radius of bending becomes small, elbow fitting shall be used.
2.3.6.4	Large bending shall be so made as to form smooth curve.
2.3.7.0	CUTTING - Pipe cutter or wheel grinder shall be used for pipe cutting. - Gas cutting shall be avoided. - Burr inside the cut end shall be removed. - The cutting surface shall be as perpendicular to the axis as possible.
2.3.8.0	Impulse Pipe Welding: a. Generally, welding of impulse pipe and fitting shall be carried out by arc welding and socket welding is adopted. Welding shall be performed by a qualified welder. Only D.C. arc welding is recommended for impulse pipe. Motor generator is preferred to rectifier transformer, since it may damage the welding joints due to surge. b. In order to prevent the cracking of the weld it is recommended to provide a small gap between the bottom of the socket and pipe end.

2.3.9.0	Testing:
2.0.0.0	a. On completion of pipeline, installation, the pipelines shall be hydraulic
	tested. Contractor shall arrange for hydraulic pump and standard gauges and
	conduct the test satisfactorily.
	b. The impulse lines shall be isolated from the instruments and tested at two
	times the maximum working pressures. The fall in pressure shall not be more
	than 1 kg/cm ₂ or 1% of the working pressure whichever is less, in 30 minutes
	and there shall be no leaks, at any of joints / welds, when isolated from source
0.040.0	of press.
2.3.10.0	Guidelines for Installation of Pneumatic Line
2.3.10.1	Copper tubing shall be connected with Olive type of compression fittings.
2.3.10.2	When two or more lines run together, the joint in the adjacent alternate line shall be a offset.
2.3.10.3	In case of copper tubing, the single run copper tube may be supported with an angle. However, suitable trays shall be used for more than one tubing.
2.3.10.4	Multi-core copper tubing shall not to be bend less than 10 deg and D is the OD if the multi-core copper.
2.3.10.5	All air distribution, main and branch lines shall be galvanised internally as well as externally and the galvanized pipe, never, shall be braced or welded.
2.3.10.6	The joints shall be screwed with Teflon tapping wherever the pipes are to be
	removed frequently for cleaning and other purposes and suitable union fittings
	shall be used.
2.3.10.7	Care shall be taken while taking a branch pipe to see that the line is not taken
	from the lower part of the main line or main header in order to avoid entry of
	any drain or dust into the system.
2.3.10.8	Instrument airline should not be routed where severe vibration, high temperature exists and adequate space should be available for maintenance.
2.3.10.9	Care shall be taken when removing the PVC sheeting, while connecting the
	copper tube. The exposed portion after jointing shall not be excessive and also
	while removing PVC, the tube should not get damaged. Pipe cutters should
	not be used for cutting the copper tube, instead the specific copper tube cutter
	shall be used. Similarly, for bending copper tubes, specific copper tube bender should be used and the radius of the bending shall be more than 2.5 times of
	the OD of the copper tube.
2.3.10.10	While using the pipe cutter, care shall be taken to remove burr from the cutting
2.0.10.10	side.
2.3.10.11	In locations where the copper tube is likely to be damaged from outside, the
	copper tube can be routed near a different pipe. While laying copper tube
	either inside angle or trays, the tube shall be supported at least at every one
	metre distance.
2.3.10.12	While fixing the copper tube fittings only Teflon tapes should be used.
	However, no tape shall be used while tightening the ferrules.

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2.3.11.0	Instrument Air line Testing
	a. All instrument air lines shall be isolated from the instruments and
	pressurized pneumatically to maximum working pressure. It shall then be
	isolated from the source of pressure and fall shall be less than 1 psi in 20
	minutes.
	b. All pneumatic signal lines shall be disconnected and blown through with
	instrument air. The line shall be blanked off and pressurized pneumatically 20
	psi, and checked with soap solution for leak.
2.3.12.0	General Guidelines on Installation of Flexible Hoses
2.3.12.1	Flexible hoses can be classified into two broad categories, viz., Rubber hoses
	and Metallic hoses. The selection of the hoses is made depending upon the
	service conditions (pressure, temperature and other environmental
	conditions).
2.3.12.2	Under pressure, a hose may change in length. Always provide some slack in
	the hose to allow for this shrinkage or expansion. (However, excessive slack
	in hose lines is one of the most common causes of poor appearance).
2.3.12.3	At bends, provide enough hose for a wide radius curve. Too tight a bend
	pinches the hose and restricts the flow. The line could even kink and close
	entirely. In many cases, use of the right fittings or adapters can eliminate
	bends or kinks.
2.3.12.4	In applications where there is considerable vibration or flexing, allow additional
	hose length. The metal hose fittings, of course, are not flexible and proper
	installation protects metal parts from undue stress, and avoids kinks in the
	hose.
2.3.12.5	Hose assemblies in service should be inspected frequently for leakage,
	kinking, corrosion, abrasion or any other signs of wear or damage. Hose
	assemblies that are worn or damaged should be removed from service and
	replaced immediately.
2.3.12.6	The service life expectation of a flexible hose mainly depend on the correct
	installation layout. In most cases, when flexible hoses fail prematurely, the
	reason of failure may be found in an incorrect layout.
2.3.12.7	As a rule, the hose is not to be bent over its limit of elasticity. The choice of
	the right hose length is of crucial importance. The hose should not be subject
	to torsion. Torsion can be usually eliminated by changing the layout.
2.3.13.0	General Notes on Installation of Local Instrument Racks and JB Frames
2.3.13.1	In cases where the local instrument stands are to be installed on a concrete
	foundation, it shall be fixed by anchor bolts.
2.3.13.2	In cases where the local instrument stands are to be installed on the base
	plate, the stand can be placed on an angle and the same can be welded.
	However, in cases where there is a probability for removal of stand is likely
	to arise, it shall be fixed by bolts.
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2.3.13.3	Installation of local junction boxes shall be installed in such a way that they are fixed on a column by welding or by fixing bolts.
2.3.13.4	Local Instrumentation rack, which shall be installed utilising the Beam and Structure, shall be fixed by welding. Care shall be taken while deciding the location in order to ensure that no hindrance is caused to the maintenance personnel in their moving space within the work area. Further, as a standard practice, it should be ensured that no instrument stands/racks/JBs shall be supported by/welded on to any of the working equipment, or even hand grilled
2.3.13.5	or floor grilled, as peer safety norms. Proper care should be taken to ensure that welding of the stand on any structure or Beam is fully welded.
2.3.14.0	General Guideline on Flow Instruments Installation
2.3.14.1	Extreme care shall be taken when welding and assembling the flow element on the pipe. Any misalignment or rough particle or edge inside the welded area may cause inaccuracy and this will increase as the flow increases.
2.3.14.2	Flow elements should always be located in upstream from any valve. Downstream side of valve shall no longer be a homogenous mixture and this may cause erratic behaviour of reading periodically.
2.3.14.3	Care shall be taken while welding the impulse pipe. Improper arrangement of piping of DP instruments can create error in the reading and even it gives an indication of negative flow of steam even though the flow is to be positive. Inadequate exchange of steam and condensate in the piping may cause negative flow. The presence of burr or dirt in the pipe can impede the flow of condensate back to the pipe, and when this happens, the pipe becomes full of water and has the effect of creating negative head.
2.3.14.4	Always ¾" to 1" pipe is recommended for free flow condensate. Gate valve shall be used for the tapping and pipe should be insulated up to condensing pot.
2.3.14.5	The Measuring instrument shall be located close to the flow-sensing element. The speed of response is reduced if there is a long run.
2.3.14.6	The orifice plates shall be installed such that the extreme face is perpendicular to the axis of the pipe within the +2 deg or -2deg. and it should be ensured that when the extreme face is facing the direction of flow, invariably the sign of positive (+) is marked on the upstream.
2.3.14.7	Location of Flow element should have clear straight run of 10D in upstream and 5D in downstream.
2.3.14.8	For non-viscous liquid flow measurements, the best location for the instruments shall be below the pipeline, If the instrument is above the line, more maintenance will be involved. Suitable vapour traps shall be provided.
2.3.14.9	In the case of air and gas flow measurement system, as part of basic requirement, it should be transmitted to the instruments without any change in the differential head due to leakage.

2.3.14.10	If the flow of any dry gases are to be measured, the location of instrument can be kept above or below the tapping points.
2.3.14.11	For air flow measurements, it is always preferable to install the instruments above the pipeline. Incase, if the instrument must be installed below the duct/pipeline, suitable Dust Collection Chamber can be installed.
2.3.14.12	The condenser pot should be located nearer to the tapping point and both condenser chamber should be at the level of upper tapping.
2.3.14.13	The unequal level will cause significant error due to false heads. If the flow nozzle is installed in vertical pipe, the lower tapping pipe which is bent and taken up to upper tapping in order to align with the upper condensate pot, must be insulated, otherwise, error is created when the bent pipe fills with condensate. The error may add or subtract depending upon the direction of flow.
2.3.14.14	For flow measurements, the instruments should always be located below the condenser pot, otherwise, the condensate will be lost from the system and the instrument will reach 'O' during the shutdown and the total system must be vented after the start up of the boiler in order to remove Air and Vapour which might have got entrapped.
2.3.14.15	In an installation where the instruments must be located above the tapping points and the condensing chamber should be equally located above the instruments the pipeline up to the condensing pot should be insulated.
2.3.14.16	In the case of viscous fluids, flow measurements which are likely to freeze or concealed in the pressure pipe or like such corrosive type fluids, suitable sealing chamber shall be used, the sealing liquid should not mix or react with the medium to be measured.
2.3.14.17	The commonly used sealing liquid includes water, light oil, glycerol, ethylene glycol and mixtures of the last two with water.
2.3.14.18	The sealing chambers, in each pressure pipe, should be installed at the same level and as close as possible to the pressure tappings.
2.3.14.19	The general arrangement for pressure tappings from the Sealing Chamber to the instrument is shown in the sketch.
2.3.14.20	The flow elements should be inspected before installation to find out the presence of any corrosion/rusting or any blockage on the pressure tapping holes or any deposits on the face of the orifice plate.
2.3.15.0	General Guideline on Installation of Valves
2.3.15.1	Primary isolating valves (root valves) must be located at the tapping which can be of globe valves.
2.3.15.2	These valves shall be installed where access is possible.
2.3.15.3	Secondary isolating valves shall be located at the end of inter-connecting pipe. It should be as nearer as possible to the measuring instruments and should be of needle type.

2.3.15.4	For pressure more than exceeding 40 kg, 2 isolating valves shall be provided.	
2.3.15.5	In the case of heavy duty isolating valves, suitable support shall be provided to avoid any loading on the stubs.	
2.3.15.6	In viscous fluids, suitable steam tracing shall be provided.	
2.3.15.7	These valves are always located as nearer to the measuring device as possible.	
2.3.16.0	Blowdown Valves or Drain Valves	
	a. These valves are fixed at the lowest end of impulse pipe	
	b. In the case of high-pressure line always 2 valves shall be fitted in series. Normally, these valves will be of globe type	
	c. For low-pressure application, single valve is used.	
	d. In case of air and flue gas measurements, either a plug or a suitable	
	gate valve of gunmetal `on/off' valve shall be provided.	
	e. The drain valve shall be connected to the common drain header which	
	finally is terminated at plate operation drain system.	
2.3.17.0	PAINITING:	
	All the supporting steelworks impulse pipe shall have protective painting. The	
	surface shall be free from rust, foreign adhering matters, grease etc. Two	
	coats of rust preventing red-oxide primer and final painting of two coats as per	
	the colour DECIDED by the site engineer. After cleaning the surface is painted	
	with one coat of Red oxide zinc chromate primer confirming to IS 2074 and	
	allowed to dry completely. The primer-coated surface is painted with two coats	
	of final painting of desired colour which shall be selected from IS-5.	
2.3.18.0	GUIDELINES FOR CABLE LAYING	
2.3.18.1	In the plant building, substations, switchgear rooms, control rooms etc. Power and control cables shall generally be laid on cable trays installed in concrete trenches, tunnels, cable basements, cable vaults, cable shafts or along building and structures as the case may be.	
2.3.18.2	In case of multicore cables of diameter upto 20 mm where not more than 3	
	cables are taken in one run, these can be taken directly along structures,	
	walkways, platforms, galleries, walls, ceiling etc. by proper clamping at regular	
	intervals of more than 300 mm.	
2.3.18.3	Power & control cables installed along buildings and structures, ceilings, walls,	
	etc. which are required to be protected against mechanical damage shall be	
	taken in G.I. conduits.	
2.3.18.4	GI conduits shall also be used for flameproof installations, wherever required, with sealing at both ends.	
2.3.18.5	In corrosive atmosphere, where 1100 V grade cables are required to be taken	
	in pipes, rigid heavy-duty PVC pipes shall be provided.	
2.3.18.6	Entry of cables through trenches/tunnels into buildings shall be by means of	
	one of the methods indicated in drawing as applicable for different buildings.	

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2.3.18.7	Cables laid exposed in racks / trays and routed through trenches / tunnels / basements etc. to individual drive / control devices etc. shall be taken in embedded surface exposed rigid GI conduits and or flexible conduits unless directly terminated to the equipment in the panels located, above trenches, tunnels or basement.
2.3.18.8	All cables routed along walls or in equipment rooms shall be protected by means of laying them through GI pipes or by providing sheet metal covers up to a height of 2000mm from the working floor levels and platforms, for protection against mechanical damage. All vertical risers shall be of enclosed type.
2.3.18.9	Tray covers shall not be provided for the cable trays within trenches, tunnels and basements. Non-perforated type sheet steel covers shall be provided for the trays in the areas susceptible to accumulation of coal dust/atmospheric abuses etc.
2.3.18.10	Cable trays shall be supported on ISA 50 X 50 X 6mm MS / GI brackets. Brackets shall be welded to steel plate inserts in the trenches / tunnels or supporting channel angle / inserts in other areas.
2.3.18.11	Wherever direct heat radiation exists, heat isolating barriers (subject to customer's approval), for cabling system shall be adopted.
2.3.18.12	For 415V power wiring in ancillary buildings, offices and laboratories, cables shall be taken through embedded / exposed GI conduits or rigid PVC pipes as applicable.
2.3.18.13	If required, a few number of cables in exceptional areas may be directly buried into the earth.
2.3.18.14	Wherever cables are to be laid below roads and railway tracks, the same shall be taken through ducts buried at a suitable depth as decided by Engineers.
2.3.18.15	At certain places where hazardous fumes / gases may cause fire to the cables, cable trenches after installation of cables may be sand-filled.
2.3.18.16	In corrosive atmosphere, PVC conduits shall be used for cables.
2.3.18.17	Single core cables, when pulled individually shall be taken through PVC pipes only.
2.3.18.18	Laying and installation of power, control and special cables shall generally conform to IS: 1255
2.3.18.19	The cables shall be laid-out in proper direction from the cable drums (opposite to the normal direction of rotation for transportation).
2.3.18.20	In case of higher size cables, the laid out cables shall run over rollers placed at close intervals and finally transferred carefully on the racks / trays. Care shall be taken so that kinks and twists or any mechanical damage does not occur to cables. Only approved cable pulling grips or other devices shall be used. Under no circumstances cables shall be dragged on ground or along structure while paying out from cable drums, carrying to site and straightening for laying purpose.

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2.3.18.21	Suitable extra length of cables shall be provided for all feeders for any future contingency, in consultation with Engineer.	
2.3.18.22	Cable runs shall be uniformly spaced, properly supported and protected in an approved manner. All bends in runs shall be well defined and made with due consideration to avoid sharp bending and kinking of cable. The bending radius of various types of cables shall not be less than those specified by cable manufacturers and that specified in IS 1255.	
2.3.18.23	All cables shall be provided with identification tags indicating the cable numbers in accordance with the cable circuit schedule. Tags shall be fixed at both ends of cables (both inside & outside of panel) both sides of floor / wall crossings, every 25m spacing for straight runs or as specified by Engineer for easy identification of cable.	
2.3.18.24	When a cable passes through a wall, cable number tags shall be fixed on both sides of the wall.	
2.3.18.25	Single core cables for AC Circuits shall form a complete circuit in trefoi formation supported by means of trefoil clamps of non-magnetic material.	
2.3.18.26	Multi-core cables above 1100 V grade shall be generally laid in ladder type trays in one layer with spacings not less than one cable diameter of bigger diameter cable.	
2.3.18.27	All 1100 V grade multicore power cables and single core DC cables shall be placed in single layer, touching each other and clamped by means of single or multiple galvanised MS saddles / aluminium strips / nylon cable ties. Cables above 35mm diameter shall be clamped individually.	
2.3.18.28	Control cables shall be laid touching each other and wherever required may be taken in two layers. All control cables shall be clamped with a common clamp / tie.	
2.3.18.29	•	
	b. LT power cables to be laid in the tray(s) below the HT cable trays.	
	c. LT control cables to be laid in the Tray(s) next below to the LT power cable tray(s)	
	d. Special control cables including screened control cables to be laid in the bottom most tray(s).	
2.3.18.30	For vertical formations, the trays closest to the wall shall be considered as bottom most tray and the order indicated in clause just above shall be followed. However, where there is no clear distinction of bottom / top trays, the order convenient for linking the horizontal and vertical formations shall be followed.	

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2.3.18.31	When it may not be possible to accommodate the cables as per the criteria indicated in the two clauses indicated above, the following rules shall override
	the criteria. However, prior approval of the Engineer will be required.
	In hierarchical order:
	a. Control cables are mixed up with the special control cables with clear
	minimum gap of 100mm between them. b. LT power cables are mixed up with control cable with clear minimum gap of
	150mm between them.
	c. LT power cables are mixed up with HT power cables with clear minimum
	gap of 200 mm between them.
	d. LT power cables are mixed up with special control cables with clear
0.0.40.00	minimum gap of 200mm between them.
2.3.18.32	In case of duplicate feeders to essential loads, the respective cables shall be
	laid through separate raceways. Alternatively, such cables shall be laid on the opposite sides of a trench/tunnel/basement.
2.3.18.33	For laying cables along building steel structures and technological structures,
2.0.10.00	the cables shall be taken by clamping with MS saddles screwed to the MS
	flats welded to the structure. MS saddles and flats shall be galvanised.
2.3.18.34	For laying cables along concrete walls, ceilings etc. The cables shall be taken
	by clamping with MS saddles screwed to the MS flats welded on the inserts.
	Where inserts are not available the saddles shall be directly fixed to the walls
2.3.18.35	using raw plus and MS flat spacers of minimum 6mm thickness. To facilitate pulling of cables in GI conduits, powdered soft stone, plastic scoap
2.3.10.33	or other dry inert lubricant may be used but grease or other material harmful
	to the cable sheaths shall not be used.
2.3.18.36	No single core cable shall pass through a GI conduit or duct except DC single
	core cables. AC single core cables shall pass through GT conduits / pipes in
	trefoil formation only.
2.3.18.37	In case of a 3 phase, 4 wire system, more than one single phase circuit, unless
2.3.18.38	originating from the same phase shall not be taken in the same GI conduit.
2.3.10.30	Entry of cables from underground trenches to the buildings or tunnels shall be by some approved method. Necessary precautions shall be taken to make the
	entry point fully water tight by properly sealing the pipe sleeves wherever they
	enter directly into the building at trench level. The sealing shall be by cold
	setting compound. Any alternative sealing arrangement may be suggested
	with the offer for consideration by BHEL.
2.3.18.39	Wherever specific cable routes are not shown in cable schedules cables shall
0.040.0	be laid as directed by Engineer.
2.3.19.0	Support Spacings & Clampings: Support spacing and clamping suitably provided and as required.
2.3.20.0	Laying of cables directly buried in ground:
2.0.20.0	Laying or capico an easy barries in ground.

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TENDER SPECIFICATION

		ation of directly buried cables in ground shall conform to the		
00010	requirements of IS 1255.			
2.3.21.0	Codes and Standards:			
	Installation of cabling work shall comply with the following Indian Standard			
	(Latest editions): IS 1255 Code of practice for installation and maintenance of powe			
		Code of practice for installation and maintenance of power cables upto and including 33 kV rating.		
		ctrical wiring installation (system voltage not exceeding		
		650 V).		
		Guide for safety procedures and practices in electrical works.		
	IS 226 Stru	Structural steel (Standard quality).		
		de of practice for use of structural steel.		
		Code of practice for use of metal arc welding for general		
		construction in mild steel.		
		Hexagonal bolts, nuts and screws		
		Electroplated coatings of cadmium on iron and steel.		
		Code of practice for hot dip galvanising for iron and steel. Method of testing uniformity of coating on zinc coated articles.		
		Selection, Installation and Maintenance of Control and		
		cating equipments for Fire Detection and Alarm System-		
		de of Practice		
	IS 2189 Sel	Selection, Installation and Maintenance of Automatic Fire		
		Detection and Alarm System-Code of Practice		
		ition to the standards mentioned above, all works shall conform to the		
	requirements of the following rules and regulations.			
	a. Indian Electricity Act and Rules framed thereunder			
	b. Fire insurance r			
	•	down by the Chief Electrical Inspector of State		
	d. Regulations laid	I down by the Factory Inspector of State		
	e. Any other regulations laid down by the authorities.			
	In case any clause of contradictory nature arises between standards and this			
2.3.22.0	specification, the l			
2.3.22.0	Accessories	Erection of Cable Trays, GI Pipes, Supports and		
2.3.22.1	Constructional det	ails and supporting arrangement for the cable trays shall be		
		awings which will be handed over to the successful bidder.		
		rtical raceways and supporting steel work shall be installed		
	along the routes as	s indicated in the drawings and as per the instructions of the		

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	Engineer-in-charge. The contractor has to fabricate and install complete tray	
	supporting structures as per the drawing / site requirement.	
2.3.22.2	Wherever specified or directed by Engineer, the contractor shall inst	
	galvanised MS sheets covers over cable trays. The width of the covers shall	
	be same as that of cable trays. Bolting shall be done to fasten covers to the	
	cable trays, elbows, reducers, tees, crosses etc.	
2.3.22.3	The contractor shall install all angles, channels, beams, hangers, brackets,	
	clamps etc. as may be necessary to suit the actual site conditions to support	
	the cable trays.	
2.3.22.4	Straight pieces of standard MS angles / channels shall be used for fabrication	
2.0.22.1	of supports / racks. All welded joints shall be smooth enough to provide a good	
	appearance and shall not cause injury to working personnel.	
2.3.22.5	Cable trays within cable trenches, tunnels and basements shall be of ladder	
2.5.22.5	type. Bottom most tray within plant buildings for overhead runs of trays shall	
	be of perforated type. Cable trays in the areas exposed to coal dust shall be	
	, , , , , , , , , , , , , , , , , , , ,	
	installed in vertical formation. Wherever due to layout constraints, it is not	
	possible to install the trays in vertical formation with Engineer's prior	
2.3.22.6	permission installing the trays in horizontal formation may be considered.	
2.3.22.0	Cable trays/racks shall be so arranged that they do not obstruct or impair	
0.000.7	clearances of passage way or maintenance of adjacent equipment.	
2.3.22.7	For installation of cables in GI conduits the conduits shall be installed first without cables but having suitable pull wires laid in conduits.	
2 2 22 9	For equipment and devices having GI conduit entry arrangement other than	
2.3.22.8	· · ·	
	standard GI conduit adopter, adopters shall be provided as required to enable the GI conduit to be properly terminated, between conduit end and motor T.B.	
2 2 22 0		
2.3.22.9	GI conduits shall run without moisture or water traps and shall be made	
2.3.22.10	drawing arrangement towards the end.	
2.3.22.10	The entire G.I. conduit system shall be firmly fastened in position. All boxes	
	and fittings shall generally be secured independently from the Gi pipes	
0.2.00.11	entering them.	
2.3.22.11	Bends of G.I. pipes / conduits shall be made without causing damage to the	
2.3.22.12	pipes / conduits.	
	Occupancy of conduits shall not be greater than 40%.	
2.3.22.13	The adopter for coupling rigid GI pipe / conduits and flexible conduit shall be	
0.00044	of aluminum or galvanized steel.	
2.3.22.14	Transportation and storage of cable drums	
2.3.22.15	Transportation and storage of cable drums shall generally conform to the	
0.0.00.40	requirements of IS: 1255	
2.3.22.16	All the cables shall be supplied to the contractor free of cost from BHEL /	
	Customer's store / storage area. Transportation of cables from storage area	
0.000.47	to the work site shall be the responsibility of the contractor.	
2.3.22.17	The cable drums shall be transported on wheels to the place of work.	

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2.3.23.0	GUIDELINES FOR CABLE TERMIANTION AND JOINTING	
2.3.23.1	Contractor shall carry out cable terminations at various electrical and	
0.0.00.0	electronic equipment terminals.	
2.3.23.2	When the equipment are provided with undrilled gland plates for cable /	
	conduit entry into the equipment, drilling and cutting on the gland plate and	
	any minor modification work required to complete the job shall be carried out at site and drawings shall be prepared and take engineer's approval before	
	driling holes. Cutting shall not be allowed.	
2.3.23.3	Termination of cables shall be done as per termination drawings &	
	interconnection diagrams furnished to the contractor. Looping of cores / wires	
	at terminals as shown in interconnection diagrams is to be done by the column	
	at no extra cost as part of the termination.	
2.3.23.4	All cable entries in the equipment shall be sealed after glanding the cables.	
2.3.23.5	Adequate length of cables shall be pulled inside the switch boards, control	
	panels, terminal boxes etc. as per near termination of each core / conductor.	
2.3.23.6	Power cable terminations shall be carried out in such a manner as to avoid	
0.0.00.7	strain on the terminals by providing suitable clamps near the terminals.	
2.3.23.7	Control cable cores entering switchboard or control panels shall be neatly	
	bunched and strapped with PVC perforated tapes / nylon ties and suitably	
	supported to keep them in position at the terminal block. All spare cores shall be connected to spare terminals wherever possible. If spare terminals are not	
	available, spare cores shall be neatly dressed and suitably taped at both ends.	
2.3.23.8	Screened control cables of 0.5 sq.mm cross-sectional area shall be terminated	
	by means of wire rapping system.	
2.3.23.9	Individual cores of control cables shall have ferrules for identification. Ferrule	
	numbers shall be provided as per the control schemes and other related	
	documents supplied.	
2.3.23.10	End sealing / termination of cables shall be done by means specified on the	
	specification for terminations. The system shall be suitable for types of cable	
2 2 22 11	specified and complete with stress relief system.	
2.3.23.11	Termination and jointing of aluminium / copper conductor power cables shall be done by means of compression method using compression type aluminium	
	/ tinned copper lugs.	
2.3.23.12	Copper conductor control cables shall be terminated directly into screwed type	
-101-011-	terminals provided in the equipment. Wherever control cables are to be	
	terminated by means of terminal lugs, the same shall be of tinned copper	
	compression type.	
2.3.23.13	Cable joints shall normally be made at an intermediate point in the straight run	
	of the cable only when the length of the run is more than the standard drum	
	length supplied by the cable manufacturer. In such cases, when jointing is	
	unavoidable, the same shall be made by means of specified cable-jointing kit,	

	subject to DITI is approval of Engineer shall be taken for deciding leastion of		
	subject to BHEL's approval of Engineer shall be taken for deciding location of joint.		
2.3.23.14	Junction boxes shall be used, wherever required, for jointing of control cables		
2.3.23.15	Termination and jointing shall generally conform to the requirements of IS:		
	1255 and shall strictly conform to the recommendations of termination and		
	jointing kit supplier.		
2.3.24.0	DESIGN REQUIREMENTS OF ITEMS SUPPLIED FOR CABLING		
	INSTALLATION WORK (IF SUPPLY IS COVERED IN BIDDER SCOPE)		
2.23.24.1	STRIP CABLE CLAMPS:		
	a. Strip Clamps shall be of aluminium alloy or cast steel or M.S. and shall		
	be used to fasten the group of multicore cables on the tray.		
	b. Clamps shall be of simple construction, made of 4 mm thick, 25 mm		
	wide strip to cover the entire width up to 300 wide tray and part of the		
	tray for more than 300 wide trays. Strip shall have two right angle bends		
	for fixing on the rung with two bolts.		
	c. Clamps shall be of different lengths for different sizes of tray width. The		
	maximum size of clamp width shall be 300 mm and for cable trays of		
	greater width, two clamps shall be used.		
2.23.24.2	SELF LOCKING CLAMPS:		
	a. Clamps shall be of nylon material / fibre glass.		
	b. Clamps shall have self-locking feature when the cord is looped.		
	c. Clamps shall be proved with manual lock release.		
	d. Clamp cord shall not move in the backward position once it has been		
	locked unless the lock release is applied.		
	e. Type test certificates to ascertain the strength of clamps shall be		
	submitted for Purchaser's approval.		
	f. Nylon self-locking clamps shall be of BHEL approved make only.		
2.23.24.3	FERRULES:		
	a. Ferrules shall be required for individual core of cable hence they shall		
	be suitable for the insulated conductor diameter.		
	b. Ferrules shall be of plastic material.		
	c. Numbering on the ferrules shall be engraved type with contrast colour		
	to the base. Engrave coloring shall be of durable quality to match the		
	entire life of the plant. Engraving shall be legible from a distance of 600		
	mm.		
	d. Ferrules shall be interlocking type in such a way that the interlocked		
	ferrules take the shape of tube with complete ferrule number appearing		
	in a straight line.		
2.23.24.4	TAGS:		
	a. Cables shall be provided with cable number tags for identification.		
	b. Cable tags shall be of durable fiber, aluminum, stainless steel sheets		
	or lead of suitable thickness.		
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	c. Cable number shall be engraved type in case of aluminum or stainless steel tags, and printed type in case of fiber sheet.
	d. Tags shall be durable quality of size 60mm x 12mm with holes at both ends.
	e. Samples of tags shall be approved by BHEL Engineer before delivery. f. Tags shall be provided with non-corrosive wire of sufficient strength for
0.00.05.0	tagging's.
2.23.25.0	GUIDELINES FOR EARTHING INSTALLATION:
2.23.25.1	All equipment shall be earthed by two separate and distinct connections. Earthing terminals will be available in all the equipment supplied by BHEL.
2.23.25.2	The earthing conductors shall be mild steel / G.I. strips / wires. All connections from the equipment to the main earthing conductors shall be made as illustrated in earthing drawings. A copy of earthing drawing shall be provided to the successful tenderer.
2.23.25.3	A continuous earthing conductor shall be installed in all cables trays and securely clamped to each tray section by suitable connectors to form a continuous earthing system. When two or more trays supporting power cables run on parallel a continuous earthing conductors shall be provided on one tray only with tap offs to the control cable trays. All valve and damper motor and rapping motors will be earthed to this conductor.
2.23.25.4	All joints in the earthing system shall be welded type. Earthing connections to all equipment including motors shall be bolted type.
2.23.25.5	Earthing connections shall be free from tinning scale, paint, grease, rust or dirt at the time of making joint.
2.23.25.6	Metallic sheaths, screens / shields and armor of all multicore cables shall be bonded and earthed.
2.23.25.7	Earthing conductors along with their run on columns, beams, walls etc., shall be supported by suitable cleats at intervals of 750 mm.
2.23.25.8	Conduits shall be bonded together and grounded at all switchgear and control centers.
2.23.25.9	M.S.Earthing conductors shall be coated with one coat of bituminous paint, wrapped with a layer of bitumen tape and finally coated with bitumen paint. For site welded GI strips / wires required coat of aluminium paint should be given.
2.23.25.10	If the equipment is not available at the time of earthing conductor laying tap connections from the main earthing conductor shall be brought out up to slab equipment foundation level with at least 200 mm spare length left for further connections to equipment earthing terminals.
2.23.26.0	Guidelines for Erection of Control Panels and Distribution Boards
2.23.26.1	The base frames will be supplied normally along with the boards. These will have to be aligned, levelled and grouted in position as per approved drawings.

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	Wherever the base channels are not available, the same will have to be fabricated and painted at site. Base channels will have to the grouted. Suitable concrete drilling machine shall be used for making hole on the concrete floor.	
2.23.26.2	For the panels which are to be mounted on the trenches, channel supports have to be provided across the cable trenches over which the base frames of the panels shall be mounted. Fabrication and installation of these supports structures shall be carried out as per drawings.	
2.23.26.3	1 •	
2.23.26.4		
2.23.27.0	The following points shall be checked up during erection i. Layout of foundation channels.	
	ii. Floor level covered by the panel with respect to main floor level.	
	iii. Location and serial no. panels.	
	iv. Positioning of panels.	
	v. Verticality of panels and breaker truck to station earth.	
	vi. Earthing of panels and breaker truck to station earth.	
	vii. Lugs for termination of HT and LT cables.	
	viii. Mounting and fixing arrangements all modules.	
	ix. Check the operation of:	
	a. Remote control	
	 Various required - closing / tripping / alarm / indications / interlocks Installation position of instruments and relays Operation of relays and instruments. 	
	x. AC / DC supplies for panel.	
	xi. Tightness of terminal connections for HT & LT connections.	
	xii. Working of ammeters and voltmeters for their entire range and other panel mounted instruments like recorder, indicator etc.	
2.3.28.0	415 V SWITCHGEAR AND ELECTRICAL PANEL TESTS (AS APPLICABLE) a. IR Test on each pole of breaker	
	b. IR test on control circuit	

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- c. Measurement of contact resistance for all three phases of breaker
- d. Measurement of resistance of the closing and tripping coil of breaker
- e. Checking the close trip operation at 70% and 100% of the rated auxiliary D.C. Voltage.
- f. Checking of interlocks provided and tripping of breaker through relays
- g. Space heater operation check
- h. Opening and closing time check
- i. Control and metering circuit checks
- j. Primary and secondary injection tests
- k. Thermal overload relay testing and checking
- Calibration of all instruments and meters
- m. Phase rotation checks
- n. High voltage test on 7C.1.3 kV switchboard

2.3.29.0 CUTTING & WASTAGE ALLOWANCE:

The following scrap allowances are permissible:

SI.No.	Description	Non-	Unaccountable
01	Length below 0.5 m steel pipes Stainless/ Copper	Salvageable 2 %	0.5 %
02	tubes, Single Pair Cables Length below 20 m multi cable, multi tubes.	2 %	0.5 %

2.3.30.0 | GUDELINES FOR HANDLING OF SOLID STATE MODULES:

- a. All the solid-state modules shall be handled by qualified person.
- b. Electronic modules should only be touched when it is absolutely essential.
- c. Before touching any electronic modules, the operator should discharge the static electricity by earthing himself or better still, ensure constant discharge by wearing an earthed wrist strip.
- d. The operator should not wear clothing made entirely from synthetic fibres, but a mixture containing atleast 65% cotton.
- e. PCB should always be held by the front panel or by the module frame and the electronic components should never be touched.

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	f. The electronic modules should never be placed close to television sets or CRT units.		
	g. Soldering irons and any other tools used must be grounded.		
	h. All modules using CMOs components are packed in antistatic bags, when transported loose to avoid ESD failures. The antistatic bags must always be used to transport modules at site from one place to the other.		
2.3.31.0	GUIDELINES FOR LANDING AND STORAGE OF ELECTRONIC CUBICLES / SUB-ASSEMBLIES / LOOSE ITEMS.		
2.3.31.1	Immediately after unloading at site, the electronic equipment should be kept in the covered area. Handling and lifting of the package should be done without jerks or impacts. Packing case should not be dripped or slid along the floor under any circumstances. Suitable forklift should be used to move the case to its final position. All the above points are to be strictly followed as the electronic equipments cannot withstand any stress due to vibration and shock.		
2.3.31.2	After unloading at site, the package of the equipment shall be inspected for external damage. In case the package is damaged, the package number and details of the damage should be noted. The details of the damage should be reported to the responsible site Engineer.		
2.3.31.3	Cases should be opened / unpacked using correct nail pullers. While opening the planks, care should be taken to see that the equipment is not damaged. Cases should not be unpacked in areas where they are exposed to rain water / liquid splashing, dust or other harmful materials like chlorine gas, sulphur dioxide etc.		
2.3.31.4	After opening the case, all supports provided for transport are to be removed with due care.		
2.3.31.5	Hinged frames should not be opened when equipment is not secured to the floor as this is likely to cause it to topple over. The hinged frame can be opened only if the equipment is still fixed on to the bottom wooden pallet.		
2.3.32.0	GUIDELINES FOR INSTALLATION OF LHS/OLHS/LHD/OLHD CABLES UNLESS OTHERWISE SPECIFIED BY OEM (OR) INSTRUCTED BY SITE ENGINEER		
2.3.32.1	STORAGE: These cables should not be stored in the areas where the temperature is above the rated maximum ambient temperature. Storage nearer to boiler, furnace or any heat producing equipment may activate the cable and lead to shorting of the cable.		
2.3.32.2	 Dos and Don'Ts WHILE HANDLING: Due care must be given while handling these cables as these cables are easily prone for damage and sensitive to heat. 		

- Test for continuity between the leads. If it is short circuit, cable is not usable.
- Avoid any mechanical stress on the cable by pinching/crushing/ bending, etc.
- Avoid installing next to mechanical (or) thermal process that may cause damage.
- Do not over tighten with fasteners.
- Avoid 90° bending of the cable, all bends shall be made by hand with the minimum radius specified by the OEM.
- Do not paint the cable.
- Allow for expansion/contraction due to temperature.
- Install with OEM recommended installation accessories such as mounting clips, spring clips, splice connectors, etc.
- Wherever required use SS messenger wire esp. inside the covered conveyors.
- If messenger wire is used, it shall be properly terminated.
- For Ceiling installation, pipe mount (or) wall mount applications use mounting clip (SS 304) (or) as specified by the OEM.
- Terminate the open ended cables as specified by OEM.
- To connect two cables, use strain relief glands (Splice Connectors).
- Allow suitable slack (or) sag between any two fastening points.
- While connecting two lead cables, following procedure may be adopted.
 - 1. Strip outer insulation and inner connections.
 - 2. Bend inner conductors by hand (no pliers)
 - 3. Insert & tighten in the splicing connectors
 - 4. Seal splice using sealant tape.
 - 5. Tape splice using Electrical tape.

Note: All the above are minimum guidelines. However, the actual guidelines as recommended by OEM may be followed. Site Engineer's decision will be final.

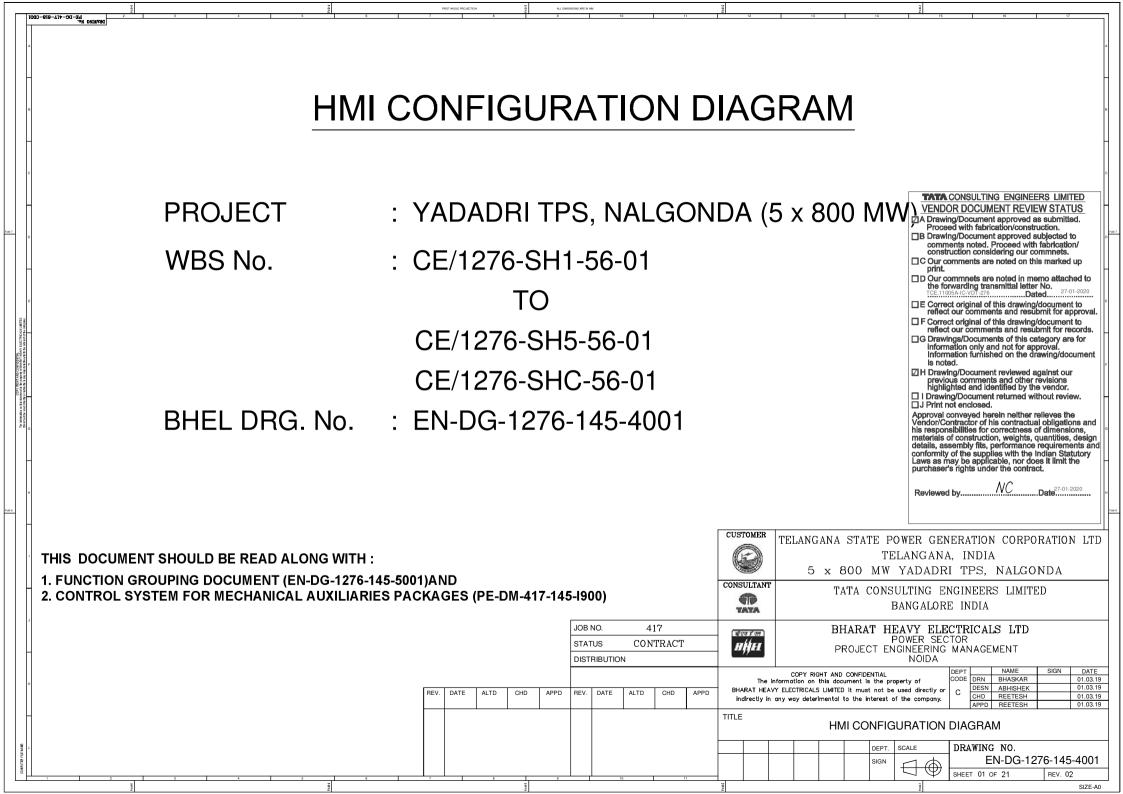
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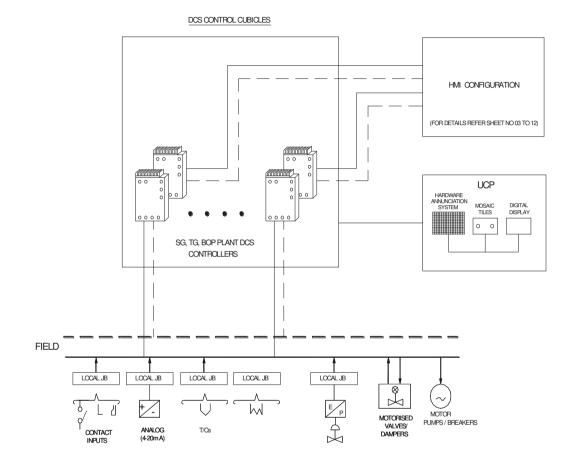
VOLUME-IA PART-II CHAPTER 4 DRAWINGS & SCHEMES

2.4.0.0 THE FOLLOWING ENCLOSED DRAWINGS ARE FOR INFORMATION ONLY

SI No	Details	No. of sheets
1	HMI Configuration Drawings for Unit 1 & 2	17
2	Write Up for C&I & Mechanical Lab Equipment (Unit 1 & 2)	32
3	PLC System Architecture Drawing	1
4	HSE Plan for Site Operations by Sub-Contractor	84

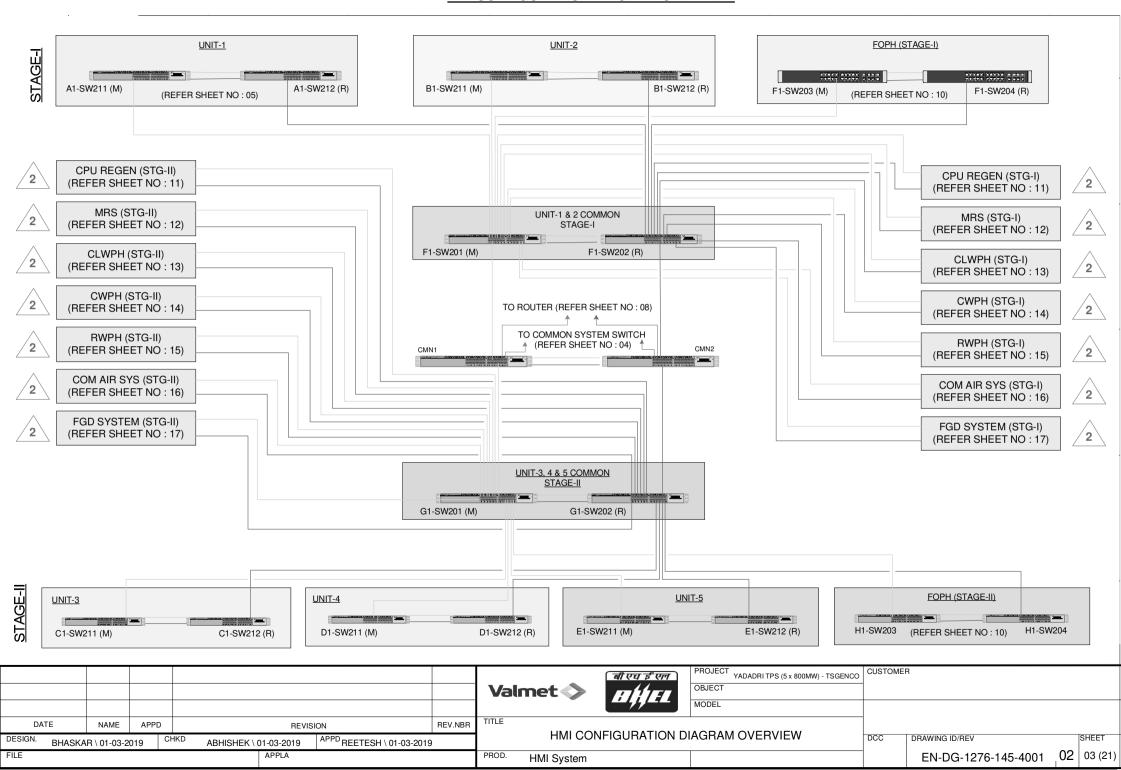
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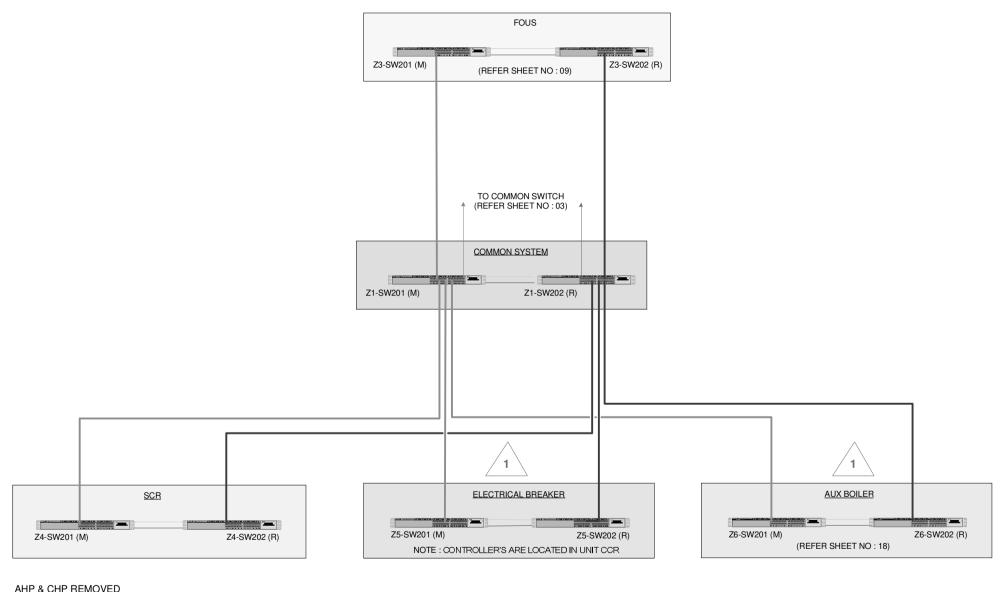




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HMI CONFIGURATION DIAGRAM OVERVIEW

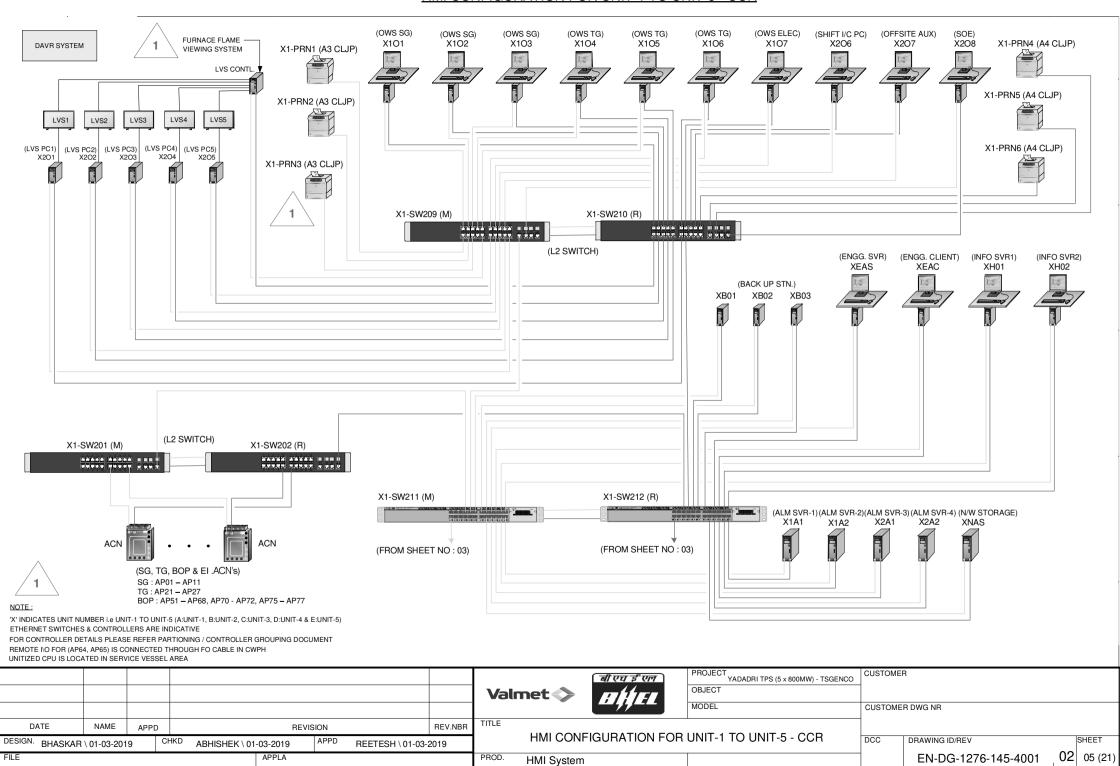


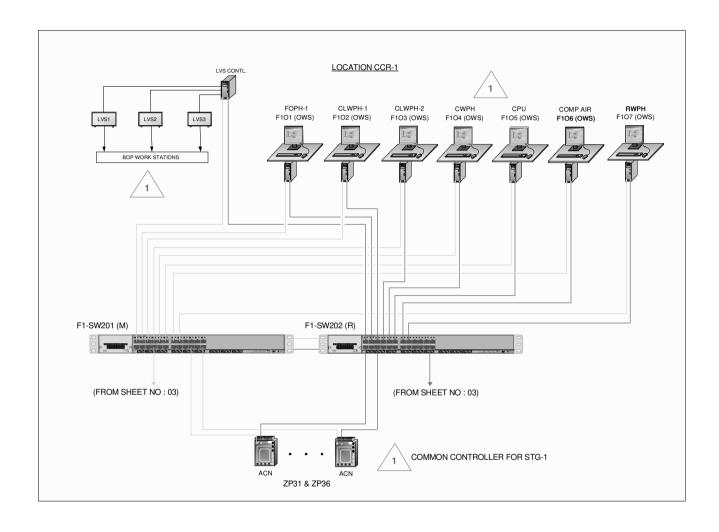


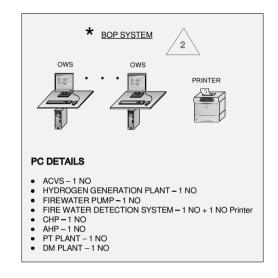
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HMI CONFIGURATION FOR UNIT-1 TO UNIT-5 - CCR





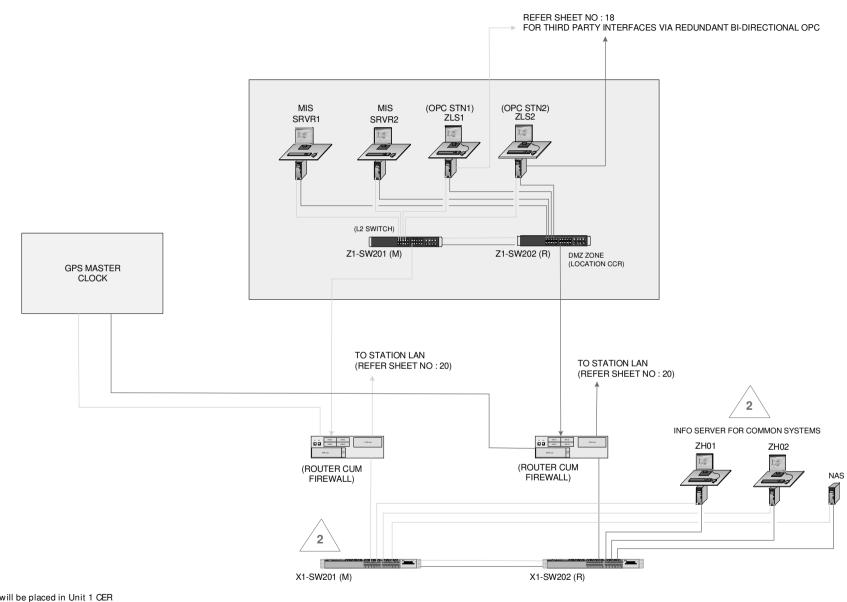


★ UNDER RESPECTIVE BOP VENDOR SCOPE. HOWEVER, DESK WILL BE SUPPLIED BY BHEL-EDN

OR CONTROLLER DETAILS PLEASE REFER PARTIONING / CONTROLLER GROLIPING DOCLIMENT

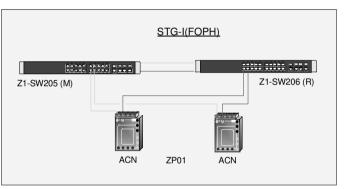
FOR CONTROLLER D	ETAILS PLE	ASE REFE	R PARTIONING / CON	TROLLER GROU	PING DOC	UMENT							
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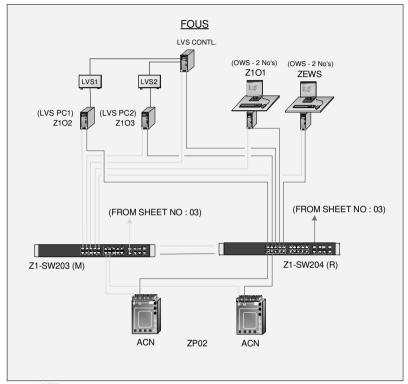
HMI CONFIGURATION COMMON FOR 5 UNITS

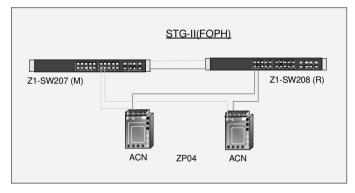


OPC stations are part of Unit 1 HMI & will be placed in Unit 1 CER

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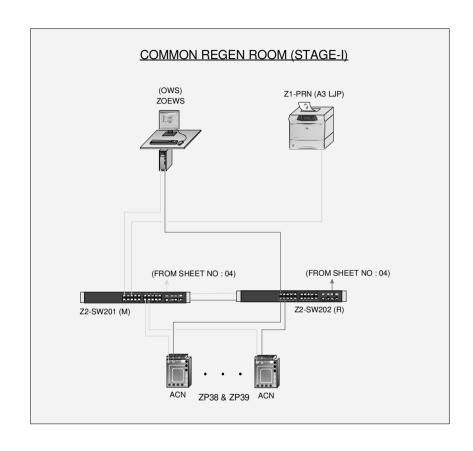


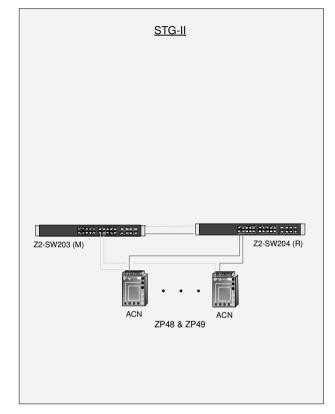
NOTE:
HFO TRUCK UNLOADING AND LDO TRUCK UNLOADING IS IN
MAIN CONTROLLER WITH MIMIC AND BACKUP PANEL

#RIO AT HFO UNLOADING TRAIN AREA WILL BE CONNECTED TO ZP02 WITH MIMIC BACKUP PANEL

NOTE: BACKUP PANEL WITH COLOURED MIMIC, PB LAMPS, ANNUNCIATION WILL BE SUPPLIED BY BHEL EDN

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DESIGN. BHASK	AR \ 01-03-2	2019 CHKD	ABHISHEK \ 01-03-2019	PPD REETE	SH \ 01-03-2019	HMI CONFIGURATIO	N FOR - FOHS (FO	PH LCR)-COMMON FOR 5 UNITS	DCC	DRAWING ID/REV		SHEET
FILE		•	APPLA			PROD. HMI System				EN-DG-1276-145-4001	02	10 (21)

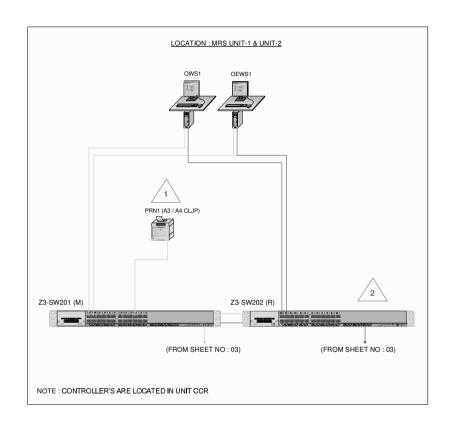


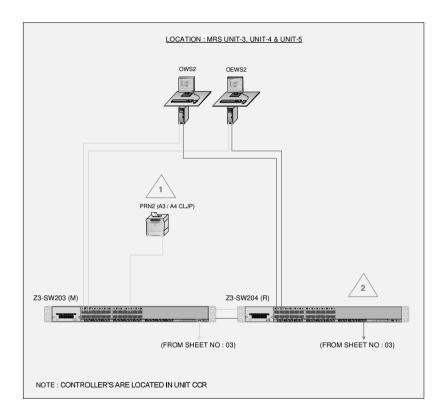


NOTE: UNITIZED DCS IS IN SERVICE VESSEL IN CCR

NOTE: BACKUP PANEL WITH COLOURED MIMIC, PB LAMPS, ANNUNCIATION WILL BE SUPPLIED BY BHEL EDN

									Valmet 🔷	BHEL	PROJECT YADADRI TPS (5 x 800MW) - TSGENCO OBJECT MODEL	CUSTOME	ER	
								\perp	T.T. 5		MODEL			
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DESIGN.	BHASKAR \	01-03-201	9	CHKD	ABHISHEK \ 01-03-2019	APPD	REETESH \ 01-03-2019		HIMI CONFIGURA	ATION FOR- COMIN	MON REGEN ROOM (STAGE-II)	DCC	DRAWING ID/REV	SHEET
FILE					APPLA				PROD. HMI System				EN-DG-1276-145-4001	02 11 (21)



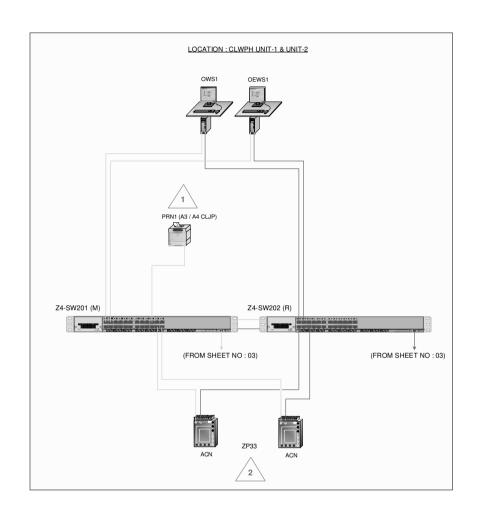


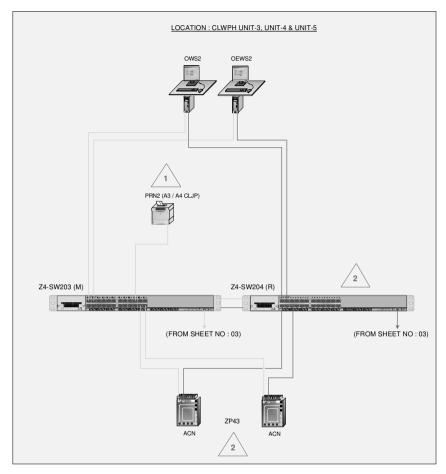
1 STAGE WISE CONTROLLER WILL BE PROVIDED IN CCR

NOTE: BACKUP PANEL WITH COLOURED MIMIC, PB LAMPS, ANNUNCIATION WILL BE SUPPLIED BY BHEL EDN

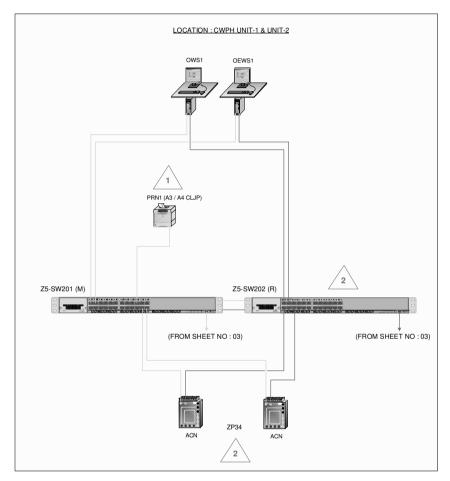
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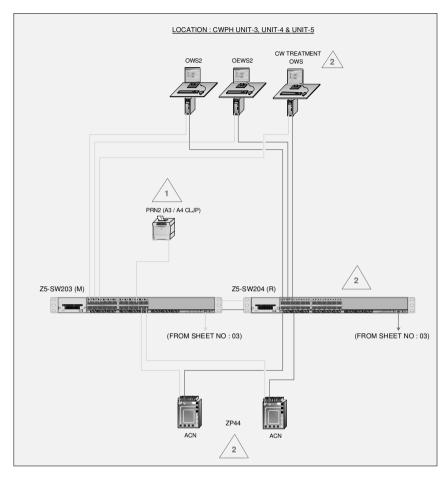






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FILE			APPLA				PROD.	HMI System				EN-DG-1276-145-4001	02 13 (21)

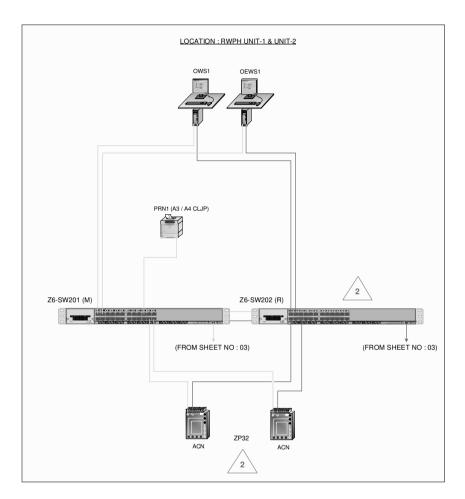


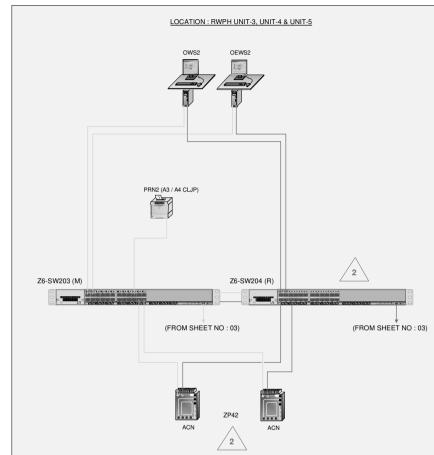


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UNIT WISE RIO'S WILL BE PROVIDED FOR CW / ACW

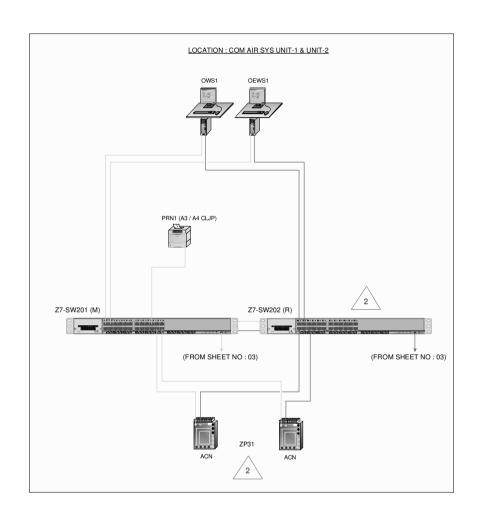
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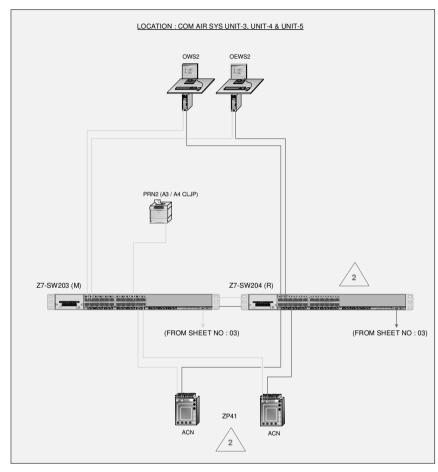




NOTE: BACKUP PANEL WITH COLOURED MIMIC. PB LAMPS, ANNUNCIATION WILL BE SUPPLIED BY BHEL EDN

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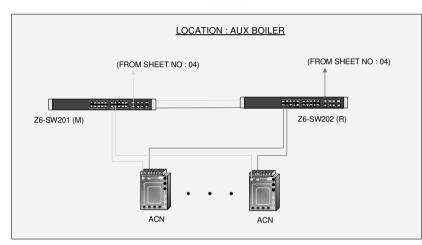




NOTE: GUI AT COMPRESSED AIR SYSTEM CONTROL ROOM WILL BE SUPPLIED BY BOP VENDOR

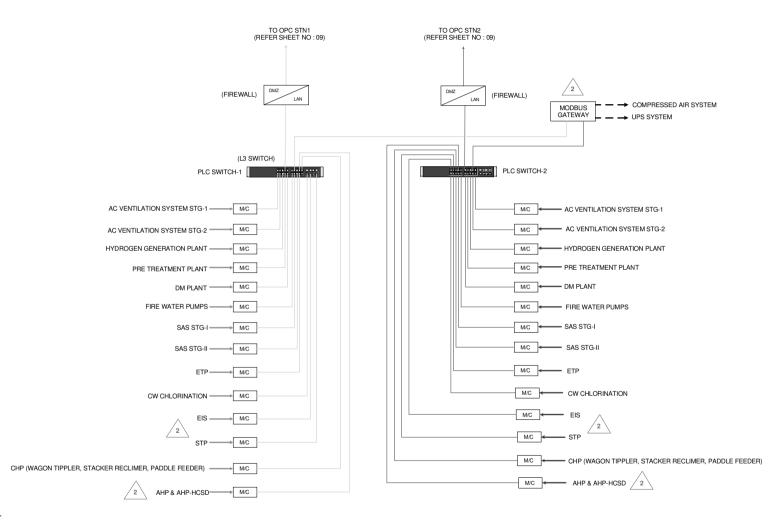
						बीएचई एल	PROJECT YADADRI TPS (5 x 800MW) - TSGENCO	CUSTOMER		
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FILE			APPLA		PROD. HMI System				EN-DG-1276-145-4001	02 16 (21)





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FILE				APPLA				PROD.	HMI System				EN-DG-1276-145-4001 _, 02	2 18 (21)

HMI CONFIGURATION DIAGRAM (THIRD PARTY CONNECTIVITY DETAILS)



Note: Third party shall have OPC Client/server

NOTE : ALL ABOVE PLC CONNECT	ONE WILL BE ON	DO DOCTOCO							बी एच ई एन	PROJECT YADADRI TPS (5 x 800MW) - TSGENCO	CUSTOME	R		
ALL ABOVE PLG CONNECT	ONS WILL BE ON	JPC PHOTOCO	L					37.1	4/ 04 5 011	OBJECT OBJECT	-			
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FILE APPLA					PROD. HMI System				EN-DG-1276-145-4001	02	19 (21)			
•														

<u>LEGEND</u> :	
	TWISTED PAIR CAT5 CABLE (TP) MAIN (100 Mbps)
	TWISTED PAIR CAT5 CABLE (TP) RESERVE (100 Mbps)
	OFC CABLE MAIN
	OFC CABLE RESERVE
	RS 485

OWS : OPERATOR WORKSTATION

OEWS: OPERATOR CUM ENGINEER WORKSTATION

CLJP: COLOR LASER JET PRINTER

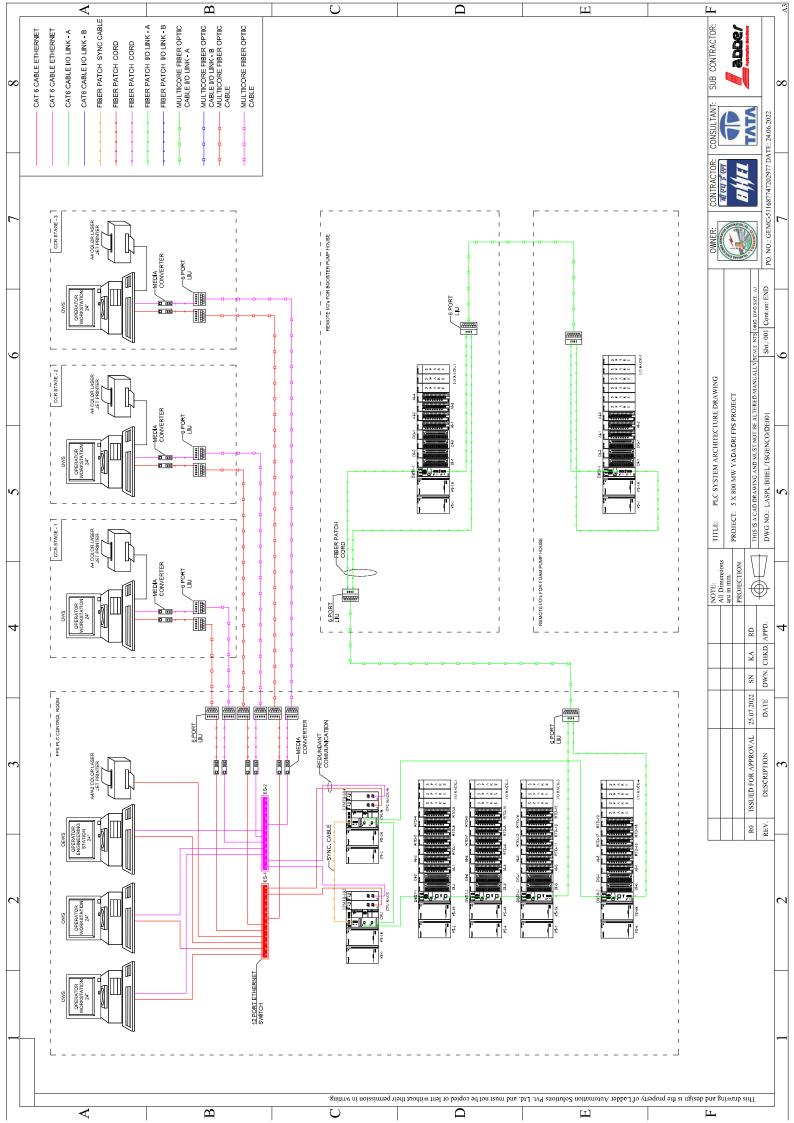
ACN: APPLICATION & CONTROL NODE

LVS: LARGE VIDEO SCREEN

CIM I/O: BUFFERING STATION FOR INFO SERVER

M/C : MEDIA CONVERTER

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DESIGN.	BHASKAR	01-03-2019	CH	IKD	ABHISHEK \ 01-03	3-2019	APPD	REETESH \ 01-03-20)19		HIVII CO	NEIGURATION	DIAGRAM (LEGENDS)	DCC	DRAWING ID/REV		SHEET
FILE			•			APPLA				PROD.	HMI System				EN-DG-1276-145-4001	02	21 (21)



VOLUME : VI SECTION-VIII LABORATORY INSTRUMENTS

1.00.00 **GENERAL**

- 1.00.01 This section provides the technical information for the design, furnishing, construction and setup of an instrument shop/ Laboratory, complete with instruments, furniture, tools and test equipment required to maintain the instruments and control devices of the plant.
- 1.00.02 Testing instrument / devices offered shall be proven type and shall incorporate latest design. All instruments supplied under this package shall be in brand-new and unused condition.
- 1.00.03 The workmanship and design shall be proven and in accordance with the best engineering practice to meet the intended purpose. Bidder shall ensure satisfactory performance of testing instruments/devices even in the worst environmental condition. All instruments shall be supplied from reputed and proven manufacturer.
- 1.00.04 Testing instruments/devices shall be furnished with all necessary accessories and original instruction/operating and maintenance manuals.
- 1.00.05 The shop shall be provided with a complete set of test and calibration equipment/test kits for electronic and pneumatic instruments and controls, falling under the purview of this specification.
- 1.00.06 All instruments offered, shall conform to the relevant International Standards.
- 1.00.07 The various instruments/devices, small tools, accessories, etc. shall be furnished (in applicable cases) with suitable and durable crates, kits or carry boxes of convenient size; complete with necessary packing etc. for safe storage when not in use.
- 1.00.08 Measuring/testing instruments, along with associated accessories shall be suitable for intended operation (both indoor and outdoor installations as applicable).
- 1.00.09 Bidder shall be responsible for proper functioning of supplied items and shall make any necessary additions/modifications, as required for proper maintenance and testing of the installed instruments and controls. Bidder shall also be responsible for erection and commissioning of the test equipment.
- 1.00.10 It is obligatory to Bidder to furnish a complete list of spare parts for these testing/calibrating, instruments/devices. Bidder shall render guarantee for easy availability of all the spare parts required, especially for the components, which are prone to failure.
- 1.00.11 Bidder shall repair or replace the defective instruments/ devices at no extra cost within the guaranteed period of each instrument/device.
- 1.00.12 Bidder shall submit with the proposal a full list of testing/laboratory instruments / tools offered along with detailed specification of the items. Catalogues, drawings and manuals as required shall be submitted with the proposal to provide necessary information pertaining to the items offered. Proposed offer document shall include but not limited to the following:
 - a) BOQ & Data Sheet

- b) Instrument laboratory room layout (tentative) along with room & equipment dimensions
- c) Layout of test bench
- d) Data/ information as per bid proposal sheet (Technical particulars)
- e) Conformance to or deviation from the specification, if any.
- 1.00.13 Bidder shall furnish following drawings and documents after award of contract:
 - a) Final version of all the drawing and document furnished along with bid
 - b) Drawing and document submission schedule
 - c) Load and utility list
 - d) Power supply, air and water distribution schemes
 - e) Mounting details including necessary accessories
 - f) Recommendations (if any) for installation/storage etc
 - g) QAP
 - h) Inspection and Test report
 - i) Spare part list
 - j) Consumable list
 - k) Training details
 - O&M Manual
 - m) Any other scheme, data, drawing, document, etc required to establish product quality and completeness of supply.
- 1.00.14 Bidder to note that the testing and laboratory instruments specified in this section shall be in addition to the equipments required for installation, maintenance, trouble shooting and calibration of instrumentation and control equipments of the plant furnished under this volume of the specification. Also, any special simulator/test stands which may be recommended and supplied by Bidder for use in calibrating electronic components of the instrumentation and control systems shall be considered separately in addition to the laboratory instruments specified in this part. Bidder shall handover to Owner all equipment specified in this part immediately after receiving the equipment at the job site. Use of this equipment by Bidder shall not be permitted without Owner's consent.
- 1.00.15 Bidder shall include a complete set of furniture for the instrument laboratory from reputed manufacturer designed for similar applications. The set of furniture shall include but shall not be limited to chairs, tables for calibration of instruments, test benches etc, all necessary cabinets for storage of manuals / booklets / records / charts, storage racks for special tools etc. The design, color, layout and model of the furniture shall be approved by Owner.
- 1.00.16 The finalization of make & model of laboratory instrument solely lies with the Owner and same shall be finalized during detailed engineering.
- 1.00.17 Scope of service of the Bidder shall also include operational and service training of Owner's personnel at site.

1.00.18 Calibration and test certificates, as applicable, shall not be more than one (1) year old.

2.00.00 CODES AND STANDARDS

The design, material, construction features, manufacture, inspection and testing of laboratory instruments shall comply with all currently applicable statutes, regulations and safety codes in the locality where the equipment will be installed. The equipment shall also conform to the latest applicable standards.

3.00.00 **DESIGN AND CONSTRUCTION REQUIREMENTS**

3.01.00 **DEAD WEIGHT TESTER - (2 NOS.)**

3.01.01 Dual range dead weight tester shall be furnished to cover 0.1-16 Kg./Sq.cm. and -2-700 Kg/Sq.cm range. It shall be compact, stable, light in weight and self contained with anodized metallic base, steel weights, twin area screw pump with ball thrust and axially located hand wheel. Accuracy shall be 0.01% of the actual reading. Dead weight piston and cylinder shall have over pressure stops preventing the piston from coming out. These pistons shall be hardened stainless steel. Oil filter shall be furnished at fill-up point to prevent contamination. The tester shall have 1/2" NPT(F) connection. Adapters of different sizes to receive 1/4"BSP,1/8"BSP, 3/4"BSP, 1/4" NPT, 1/8" NPT & 3/4" NPT etc pressure gauge shall be supplied. At least 3 no's of adaptor sets shall be supplied. The detailed adaptors required will be decided by the Owner. Make and model of dead weight tester shall be decided by the Owner from the list of dead weight testers furnished by bidder.

- 3.01.02 The following accessories shall be included:
 - a) Angle connector for flush mounted gauges
 - b) Spirit level
 - c) Bag of seals
 - d) Wrenches
 - e) Spanners
 - f) Pointer remover
 - g) Pointer punch
 - h) Can of fluid
 - i) Dirt trap/ purifier

3.02.00 LABORATORY TEST PRESSURE GAUGES - (3 SETS OF EACH TYPE)

3.02.01 Three Sets of test pressure gauges (accuracy 0.1% including hysteresis) as listed below shall be supplied :

ITEM No.	RANGE							
01.	- 1 to 0 Kg/Sq.cm							
02.	0 - 1.0 Kg/Sq.cm							

ITEM No.	RANGE							
03.	0 - 1.6 Kg/Sq.cm							
04.	0 - 2.5 Kg/Sq.cm							
05.	0 - 4 Kg/Sq.cm							
06.	0 - 6 Kg./Sq.cm							
07.	0 - 10 Kg/Sq.cm							
08.	0 - 16 Kg/Sq.cm							
09.	0 - 25 Kg/Sq.cm							
10.	0 - 40 Kg/Sq.cm							
11.	0 - 60 Kg/Sq.cm							
12.	0 - 100 Kg/Sq.cm							
13.	0 - 160 Kg/Sq.cm							
14.	0 - 250 Kg/Sq.cm							
15.	0 - 400 Kg/Sq.cm							
16.	0 - 600 Kg/Sq.cm							

- 3.02.02 All test pressure gauges shall have 250 mm anti-parallax white dial with black figures and graduation lines of fineness and legibility used for high precision instruments. The dial shall be mirror-polished stainless steel under the tip of the pointer. Cases shall be fine wrinkle phenol or die cast aluminium, light but strong and rigid. Mounting shall be direct or flush.
- 3.02.03 The material of the sensing element shall be solid drawn phosphor bronze upto 10 Kg/Sq.cm and above 10 Kg/Sq.cm. stainless steel tube.
- 3.02.04 The pointer shall be lightweight, stainless steel balanced design with tip turned 90 degree for easy reading to smallest sub- division.
- 3.02.05 Connection size of all gauges shall be 1/2" NPT (M).
- 3.02.06 For all test gauges point-by-point test certificate of the readings shall be provided.
- 3.03.00 LABORATORY TYPE MANOMETER- (2 NOS OF EACH TYPE)
- 3.03.01 Enclosed type free-standing U-tube manometers of the following ranges shall be supplied:

ITEM No.	RANGE
01.	0-250 mm of WC
02.	0-600 mm of WC (300-0-300)
03.	0-1000 mm of WC (500-0-500)
04.	0-2500 mm of WC (1250-0-1250)

05.	0-5000 mm of Hg
06.	0-8000 mm of Hg

- 3.03.02 These U type manometers shall be used for measuring low pressures, differential pressures or vacuum. Scales shall be calibrated in centimeters and sub-divided into tenths. These shall be suitable for maximum static pressure of 7 bar with an accuracy of ±1% of FSD. Cases shall be of aluminium on three sides with clear acrylic front cover. Scales shall have provision for zero adjustment.
- 3.03.03 All wetted parts and fittings shall be SS-304. Manometer will be mounted on M.S. three leg stand having level adjustment arrangement and attached spirit level. The scale graduations shall be engraved on milky white acrylic in black. Metering tube shall be clear acrylic plastic having uniform reamed bore and thick walls, gland-packed in end blocks. End connections shall be 1/2" NPT (F), with check valves. The scale shall be provided with vernire arrangement. Liquid drain plug shall be provided. 3 way & 5 way manifold, stand, coloured liquid & storing bottle, vernier, aspirator, cheack valve, liquid pump fill-up funnel and nylon tubes shall be included.

3.04.00 INCLINED TUBE MANOMETER - (2 NOS.)

3.04.01 Portable inclined tube manometers of free standing type of following ranges 0-50 mm, 0-100 mm and 0-200 mm WCL shall be provided.

ITEM No.	RANGE
01.	0-50 mm of WC
02.	0-100 mm of WC
03.	0-200 mm of WC

- 3.04.02 These shall be used for measurement of draft, air velocity and air pressure around atmospheric pressure. The scale graduation shall be engraved on milky white acrylic in black and scale shall be calibrated in cm. Indicating tube and oil chambers shall be drilled and reamed in a solid block of clear acrylic plastic material. These manometers shall have levelling screws at the bottom and spirit level bubbles for accurate levelling. Each manometer shall be complete with connecting tubes, mounting box, brass range scale, tube chamber, connecting tube, 1/2" NPT process adapters, manometer liquid and drain plug. Five valve manifold shall be supplied along with each manometer.
- 3.04.03 Vertical type manometer with range 0-10mbar to 0-765mbar along with differential indicating loquid shall be provided. It shall have scale with black graduation on white background with zero adjustment facility. Accuracy shall be ±0.25% of reading.
- 3.04.04 Test manometer with range 0-10cm shall be provided. It shall have 0-200mm WC scale with zero adjustment facility. Accessories such as borosilicate glass tube in Al box, three & five way manifold, liquid pump aspirator, check valve, vernier etc shall be provided.

3.05.00 PORTABLE MULTIFUNCTION CALIBRATOR – MICROPROCESSOR BASED - (3 NOS.)

- 3.05.01 Portable Multifunction Calibrator shall be supplied for testing and calibration of process instruments. The calibrator shall have facility for measurement and simulation of the following instruments and parameters:
 - a) Pressure and DP transmitters
 - b) Electro-pneumatic converters.
 - c) Thermocouples and RTD
 - d) Electronic receivers and controllers
 - e) DC voltage & current generation
 - f) Frequency
- 3.05.02 The calibrator shall have large multiple digital indicator 4 to 5 digits. It can operate according to function and menu guided set up mode. The calibrator shall have storing facility of field calibration data together with set up information as per requirement.
- 3.05.03 The calibrator shall be microprocessor based with latest state of the art design and shall have LCD display simultaneously for both input and output signal, membrane type key pad with tactile sound, 230V AC mains supply, in built battery & battery charger, carrying case, test probes, fuse etc.. Preferred feature IP-65 enclosure class.

3.06.00 PRESSURE AND VACUUM AIR PUMP - (2 NOS.)

- 3.06.01 Portable type Combined pressure and vacuum pump shall be supplied. This air pump is to produce pressure upto 2 bar for intermittent service, 1 bar for continuous service and to pull a vacuum as high as 700 mm of mercury. The actual free air delivery shall be 40 litre per minute at 1 bar.
- 3.06.02 This pump shall be complete with pressure gauges (150 mm dial pressure gauge 0-2.5 bar and 150 mm dial vacuum gauge 0-760 mm mercury), lubricator, moisture trap, dust filter, oil mist eliminator, solenoid operated iaolation cum air admittance valve, hose nipples and other fittings & accessories.

3.07.00 PRESSURE GAUGE COMPARATOR (2 NOS.)

- 3.07.01 Pressure gauge comparator shall be supplied for testing pressure gauges and vacuum gauges upto 250 bar and 700 mmhg vacuum with an accuracy of +/-0.2%. This unit shall be complete with test gauges of ranges 0-50 bar, 0-300 bar and 760 to 0 mm Hg. One slide wrench, screw driver, two gauge pointer removers, gauge adaptors set packed in a separate box, one lever handle union, gauge cock 1/2" NPT(F) and 1/4" NPT(F) connectors for pressure gauges to be tested and other accessories as required. The pressure developed by the test pump shall be continuously adjustable. Filling fluid, funnel to be supplied along with the unit. Comparator shall have the features of LCD digital display for pressure.
- 3.07.02 The comparator shall be of latest state of the art design and shall have in built battery and battery charger.

- 3.08.00 PRESSURE GAUGE COMPARATOR- PORTABLE TYPE (1 NO.)
- 3.08.01 Portable pressure gauge comparator shall be supplied for testing pressure gauges and vacuum gauges with in range of 8157 to 19999 mm WC with an accuracy of +/- 0.1% and 1 mmWC vacuum and pressure resolution. Prssure calibrator and comparator shall be supplied with one hand pump & digital calibrator cum indicator. It will be supplied with 41/2 digit LCD display, built in relief valve, zero adjustment facility etc.
- 3.08.02 The comparator shall be of latest state of the art design and shall have in built battery and battery charger.
- 3.09.00 **DECADE RESISTANCE BOX (2 NOS.)**
- 3.09.01 Decade resistance box shall be supplied as per specification stated below:
- 3.09.02 A dial type resistance box shall be supplied. Range of resistance box shall typically be 0.01 ohm to 111.11111 K ohms. There shall be eight dials, each dial providing one decade of resistance value. The resistance coils should be made of manganin, non inductivity wound and aged resistors with low temperature coefficiect and low contact resistance steps. The ends of the coils should be soldered to the terminal blocks with silver solder. The direct-reading accuracy of the resistance box shall be \pm 2% for 0.01 decade, \pm 0.3% for 0.1 decade, \pm 0.05% for 1,10,100,1K, 10K decades and \pm 0.5% for 100K decade . All resistors shall be temperature compensated.
- 3.09.03 Resistance box shall be supplied with probes, leads, clips, connectors etc.
- 3.10.00 A.C. UNIVERSAL BRIDGE- (1 NO.)
- 3.10.01 A.C. bridge of the following specification shall be supplied together with probes, leads, clips, connectors, power supply cord, accessories etc.
- 3.10.02 R.L.C. bridge shall have a measuring frequency of 1 KHz/10 KHz. The bridge shall be suitable for 240V, 50 Hz supply.
 - Resistance : 10 Ohms to 10 M Ohms in seven full scale ranges with least count 10 m Ohms in 10 Ohms range.
 - Capacitance : 1000 PF to 1000 micro F in seven full scale ranges with least count of 1 PF in 1000 PF range
 - Inductance : 1000 micro H to 1000 H in seven full scale ranges with least count of 1 micro H in 1000 micro H range
- 3.10.03 It shall also be possible to measure "D" dissipation factor for capacitors and "Q" quality factor for inductances.
- 3.11.00 SIGNAL GENERATOR (2 NOS.)
- 3.11.01 Signal generator shall have frequency range of 0.01 c/s to 200 K c/s in at least four ranges . The signal generator shall have sine wave, square wave and saw tooth wave outputs.

3.11.02 The output frequency shall be continuously adjustable and frequency reading shall be displayed on a digital indicator. The voltage range of the generator shall be switchable between 1V & 10V and continuously controlled and shall be monitored on a built-in digital voltmeter. The signal generator shall have high frequency stability and low harmonic distortion. Harmonic distortion shall be less than 0.5 percent. Signal generator shall be suitable for 240V single phase, 50 Hz, supply and shall be complete with carrying case, probes, fuse and other accessories as required.

3.12.00 **HAND TACHOMETER - (2 NOS.)**

- 3.12.01 Bidder shall supply combined contact and photo type tachometer with latest state of the art design.
- 3.12.02 The tachometer shall have a range of 10-99999 RPM for optical type and 10-25000 RPM for contact type and 6-1000 meters for linear reading. The device shall have integral non contact photo electric pickup with adapter for contact pickup. Non contact pick up shall have a range of 1-25 inches from target. It shall have 5 digit LCD display and shall be battery operated. The tachometer shall have data display time of 1 minute after release of measurement and data memory time of 30 minutes The tachometer shall be rugged in construction and shall be complete with all accessories such as contact adapter, surface speed wheel, interchangeable tips-concave, convex, linear, reflective tape(100 strips), batteries, carrying case. A built-in safety clutch shall be incorporated to protect the tachometer against overload if the speed is higher than the selected range.

3.13.00 INSULATION TESTER OF DIFFERENT RANGE - (1 NO.)

- 3.13.01 Insulation tester shall be portable and battery operated type with LCD display. Test voltage shall be 250 V / 500 V / 1000 V / 2500 V D.C. Range of insulation measurement shall be from 0.5 Meg Ohms to 50,000M ohms with an accuracy of ±5%.. Insulation resistance shall be indicated on a meter.
- 3.13.02 Following accessories shall be included:
 - a) Necessary carriers with rubber and steel centres
 - b) Measuring roller
 - c) Extension rod
 - d) Carrying case
- 3.13.03 The indication shall be magnetically damped. Push button shall be provided to hold the pointer for exact reading.

3.14.00 D.C. REGULATED POWER SUPPLY - (4 NOS.)

Bidder shall supply D.C. Regulated Power supply designed with latest state of the art electronic and IC technology. D.C. Regulated Power supply shall have the following features:

01. Voltage Range : 0 to + 60V DC, 1 Amps. (floating),

(Continuously adjustable)

02. Voltage / Current Range : 0-60V/0-2.5A

meters

03. Display : LCD

04. Meter Accuracy : \pm 2% FSD

05. Power Supply : 240 V AC, 50 Hz.

Connection

06. Output Impedance : 50 m Ohm or less.

07. Load Regulation : 0.1% variation in voltage , 0.2% variation in

current

08. Drift in 8 Hours : 0.1% variation in voltage, 0.2% variation in

current

09. Ripple and Noise : Less than 1 mV

10. Setting Resolution : 20 mV / 20 mA

11. Temperature co-efficient : 0.05% per Deg.C

12. Accessories : Test cords and clips as required.

Power supply shall be short circuit proof and crowbar protected.

3.15.00 **STOP WATCH – (2 NOS)**

3.15.01 Digital Type

Stop Watch shall be electronic type with LCD type display and complete with battery set and carrying case. The stopwatch shall have start, stop and reset button.

The case shall be non-rusting, dust and damp- proof.

3.15.02 **Mechanical Type**

Stop Watch shall be non-magnetic and with jeweled movement. The stopwatch shall have two hands, a large split second hand making one revolution in 30 seconds and having a dial sub divided into 1/10 seconds, the other hand will record on a small dial graduated to 15 minutes and in 1 minute interval.

The case shall be chromium plated, non-rusting, dust and damp proof. The face shall have white dial with steel hand and with bold figures.

3.16.00 **CONTINUITY TESTER -(10 NOS.)**

Continuity tester shall be electronic and battery operated. A hooter shall be provided which will sound when continuity detected. Tester shall be supplied with battery charger, lead wires and probes. The tester shall be kept in a carrying case.

3.17.00 **TONG TESTER – (3 NOS.)**

Tong tester shall be suitable for measuring the current ranges of 0-5/10-15/30 amps AC and DC. It shall have swiveling joint between tongs and meter to facilitate easy reading. Tong Testers shall have facility of indicating power factor, frequency and KW.

3.18.00 **HIGH RANGE TONG TESTER – (1 NOS.)**

High range tong tester shall be suitable for measuring the current ranges of 0-1000 amps AC with an accuracy of 1% and resistae of 0-2000 ohm with an accuracy of 1.2%. It shall have auto tanging facility along with 31/2 digit LCD display.

3.19.00 STABILISED POWER SUPPLY – (2 NOS.)

Bidder shall supply stabilized power supply designed with latest electronics and IC technology. It shall have the following minimum features:

01. Voltage Range : 0-240V AC, continuously adjustable.

02. Current Range : 0-10A

03. Power Supply : 240V AC, 50 Hz

Connection

04. Indication : Meters indicating voltage and current shall be

integral with power supply

05. Load Regulation : 0.25% variation in voltage

06. Accessories : Test lead wire

3.20.00 TEMPERATURE CONTROLLED BATH - (1 NO.)

Electronically controlled Temperature bath of following specification shall be supplied. Range approximately (-20) to (+100) Deg.C

- a) Insulated box of capacity (water / freezing liquid) around 0.02 Cu.m.
- b) Provision of holes with lids on the top for inserting thermocouples / RTD / Temperature gauge. The temperature controller shall have LED / LCD type display for set and measuring parameter. Operating voltage shall be 240V, 50Hz, 1 Ph.
- c) Unit shall be complete with Thermo element, Power supply cords, etc.

3.21.00 TEMPERATURE CALIBRATOR – (3 NOS.)

Electronic type comprising of integral electric heater, thermometer, temperature indicating controller and cooling fan with stability within ± 0.2 Deg C. Instrument shall have range of 0-600 Deg C. The equipment shall be complete with all standard and required accessories and carrying case. Instrument shall have provision for accommodating different bulb size thermometers/temperature elements (Thermocouples/RTD).

3.22.00 TEMPERATURE CALIBRATOR - TABLE MOUNTED (2 NOS.)

Microprocessor based temperature calibrator programmable for different temperature and slope rates suitable for RTD, thermocouple, switches shall be supplied. It shall have self diagnostic capability along with low battery indication and 4 ½ digit LCD display. It shall have following ranges:

- a. Range of -50 to 123°C along with accuracy of ± 0.3 °C, resolution of 0.1°C, and stability of ± 0.05 °C.
- b. Range of 50 to 600°C along with accuracy of ±0.5°C, resolution of 0.1°C, and stability of ±0.05°C.
- c. Range of 200 to 1204°C along with accuracy of ±2°C, resolution of 1°C, and stability of ±0.5°C.

The accessories shall include calibration software, RS-232C interface etc.

3.23.00 **HOT AIR BLOWER – (1 NO.)**

Portable hot air blower of reputed Make shall be supplied. Blower shall be suitable for 240V A.C., 50 Hz supply.

3.24.00 **STROBOSCOPE –(1 NO.)**

Portable stroboscope suitable for 240V AC, 50 Hz, supply from reputed Make shall be supplied. Measuring range shall be from 0 to 6000 rpm minimum in suitable ranges. It shall have flash rate of 100 to 10,000 flashes/ minute with Xenon flash lamp.

3.25.00 **PORTABLE TREND RECORDER - (1 NO.)**

Recorder shall be suitable for 240V AC, 50 Hz, supply. Recorder shall have signal-conditioning circuits to receive 4-20 mA, DC, thermocouple, RTD and other voltage-current signals encountered in electronic circuits. Recorder chart shall have 6 speed selections between 2 and 700 cm per hour. the recorder shall be 3-pen type. The scales shall be graduated in 0-100%. Accuracy shall be $\pm 1\%$ or better. Reference junction compensation feature shall be built-in. The minimum input impedance for voltage measurement shall be 500 K Ohms and for current inputs the impedance shall be 950 Ohms. The following spares and consumables shall be provided:

- a) Chart rolls
- b) Ink cartridges/sacks
- c) Replacement tips
- d) Chart drive motor

3.26.00 **BAROMETER – (1 NO.)**

Precision barometer shall be electronic type (digital display) with a range of 660 to 800 mm Hg with 0.1 mm Hg accuracy complete with battery, battery charger

and carrying case. The display shall be barometric pressure, humidity and temperature.

3.27.00 SURFACE PYROMETER— (2 NOS.)

- 3.27.01 Bidder shall supply pyrometer with spectral response 8 to 14.Instrument shall be supplied with hand held probe and cable (5 metres) assembly. Indication shall be by 5.1/2 digit LED display. Range shall be 0-999 Degree Celsius. Accuracy shall be $\pm 0.8\%$ and repeatability shall be 1°C. Analog output shall be 0-1V or 1 Mv/°C. It shall have RS 232C interface facility.
- 3.27.02 Instrument shall have internal chargeable battery. Battery charging circuit suitable for 240V AC, 50 Hz shall be integral with the instrument.

3.28.00 ELECTRONIC AND PNEUMATIC TEST BENCH - (2 NOS.)

- 3.28.01 Self contained test bench with sets of drawers for testing and repair of electronic/ electrical / pneumatic instruments and gadgets shall be supplied. This shall include necessary isolating switch, power supply switch, holding brackets, power supply sockets, signal sockets, meters, plugs, variac, air gun etc. laid aesthetically in a bench-top unit. Computer aided calibration facility with calibration management system shall also be provided.
- 3.28.02 Combined panel & desk type arrangement with instruments/ hardwares laid aesthetically shall be provided. Front and slant area shall be of 3mm CRCA sheet. Other sides including door shall be of 2mm CRCA sheets. Suitable illumination with door operated switch shall be provided. Color shall be Brilliant White (interior) and Light Grey 631 shade IS 5 (EXTERIOR). However, approval of color shade shall be obtained from Owner during detailed engineering.
- 3.28.03 Electronic part of the test bench shall include but not limited to, all the required test instruments and accessories such as power supply sockets with switch (415V AC-15/5A 2 Nos, 230V AC -15/5A 4 Nos, 220V DC 2 Nos, ±24V DC-2 Nos, ±48V DC-2 Nos, ±12V DC-2 Nos, ±5V DC-2 Nos). Voltage levels are tentative and shall be matched to supply requirements of Bidder and Owner's range of products. Other instruments/ hardware shall include Digital Oscilloscope, Decade Resistance Box, Digital Multimeter, Function Generator, Chartless Recorder, Variable DC Stabilised power supply, Variable AC power supply, Stepdown transformer, Continuity Tester, Fixed power supply, Electrically operated Air gun, MCB for each instrument, Digital LCR-Q Bridge, Card IC Tester, Soldering and Desoldering station, Power Meter with Harmonic Analysis, Tool Box with screw driver set, spanner, plie cutter etc.
- 3.28.04 Temperature Bath of the test bench shall consist of medium (600°C) and high (1200°C) temperature baths for calibration of thermocouples and RTD, Scanner/thermometer with digital display and with RS232C interface, temperature calibrator etc.
- 3.28.05 Pneumtic part of test bench shall include, but not limited to, all the required test instruments and accessories such as power supply sockets with switches, Pressure and Vacuum gauges, Low/ medium/ differential pressure manometer/ calibrator and controller, Multifunction calibrator station, High pressure calibrator, Variac, Motorised vacuum pump, Portable high pressure pump, Dead weight tester, Portable multifunction calibrator, Air filter regulator, Electrically operated Air gun, MCB for each instrument etc.

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- 3.28.06 Computerised calibration system shall consist of server and PC, 21" TFT monitor and A3 color laser jet printer and shall be located on the test bench (Details of the system shown in latter part of specification).
- 3.28.07 The variable A.C supply shall have a range of 0-240V and sub-panel shall contain ammeter and voltmeter. The output shall be protected with circuit breaker. A voltmeter shall be provided in sub-panel to indicate input and output voltages.
- 3.28.08 D.C. supplies shall be externally settable, floating type, reverse polarity protected. A metering sub-panel shall be provided for monitoring voltage, current with necessary plug sockets.
- 3.28.09 Standard utility outlet sockets (4 nos.) shall be provided. A compressed air blowing arrangements shall be included having a gauge, regulator and flexible hose

3.29.00 PORTABLE DIGITAL MULTIMETER - (10 NOS.)

01. Display : 51/2 digit LCD display with unit indication

02. Functions : DC volts, AC volts, DC Ma & A, AC Ma & A, Ohms

03. Range : DC Volts; AC Volts; DC mA, AC mA, frequency

and Ohms (Total 25 ranges)

a. DC Voltage-0- 200 mV / 1000 V
b. AC Voltage-0- 200 mV / 750 V
c. DC Current-0- 200 mA / 2A
d. AC Current-0- 200 mA / 2A

e. Resistance-0- 200 Ohm/ 200 M Ohm

f. Frequency-10 Hz to 100 kHz

04. Accuracy : ±0.25% of reading+1 digit basic range

05. Range selection : Manual and automatic with over range indication

06. Zerro adjustment : Automatic

07. Overload : Up to 1000V DC or AC

protection

08. Polarity indication : Automatic

09. Power supply : Battery/ mains operated with lowbattery voltage

indication

10. Accessories : Test lead, fuse , battery

3.30.00 PORTABLE VACUUM TESTER (2 NOS.)

3.30.01 It shall calibrate and test vacuum instrument ranges 760 mm Hg vacuum and comprise of precision test gauge with swivel fitting shut off valve, pistol grip

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handle, etc. It should be light weight for field use and should have Needle valve for positive shut-off piston grip, handle for quick, easy pump action.

3.30.02 It shall have the following features and specification:

01. Carrying Case : High impact plastic with a die cut foam insert snap

open enclosures and handle fitted slots for the

tester and two spare gauges.

02. Accuracy : \pm 0.5% of gauge span

03. Range : 0 to 760 mm Hg

04. Test Connection : 1/2" NPT 60 cm long nose

3.31.00 FIELD TRANSMITTER CALIBRATOR - (2 NOS.)

3.31.01 Bidder shall supply portable Field Transmitter Calibrators suitable for configuration and calibration of smart transmitters.

3.31.02 Field Transmitter Calibrators shall have following features:

01. Type : Portable

02. Display : 41/2 digit LCD

03. Range : 4-20Ma DC

04. Unit : Ma or percent

05. Output simulation : 24V DC loop power

06. Over range : 25%

protection

07. Adjustment : Continuous output

08. Battery power supply : Rechargable power pack

09. Accuracy : 0.1%

10. Accessories : Battery holder, carrying case, fuse, test leads,

battery charger unit along with rechargeable

battery

3.32.00 FIELD PRESSURE COMPARATOR(PORTABLE) – (4 NOS.)

01 Features : Single volume pump with integral pressure

regulator for fine pressure adjustment

02

03 Accuracy : $\pm 0.5\%$ of gauge span.

04 Range : 8157 to 19999 mmwcl , with 1 mmwcl vacuum

and pressure

05 Display : 4 ½ digit calibrator LCD readout

06 Adjustment : zero adjustment.

07 Accessories: Pressure calibrator/ pressure comparator shall be

supplied with one hand pump, digital calibrator

cum indicator, built in relief valve,

Four test gauges. Gauge shall be compensated

for temperature; operating pressure 300

Kg/Sq.cm maximum

3.33.00 PORTABLE GAS ANALYZER – (1 NO. CO & CO₂, 1 NO. O₂, 1 NO.NO & NO₂, 1 NO. SO₂)

Bidder shall supply one (1) no. manually operated portable flue gas analyzer with an accuracy of $\pm 2\%$ for field determination of content of following gases in flue gas:

CO:0-1000 PPM

O₂: 0-25% by volume

NO:0-100 ppm

SO₂: 0-1000 ppm

HC:0-100% LEL

Power supply shall be 230V AC. It shall have RS232C interface facility. All hardware items such as battery, battery charger, filter, probe, leather case, cable etc. and chemicals required for operation of these analyzers shall be furnished.

3.34.00 SOLDERING IRON WITH SOLDER SUCKER (8 SETS)

- 3.34.01 Soldering iron shall be provided along with temperature controlling equipment for precise adjustment of temperature. Different sizes of soldering tips shall be provided with the iron.
- 3.34.02 Solder sucker shall be provided for removal of molten solder from terminal connections.
- 3.35.00 **DESOLDERING STATION (1 SET)**

- 3.35.01 Soldering iron shall be provided along with temperature controlling equipment for precise adjustment of temperature. Different sizes of soldering tips shall be provided with the iron.
- 3.35.02 Accessories shall include desoldering handpiece, power cord, connecting cable, iron holder, handle, cleaning drill, nozzle remover, heat resistant pad etc.
- 3.36.00 **VARIAC (1 NOS.)**

Light weight variac providing voltage upto 550V, 10A, 50 Hz is envisaged. Voltage scale around the voltage-varying knob shall have white lettering and graduation as black back ground.

- 3.37.00 **POWER PACK (2 NOS.)**
- 3.37.01 Bidder shall supply power pack designed with latest state of the art electronics technology. It shall accept 110V 1 phase / 240V 1 phase, 50 Hz signal as input. Output voltage of the power supply pack shall be 0-60V adjustable over the entire

range. The systems shall be capable of providing both positive and negative supply voltage with respect to a common reference point.

- 3.37.02 Power supply packs shall include indicating meters to indicate the output voltage and output current. The power pack shall be capable of delivering current upto 10 Amps. Max ripple should be 5 mA at full load.
- 3.38.00 VIBRATION ANALYZER BALANCER INSTRUMENT (2 NOS.)
- 3.38.01 The microprocessor based portable self-contained dual input instrument shall have the following specification and features:

01. Indication : Digital/Analog frequency and amplitude meter

02. Frequency : 60 to 6,00,000 CPM

03. Sensitivity : 0.03 microns peak to peak adjustment

04. Diagnostic : Hard copy tabular print-out

05. Printer : In-built; Amplitude and frequency plotting

capability (3 speeds)

- 3.38.02 The instrument shall have two range manual tunable filter, two range internal oscillator, high density stroboscopic light (One flash per cycle up to 15000 cpm, sub multiple firing up to 600000 cpm). The instrument shall be capable of the following measurements:
 - a) Displacement in 0 to 3000 micron in 8 ranges.
 - b) Velocity in 0-3000 mm / sec. in 8 ranges.
 - c) Acceleration in 0-100 g in 8 ranges.
 - d) Spike energy 0-100 g's in 8 ranges.

- 3.38.03 The instrument shall have LCD backlit display, membrane type key pad, replaceable, seales, rechargable battery and battery charger. Enclosure class shall be IP-65.
 - a) Temperature Range : 0 to + 50 Deg.C
 - b) Power Supply : 230V, 50 Hz, 1 Ph, AC
- 3.38.04 Accessories.
 - a) Accelerometer
 - b) Straight probe
 - c) Pick up cable
 - d) Stroboscopic light
 - e) Strobe cable
 - f) Fuse
 - g) Power cable

3.39.00 **FURNACE (1 NO.)**

Furnace shall be suitable for 240V, Phase, 50 Hz power supply, capacity of heating chamber shall be 0.25 cubic metres and it should be insulated with glass wool and heated by high grade wire elements distributed along the bottom and sides, giving a uniform temperature. Furnace temperature shall be indicated by a thermometer and controlled by a thermostat over a range of 0-1100 Deg.Celsius. ON/OFF positions of thermostat shall be indicated by an indicating lamp. On/ Off switch along with indication lamp shall be provided.

3.40.00 **PORTABLE METER CALIBRATOR (2 NOS.)**

- 3.40.01 This instrument shall provide an accurate measure of DC, AC, Volts, amps and ohms. It shall be able to generate milliamperes for instrument calibration. It shall be electronic type with LCD display and shall be provided with battery and battery charger.
- 3.40.02 Battery charging circuit shall be integral with the instrument and shall be suitable for 240V, AC, 50 Hz supply.

Ranges:

D.C. Volts : 0 - 1mV - 10V
 D.C. Current : 0 - 1 micro A-1A
 A.C. Volts : 0 - 1mV - 10V
 A.C. Current : 0 - 1 micro A - 1A
 Ohms : 1 Ohm - 10 M Ohms

Accuracy : ± 0.1%

3.41.00 DIGITAL CABLE IDENTIFICATION SYSTEM (1 NO.)

Features: Quick identification of shorting lines and open lines.

It shall handle upto 96 pairs at one time.

3.42.00 DUAL BEAM PORTABLE DIGITAL STORAGE OSCILLOSCOPE (2 NOS.)

01. Bandwidth (3 db) : 60 MHz

02. Selection : Trigger, Time base, Horizontal & Vertical

deflection

03. Deflection factor : 2 mV/div. to 5 V/div.

04. No. of Steps (Vert.) : 10 (min) (1-2-5)

05. Accuracy : \pm 0.5% or better

06. Input impendence (Signal) : 1 M Ohm, 20 pf

07. Maximum voltage 400V d.c./a.c. p to p

08. CMRR : 10:1 at 50 MHz (minimum)

09. Sample rate : 10 x 106/Sec.

10. Record memory : 4K points

11. Save memory : 4K points

12. Display mode : x1, x10, storage compress

13. Time base : 0.05 s/div. to 0.5 s/div.

14. No. of steps (hr.) : 20 (min) (1-2-5)

15. Input impedance (trigger) : 20 K Ohm

16. Time base linearity : $\pm 5\%$

17. Z modulation frequency : Upto 5 MHz

18. Controls available : Intensity, focus, brightness

19. Operating voltage : 100-250V AC, 50 Hz

20. Ambient temperature : 0-50 Deg.C

21. Feature : Overload protection

22. Accessories : Probes, carry case etc., as required

3.43.00 HAND HELD THERMOCOUPLE AND PT-100 OHM SIMULATOR AND INDICATOR (1 NO.)

- 3.43.01 Bidder shall supply hand held type T/C and RTD Pt-100 simulator and indicator. The instrument shall be electronic type with in built battery and battery charger.
- 3.43.02 It shall have following specification:

01. Indication : Liquid Crystal Display (LCD)

02. Operating Temperature : - 20 to 55 Deg.C

Limits

03. Storage Temperature : - 30 to 60 Deg.C

Limits

04. Temperature Resolution : 1.0 or 0.1 Degree

05. Function : Generation/ measurement of

Thermocouple e.m.f (for K,E,J,T,N,B,R,S)

Generation / measurement of equivalent

RTD Temperature (PT-100)

06. Accessories : Test lead, carrying case, battery & battery

holder, fuse, battery charger along with

rechargeable battery

3.44.00 SUPPRESSED RANGE MERCURY IN GLASS THERMOMETER (2 SET)

Bidder shall supply suppressed range Mercury in glass thermometers for temperature baths / calibrator consists of the following gauges :

01. 0-52 deg. C : 1 No.

02. 48 - 102 deg. C : 1 No.

03. 97 – 152 deg. C : 1 No.

04. 147 – 202 deg. C : 1 No.

05. 197 – 252 deg. C : 1 No.

06. 247 – 302 deg. C : 1 No.

07. 297 – 360 deg. C : 1 No.

08. 350 – 402 deg. C : 1 No.

09. 395 – 605 deg. C : 1 No.

3.45.00 I.C. INSERTION AND EXTRACTION TOOLS FOR VARIOUS PIN NUMBERS 14,16 AND 48 (2 NOS.)

Bidder shall supply the tool having professional quality and of reputed make.

3.46.00 **RHEOSTATS (1 SET.)**

Rheostat shall be slide resistor type wound on ceramic frame. It should have max temperature rise of 375°C and maximum working voltage of 500 volts. Bidder shall supply Rheostats of the following ratings from reputed manufacturer:

01. 1A : 1 No.

02. 2A : 1 No.

03. 5A : 2 No.

04. 10A : 2 No.

05. 12A : 1 No.

06. 18A : 1 No.

3.47.00 **DESKTOP DIGITAL MULTIMETER - (2 NOS.)**

Bidder shall supply desktop type Digital Multimeter for measuring DC and AC voltages, currents and resistances. Desk top type Digital Multimeters shall have the following features:

01. Display : $5 - \frac{1}{2}$ digit LED display

02. Measurements : DCV, ACV, Resistance (2W, 4W), DCA,

ACA

03. Maximum Measurements

in standard ranges

DCV - 1000V

ACV - 700V

Resistance - 200 Mohm

DCA - 2A

ACA - 2A

04. Sampling rate : Selectable

05. Over range information : To be displayed

06. Data Memory : To store upto 2000 measured data and

atleast 10 set up information

07. Operating Temperature : $5 - 40 \deg C$

08. Power Requirements : 240V AC, 50 Hz

09. Communication Interface : RS-232C

10. Special functions : Auto range mode, Auto sample mode

11. Accessories : Power supply cord, Measurement lead,

Remote connector

3.48.00 PHASE SEQUENCE METER - (1 NO)

Electronic type

3.49.00 **FREQUENCY METER – (1NO.)**

Electronic type

3.50.00 **MINISCOPE METER – (1NO.)**

BW: 100Mhz, Sampling rate: 5 Gs/s, No. of channel: 2 + ext. trigger, Rise time: 3.5 ns, Time/divn.:- 5ns-60s, Vol / div. 1mv to 100v, Record length: 512 Bytes / 30000 Bytes, Screen wave form / set up memory:- 10,20,40, Ni-cd operation and charger for minimum 4 hour operation, Automatic set up and trend plot

Accessories: Charger set, Probe set and Carrying case etc.

3.51.00 VIBRATION / SOUND LEVEL MONITOR – (1NO.)

01. Velocity Range : 0 - 3000 mm/sec

02. Vibration Measurement : 0-3000 micron peak to peak

03. Sound amplitude : 45-140dB

measurement

04. Frequency Range : 10-10000 Hz

05. Accessories : Microphone, vibration pick up, straight

probe, pick up cable, carrying case,

battery & battery charger

3.52.00 **TOOL KIT BOX- (12NOS.)**

Each box shall comprise of sets of Allen keys of different sizes both in inch and millimeter, slide wrenches of different sizes, D spanner of different sizes, electric tester, Ring spanner of different sizes, Insulated screw drivers etc. as a minimum.

3.53.00 **WORK BENCH – (2 NOS.)**

Heavy-duty wooden construction with drawers, racks, vice, drill machine.

3.54.00 **INSTRUMENT RACK – (2 NOS.)**

Heavy-duty steel rack for storing bulk quantity of transmitters, switches, RTD, thermocouples etc during any capital maintenance of machine.

3.55.00 PORTABLE PH CALIBRATOR – (2 NOS.)

To check and calibrate pH measuring equipments. Compact portable simulator shall be offered.

01. Range : 0-14 pH in steps of 1 pH

02. Accuracy : $\pm 0.01 \text{ pH}$

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03. Electrodes : Combination or Glss & Reference

04. Display : 4 digit LCD

05. Stability : 0.1 Ph / 24 hrs at constant temperature

06. Temperature : 0-100 °C, manual/ automatic

compensation

07. Power source : 240V, 1 Ph, 50Hz

08. Accessories : Battery pack with charger, digital display,

connector leads, carrying case, buffer tablets, test & glass electrode and others as

necessary.

3.56.00 OIL CONDITION MONITOR— (1 NO.)

01. Type : Portable Particle Counter

02. Quantity : One (01)

03. Power supply : 240V AC mains and Battery operated

04. Indication : Front panel scrollable data

05. Function Key : Membrane key

06. Memory : Adequate for at least 2000 measurements

07. Channels : At least six

08. Printer : In built

09. Analysis : As per international standard

10. Enclosure : Stainless steel

11. Accessories : • Battery charger

Process attachment

Carrying case

12. Tractability : Yes

13. Special feature : Display of environmental data such as

humidity, temperature and air velocity

3.57.00 PORTABLE ULTRASONIC FLOW METER -(1 NO.)

3.57.01 02 (two) nos. of clamp on type portable Ultrasonic flow measuring instruments for measuring flow through any pipe sizes in between 10 to 2500 mm with an accuracy of $\pm 1\%$ of reading. Sensor shall be weather & dustproof conforming to

IP-65. Meter shall be programmable with alphanumeric display (LCD) and membrane type keyboard. Battery, Charger set and Temperature sensor shall also to be provided.

3.58.00 WET AND DRY BULB HYDROMETER - (1 NO.)

3.58.01 01 (one) no. of Wet and Dry Bulb Hydrometer with power supply from three 1.5 V alkaline batteries of reputed make shall be supplied. Measuring range shall be 10 to 95% Relative Humidity and ± 10 to 110^{0} F with an accuracy of $\pm 0.3^{0}$ F. Wicks carrying case instruction set shall be supplied with the instruments.

3.59.00 ANEROID BAROMETER - (1 NO.)

3.59.01 01 (one) no. of Aneroid Barometer for measuring atmospheric pressure of reputed make.

01. Range : 28.3" to 31.8" Hg

02. Accuracy : 0.33% full scale

03. Sensitivity : 0.2% full scale

04. Scale Length : 16" through 1 pointer revolution

05. Dial Diameter : 4"/6"

06. Dial calibration : Standard are mm Hg or inches Hg calibration in

other units and two sets of graduations on a

single dial.

07. Min. Graduation : 0.5mm or 0.02"

3.60.00 FLOW METER CALIBRATOR - (1 NO.)

01. Accuracy : +2%

02. Range : 0 - 1000 mmwcl / 0-6000 mmwcl / 0-30000

mmwcl

03. Display : 3 digit LCD

3.61.00 **AIR SET -(1 NO.)**

01. Filter element : 5 micron sintered bronze filter element

02. Max. primary press : 28 kg/cm²

03. Secondary pressure : 0-2.1 kg/cm²

04. Connection : 1/4" NPT (F)

05. Accessory : O/P Gauge

EPC Bid Document e-PCT/TS/K/02/2014-15

3.62.00 **MODULE TESTER -(1 NO.)**

01. Type : Latest version PC with windows based test

software

02. No. of channels : More than 48

03. Power supply : Built in

04. Loop test : Continuous

05. Feature : Testing of memory devices, open collector

devices, resistance, capacitance & voltage measurement, self test, diagnostic software, circuit tracer for IC links, extensive IC

libraries

06. Accessory : Standard set of Dip clips, probes, different

type of connectors, ribbon cables etc.

3.63.00 DC REGULATED POWER SOURCE -(2 NOS.)

01. Range : 0 to ±60V DC, 2.5A

02. Display : LCD

03. Power supply : 240V AC, 1 Phase, 50Hz

04. Mode Indication : LED indication for constant voltage/

constant current operating mode

05. Load Regulation : (i) 0.1% variation in voltage

(ii) 0.2% variation in current

06. Ripple and Noise : Less than 1mV

07. Resolution : 50 mv/ ma

08. Features : Overvoltage protection/ Overcurrent

protection

09. Accessories : Test lead

3.64.00 **WELDING MACHINE -(1 NO.)**

01. Type : Portable

02. Welding Process : Arc welding through hand welding electrode

(coated wire or rod)

03. Power supply : 240V AC, 1 Phase, 50Hz

EPC Bid Document e-PCT/TS/K/02/2014-15

04. Accessories : Electrode cable

3.65.00 **JEWELLERS LATHE -(1 NO.)**

01. Type : Paddle/ Motor operated

02. Feature : High precision cutting

03. Power supply : 240V AC, 1 Phase, 50Hz

3.66.00 **GRINDING MACHINE -(1 NO.)**

01. Type : Motor operated adjustable speed

02. Feature : Different grade grinding wheel

03. Power supply : 240V AC, 1 Phase, 50Hz

3.67.00 **FEELER GAUGE - (1 NO.)**

01. Type : Sets of feeler of different size

3.68.00 PRECISION INSTRUMENT RADIAL DRILLING MACHINE - (1 NO.)

01. Type : Motor operated

02. Mounting : Desk

03. Power supply : 240V AC, 1 Phase, 50Hz

04. Accessories : Drill bits of different size

3.69.00 PORTABLE DRILLING MACHINE - (1 NO.)

01. Drilling capacity : 6 mm

02. Drilling depth : 25 mm

03. Power supply : 240V AC, 1 Phase, 50Hz

04. Mounting : Cast iron base on hard chrome-plated

column

3.70.00 **AUTO TRANSFORMER - (1 NO.)**

01. Capacity : 15A, 8A

EPC Bid Document e-PCT/TS/K/02/2014-15

02. Input : 0-550V, 50Hz

03. Output : 0-270V continually adjustable through knob

04. Scale : (i) Voltage scale around voltage varying

knob

(ii) White lettering and graduation as black

background

05. Accessories : Test lead wires

3.71.00 UNIVERSAL DIGITAL THERMOMETER - (1 NO.)

01. Type : Portable and Digital

02. Range : (-) 50 to 1200°C

03. Type of element : RTD (Pt-100) & Thermocouple (Type:

K,S,J,T,E,R,B and N)

04. Display : LCD

05. Power Supply : Battery operated

3.72.00 LOW AND MEDIUM PRESSURE CONTROLLER - (1 NO.)

01. Range : 0-2 kg/cm² (Low), 0-20 kg/cm² (Medium)

02. Accuracy : 0.05% or better

3.73.00 NICKEL CADMIUM CELL - (1 NO.)

01. Cell Type : Ni-Cd

02. Voltage Range : To suit supplied Laboratory instruments

03. Power Supply : 240V AC, 1 Phase, 50Hz

04. Charger suit : Yes

3.74.00 PORTABLE PNEUMATIC/ HYDRAULIC CALIBRATOR - (1 NO.)

01. Accuracy : 0.1% Full Scale

02. Indication : 41/2 digit LCD

03. Pump Range : (i) (-)1 to 0 Bar (Pneumatic type)

EPC Bid Document e-PCT/TS/K/02/2014-15

(ii) 0 to 20 Bar (Hydraulic type)

(iii) 0 to 200 Bar (Hydraulic type)

04. Control : Volume control with fine adjustment through

vernier

05. Display range : 0-24 mA

06. Power supply : In built rechargeable battery

3.75.00 **BENCH VICE & HAND VICE - (1 NO.)**

[A] Bench Vice

01. Type : Bench mounted

02. Purpose : For instrumentation work

[B] Hand Vice

01. Type : Portable

02. Purpose : For instrumentation work

3.76.00 **VACUUM CLEANER - (1 NO.)**

01. Type : Portable

02. Vacuum : 2000 mm Wcl

03. Power supply : 240V AC, 1 Phase, 50Hz

04. Accessories : All purpose nozzle, radiator brash, jet air

nozzle etc.

3.77.00 INFRARED PYROMETER - (1 NO.)

01. Type : Hand held non contact infrared technique

02. Temperature Range : 200-1800°C

03. Display Resolution : 1°C

04. Ambient Temperature : 0-50°C

05. Power supply : Battery operated

06. Accessories : Battery charger kit, Case

3.78.00 **ANEMOMETER (PORTABLE TYPE) - (1 NO.)**

EPC Bid Document e-PCT/TS/K/02/2014-15

01. Type : Portable

02. Display : LCD backlit disply, Simultaneous display of

ambient temperature, air flow/ velocity

03. Accessories : Battery, Battery charger kit, Carrying Case

3.79.00 COMPUTERISED CALIBRATION SYSTEM - (1 NO.)

This shall be located on test bench.

01. Processor : Latest available version from Pentium

02. SD RAM : 2 GB (Min)

03. Hard Disk : 500 GB (RAID)

04. Monitor : 21" (TFT)

05. Printer : A3 color laser jet

06. Power supply : 240V AC, 1 Phase, 50Hz

07. Other feature : USB Port, Serial/ parallel Ports, R/W DVD,

10/100 Mbps Ethernet port, Mouse, KB

08. Software : Licensed version of all necessary software

3.80.00 **SCREW GAUGE - (1 NO.)**

01. Spindle : Stainless steel

02. Accessory : Ratchet lock nut

3.81.00 **SCANNER - (1 NO.)**

01. Type : Electronic

3.82.00 **GRINDING WHEEL - (5 NO.)**

01. Type : Abrasive type

3.83.00 **TORXIMETER - (2 NO.)**

01. Application : Used for bolt torquing, torque wrench

calibration, contact closure measurement

EPC Bid Document e-PCT/TS/K/02/2014-15

02. Feature : 3 units of measurement hold, peak, min-

max, fast/ slow sampling, hi/ low resolution,

auto power off

03. Accessories : Hard carrying case, torque probe, cable,

battery along with battery charger etc.

3.84.00 **PITOT TUBE - (2 NO.)**

01. Material : Stainless Steel

3.85.00 **LAPTOP - (2 NO.)**

01. Processor : Latest or Core i5 (min)

02. RAM : 2 GB (min)

03. Hard Drive : 1 TB

04. Multimedia Drive : DVD+/-RW

05. Display : 15.6"

06. Network Card : Yes

07. Keyboard : Yes

08. Pointing Device : Touch pad

09. External Port : 3 nos (min) USB compliant port

10. Operating System : Latest available version

11. Software : Liscenced version of all necessary software

12. Accessory : Carrying case, additional battery along with

battery charger

3.86.00 VIBRATION CALIBRATOR (PROXIMITY & SEISMIC PROBE) – (1NO.)

01. No of channel : 2 Analog+1 Auxiliary

02. Continuous battery

operation

Up to 12 hour

03. PC Communication

Interface

: USB

04. Display : LCD

EPC Bid Document e-PCT/TS/K/02/2014-15

05. Max input signal range : ±20V

06. Frequency Range : 0-40 KHz

07. Protection class : IP-65

08. Accessories : Probe, pick up cable, carrying case,

battery & battery charger etc

3.87.00 PORTABLE mA CALIBRATOR – (3 NO.)

01. Type : Micrprocessor based

02. Application : To measure or source mA signal for

calibration of receiver type instruments

03. Range : 0-24 mA

04. Resolution : 0.001

05. Accuracy : 0.001%

06. Measure Volts : 0 to 60 V

07. Accessories : Test lead, rechargeable battery with

battery charger, carrying case etc

3.88.00 TABLE MOUNTED mA CALIBRATOR – (2NO.)

01. Input range : 0 to ± 100 mA DC, 0 to ± 1200 mV , 0 to

±80 V (Programmable)

02. Output range : 0 to 25 mA DC, 0 to ± 1200 mV, 0 to 10

V (Programmable)

03. Accuracy : $\pm 0.03\%$ of reading

04. Temperature : 0-50°C

05. Accessories : Test lead, power cord, carrying case etc

3.89.00 PORTABLE mV CALIBRATOR – (2NO.)

01. Input range : 0 to 120 mV , 0 to 30 V (Programmable)

02. Output range : 0 to 120 mV , 0 to 12 V , 0 to 30 V, O to

24 mA (Programmable)

03. Accuracy : $\pm 0.02\%$ of reading

04. Temperature : 0-50°C

EPC Bid Document e-PCT/TS/K/02/2014-15

05. Preferred feature : Reference junction compensation for

thermocouple, over voltage/ current

protection

06. Accessories : Test lead, rechargeable battery with

battery charger, carrying case etc

3.90.00 **TEST RTD – (2NO.)**

01. Sensor type : Platinum resitance

02. Temperature : 0-600°C

03. Accessories : Cable, carrying case etc

3.91.00 TEST THERMOCOUPLE – (2NO.)

01. Sensor type : All type of thermocouple

02. Temperature : 0-1200°C

03. Accessories : Cable, carrying case etc

3.92.00 FREEQUENCY COUNTER/ TIMER – (1NO.)

01. Bandwidth : 350 MHz

02. Display : 12 digit

03. Temperature : 0-50°C

04. Accessories : Battery with battery charger, carrying case

etc

VOLUME-1D

FORMS & PROCEDURES

F & P – SR dated 18-05-2022

BHARAT HEAVY ELECTRICALS LIMITED
BHARAT HEAVY ELECTRICALS LIMITED



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OFFER FORWARDING LETTER / TENDER SUBMISSION LETTER

Form No: F-01 (Rev 00)

OFFER FORWARDING LETTER / TENDER SUBMISSION LETTER

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

Offer Reference No: Date:
To,
(Write Name & Address of Officer of BHEL inviting the Tender)
Dear Sir, Sub : Submission of Offer against Tender Specification No:
I / We hereby offer to carry out the work detailed in the Tender Specification issued by Bharat Heavy Electricals Limited, Power Sector - Southern Region. Chennai, in accordance with the terms and conditions thereof.
I/We have carefully perused the following listed documents connected with the above work and agree to abide by the same.
 Amendments/Clarifications/Corrigenda/Errata/etc issued in respect of the Tender documents by BHEL Notice Inviting Tender (NIT) Price Bid Technical Conditions of Contract Special Conditions of Contract General Conditions of Contract Forms and Procedures
Should our Offer be accepted by BHEL for Award, I/we further agree to furnish 'Security Deposit' for the work as provided for in the Tender Conditions within the stipulated time as may be indicated by BHEL.
I / We further agree to execute all the works referred to in the said Tender documents upon the terms and conditions contained or referred to therein and as detailed in the appendices annexed thereto.
I/We have deposited/depositing herewith the requisite Earnest Money Deposit (EMD) as per details furnished in the Check List.
Authorised Representative of Bidder Signature: Name: Address:
Place: Date:

DECLARATION BY AUTHORISED SIGNATORY OF BIDDER

Form No: F-02 (Rev 00)

DECLARATION BY AUTHORISED SIGNATORY OF BIDDER

(10 be typed and submitted in the Letter Head of the Company/Firm of Bidder)
To,
(Write Name & Address of Officer of BHEL inviting the Tender)
Dear Sir,
Sub: Declaration by Authorised Signatory Ref: 1) NIT/Tender Specification No:, 2) All other pertinent issues till date
I/We, hereby certify that all the information and data furnished by me with regard to the above Tender Specification are true and complete to the best of my knowledge. have gone through the specifications, conditions, stipulations and all other pertinent issues till date, and agree to comply with the requirements and Intent of the specification.
I further certify that I am authorised to represent on behalf of my Company/Firm for the above mentioned tender and a valid Power of Attorney to this effect is also enclosed.
Yours faithfully,
(Signature, Date & Seal of Authorized Signatory of the Bidder)
Date:
Enclosed : Power of Attorney

NO DEVIATION CERTIFICATE

Form No: F-03 (Rev 00)

NO DEVIATION CERTIFICATE

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

To,

(Write Name & Address of Officer of BHEL inviting the Tender)

Dear Sir,

Sub: No Deviation Certificate
Ref: 1) NIT/Tender Specification No:,
2) All other pertinent issues till date

We hereby confirm that we have not changed/ modified/materially altered any of the tender documents as downloaded from the website/ issued by BHEL and in case of such observance at any stage, it shall be treated as null and void.

We also hereby confirm that we have neither set any Terms and Conditions and nor have we taken any deviation from the Tender conditions together with other references applicable for the above referred NIT/Tender Specification.

We further confirm our unqualified acceptance to all Terms and Conditions, unqualified compliance to Tender Conditions, Integrity Pact (if applicable) and acceptance to Reverse Auctioning process.

We confirm to have submitted offer in accordance with tender instructions and as per aforesaid references.

Thanking you,	
	Yours
faithfully,	

(Signature, date & seal of authorized representative of the bidder)

DECLARATION CONFIRMING KNOWLEDGE ABOUT SITE CONDITIONS

Form No: F-04 (Rev 00)

DECLARATION CONFIRMING KNOWLEDGE ABOUT SITE CONDITIONS (To be typed and submitted in the Letter Head of the Company / Firm of Bidder) To, (Write Name & Address of Officer of BHEL inviting the Tender) Dear Sir, Sub: Declaration confirming knowledge about Site conditions Ref: 1) NIT/Tender Specification No: 2) All other pertinent issues till date I / We. hereby declare confirm that we have visited the Project Site as referred in BHEL Tender Specifications and acquired full knowledge and information about the Site conditions including Wage structure, Industrial Climate, the Law & Order and other conditions prevalent at and around the Site. We further confirm that the above information is true and correct and we shall not raise any claim of any nature due to lack of knowledge of Site conditions. I/We, hereby offer to carry out work as detailed in above mentioned Tender Specification, in accordance with Terms & Conditions thereof. Yours faithfully, (Signature, Date & Seal of Authorized Representative of the Bidder) Date: Place:

DECLARATION FOR RELATION IN BHEL

Form No: F-05 (Rev 00)

DECLARATION FOR RELATION IN BHEL

(To be typed and submitted in the Letter Head of the Company/Firm of Bidder failing which the offer of Bidder is liable to be summarily rejected)

To,

(Write Name & Address of Officer of BHEL inviting the Tender)

Dear Sir,

Sub: Declaration for relation in BHEL

Ref: 1) NIT/Tender Specification No:

I/We hereby submit the following information pertaining to relation/relatives of Proprieter/Partner(s)/Director(s) employed in BHEL

Tick($\sqrt{}$) any one as applicable:

 The Proprieter, Partner(s), Director(s) of our Company/Firm DO NOT have any relation or relatives employed in BHEL

OH

- 2. The Proprieter, Partner(s), or Director(s) of our Company / Firm HAVE relation / relatives employed in BHEL and their particulars are as below:
 - (i)

(ii)

Signature of the Authorised Signatory

Note:

- 1. Attach separate sheet, if necessary.
- 2. If BHEL Management comes to know at a later date that the information furnished by the Bidder is false, BHEL reserves the right to take suitable against the Bidder / Contractor.

NON DISCLOSURE CERTIFICATE

Form No: F-06 (Rev 00)

NON DISCLOSURE CERTIFICATE

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

NON DISCLOSURE CERTIFICATE
I/We understand that BHEL PSSR is committed to Information Security Management System as per their Information Security Policy.
Hence, I/We M/s
To maintain confidentiality of documents & information which shall be used during the execution of the Contract.
The documents & information shall not be revealed to or shared with third party which shall not be in the business interest of BHEL PSSR.
(Signature, date & seal of Authorized Signatory of the bidder)
Date:

FORMS & PROCEDURES BANK ACCOUNT DETAILS FOR E-PAYMENT

Form No: F-07 (Rev 00)

BANK ACCOUNT DETAILS FOR E-PAYMENT

<u>(S</u>	•	ompany /Firm of Bidder, and <u>ENDORSED</u> to enable BHEL release payments through
1.	Beneficiary Name	:
2.	Beneficiary Account No.	:
3.	Bank Name & Branch	:
4.	City/Place :	
5.	9 digit M ICR Code of Bank Branch	:
6.	IFSC Code of Bank Branch	:
7.	Beneficiary E-mail ID (for payment confirmation)	:

NOTE: In case Bank endorsed certificate regarding above has already been submitted earlier, kindly submit photocopy of the same.

FORMAT FOR SEEKING CLARIFICATION

Form No: F-08 (Rev 00)

FORMAT FOR SEEKING CLARIFICATION

(To be typed and submitted in the Letter Head of the Company/Firm of Bidder)
To,
(Write Name & Address of Officer of BHEL inviting the Tender)
Dear Sir,
Sub: Request for Clarification Ref: 1) NIT/Tender Specification No:

2) All other pertinent issues till date

SI no	Reference clause of Tender Document	Existing provision	Bidder's query	BHEL's clarification
1				
2				
3				
4				
5				
6				

Yours faithfully,

(Signature, date & seal of Authorized Representative of the Bidder)

FORMS PROCEDURES CAPACITY EVALUATION OF BIDDERS FOR CURRENT TENDER

Form No: F-09 (Rev 00)

CAPACITY EVALUATION OF BIDDERS FOR CURRENT TENDER

	DESCRIPTION OF WORK (Similar to Tendered Scope)	WORK ORDER REF & DATE	CONTRACT VALUE (Rs. LACS)	CUSTOMER NAME & ADDRESS	CURRENT STATUS OF THE JOB ALONG WITH LATEST MILE STONE COMPLETED	%AGE OF WORK COMPLETED	VALUE OF BALANCE WORK (Rs. Lacs)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

NOTES:

1. BIDDERS ARE REQUIRED TO	FURNISH ALL TI	HE JOBS OF SIMI	LAR NATURE	WHICH THEY	ARE EXECUTING	(IN PROGRESS)	AT THE TIME
OF SUBMISSION OF TENDER, A	S PER ABOVE FO	RMAT.					

2. BIDDERS HEREBY UNDERTAKE THAT THEY HAVE FURNISHED THE DETAILS SOUGHT AS PER POINT NO. 1 IN TOTALITY AND THAT THE DETAILS FURNISHED IS COMPLETE IN ALL RESPECT.

3. BHEL WILL TAKE APPROPRIATE ACTION AS DEEMED FIT , IN CASE, IT IS FOUND AT A LATER DATE THAT THE CONTRACTOR HAD SUPPRESSED THE FACTS AND HAVE NOT FURNISHED THE CORRECT & COMPLETE INFORMATIONS.

DATE:	Signature
PLACE:	Name, Designation & Seal of Bidder

Form No: F-10 (Rev. 00)

BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking)
Power Sector – Southern Region
Chennai

CONTRACT AGREEMENT

AGREEMENT NO	
NAME OF WORK	
NAME OF THE CONTRACTOR WITH FULL ADDRESS	
VALUE OF WORK AWARDED	
LETTER OF INTENT NO.	
TIME ALLOTTED FOR COMPLETING THE WORK (DATE OF COMPLETION)	
SIGNATURE OF CONTRACTOR	(SIGNATURE OF BHEL OFFICER)
CONTRA	ACT AGREEMENT
Company incorporated under the C	DAY OF between MITED (A Government of India Enterprise) a companies Act, 1956, having its Registered Delhi- 110049 (herein after called BHEL) of
M/C	AND
M/S (hereinafter called the `Contr	ractor') of the SECOND PART.

WHEREAS M/sstate that they have acquired and possess extensive experience in the field of And
Whereas in response to an Invitation to Tender No issued by BHEL for execution of the contractor submitted their offer Nodateddated
And whereas BHEL has accepted the offer of the Contractor on terms and conditions specified in the Letter of Intent Nodateddateddateddated
THIS AGREEMENT WITNESSES AND it is hereby agreed by and between the parties as follows:
1. That the contractor shall execute the work ofand more particularly described in Tender Specification Noincluding Drawings and Specifications (hereinafter called the said works) in accordance with and subject to terms and conditions contained in these presents, instructions to Tenderers, General Conditions of Contract, Special Conditions, Annexures, Letter of Intent datedand such other instructions, Drawings, Specifications given to him from time to time by BHEL.
2. The Contractor is required to furnish to BHEL Security deposit in the form of cash/ approved securities/ Bank Guarantee valid upto for a sum of Rs towards satisfactory performance and completion of the Contract.
3. The Contractor has furnished a Bank Guarantee bearing nodatedfor a sum of Rsexecuted byin favour of BHEL towards Security Deposit valid upto
OR
The Contractor has furnished to BHEL an initial Security Deposit of Rsin the form of cash / approved Securities/ B.G No dated for Rsexecuted by in favour of BHEL valid upto and has agreed for recovery of the balance security deposit by BHEL @ 10% of the value of work done from each running bill till the entire Security Deposit is recovered.
OR
The contractor has furnished to BHEL an initial Security Deposit of Rs
4. The Contractor hereby agrees to extend the validity of the Bank Guarantee for such further period or periods as may be required by BHEL and if the Contractor fails to obtain such extension(s) from the Bank, the Contractor, shall pay forthwith or accept recovery of Rs from the bills in one

installment and the contractor further agrees that failure to extend the validity of the Bank Guarantee or failure to pay the aforesaid amount in the manner specified above shall constitute breach of contract. In addition to above, BHEL shall be entitled to take such action as deemed fit and proper for recovering the said sum of Rs.------

OR

In case the contractor furnishes the bank guarantee at a later date the contractor hereby agrees to extend the validity of bank guarantee for such further period or periods as may be required by BHEL and if the contractor fails to obtain such extension(s) from the bank, the contractor shall pay forthwith or accept recovery of the amount of bank guarantee given in lieu of security deposit from the bills in one installment and the contractor further agrees that failure to extend the validity of bank guarantee or failure to pay the aforesaid amount in the manner specified above shall constitute breach of contract. In addition to above, BHEL shall be entitled to take such action as deemed fit and proper for recovering the said sum.

- 5. That in consideration of the payments to be made to the Contractor by BHEL in accordance with this Agreement the Contractor hereby covenants and undertakes with BHEL that they shall execute, construct, complete the works in conformity, in all respects, with the terms and conditions specified in this Agreement and the documents governing the same.
- 6. That the Contractor shall be deemed to have carefully examined this Agreement and the documents governing the same and also to have satisfied himself as to the nature and character of the Works to be executed by him.
- 7. That the Contractor shall carry out and complete the execution of the said works to the entire satisfaction of the Engineer or such other officer authorised by BHEL, within the agreed time schedule, the time of completion being the essence of the Contract.
- 8. That BHEL shall, after proper scrutiny of the bills submitted by the Contractor, pay to him during the progress of the said works such sum as determined by BHEL in accordance with this Agreement.
- 9. That this Agreement shall be deemed to have come into force from ------ the date on which the letter of intent has been issued to the Contractor.
- 10. That whenever under this contract or otherwise, any sum of money shall be recoverable from or payable by the Contractor, the same may be deducted in the manner as set out in the General Conditions of Contract or other conditions governing this Agreement.
- 11. That all charges on account of Octroi, Terminal and other taxes including sales tax or other duties on material obtained for execution of the said works shall be borne and paid by the Contractor.

- 12. That BHEL shall be entitled to deduct from the Contractor's running bills or otherwise Income Tax under Section 194 (C) of the Income Tax Act, 1961.
- 13. That BHEL shall be further entitled to recover from the running bills of the Contractor or otherwise such sum as may be determined by BHEL from time to time in respect of consumables supplied by BHEL, hire charges for tools and plants issued (Where applicable) and any other dues owed by the Contractor.
- 14. That it is hereby agreed by and between the parties that non- exercise, forbearance or omission of any of the powers conferred on BHEL and /or any of its authorities will not in any manner constitute waiver of the conditions hereto contained in these presents and the liability of the Contractor with respect to compensation payable to BHEL or Contractor's obligations shall remain unaffected.
- 15. It is clearly understood by and between the parties that in the event of any conflict between the Letter of Intent and other documents governing this Agreement, the provisions in the Letter of Intent shall prevail.

To: The fellowing decamente		
Invitation to Tender Nodocuments specified therein.		and the
2. Contractor's Offer No	dated	
3		_
4		_
5		_
6. Letter of Intent No	dated	
7	shall	also
form part of and govern this Agreement.		
IN WITNESS HEREOF, the parties hereto hapresence of	ive respectively set their sign	natures in the
WITNESS	(CONTRACTOR) (to be signed by a person holding a valid Power of Attorney)	
1.		
	a valid i oviol oli illioni	
2.		
WITNESS 1.	(For and on behalf of BHE	EL)

16

2.

The following documents

PROFORMA OF BANK GUARANTEE (in lieu of SECURITY DEPOSIT)

(On non-Judicial paper of appropriate value) (Para 4.7.6 of Works Accounts Manual)

	Bank Guarantee No
	Date
To (Employer's Name and Address)	
In consideration of Bharat Heavy Electricals Limited (hereinafter reference expression shall unless repugnant to the context or meaning there permitted assigns) incorporated under the Companies Act, 1956 and BHEL House, Siri Fort, Asiad, New Delhi – 110049 through its unit at Ender Power Sector Southern Region, Tek Towers, No.11, Old Mahabalipuran Chennai - 600097 having agreed to exempt	eof, include its successors and d having its registered office at Bharat Heavy Electricals Limited, m Road, Okkiyam Thoraipakkam,
Contractor / Supplier) with its registered office at² (hereina	
which term includes supplier), from demand under the terms and co	onditions of the Contract arising
vide Letter of Intent (LOI) reference No	dated ³ valued
at Rs 4 (Rupees	only) ⁴ (hereinafter called the
said Contract), of Security Deposit for the due fulfilment by the sa	id Contractor of the terms and
conditions contained in the said Contract, on production of a Bank G	juarantee for Rs5
(Rupees only),	
We, the	ng our Head Office at Bank), at the request of antor under this Guarantee, do nmediately pay to the Employer,
an amount not exceeding Rs without any demur, in Employer and without any reservation, protest, and recourse and w prove or demonstrate reasons for its such demand	
Any such demand made on the bank, shall be conclusive as regards the Bank under this guarantee. However, our liability under this guarantee amount not exceeding Rs5.	
We undertake to pay to the Employer any money so demanded r disputes raised by the Contractor(s) in any suit or proceeding pending Arbitrator or any other authority, our liability under this present b	g before any Court or Tribunal or
The payment so made by us under this guarantee shall be a valid dischereunder and the Contractor(s) shall have no claim against us for materials.	
We, further agree that the guarantee herein contained shall remain in period that would be taken for the performance of the said Contract enforceable till all the dues of the Employer under or by virtue of the paid and its claims satisfied & the Employer certifies that the terms and have been fully and properly carried out by the said contractor(s) of discharge of this guarantee by the Employer, whichever is earlier. This in force upto and including	t and that it shall continue to be ne said Contract have been fully d conditions of the said Contract or acceptance of the final bill or

on or before the ⁷ , we shall be discharged from all the liability under this guarantee thereafter.
We,(indicate the name of the Bank) further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by any reason of any such variation or extension being granted to the said contractor(s) or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.
The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee that the Employer may have in relation to the Contractor's liabilities.
This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Contractor but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).
We, BANK lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing. Notwithstanding anything to the contrary contained hereinabove:
a) The liability of the Bank under this Guarantee shall not exceed
b) This Guarantee shall be valid up to
We, Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.
Date Day of for (indicate the name of the Bank)
(Signature of Authorised signatory)
 NAME OF VENDOR /CONTRACTOR / SUPPLIER REGISTERED OFFICE ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER. LETTER OF INTENT(LOI) REFERENCE NO. WITH DATE CONTRACT VALUE (AS MENTIONED IN LOI) BG AMOUNT IN FIGURES AND WORDS VALIDITY DATE DATE OF EXPIRY OF CLAIM PERIOD (CLAIM PERIOD SHALL BE MINIMUM OF 3 MONTHS AFTER VALIDITY DATE)

Note:

- 1. The BG should be on Non-Judicial Stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the State(s) where the BG is submitted or is to be acted upon or the rate prevailing in the State where the BG was executed, whichever is higher. The Stamp Paper/e-stamp paper shall be purchased in the name of Vendor/Contractor/Supplier /Bank issuing the guarantee.
- 2. In Case of Bank Guarantees submitted by Foreign Vendors
 - a. From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India) can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.
 - b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor Country's Bank)
 - b.1 In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by any of the Consortium Banks only will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank's (BHEL's Consortium Bank) branch in India. It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements.
 - b.2 In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at sl.no. b.1 will required to be followed.
 - b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time).

BANK GUARANTEE FOR INTEREST BEARING REFUNDABLE ADVANCE

Form No: F-12 (Rev 00)

BANK GUARANTEE FOR INTEREST BEARING REFUNDABLE ADVANCE

B.G. No. Date
This deed of Guarantee made thisday oftwo thousandby < Name and Address of Bank > hereinafter called the "The Guarantor" (which expression shall unless repugnant to the context or meaning thereof be deemed to include its successors and assigns) in favour of M/S Bharat Heavy Electricals Limited a Company incorporated under the Companies Act, 1956, having its registered office at BHEL House, Siri Fort, New Delhi - 110049 through its unit at Bharat Heavy Electricals Limited, Power Sector Southern Region, 690, Anna Salai, Nandhanam, Chennai 600 035, hereinafter called "The Company" (which expression shall unless repugnant to the context or meaning thereof be deemed to include its successors and assigns).
WHEREAS M/s(hereinafter referred to as the Contractor) have entered into a Contract arising out of Letter of Intent nodtd(hereinafter referred to as "the Contract") for the < Name of work > with the Company.
AND WHEREAS the Contract inter-alia provides that the Company will pay to the Contractor interest bearing advance of Rs only) on certain terms and conditions specified in the Contract subject to the Contractor furnishing a Bank Guarantee for Rs only) in favour of the Company.
AND WHEREAS the Company has agreed to accept a Bank Guarantee from a Bank to cover the said advance.
AND WHEREAS the Contractor has approached the Guarantor and in consideration of the arrangement arrived at between the Contractor and the Guarantor, the Guarantor has agreed to give the Guarantee as hereinafter mentioned in favour of the Company.
NOW THIS DEED WITNESSES AS FOLLOWS:- (1) In consideration of the Company having agreed to advance a sum of Rs (Rupees only) to the Contractor , the Guarantor do hereby guarantee the due recovery by the Company of the said advance with interest thereon as provided

BANK GUARANTEE FOR INTEREST BEARING REFUNDABLE ADVANCE

according to the	terms and o	conditions of	the Contra	ct. If the s	said
Contractor fails to	utilise the said	d advance for	the purpose	e of the Contr	ract
and /or the said ac	lvance togeth	er with interes	st as afores	aid is not f	ully
recovered by the (Company the	Guarantor do	hereby ur	nconditionally a	and
irrevocably undertake	e to pay to	the Company	y without c	lemur and me	rely
on a demand, to	the extent	of the said	d sum d	of Rs	
(Rupees	only)	any claim ma	ide by the C	Company on th	ıem
for the loss or damag	ge caused to d	or suffered by	the Compa	any by reasons	s of
the Company not be	ing able to red	cover in full	the advance	with interest	as
aforesaid.					

- (2) The decision of the Company whether the Contractor has failed to utilise the said advance or any part thereof for the purpose of the Contract and / or as to the extent of loss or damage caused to or suffered by the Company by reason of the Company not being able to recover in full the said sum of Rs. with interest if any shall be final and binding on the Guarantor, irrespective of the fact whether the Contractor admits or denies the default or questions the correctness of any demand made by the Company in any Court Tribunal or Arbitration proceedings or before any other Authority.
- (3)The Company shall have the fullest liberty without affecting in any way the liability of the Guarantor under this Guarantee, from time to time to vary any of the terms and conditions of the Contract or extend time of performance by the Contractor or to postpone for any time and from time to time any of the powers exercisable by it against the Contractor and either enforce or forebear from enforcing any of the terms and conditions governing the Contract or securities available to the Company and the Guarantor shall not be released from its liability under these presents by any exercise by the Company of the liberty with reference to the matters aforesaid or by reasons of time being given to the Contractor or any other on the part of the Company or any forbearance, act or commission indulgence by the Company to the Contractor or of any other matter or thing whatsoever which under the law relating to sureties would, but for this provision have the effect of so releasing the Guarantor from its liability under this guarantee.
- (4) The Guarantor further agrees that the Guarantee herein contained shall remain in full force and effect during the period till the Company discharges this Guarantee, subject to however, that the Company shall have no claim under this Guarantee after_____ i.e. (the present date of validity of Bank Guarantee unless the date of validity of this Bank Guarantee is further extended from time to time, as the case may be) unless a notice of the claim under this Guarantee has been served on the Guarantor before the expiry of the said period in which case the same shall be enforceable against the Guarantor not withstanding the fact that the same is enforced after the expiry of the said period.

BANK GUARANTEE FOR INTEREST BEARING REFUNDABLE ADVANCE

(5)	The Guarantor undertakes not to revoke this Guarantee during the period it is in force except with the previous consent of the Company in writing and agrees that any liquidation or winding up or insolvency or dissolution or any change in the constitution of the Contractor or the Guarantor shall not discharge the Guarantor's liability hereunder.
(6)	It shall not be necessary for the Company to proceed against the Contractor before proceeding against the Guarantor and the Guarantee herein contained shall be enforceable against them notwithstanding any security which the Company may have obtained or obtain from the Contractor shall at the time when proceedings are taken against the Guarantor hereunder be outstanding or unrealised.
(7)	Notwithstanding anything contained herein before, our liability under the Guarantee is restricted to Rs (Rupees). Our guarantee shall remain in force until, i.e. the present date of validity of Bank Guarantee unless the date of validity of this Bank Guarantee is further extended from time to time. Unless a claim or demand under this guarantee is made against us on or before, we shall be discharged from our liabilities under this Guarantee thereafter.
(8)	Any claim or dispute arising under the terms of this document shall only be enforced or settled in the courts at Chennai only.
(9)	The Guarantor hereby declares that it has power to execute this Guarantee under its Memorandum and Articles of Association and the executant has full powers to do so on its behalf under the Power of Attorney dated (To be incorporated by the Bank) granted to him by the proper authorities of the Guarantor.
	IN WITNESS whereof the(Bank) has hereunto set and subscribed its hand the day, month and year first, above written.
	(Name of the Bank)
	Signed for and on behalf of the Bank (Designation of the Authorized Person Signing the Guarantee)
	(Signatory No)
DAT	ED.

SEAL

Notes:

- 1. The BG shall be executed on non-judicial stamp papers of adequate value procured in the name of the Bank in the State where the Bank is located.
- 2. The BG is required to be sent by the executing Bank directly to BHEL at the address where tender is submitted / accepted, under sealed cover.

FORMS & PROCEDURES FORM for EXTENSION OF VALIDITY OF BANK GUARANTEE

Form No: F-13 (Rev 00)

FORM for EXTENSION OF VALIDITY OF BANK GUARANTEE

- 1. To be typed on non judicial Stamp Papers of value as applicable in the State of India from where the BG has been issued or the State of India where the BG shall be operated
- 2. The non judicial stamp papers shall be purchased in the name of the Party on whose behalf the BG is being issued or the BG issuing Bank

BANK GUARANTEE No: Date:
То
(Write Designation and Address of Officer of BHEL inviting the Tender)
Dear Sir
Sub: Validity of Bank Guarantee No:
At the request of M/s
Except as provided above, all other terms and conditions of the Original Bank Guarantee No
Kindly treat this extension as an integral part of the original Bank Guarantee to which it would be attached.
Yours faithfully
Signature Name & Designation Power of Attorney / Signing Power No Seal of Bank



Name of Project	Contract No.	
Name of Work	Name of Contractor	

PART- A: PLAN/ REVIEW OF WORK FOR THE MONTH OF

Date of Plan/	

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SN.	Description of work	Unit of Measur ement	Unit Rate	(QTY Pla	nnned for the per Part –C of month)	attril contrac	tive Shortfall butable to ctor upto last month er Note 1)	Ac	hieved	to BHE	l attributable L w.r.t Plan ol. 3 of Part- D)	attri Contra	tive Shortfall butable to actor upto & ag this month	REMARKS (Reasons for Shortfall attributable to Contractor.
(a)	(b)	(c)	(d)		A		В		C	D		E=A	A+B-C-D	Supporting documents to be kept as record.)
				Phy.	Financial	Phy.	Financial	Phy.	Financial	Phy.	Financial	Phy.	Financial	kept us record.)
	Value of Other Items not mentioned above but planned to be executed in this month													
	Total	•		•	ΣΑ		ΣΒ		ΣC		ΣD		ΣΕ	

Note 1: In addition to the work planned as per Col. 'A', Contractor shall also make full efforts to minimize the 'Cumulative shortfall attributable to contractor upto the month' as mentioned in Col. 'B' by enhancing its resources, so as to achieve the completion of activities as per agreed schedule. In case contractor is not able to execute the entire shortfall, then BHEL 'Engineer in-charge', shall decide the priority of work to be executed and it shall be binding on the contractor.

Note 2: Percentage Shortfall attributable to contractor w.r.t. "Plan - Shortfall attributable to BHEL" for the month = $[(\Sigma E - \Sigma B)/(\Sigma A - \Sigma D)]x100$ In case, $(\Sigma E - \Sigma B)$ is negative, then it shall be treated as zero percent."

Note 3: Form 14 should include all items being planned in the current month, and all items against which shortfall was attributable to contractor till previous month. However, for practical reason, if it is not possible to mention some of the items in Form-14 being planned to be executed in this month, then also value of such items shall necessarily be included in calculation of Total Value.

Note 4: In case reason for shortfall attributable to contractor is w.r.t. T&P and Manpower, it should be in conformity with Part B1 and B2.





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Name of Project	Contract No.	
Name of Work	Name of Contractor	

PART – B-1: PLAN/REVIEW OF DEPLOYMENT OF MAJOR T&PS FOR THE MONTH OF

Date of Plan/ Review

CONTRACTOR'S SCOPE:-

		PLAN				DEPLOYMENT STATUS					
SN.	Major T&P to be deployed as per work planned for the month	QTY.	Deployment Period (in days)	Weightage assigned to planned T&P (in fraction such that ΣC =1)	Actual Deployed Quantity	Actual Deployment Period (in days)	Weighted T&P Deployed	REMARKS (Works affected due to non-deployment of T&Ps)			
	A		В	С	D	Е	$F=(C \times D \times E) / (A \times B)$				

Note: In case, E>B, it shall be considered as E=B. Similarly, in case D>A, it shall be considered as D=A. Percentage of T&P Deployed = $\Sigma F \times 100$

BHEL SCOPE:-

	PLAN			DEPLOYMENT STATUS				
SN.	Major T&P to be deployed as per work planned for the month	QTY.	Deployment Period (in days)	Actual Deployed Quantity	Actual Deployment Period (in days)	REMARKS (Works affected due to non-deployment of T&Ps)		





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Nam	e of Project				Contract No.							
Nam	Name of Work Name of Contractor											
CON	PART – B-2: PLAN/ REVIEW OF DEPLOYMENT OF MANPOWER FOR THE MONTH OF											
SN.	Area of Work	Category of Labour	No. of Labour required as per category	Deployment Period (in days)	No. of Labour actually deployed	Actual Deployment Period (in days)	REMARKS (Works affected due to non- availability of labour)					
			A	В	С	D						

Percentage of Manpower Deployed= $100 \times \Sigma(CxD)/\Sigma(AxB)$



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Name of Project	Contract No.	
Name of Work	Name of Contractor	

PART – C: PLAN(PHYSICAL) FOR THE NEXT MONTH i.e. Date of Plan

		Planned			T&Ps Re	equired		Manpower Required		REMARKS (Reasons for	
SN.		Quantity (excluding	,	Unit of Contractor Scope		BHEL Sco	pe				
		Planned	d shortfalls	Measu-	Major T&P to be deployed as per work planned for the month	Quantity	Major T&P to be deployed as per work planned for the month	Quantity	Category of Labour	No. of Labour required as per Category	difference in Original Planned Quantity w.r.t. Planned quantity to be given)

Note 1: Planned quantity should be based on available/ expected fronts/ inputs in the next month

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Note 2: "Original Planned Quantity" shall be as per latest jointly agreed programme between BHEL and Contractor before commencement of work or at the time of latest Time Extension, as the case may be.





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Name of Project	Contract No.	
Name of Work	Name of Contractor	

PART - D: REASONS FOR SHORTFALL ATTRIBUTABLE TO BHEL IN RESPECT OF PLAN FOR THE MONTH

						TERRITOR THE STORTH	
		Description of Work	Quantit	ies Affected	Reasons for Shortfall	Agency responsible for	Remarks
S	N.	(from Part-A)	Physical	D1 : 1 II : C1 (reasons for shortfall	(Supporting Documents in respect of agency responsible)	
			Quantity	rement			
	1	2	3		4	5	6

Note1: Reasons for shortfall shall include non-availability of fronts/ drawings/ materials/ T&P (BHEL Scope)/ clearances etc. and other hindrances for which contractor is not responsible.

Note2: Agency responsible may be BHEL Site/ MUs/ Design Centre/ BHEL Customer etc.

Form No: F-14 (Rev 01)

Form No.: F-15 (Rev 03)

Project		Vendor			Package/Unit	
SI. No.	Parameter for Measurement	Classification	Max Score	Score Obtained	Measurement Key/Scheduled date	Supporting Documents
#1.01	Cumulative number of days in the month, the nominated Quality Officer or his authorised nominee was not available	QUALITY	1.5		Quality Officer or his authorised nominee should be available for all the days of working at site	Daily Log Book entry/Incident Registers/letter references
#1.02	Number of instances of non- compliance wrt FQP, Standard Drawings, Specifications, E&C Manuals etc.	QUALITY	1.5		No deviation from FQP, Standard Drawings, Specifications, E&C Manuals etc. is allowed without BHEL Engineer's approval.	Daily Log Book entry/Incident Registers/letter references
#1.03	Percentage submission of test certificates for batches of welding electrodes, cement, sand, aggregate, consumable, Paints etc. as applicable for this month OR In case of MM & MH package, monthly checks for Storage/Preservation of material.	QUALITY	1		Submission of 100% Test certificates for materials as per FQP is mandatory. MM & MH package: Storage/Preservation as per manual/procedure.	Daily Log Book entry/Incident Registers/letter references
#1.04	Number of incidences of improper storage & preservation (not in accordance to the guidelines of BHEL MUs or approved FQP) of materials, consumables (viz. gases, welding electrodes & fluxes, fuel etc.) & bought-out items (paints, fasteners etc.) under the custody of the contractor	QUALITY	1		Total number of non-compliances	Daily Log Book entry/Incident Registers/letter references
#1.05	Rework/ Rejection instances in a month necessitated due to deviation from Standard Drawings /Specifications /Manuals /E&C procedures /FQPs or due to Poor Workmanship by contractor	QUALITY	2		Reworks/ Rejection should be as minimum as possible. Total number of reworks/ rejections due to reasons attributable to contractor.	Daily Log Book entry/Incident Registers/letter references
#1.06	Delay in preparation & submission of signed protocols / log sheets / site register / NDT test reports as per approved FQP/ Qualified Welder List along with photocopies of Welder ID cards / Welder Performance Evaluation records etc. in the month OR in case of MM / MH package reconciliation statement / verification report.	QUALITY	1		Within 2 days of measurements taken or within first 3 working days of next month, as advised by BHEL Engineer	Daily Log Book entry/Incident Registers/letter references
#1.07	Number of instances for Major equipment/product failure due to negligence/improper work/poor workmanship by contractor	QUALITY	1		No such event should happen	Daily Log Book entry/Incident Registers/letter references
#1.08	Total number of complaints received in the month on the quality of finish / aesthetics	QUALITY	1		Total number of non-compliances	Daily Log Book entry/Incident Registers/letter references

Form No.: F-15 (Rev 03)

Project		Vendor			Package/Unit	
SI. No.	Parameter for Measurement	Classification	Max Score	Score Obtained	Measurement Key/Scheduled date	Supporting Documents
#2.01	Cumulative number of days of delay in submission of Plan FOR THE MONTH supported by deployment plan of Major T&Ps and Manpower (as per Form F-14) and relevant construction/layout drawings - like A4 plan / elevation views of plan status for structures / pressure parts/Civil Works, Piping isometrics for piping, Layout / PID / System reference sketch, Unloading / storage plans etc.as applicable.	PERFORMANCE	5		Number of days delayed from second working day of the month	Daily Log Book entry/Incident Registers/letter references
#2.02	Percentage of timely submission of Daily Reports for Progress of work, Resources, Consumables etc.	PERFORMANCE	1.5		Percentage of timely submission of daily reports/ Scheduled date is successive next day for each day	Daily Log Book entry/Incident Registers/letter references
#2.03	Number of days delayed for submission of FQP log sheets / protocols / Monthly Progress Reports for the work executed during the month under measurement	PERFORMANCE	1.5		Number of days delayed/Scheduled date is first 2 working days of next month	Daily Log Book entry/Incident Registers/letter references
#2.04	Percentage Shortfall attributable to contractor w.r.t. "Plan - Shortfall attributable to BHEL" for the month as per Form-14	PERFORMANCE	35		As per Part-A of Form-14	Progress review formats
#2.05	Number of days delayed in submission of Running bills with complete supporting documents (including updated reconciliation statement of BHEL issued material) for the month	PERFORMANCE	2		Number of days delayed / Scheduled date is 7th day of next month	Daily Log Book entry/Incident Registers/letter references
#2.06	Number of times the Top Management of contractor did not respond to critical issues of site, for the month	PERFORMANCE	1		Total number of instances	Daily Log Book entry/Incident Registers/letter references
#2.07	Cumulative number of days in the month the works were stopped / refused on interpretation of contract clauses/scope due to tendency of taking undue advantage by interpreting contract clauses in their favour	PERFORMANCE	2		Cumulative number of days lost	Daily Log Book entry/Incident Registers/letter references
#2.08	Number of times rework was refused by contractor	PERFORMANCE	1		Total number of non-compliances	Daily Log Book entry/Incident Registers/letter references

Form No.: F-15 (Rev 03)

Project		Vendor			Package/Unit	
SI. No.	Parameter for Measurement	Classification	Max Score	Score Obtained	Measurement Key/Scheduled date	Supporting Documents
#2.09	Cumulative number of days in the month recording / logging was not done in daily log / history register / hindrance register / soft form in a PC maintained at BHEL Site Office	PERFORMANCE	1		Cumulative number of days recording or logging was not done / all days of the month	Daily Log Book entry/Incident Registers/letter references
#3.01	Percentage of Manpower Deployed w.r.t. Plan for the month as per Form-14.	RESOURCES	7		As per Part-B2 of Form-14	Daily Log Book entry/Incident Registers/letter references
#3.02	Percentage of T&P Deployed w.r.t. Plan for the month as per Form-14.	RESOURCES	7		As per Part-B1 of Form-14	Daily Log Book entry/Incident Registers/letter references
#3.03	Cumulative number of major instances in the month hampering / affecting progress of work due to breakdown or non-availability of major T&P and MME for the work, under the scope of Contractor	RESOURCES	3		Cumulative number of instances	Daily Log Book entry/Incident Registers/letter references
#3.04	Cumulative number of major instances in the month hampering / affecting progress of work due to non-availability of Consumables/ use of improper consumables under the scope of contractor	RESOURCES	3		Cumulative number of instances	Daily Log Book entry/Incident Registers/letter references
#4.01	Number of non-compliances during the month for Statutory requirements like validity of Labour Licence, Insurance Policy, Labour Insurance, PF, BOCW Compliance etc. and any other applicable laws/ Regulation, Electrical Licence, T&P fitness certificate, Contractors' All Risk Policy etc. as applicable	SITE INFRASTRUCTURE & SERVICE	1		Total number of non-compliances	Daily Log Book entry/Incident Registers/letter references
#4.02	Cumulative number of days in a month poor illumination is reported at storage area, erection area, pre-assembly area and other designated areas by BHEL site.	SITE INFRASTRUCTURE & SERVICE	0.5		Total number of non-compliances/random checks	Daily Log Book entry/Incident Registers/letter references
#4.03	Cumulative number of days of non-availability of well-maintained toilets facilities for workers (separate for men and women) and non-availability of potable drinking water stations for workers in specified areas.	SITE INFRASTRUCTURE & SERVICE	1		Total number of non-compliances/random checks	Daily Log Book entry/Incident Registers/letter references

Project		Vendor			Package/Unit	
SI. No.	Parameter for Measurement	Classification	Max Score	Score Obtained	Measurement Key/Scheduled date	Supporting Documents
#4.04	Total number of instances in the month, Housekeeping NOT attended to in spite of instructions by BHEL -i.e. removal / disposal of surplus earth / debris / scrap / unused / surplus cable drums / other electrical items / surplus steel items / packing materials, thrown out scrap like weld butts, cotton waste etc. from the working area to identified locations	SITE INFRASTRUCTURE & SERVICE	2		Total number of non-compliances/random checks	Daily Log Book entry/Incident Registers/letter references
#4.05	Total number of instances in a month, Site Office with reasonably good facilities including enough nos. of computers and printers etc. for use by office and supporting staff was not made available/maintained.	SITE INFRASTRUCTURE & SERVICE	0.5		No discrepancy during regular or surprise visits	Photograph and report of the Engineer
#5.01	Number of days delayed in making labour payments for the last month	SITE FINANCE	2		Number of days delayed / Scheduled date is 7th day of next month	Daily Log Book entry/Incident Registers/letter references
#5.02	Number of complaints from labour/ sub supplier/ sub-contractor for non-receipt of payments from contractor	SITE FINANCE	1.5		Total number of complaints or reporting	Daily Log Book entry/Incident Registers/letter references
#5.03	Number of times the site operations were hampered for want of funds at the disposal of site-in-charge.	SITE FINANCE	1.5		Total number of non-compliances	Daily Log Book entry/Incident Registers/letter references
#6.0	Performance against HSE Parameters (as per Annexure-AA)	HSE	10		Score as per Safety Performance Evaluation System, scaled down to 10	Safety Performance Evaluation System
	I	Total	100			ı

Less Deduction in Score Due to Fatal Accidents attributable to the Contractor @ 20 points/ accident	
Less Deduction in Score Due to Major Accidents (Permanent Disability or bodily injury by which person injured is prevented to resume to work within 48 hours or more after accident,, Major Damage to Equipment etc.) attributable to the contractor @ 15 points/ accident	
Less Deduction in Score Due to Minor Accidents attributable to the contractor @ 2 points/ accident	
Less Deduction in Score Due to not Maintaining of Labour Colony (if applicable) as per BHEL HSE policy @3 points in a month on verification any day	
Final Score	

Project		Vendor			Package/Unit	
SI. No.	Parameter for Measurement	Classification	Max Score	Score Obtained	Measurement Key/Scheduled date	Supporting Documents
	Performance Score Summary for the Month	Total Score	Score Obtained			
	QUALITY	10				
	PERFORMANCE	50				
	RESOURCES	20				
	SITE INFRASTRUCTURE & SERVICE	5				
	SITE FINANCE	5				
	HSE	10				
	OTHERS (deductions if any)	0	-			
	TOTAL	100				

Note:

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

Monthly Safety Performance Evaluation of Contractor

SL	Parameter for Measurement	M/O	Wt	Supporting Documents
1 a	Induction training for new workers conducted through audiovisual medium & documented ?	М	1	Induction Training Records
1b	Tool box talk conducted regularly as per plan, and documented?	M	1	Toolbox Talk Records
1 C	Contractor in charge and safety in charge attended safety meetings?	М	2	Minutes of Meeting
1d	Whether observations in safety meetings are complied before next meeting?	М	2	-do-
1e	Preparation and submission of Monthly HSE report within stipulated time	М	1	Report submission date
1 f	Preparation and submission of Incident/near-miss report and RCA Report (as applicable) within stipulated time	М	1	Incident/ Near Miss Records
1 g	Carrying out Inspections and submission of Inspection reports within stipulated time	М	1	Inspection Records
1h	Regular Job Specific Training ensured for High Risk Workers (through audio-visual medium) as per plan	М	1	Training & Attendance Records
2a	Whether the contractor is registered under BOCW	M	2	BOCW Registration Certificate
2b	Availability of Qualified safety officer (1 for every 500 labour)	М	2	Safety Officer qualification & experience records
20	Availability of Qualified safety supervisor (1 for every 100 labour)	М	2	Safety Officer qualification & experience records
2d	All the workers are provided and using safety helmets and safety shoes/gum boots	М	2	PPE Issue Records, Inspection/ non-conformity records
2 e	Housekeeping done on regular basis and scrap removal at site	М	1	Housekeeping records, Inspection/ non-conformity records
2f	Usage of Goggles/Face shields and Hand gloves for gas cutter and grinders		1	PPE Issue Records, Inspection/ non-conformity records
2 g	Wall openings & floor openings are guarded?		1	Inspection/ non-conformity records
2h	Adequate illumination provided in all working area?		1	Inspection/ non-conformity records
2i	Safety posters, sign boards and emergency contact numbers in all prominent location are displayed?		1	Inspection/ non-conformity records
2 j	Availability of automatic reverse horns, Main horn, hook latches for Vehicles, mobile cranes, Hydras		1	Inspection/ non-conformity records
2k	Ban of carrying mobile phones to work place is implemented for workers		1	Inspection/ non-conformity records
2	Availability of Tags & Inspection Certificates for Cranes of all capacities		1	Master T&P List with internal & external test details
21.2	Availability of Tags & Inspection Certificates for Winches of all capacities		1	Master T&P List with internal & external test details
21.3	Availability of Tags & Inspection Certificates, colour coding for Chain pulley blocks		1	Master T&P List with internal & external test details
21.4	Availability of Tags & Inspection Certificates for Vehicles - Trailers, Dozers, Dumpers, Excavators, Mixers etc.		1	Master T&P List with internal & external test details
2l.5	Availability of Tags & Inspection Certificates for Welding machines, grinders, Drilling machines, etc.		1	Master T&P List with internal & external test details

2m.1 Use of Lifting Permit as per requirement 2m.2 Use of Height Permit as per requirement 2m.3 Use of Height Permit as per requirement 2m.4 Use of Height Permit as per requirement 2m.5 Use of Height Permit as per requirement 2m.6 Use of Excavation permit as per requirement 2m.7 Use of Confined space work permit as per requirement 2m.6 Use of Gordined space work permit as per requirement 2m.7 Use of Confined space work permit as per requirement 2m.6 Use of Gordined space work permit as per requirement 2m.7 Use of Confined space work permit as per requirement 2m.8 Use of Gordined space work permit as per requirement 2m.9 Use of Radiography permit as per requirement 2m.9 Use of Radiography permit as per requirement 2m.9 Use of Radiography permit as per requirement 2m.10 Use of Any other Applicable Permit as per requirement 3material safety data sheet(MSDS) available for all chemicals and displayed in usage and storage area? 3material safety data sheet(MSDS) available for all chemicals and displayed in usage and storage area? 3material safety data sheet(MSDS) available for all chemicals and displayed in usage and storage area? 3material safety data sheet(MSDS) available for all chemicals and displayed in usage and storage area? 3material safety data sheet(MSDS) available for all chemicals and displayed in usage and storage area? 3material safety data sheet(MSDS) available for all chemicals and displayed in usage and storage area? 3material safety data sheet(MSDS) available for all chemicals and displayed in usage and and in case of spill? 3material safety data sheet(MSDS) available for all chemicals and displayed in usage and shorage area? 3material safety data sheet(MSDS) available for all chemicals and displayed records 3material safety data sheet(MSDS) available for all chemicals and displayed non-conformity records 4material safety data sheet(MSDS) available for all chemicals and in spection/ non-conformity records 4material safety data sheet data sheety data sheety data sheety data sheety data sheety data she	nal &	Master T&P List with interna external test details	1		Availability of Tags & Inspection Certificates, colour coding for Wire rope slings etc.	21.6
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	у	records			and fire buckets filled with sand?	
6c whether Caution Boards have been displayed? 1 -do-		-do-	1		,	6b
		-do-	1		whether Caution Boards have been displayed?	6c
6d Usage of Metal Plug top for all hand power tools? 1 -do-		-do-	1		Usage of Metal Plug top for all hand power tools?	6d
6e Usage of Insulated welding cables. 1 -do-	_	-do-	1		Usage of Insulated welding cables.	6e
6f Electrical Booth/Distribution Board to be covered by proper Canopy.		-do-	1		,	6f
6g Availability of functional & individual 30ma ELCB / RCCB and MCB for protection and conducting periodical check-up? 1 -do-			1		Availability of functional & individual 30ma ELCB / RCCB and MCB	6g
6h Double earthing for panel boards and all machinery & proper earth pit with regular inspection available? 1 -do-		-do-	1			6h
6i Whether Electrician is qualified and experienced 1 Qualification & Experience records of electrician	į	•	1		Whether Electrician is qualified and experienced	6i
6j Availability and usage of Rubber hand gloves by electrician? Inspection/ non-conformity records	У	Inspection/ non-conformity records	1		Availability and usage of Rubber hand gloves by electrician?	6 <u>j</u>

7a	Whether Scaffolding pipes made with steel or aluminium, are being used and checked periodically by experienced/ certified scaffolder?		2	Inspection/ non-conformity records
7b	8mm Stainless Steel wire rope with plastic cladding is provided for life line (Vertical / Horizontal) during height work?		2	-do-
7C	Availability of emergency lighting in case of power failure		1	-do-
7d	Whether all the openings are covered with Safety Nets made of fire proof Nylon?		1	-do-
7e	Whether MS pipe rails around staircases & platforms in usage are provided with top, middle rails and toe guard?		1	-do-
7 f	Whether Ladder with vertical life line /Fall arrestor is available to climb?		1	-do-
79	Whether all workers deployed for working at height have been issued height pass after undergoing vertigo test?		1	Height Pass records
7h	Whether all workers deployed for height work / climbing ladder are provided and using Double lanyard safety belt?		1	PPE Issue records, inspection/ non-conformity reports
7 i	Is all hand tools/Small material used by height workers is tied firmly to prevent fall?		1	-do-
8a	Flash back arrestors for all gas cutting sets is available on Torch side and cylinder side		1	Inspection/ non-conformity records
8b	Oxygen/Acetylene/LPG cylinders not in use have caps in place and stored separately?		1	-do-
8c	Availability of Face screen, Hand gloves, and Apron, for welders		1	-do-
8d	Protection from falling hot molten metal during metal cutting / welding at height by providing GI sheet below the cutting area especially in fire prone areas		1	-do-
9a	Pre-employment medical check-up done for all workers and submitted?		1	Medical check records
9b	Availability of first aid centre, with MBBS doctor(Own or Sharing basis)	М	2	Attendance records
9c	Availability of Ambulance facility 24 hours (Own or sharing basis)	M	2	-do-
9d	Is First aid trained personnel's are available and their names are displayed at site?	М	1	-do-
9e	Availability of Emergency vehicle at site		1	
9f	Periodical medical check-up is conducted for all the workers and submitted?		1	Medical check records
99	Availability of sufficient number of first aid box as per standard list and maintaining record		1	Inspection records
10a	Availability of Fire extinguishers, buckets at all vulnerable points		2	Fire extinguisher records
10b	Periodic fire mock drill conducted?		1	Fire, Mock drill records
10 C	Are all flammable materials are stored separately?		1	
10d	Periodic grass cutting is done in material storage area?		1	
10e	Availability of 24V DC lighting in confined space work area		1	

Note:

- M: Mandatory; O: Optional. Points other than mandatory can be excluded with appropriate justification (scope etc.) by BHEL. Score obtained in selected parameters divided by maximum possible score of selected parameters shall be multiplied by 10 for use in as per point SI. no. # 6.0 as detailed at page 4 of Form F-15.
- > There shall be deduction of marks from overall score for Fatal/ Major/ Minor Accidents and for not maintaining labour colony, as detailed at page 4 of Form F-15.

INDEMNITY BOND

Form No: F-21 (Rev 00)

INDEMNITY BOND

(To be executed on a Non Judicial Stamp Paper of the requisite value as per Stamp Duty prevalent in the respective State)

This Indemnity Bond executed by <name of company> having their Registered Office at <xxxxxxxxxxxx in favour of M/s Bharat Heavy Electricals Limited, a Company incorporated under the Companies Act, 1956, having its Registered Office at BHEL House, Siri Fort, Asiad, New Delhi - 110049 through its Unit at Power Sector- Southern Region, 690, Anna Salai, Nandhanam, Chennai-35, Tamilnadu. (Hereinafter referred to as the Company)

AND WHEREAS under the provisions of GCC further stipulates that the Contractor shall indemnify the Company against all claims of whatever nature arising during the course of execution of Contract including defects liability period of <xx Months > i.e till <xx xx xxxx>

Now this deed witness that in case the Company is made liable by any Authority including Court to pay any claim or compensation etc. in respect of all labourers or other matters at any stage under or relating to the Contract with the Contractor, the Contractor hereby covenants and agrees with the Company that they shall indemnify and reimburse the Company to the extent of such payments and for any fee, including litigation charges, lawyers' fees, etc, penalty or damages claimed against the Company by reason of the Contractor falling to comply with Central/States Laws, Rules etc, or his failure to comply with Contract (including all expenses and charges incurred by the Company).

INDEMNITY BOND

The Contractor further indemnifies the Company for the amount which the Company may be liable to pay by way of penalty for not making deductions from the Bills of the Contractor towards such amount and depositing the same in the Government Treasury.

The Contractor further agree that the Company shall be entitled to with hold and adjust the Security Deposit and/or with hold and adjust payment of Bills of Contractor pertaining to this Contract against any payment which the Company has made or is required to make for which the Contractor is liable under the Contract and that such amount can be withheld, adjusted by the Company till satisfactory and final settlement of all pending matters and the Contractor hereby gives his consent for the same.

The Contractor further agrees that the terms of indemnity shall survive the termination or completion of this contract.

The contractor further agrees that the liability of the contractor shall be extended on actual basis notwithstanding the limitations of liability clause, in respect of :

- 1. breach of terms of contract by the contractor
- 2. breach of laws by the contractor
- 3. breach of Intellectual property rights by the contractor
- 4. breach of confidentiality by the contractor

Nothing contained in this deed, shall be construed as absolving or limiting the liability of the Contractor under said Contract between the Company and the Contractor. That this Indemnity Bond is irrevocable and the condition of the bond is that the Contractor shall duly and punctually comply with the terms and the conditions of this deed and contractual provisions to the satisfaction of the Company.

In witness where of M/s xxxxxxxxxxxx these presents on the day, month and year first, above written at xxxxxxxx by the hand of its signatory Mr. xxxxxxxxxxx.

Witness:

1

2

CONSORTIUM AGREEMENT

Form No: F-22 (Rev 00)

CONSORTIUM AGREEMENT

(To be executed on Rs. 50/- Non – Judicial Stamp Paper)

CONSORTIUM AGREEMENT

WHEREAS the First Party and the Second Party are contractors engaged in the business of carrying out various items of works. WHEREAS the two parties have agreed to constitute themselves into a consortium for the purpose of carrying out the said works, and that the consortium will be continued till the completion of the works in all respects.

WHEREAS the parties have agreed to certain terms and conditions in this regard:

NOW THEREFORE THIS AGREEMENT WITNESSETH AS FOLLOWS:

- First and Second parties hereby constitute themselves into a Consortium for the purpose of bidding and undertaking the said works pursuant to the said NIT as hereinafter stated.
- 2. The First Party will be the leader (Lead Partner) and will be responsible for the entire works.
- 3. The First Party shall undertake the following part(s) of work detailed in the NIT namely _____
- 4. The Second Party shall undertake the following part(s) of work detailed in the said NIT namely ______
- 5. The parties hereby declare and confirm that each of them will fulfill the required minimum qualifying requirements as prescribed in the said NIT for the works agreed to be undertaken by them as stated here-in-above.
- 6. It is also agreed between the parties hereto that all of them shall be individually and severally responsible for the completion of the said works as per the schedule. Further, if the Employer / Owner sustains any loss or damage on account of any breach of the Contracts, we the, Consortium partners individually and severally undertake to promptly indemnify and pay such losses / damages caused to the Employer/Owner on its written demand without any demur, reservation, contest or protest in any manner whatsoever.

CONSORTIUM AGREEMENT

- 7. The parties hereby agree and undertake that they shall provide adequate finances, suitable Tools, Plants, Tractors, Trailers, other transportation equipment, other Tools & Plants, Measuring & Monitoring Equipments (MMEs), Men and Machinery etc. for the proper and effective execution of the works to be undertaken by them as specified here-in-above.
- 8. It is agreed interse between the parties hereto that all the consequences liabilities etc., arising out of any default in the due execution of the said works shall be borne by the party in default, that is by party in whose area of works default has occurred, provided however, so far as M/s Bharat Heavy Electricals Limited is concerned, all the parties shall be liable jointly and severally.

IN WITNESS HEREOF the parties above named have signed this agreement on the day month and year first above written at _____(Place) .

WITNESS For

1. NAME
2. OFFICIAL ADDRESS (FIRST PARTY)

WITNESS For

- 1. NAME (SECOND PARTY)
- 2. OFFICIAL ADDRESS

[The successful bidder shall have to execute the "JOINT DEED OF UNDERTAKING" in the format to be made available by BHEL at the time of awarding].

REFUND OF SECURITY DEPOSIT

Form No: F-23 (Rev 00)

REFUND OF SECURITY DEPOSIT

	nstruction Manager Site Office,	
Dear S	ir,	
Ref:	Refund of Security Deposit Contract No:,	
dated	nave submitted Final Bill in respect of the above Contract/Work vide our letter no:	
1.	tails of Security Deposit are as below: Cash Portion : BG Portion :	
Thanki	ng You	
Date:	Authorised representative of Conf	tractor
	To be filled up by BHEL	·
	Security Deposit to be refunded: a. Cash Portion: b. BG Portion : Less	
3.	 a. Amount spent by BHEL on behalf of Contractor: b. Payments made by BHEL on behalf of Contractor: c. Other recoveries for Services etc d. Any other recoveries e. Total of 'a' to 'd': Net Amount to be released (1-2): 	
4.	 Certified that a. The payment recommended for release is in order and there are no demands othe those included in the claim outstanding from the Contractor b. Contract Guarantee period of Months commenced wef: c. All objections raised so far have been settled d. A note for refund of Security Deposit has been made in the Measurement Book 	
_	re of BHEL Engineer Construction Mana	ger

REFUND OF GUARANTEE MONEY

Form No: F-24 (Rev 00)

BHARAT HEAVY ELECTRICALS LIMITED POWER SECTOR, SOUTHERN REGION

REFUND OF GUARANTEE MONEY								
Ref	No	:	Date	e:				
	1.	Name and Address of Contractor	:					
	2.	Contract Agreement/LOI No	:					
	3.	Date of Contract Agreement/LOI	:					
	4.	Name of the Work undertaken	:					
	5.	Date of commencement of the Work	:					
	6.	Date of Completion of the Work	:					
	7.	Period of Maintenance (Guarantee Period)						
	8.	Date on which the Final Bill was paid	:					
	9.	Last date of making good the defect during Maintenance Period	:					
	10.	Expenditure incurred by BHEL during Maintenance Period, if any, recoverable	:					
	11.	Date on which Guarantee Money refund falls due as per Contract	:					
	12.	Amount of Guarantee Money to be refunded	:					
13. Less Amounts recoverable (with details)								
		a. Amount spent by BHEL on maintenance	:					
		b. Payments made by BHEL on behalf of Contracto	r:					
		c. Court dues/penalties/compensation	:					
		d. Other recoveries for Services, etc	:					
		e. Total of 'a' to 'd'	:					
	14.	Net Amount recommended for release (12-13)	:					

REFUND OF GUARANTEE MONEY

CERTIFICATE TO BE FURNISHED BY THE CONTRACTOR

work done or fo Contract Agree and the payme	claim or demand outstanding against BHEL, for the relation or material supplied or any other account arising out of or connected with the ment / LOI (No dated nt of this bill shall be in full and final settlement of all my/our claims and demands
including the 'D	eposits' of the Contract Agreement / LOI referred to.
Date:	Signature of Contracto
CERTIFIC/	TE TO BE FURNISHED BY SENIOR ENGINEER/CONSTRUCTION MANAGER
Certifie	d that
a.	The payment recommended for release is in order and there are no demands other than those included in the claim outstanding from the Contractor
b.	Maintenance period (Contract Guarantee period) is over and the Contractor has carried out the works required to be carried out by him during the period of maintenance (Guarantee) to our satisfaction, and all expenses incurred by the Company on carrying out such works have been included for adjustment
C.	All objections raised so far have been settled
d.	A note for refund of Guarantee Amount has been made in the Measurement Book and Contract Agreement / Work Order
Signature of Bl	EL Engineer
Date:	Construction Manage
	FOR USE IN ACCOUNTS DEPARTMENT
Passed for Rs_	(Rupees only)
Accountant	Accounts Officer
	ACKNOWLEDGE BY THE CONTRACTOR in full and final settlement of my / our claim
Date:	Signature of Contracto

FORMS & PROCEDURES POWER OF ATTORNEY for SUBMISSION OF TENDER / SIGNING CONTRACT AGREEMENT

Form No: F-25 (Rev 00)

POWER OF ATTORNEY for SUBMISSION OF TENDER / SIGNING CONTRACT AGREEMENT

•	ed on non judicial Stamp 		value as applicable and Notarised)
and appoint Mr true and lawful At 'Company', for subrand to do necessar Power Sector South	torney of M/snitting Tender/entering Jawful acts on behavern Region, No 11,	mg into Contract and alf of Company with TEK Towers, Okkiyanection with	nereby make, nominate, constitute ature given below herewith to be hereinafter called inter alia, sign, execute all papers M/s Bharat Heavy Electricals Ltd, am Thoraipakkam, Old
dated			:,
as may be lawfully name of the compa	done by the said att	orney and by or on owers conferred her	acts, deeds, things or proceedings behalf of the company and in the rein and the same shall be binding
	REOF the common sappearing on the do		has been hereunto affixed in the
Dated at	, this	day of	
Director / CMD / Pa	rtner / Proprietor		
		Si	gnature of Mr(Attorney)
Witness		Attested by:	Director/CMD/Partner/Proprietor
			Notary Public

FORMS & PROCEDURES ANALYSIS OF UNIT RATES QUOTED

Form No: F-26 (Rev 00)

ANALYSIS OF UNIT RATES QUOTED

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

Offer Reference No: Date:
To,
(Write Name & Address of Officer of BHEL inviting the Tender)
Dear Sir,
Sub : Analysis of Unit Rates Quoted Ref : Tender Specification No:
Analysis of the Dates wested by one is recorded above. To adenie as detailed

Analysis of Unit Rates quoted by us in respect of above Tender is as detailed

SI. No.	DESCRIPTION	% OF QUOTED RATE	REMARKS
01	SITE FACILITIES VIZ., ELECTRICITY, WATER OTHER INFRASTRUCTURE.		
02	SALARY AND WAGES + RETRENCHMENT BENEFITS		
03	CONSUMABLES		
04	T&P DEPRECIATION & MAINTENANCE		
05	ESTABLISHMENT & ADMINISTRATIVE EXPENSES		
06	OVERHEADS		
07	PROFIT		
	TOTAL	100%	

Yours faithfully,

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

Form WAM 6

BHARAT HEAVY ELECTRICALS LIMITED

DIVISION.....

Running Account Bill

(Para 4.31.1 of Works Accounts Manual)

Name of the Contractor:

Departmental Bill no:

Date:

Division:

Dated:

Sub-Division:

Sanctioned Estimate: Code No:

Name of the Work:

Date of written order to commence the work:

Date of commencement of the Work:

Contract Agreement No:

Due date of completion as per Agreement:

1. ACCOUNT OF WORK EXECUTED

On account payment for work not previous previously measured	work not previously viously measured**al since last Total		Description of Work	Quantity as per agree- ment	Quantity executed up to date	Rate	Unit	Payment on the basis of actual	Quantity since last running	Payment on the basis of actual measurement	Remarks
Total since last As per running Running account Account bill bill	Total up to date							measure- ment up to date	account bill	since last running account bill	
Rs. Rs. I	Rs.					Rs.	P.	Rs.	P.	Rs. P.	
1 2 3	3	4	5	6	7	8	9	10	11	12	13

^{**1.} Whenever payment is made on 'on account' basis without actual measurements the amount in whole rupees should be entered in columns 1 to 3 only and not in columns 7 to 12.

^{2.} whenever there is an entry in column 12 on the basis of actual measurement, the whole of the amount previously paid without detailed measurement should be adjusted by a minus entry in column 2 equivalent to the amount shown in column 1, so that the total up to date in column 4 may become nil.

										Form WA	M 6 (contd)
2	3	4	5	6	7	8	9	10	11	12	13
				Total value of w	vork done up t	o date		(A)			
				Deduct value of Running Accou		on the last		(B)			
				Net value of wo	rk done since	last		(C)			

Form WAM 6 (contd...)

II.MEMORANDUM OF PAYMENTS

			ı	II
		Rs. P.	Rs. P.	Rs. P.
1.Total value of work actually measured as per Account No. I. Column 10 2.Total up to date 'on account' payment for work covered by approximate	(A)			
Or plan measurements as per Account No. I, Column 3	(B)			
3. Total up to date secured advances on security of materials as per column 8 Of the enclosed Account (Form WAM 10)	(C)			
4.Total up to date payments [(A) + (B) + (C)]	(D)			
5.Total amount of payments already made as per Entry (D) of last Running Account Bill No Datedforwarde to the Accounts				
Office on	(E)			
6.Balance [(D)-(E)]				
7.Payments now to be made:				
a) by cash/cheque				
b) by deduction for value of materials suppliedc) by BHEL vide Annexure A attachedd) by deduction for hire of tools and plant vide				
Annexure B attached				
e) by deduction for other charges vide Annexure C Attached				
f)by deduction on account of security deposit				
h) by deduction on account of Income Tax				

Note: Amounts relating to items 4 to 6 above should be entere in column II and those relating to item 7 in column I. The amount shownagainst item 6 and the total of item 7 should agree with each other.

			Form WAM 6 (contd)	
		III.CERTIFICATE OF THE ENGINEER	R IN CHARGE	
1.			nt of work executed) are based were made byorded at pagesof Measurement Book No	
2.	Certified that the methods of measurement at drawings etc, forming part of the contract agr		out in accordance with the terms and conditions, schedules, specification the deviation statement (Annexure D).	ns and
3.	connection with several items and the value of	of the such work is, in no case, less than '	ed as shown in column 10 of Part I, some work has actually been done in 'on account' payments as per column 3 of Part I, made or proposed to be etailed measurement which will be made as soon as possible.	
	Signature of Contractor		Signature of Engineer in charge	
	Date:		Designation:	
		N/ 05DTISIOATS 05 THE	Date:	
4	Contified that managements have been shown	IV. CERTIFICATE OF THE		~~~!i~~
1.	at site and also by the undersigned and the re		Measurement book. (vide pages) (Name and Designation (Name an	gnation
2.	Certified that all the measurements recorded	in the measurement book have been corr	rrectly billed for	
3.	Certified that all recoberable amounts in resp	ect of materials tools and plant etc, and o	other charges have been correctly made vide Annexures A to C attached	
	Certified for payment * of Rs	(Rupees	only	v)
	To be paid in cash/by cheque in the presence	e of		
		ALLOCATI		
	The expenditure is chargeable as under and Ledger Head	to be included in the accounts for Debit (Gross amount)	20 Credit (Deductions)	
	Ledger Head	Rs. P.	Rs. P.	
		N3. F.	N3. F.	
	Total			
* Here	specify the net amount payable.		Signature of Senior Engineer Date:	

							Form WAM 6	(contd
		V.ENTF	RIES TO BE MADE IN THE A	ACCOU	NTS OFFICE			
Entered in Journal B Passed for Less Deductions Net Amount Payable (Rupees Payable to Shri/M/s.	look vide entry No Rs R: B		Estimate Name o Ledger Head		ALLOCATION rk: Debit (Gross amount) Rs. P.	Code no: Credit (Deductions) Rs. P.	_	
Assistant Date:	Accountant Date:	Account Officer Date:	-	Total			_	_
	yments on account of t	(Rupees					only) as per	
Signature of witness Address :					Star	enue mp nature of Contractor		
Date:					Date			
		VII. ENTRIES	TO BE MADE BY TREASU	JRY SEC	CTION			
Cash Book entry N	lo. and date:		Amount paid	Rs				
			Amount unpaid	Rs				
			Total	Rs				
						Signature of C Date:	ashier	

Form WAM 6 (contd...) **ANNEXURE A** Statement showing details of materials issued to the contractor Shri/M/s..... In respect of Contract Agreement NoDated...... SI. Stores Issue Description Quantity Quantity Whether If recoverable from the contractor R No. issue voucher of material actually issued recover-Voucher No. and issued to able Amount incorp-Rate Amount Balance M No. date the from the rated at recoverrecovernow Α which and allotted by contractor in the contracable ed up to recover-R date stores to previous K work tor or recovered the SIV supplied able S bill free Rs. P. Rs. P. Rs. P. Rs. P. 1 2 3 4 5 6 7 8 9 10 11 12

	Total	
Signature of contractor Date:	Signature of Engineer in Charge Date:	Signature of Senior Engineer Date:

Form WAM 6 (contd...) **ANNEXURE B** Statement showing tools and plant issued to the contractor Shri/M/s..... In respect of Contract Agreement NoDated...... Description of tools Period for Rate at Amount Amount Balance Remarks No and plant issued which which recoverrecovered now Issued able upto recovered recovery Is to be previous Made bill Rs. P. Rs. P. Ρ. Rs. P. Rs. 3 4 5 6 7 8

	Total	
Signature of contractor Date:	Signature of Engineer in Charge Date:	Signature of Senior Engineer Date:

								Form WAM 6 (contd
	Statement abouting	dataila af athau	r roccycrica	ta ha mada frar	ANNEXUI			
	In respect of Contract							
SI. No	Particulars	Unit	Quantity		Amount recover- able	Amount recovered upto pre-vious bill	Amount now recovered	Remarks
				Rs. P.	Rs. P.	Rs. P.	Rs. P.	
1	2	3	4	5	6	7	8	9
1. 2. 3. 4. 5. 6. 7. 8. 9.	Empty containers not r	Elec Seig Med Cost	er Charges tricity charges norage chargi ical charges of empty gun	es				
10.								
				Total				
Sigr Date	nature of contractor e:			ignature of Enç Date:	gineer in Charge		Signature of Ser Date:	nior Engineer

Form WAM 6 (contd...)

ANNEXURE D

Name of the Contractor: Contract Agreement No: Name of the Work: Date: Description SI. Unit Quantity Quantity Quantity Total quantity Rate as per further No. of item anticipated as per agreement as Agreement anticipated on completion Rs. Ρ. executed 2 3 7 5 6 8 4

Rate as executed	Amount as per agreement	Amount as executed	Amount further	Total amount anticipated	Difference	Reason for the deviation with
			anticipated	on completion	Excess savings	authority, if any
Rs. P.	Rs. P.	Rs. P.	Rs. P.	Rs. P.	Rs. P. Rs. P	
9	10	11	12	13	14 15	16

Signature of Engineer in Charge Date:

Signature of Senior Engineer Date:

	BHARAT HEAVY ELECTRICALS LIMITED DIVISION											
	And Final bill (Para 4.3.2 Of Works Accounts Manual)											
Name of Contractor Departmental Bill no Date												
Name of	the Work					Division				Division		
Sanctione	Sanctioned Estimate						en order to co	ommence the	work			
Contract /	Contract Agreement/work Order No					Date of com	mencement o	of work				
						Due date of completion as per agreement						
						Date of actu	al completion	of the work				
					I. ACCOUN	T OF WOF	RK EXECU	TED				
On Account	payment for	the work not									Payment on	
previously n	neasured **										the basis of	
									Payment on		actual	
									the basis of	Quantity	measurement	
Total as per			Item No of						actual	since last	since last	
last running	_	Total up to	the	Descripti	Quantity as	Quantity			measuremen	running	running	
	account bill		agreement/	_	per	executed	Rate		t up to date	account	account bill	
Rs.	Rs	Rs	work order	work	agreement	up to date	Rs. P	Unit	Rs P	bill	Rs P	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13

1	2	3	4	5	6	7	8	9	10	11	12	13

Total Value of Work Done up to date	(A)	
Deduct Value of work shown on the last running account bill	(B)	
Net value of work done since last running account bill	(C)	

rds)Only

II MEMORANDUM OF PAYMENT

				r.s.	Г
1	Total Value of work actually measured as per Account no I coloumn 10		(A)		
С	educt amount of paym,ents already made as per last running account bill No	Dated			
2	Forwarded to the Accounts Office on		(B)		
3	Payments now to be made { (A) - (B)}		(C)		
4 Deduc	t ammounts recoverable from the contractor on account of :	Rs	`´P		
а	A C C C C C C C C C C C C C C C C C C C		-		
b					
C	Other charges vide Annexure C attached				
d	Income Tax				
	Total deduction				
5 Baland	ce control of the con				
	d of 50% of security deposite on completion of work				
7	Net amount to be paid to the Contractor				
	III. CERTIFICATE OF THE ENGINEER IN	CHARGE			
The m	easurement on which the entries in coulmns 7 to 12 of Part I of this bill (Account of	work executed) are hased we	re made hv	
1110 111	casarement on which the chares in countries 7 to 12 of 1 art 1 of this bill (Account of	Work exceuted	, are based we	ic made by	
1	(Name and designation)				
2	A statement showing the quantities of stores issued to the contractor (whether	r free or on rec	overy basis) an	d their disposal	l is attached.
Date:			Signature of E	ngineer in charg	ae
			Designation	J 22 2.1.4.	<i>J</i> -

IV CERTIFICATE OF THE SENIOR ENGINEER

Cretified that the measurements have	e been check measured to the prescribed extent by	lly completed on the due date in accordance with the terms and
(Name 8	& designation). And by the the undersigned at site and	relevent entries have been initiated in the measurement book (vide
2 pages)		
3	Certified that the methods of measurer	ment are correct
4 Certified that t	he measurements have been technically checked with	reference to contract drawings, deviations etc
5 Certified that all the measu	rements recorded in the measurement book have been	correctly billed for at the contract rates or approved rates.
		electricity charges etc, have been correctly made vide Annexures A
		contractor or direct to the work) have been technically checked and
		(Only). To be paid in
	ALLOCATION	
The expenditure as under and to be	included in the accounts for19	
	Debit	Credit
Ledger Head	(Gross Amount)	(Deduction)
	Rs. P	Rs. P
	Total	
* Here specify the net amount payab	ole	Signature of Senior Engineer Date

V. ENTRIES TO BE MADE IN THE ACCOUNTS OFFICE

		V. LIVINIED TO BE MAD	DE IN THE ACCOUNTS OF FICE		
		. Dated		ALLOCATION	
Entered in Journa	al book vide entry No	Dated	Estimate No:		Code No
Passed for	F	Rs	Name of the Work		
Less Deductions	F	Rs			
(Rupees		Only)	Ledger Head	Debit	Credit
Payable to Shri/N	Л/s	by cheque/cash		(Gross Amount)	(Deduction)
	ctors' Ledger no			Rs P	Rs
Assistant Date:	Accountant Date:	Accounts officer Date:	Total		
VI. Received Rs. no further claims	` ·		Only) in full and final settlement of all	moneys due under this o	contract and I / we have
Signature of Witn Address	ness				
			-	levenue Stamp	
				e of Contractor	
			Date:	C Of Contractor	
			Date.		
		VII . ENTRIES TO BE M	ADE BY TREASURY SECTION		
	Cash h	ook entry no and date :	Amount Paid Rs		
	Ju311 D	on only no and dato .		!s	
			Total Rs		
			1000		

Signature of Cashier

Date:

ANNEXURE A

Part I

Sta	Statement showing details of material issued to the contractor Shri/M/s											In respect of Contract			
			Agreement/V	Vork Orde	r No		Dated								
						Whether		lf	f recov	erable t	from (contracto	r		Remarks
		Issue voucher	description			recoverabl					Amo	unt			
	Stores	No and date	of material		Quantity	e from the	Rate at		Amo	unt	reco	verable	Bala	ance	
	Issue	alloted by	issued to		actually	contractor	which		Reco	verabl	upto		Nov	1	
	voucher No	stores to the	the	Quantity	incorporated	or supplied	recoverat	ble	е		prev	ious bill	reco	vered	
SI No	and date	SIV	contractor	issued	in the work	free	Rs P		Rs	Р	Rs	Р	Rs	Р	
1	2	3	4	5	6	7	8			9		10		11	12

Total

Signature of Contractor Date

Signature of Engineer in charge Date

Signature of Senior Engineer Date

ANNEXURE A

	Agreement/Work Order No			Dated				and not covered by the agreement			
		Issue voucher	description					Amount			
	Stores	No and date	of material		Quantity		Amount	recoverable			
	Issue	alloted by	issued to		actually		Recoverabl	upto	Balance Now		
	voucher No	stores to the	the	Quantity	incorporated	Issue Rate	е	previous bill	recovered		
No	and date	SIV	contractor	issued	in the work	Rs P	Rs P	Rs P	Rs P	Remarks	
	2	3	4	5	6	7	8	9	10	11	

Γotal		
Add Departmer	9	
Add Sales Tax	(wherever applicable)	
Γotal		

Signature of Contractor Date

Signature of Engineer in charge Date

Signature of Senior Engineer Date

ANNEXURE B

Sta	tement showing TOOLS & PL Agreement/Work	_ANTS issue cOrder No…	d to the contractor Shri/N Da	ıted	an	d not covered by the	in respect of Contract ne agreement
SI No 1	Description of tools & plants issued 2	Period for which issued 3	Rate at which Recivery is to be made 4	Amount recoverabl e Rs P 5	Amount recoverable upto previous bill Rs P 6	Balance Now recovered Rs P 7	Remarks 8
				Total			
	Signature of Contractor			Signatur	e of Engineer in charge		Signature of Senior Engineer

Date

Date

Date

ANNEXURE C

Sr.No	Particulars	Unit	Quantity	Rate Rs. P.	Amount recoverable Rs. P	Amount recovered upto previous bill Rs. P.	Amount now recovered Rs. P.	Remarks
1	2	3	4	5	6	7	8	9

- 1 Water Charges
- 2 Electricity Charges
- 3 Seignorage Charges
- 4 Medical Charges

Cost of

empty

gunny bags

and empty

containers

not

5 returned

6

′

8

9

10

Total

Signature of Contractor Date

Signature of Engineer Incharge Date

Signature of Sr. Engineer Date

ANNEXURE D-

DEVIATION STATEMENT :

Name	of	the Contractor	:
Name	of	the Work:	

Contract Agreement/Work Order No. :

Date:

Sl.	Descrip-	Unit		Quantity	Rate	Rate	Amount	Amount	Difference		Reason for the deviation	
INO.	of item		as per agree- ment	executed	as per agree- ment	as execu- ted	as per agree- ment	as executed	Excess	Savings	with autho-	
						Rs. P.	Rs. P.	Rs. P.	Rs. P.	Rs. P.	Rs. P.	
1	2	3	4	5	6	7	8	9	10	11	12	

Signature of Engineer in Charge Date:

Signature of Senior Engineer Date:

ANNEXURE E

SI. No.	Description of material	Unit Quantity actually issued	actually	Quantity actually incorpo- rated in the work	Balance	Particulars of disposal of balance	Quantity to be issued as per approved data for work actually	Variation in consumption (Difference between column 5 and 8)		Rate charge- able for excess/ short consu- mption, if any	Amount recoverable for excess/ short consumption, including materials not returned Rs. P.
						done —	More	Less			
1	2	3	4	5	6	7	8	9	10	11	12
1. 2. 3. 4. 5. 6. 7. 8. 9.	Cement Bricks Wood Asbestos Sheet Iron Materials										
	Signature of Cor	itracto	r	Signatu Date :	re of Eng	ineer in Char	ge	Signat	ure of	Senior Er	ngineer

- respectively of Annexure A (Part I and II).
 - 2. Data statement of theoretical consumption should be attached in support of quantity specified in column 8.

	ANNEXURE F										
Statement s	howing detail	of materials iss /Work Order No	ued to the c	ontractor S	hri/M/s	Date	ed				
	Name of wo					FREE OF CO					
Sr.No	Stores issue voucher No.	ription of ma		Quantit y issued	per data	d in the work	Balance(If any)	for the balance	for material not returned Rs.P.	Amount recovera ble for material not returned Rs. P	Remarks
1	2	3	4	5	6	7	8	9	10	11	12
			Total								
			TULAI								
			Signature Date	of Engineer Ir	ncharge	Signature of Date	Sr. Engineer				
i											

Note:Data statement of therotical consumption should be attached in support of the quantity specified in coloumn 6

ANNEXURE G

QUESTIONNAIRE TO BE ANSWERED BY ENGINEER IN CHARGE AND SENIOR ENGINEER						
(Correct particulers and answers to be recorded)						
Name of the work :						
Name of the Contractor :						
Date of commencement of the work:						
Contract agreement/work ordered no. and date:						
Reference to supplementary agreement no,if any :						
Whether adminstrative approval and techanical sanction has been						
accorded by the cmpetent authority ? If so ,citc reference						
Whether sanction of the competent authority and financial						
concurrencr of the Accounts Departnment for award of the work						
has been accorded? If so,cite reference.						
Wheter the work has been completed in time ? If not ,wheter						
penalty has been levied or sanction of the competent authority for						
extension of time granted and communicated to the Accounts						
Department with reasons for grant of extension? (Due and actual						
date of completion of the work and reference to letter no. and date						
granting the extension of time should be given)						
(a) Wheter the rates allowed in the bill have been checked with						
the contract agreement? (b) Wheter the rates for						
extra/supplemental items have been approved by the competent						
authority and the sanction communicated to the accounts						
Department together wiht rate analysis? If so,cite reference.						
Wheter deviations have been approved by the competent						
authority? If yes, give reference to the approval; if not, give						
reasons.						
Whether the rates of recovery of stores issued to the contractor						
which are not provided for in the Contract Agreement have been						
settled in counsultation with Finance?						
Whether discrepancies pointed out by the Accounts Department in						
the store statement have been reconciled and accepted by the						
Accounts Department?						

ANNEXURE G

QUESTIONNAIRE TO BE ANSWERED BY ENGINE	
(Correct particulers and answ	ers to be recorded)
Whether materials issued to the contractor in excess of the theoretical requirements have been returned to the Stores Department and the no. and date of such retuened stores vouchers have been shown in stores statement? If not ,whether the cost of such excess material has been recovered at the prescribed rate? Whethre consumption statements in respect of materials chargeabale to the work have been attached to the bill?	
Whether consumption of materials shown has been technicaly checked by Senior Engineer?	
Whether materials isshued and used in the work is not less then that required for consumption in work accroding to our specification? If comsumption is less, whether necessary recovery has been made in the bill?	
Whether mesurments have been checked by the Engineer and Sr. Engineer to the extent required and certificates of check recorded in the mesurments books?	
Whether contractor has signed the bill and the mesurments books without reservations? If not; whether resones have been intimated to the Accounts Department?	
Whethet arithmatical calculations have been checked and certificate recorded in the mesurment books by a person other than the one who calculated initially	
Whether any work was done at the risk and cost of the contractor and whether such cost has been recovered from him? Give particulers.	
Whether all advance payments on running Accounts have been recovered?	
Whether tall the recovries due to services given to the contractor like rent of accommodation, water charges, electricity charges etc. have been recovered and wheather payments made by the company on behalf of the contractor have been adjusted?	
Whether the files containing abstracts from mesurments books/ standared mesurment books have been completed/ updated?	
Whether hire charges of tools and plant have been recovered and the statement of hire charges with full details attached?	

ANNEXURE G

QUESTIONNAIRE TO BE ANSWERED BY ENGINE	ER IN CHARGE AND SENIOR ENGINEER
(Correct particulers and answ	vers to be recorded)
Whether the certificate of workmanship and completion of work according to specifications, drawings etc. is recorded by Engineer/Sr. Engineer and whether recoveries have been made for defective works, if any?	
Whether all corrections in the bill/measurement books etc. have been neatly made and attasted and there are no overwriting?	
Whether final measurments have been taken as soon as possibal after completion of work and the cretificate of complition issued? If not, whether resons for delay have been recorded and communicated to Accounts?	
In respect of Quintites reduced in the final bill as compare to the running payment, whether adequate reasons have been recorded and communicated to Accounts	
Whether the Expeinditure has been classified correctly according to heads of Account recorded in the sanctioned estimate?	
Whether the work has been completed within the estimated cost? If not, what is the percentage of excess over thw sanctioned estimate/ addministrative approval? In case the excess is beyond the competency of Sr. Engineer, what action has been taken for the obtaining the approval of the authority complent to sanction the excess?	
(a) If the contractor has furnished bank guarantee in lieu of cash sequrity deposit towards proper exicuation of works and guarantee against defectsduring the maintenance period, whether the period of currency of the bank guarantee cover the entire maintenance period? (b) If not, whether sequrity deposite has been proposed to be recovred from the final bill?	
Whether all the previous audit objections raised on running Account bills have been settled? If so, cite refrence.	
Signature of Engineer in Charge	Signature of Engineer in Charge
Date:	Date:

(On non-Judicial paper of appropriate value) (Para 4.7.6 of Works Accounts Manual)

Bank Guarantee No
Date
То
(Employer's Name and Address)
Dear Sirs,
In accordance with the terms and conditions of Invitation for Bids/Notice Inviting Tende No
registered office at
The Tender Conditions provide that the Tenderer shall pay a sum of Rs ⁵ as Earnes Money Deposit in the form therein mentioned. The form of payment of Earnest Money Deposit includes Bank Guarantee executed by a Scheduled Bank.
In lieu of the stipulations contained in the aforesaid Tender Conditions that an irrevocable and unconditional Bank Guarantee against Earnest Money Deposit for an amount of
we, the
(hereinafter referred to as the Bank) being the Guarantor under this Guarantee, hereby irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer without any demur, merely on your first demand any sum or sums of
Rs) without any reservation, protest, and recourse and without the beneficiary needing to prove or demonstrate reasons for its such demand
Any such demand made on the Bank shall be conclusive as regards the amount due and payable be the Bank under this guarantee. However, our liability under this guarantee shall be restricted to a amount not exceeding Rs6
We undertake to pay to the Employer any money so demanded notwithstanding any dispute of disputes raised by the Tenderer in any suit or proceeding pending before any Court or Tribuna Arbitrator or any other authority, our liability under this present being absolute and unequivoca
The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment hereunder and the Tenderer shall have no claim against us for making such payment.

We Bank further agree that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Tender or to extend the time of submission of from time to time or to postpone

for any time or from time to time any of the powers exercisable by the Employer against the said Tenderer and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Tenderer or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Tenderer or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Tenderer and notwithstanding any security or other guarantee that the Employer may have in relation to the Tenderer's liabilities.

This Guarantee shall be irrevocable and shall remain in force upto and including	⁷ and sha
be extended from time to time for such period as may be desired by the Employer.	

We, Bank lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

a) The	e liability of the	Bank under this	Guarantee shall no	ot exceed ⁶
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- b) This Guarantee shall be valid up to⁷

We,		Bank, have	e power to	issue this	Guarantee	under	law and	the ur	ndersigned	as a
duly	authorized p	erson has full	oowers to s	sign this G	uarantee or	n behalf	of the B	ank.		

For and on behalf of (Name of the Bank)

(Signature of Authorised signatory)

Date......
Place of Issue.....

- Details of the Invitation to Bid/Notice Inviting Tender (Tender Ref. No. Eg. BHEL PSSR SCT XXXX)
- ² Name of Tenderer
- ³ REGISTERED Office Address of the Tenderer
- ⁴ Details of the Work i.e Tender Description
- ⁵ EMD Amount as mentioned in Notice Inviting Tender
- ⁶ BG Amount in words and Figures (BG Amount shall be Minimum of EMD amount less Rs. 2 Lakhs)
- 7 Validity Date
- Date of Expiry of Claim Period (Claim Period shall be minimum of 3 Months after the validity date of Bank Guarantee)

Note:

1. The BG should be on Non-Judicial Stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the State(s) where the BG is submitted or is to be acted upon or the rate prevailing in the State where the BG was executed, whichever is higher. The Stamp Paper/e-stamp paper shall be purchased in the name of Vendor/Contractor/Supplier/Bank issuing the guarantee.

- 2. In Case of Bank Guarantees submitted by Foreign Vendors
 - a. From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India) can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.
 - b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor Country's Bank)
 - b.1 In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by any of the Consortium Banks only will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank's (BHEL's Consortium Bank) branch in India. It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements.
 - b.2 In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at sl.no. b.1 will required to be followed.
 - b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time).

PROFORMA OF BANK GUARANTEE (in lieu of RETENTION AMOUNT)

(On non-Judicial paper of appropriate value)

	Bank Guarantee No Date
To Bharat Heavy Electricals Limited, Power Sector Southern Region, Tek Towers, No.11, Old Mahabalipuram Road, Okkiyam Thoraipakkam, Chennai – 600097	
In consideration of Bharat Heavy Electricals Limited (herein expression shall unless repugnant to the context or mean permitted assigns) incorporated under the Companies Act, BHEL House, Siri Fort, Asiad, New Delhi – 110049 throu Limited, Power Sector Southern Region, Tek Towers, No. Thoraipakkam, Chennai – 600097 having agreed to exem (Name of the Vendor / Contractor / Supplier) with its registe called the said "Contractor" which term includes Supplie conditions of the Contract reference No. at Rs 4 (Rupees) ⁴ (Retention Amount for the due fulfilment by the said Contract in the said Contract, on production of a Bank Guarant only),	ning thereof, include its successors and 1956 and having its registered office at augh its Unit at Bharat Heavy Electricals 11, Old Mahabalipuram Road, Okkiyam apt
(address of the Head Office) (hereinafter re-	he Guarantor under this Guarantee, do h and immediately pay to the Employer, emur, immediately on demand from the
Any such demand made on the bank, shall be conclusive as the Bank under this guarantee. However, our liability under amount not exceeding Rs	
We undertake to pay to the Employer any money so der disputes raised by the Contractor(s) in any suit or proceeding Arbitrator or any other authority, our liability under this preser	pending before any Court or Tribunal or
The payment so made by us under this guarantee shall payment hereunder and the Contractor(s) shall have no claim	

We, further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied & the Employer certifies that the terms and conditions of the said

PROFORMA OF BANK GUARANTEE (in lieu of RETENTION AMOUNT)

Contract have been fully and properly carried out by the bill or discharge of this guarantee by the Employer, we remain in force upto and including6 and period as may be desired by the Employer. Unless a son us in writing on or before the7, we shappen guarantee thereafter.	hichever is earlier. This guarantee shall initially shall be extended from time to time for such demand or claim under this guarantee is made
We, (indicate the name of the Employer shall have the fullest liberty without our cooligations hereunder to vary any of the terms and comperformance by the said contractor(s) from time to time any of the powers exercisable by the Employer at the end our liability by any reason of any such variation or extended for any forbearance, act or omission on the part of the to the said contractor(s) or by any such matter or this sureties would but for this provision have effect of so resulting to the said contractor(s) or by any such matter or this sureties would but for this provision have effect of so resulting to the said contractor(s) or by any such matter or this sureties would but for this provision have effect of so resulting to the said contractor or this provision have effect of so resulting to the said contractor or this provision have effect of so resulting to the said contractor or this provision have effect of so resulting to the said contractor or this provision have effect of so resulting to the said contractor or this provision have effect of so resulting to the said contractor of the said contractor or this provision have effect of so resulting to the said contractor or this provision have effect of so resulting to the said contractor or the said contr	onsent and without affecting in any manner our ditions of the said Contract or to extend time of the or to postpone for any time or from time to against the said contractor(s) and to forbear or said Contract and we shall not be relieved from the nsion being granted to the said contractor(s) or a Employer or any indulgence by the Employer or which under the law relating to
The Bank also agrees that the Employer at its option against the Bank as a principal debtor, in the first instant and notwithstanding any security or other guarantee Contractor's liabilities.	ance without proceeding against the Contractor
This Guarantee shall not be determined or affected by of constitution or insolvency of the Contractor but shal and operative until payment of all money payable to will not be discharged due to the change in the constitu	I in all respects and for all purposes be binding the Employer in terms thereof. This guarantee ition of the Bank or the Contractor(s).
We, Bank lastly undertake nexcept with the previous consent of the Employer in wr	ot to revoke this guarantee during its currency iting.
Notwithstanding anything to the contrary contained her	einabove:
a) The liability of the Bank under this Guarantee shall r	ot exceed5
b) This Guarantee shall be valid up to ⁶	
 c) Unless the Bank is served a written claim or demand guarantee shall be forfeited and the Bank shall be re this guarantee irrespective of whether or not the original 	lieved and discharged from all liabilities under
We, Bank, have power to undersigned as a duly authorized person has full po Bank.	o issue this Guarantee under law and the owers to sign this Guarantee on behalf of the
	Date Day of
	for (indicate the name of the Bank

PROFORMA OF BANK GUARANTEE (in lieu of RETENTION AMOUNT)

- ¹ NAME OF THE VENDOR /CONTRACTOR / SUPPLIER.
- ² ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER.
- 3 DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE
- ⁴ CONTRACT VALUE
- ⁵ BG AMOUNT IN FIGURES AND WORDS
- ⁶ VALIDITY DATE
- ⁷ DATE OF EXPIRY OF CLAIM PERIOD

Note:

- 1. Units are advised that expiry of claim period may be kept 3-6 months after validity date. It may be ensured that the same is in line with the agreement/ contract entered with the Vendor.
- 2. The BG should be on Non-Judicial Stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the State(s) where the BG is submitted or is to be acted upon or the rate prevailing in the State where the BG was executed, whichever is higher. The Stamp Paper/e-stamp paper shall be purchased in the name of Vendor/Contractor/Supplier /Bank issuing the guarantee.
- 3. In line with the GCC, SCC or contractual terms, Unit may carry out minor modifications in the Standard BG Formats. If required, such modifications may be carried out after taking up appropriately with the Unit/Region's Law Deptt.
- 4. In Case of Bank Guarantees submitted by Foreign Vendors-
- a. From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India) can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.
- b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor Country's Bank)
- **b.1** In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank's (BHEL's Consortium Bank) branch in India. It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements.
- **b.2** In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at **sl.no. b.1** will required to be followed.
- **b.3** The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time). The BG Format provided to them should clearly specify the same.

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1.0 Scope

This document describes the guidelines to be followed by BHEL for conducting Reverse Auction (RA) for procurement of material/ works/services. The RA shall follow the philosophy of English Reverse (No ties).

English Reverse (No ties) is a type of auction where the starting price and bid decrement are announced before start of online reverse auction. The interested bidders can thereupon start bidding in an iterative process wherein the lowest bidder at any given moment can be displaced by an even lower bid of a competing bidder, within a given time frame. The bidding is with reference to the current lowest bid in the reverse auction. All bidders will see the current lowest quoted price and their rank. The term 'No ties' is used since more than one bidder cannot give an identical price, at a given instant, during the reverse auction. In other words, there shall never be a tie in the bids.

3.0 Upfront declaration in NIT

Decision to go for RA would be taken before floating of the tender. In case it is decided to go for RA, same shall be declared upfront in NIT by inserting the following **clause:**

"BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) for this tender. RA shall be conducted among the technocommercially qualified bidders.

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

6.0 Business rules for RA

Model Annexure-I is attached.

7.0 Role of Service Provider

- Acknowledge the receipt of mandate from BHEL.
- Contact the bidders, provide business rules and train them, as required.
- Get the process compliance form signed by all the participating bidders before RA event.

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- Conduct the event as per the contract and business rules.
- Submit the Login Reports, Results, History sheet and authorized final bid from the bidders.
- To obtain price breakup from successful bidder and submit the same to BHEL.

10.0 Reverse Auction Process

10.1 Reverse Auction will be conducted if two or more bidders are technocommercially qualified. In case of two or three qualified bidders, there shall be no elimination of H1 bidder (whose quote is highest in sealed envelope price bid). In case of four qualified bidders, the H1 bidder shall be eliminated whereas in case of five qualified bidders, H1 & H2 bidders shall be eliminated. However, in case of six or more qualified bidders are available, RA would be conducted amongst first 50% of the bidders arranged in the order of prices from lowest to highest. Number of bidders eligible for participating in RA would be rounded off to next higher integer value if number of qualified bidders is odd (e.g. if 7 bids are qualified, then RA will be conducted amongst lowest four bidders). However, there will be no elimination of qualified bidders who are MSE or qualifying under PPP-MII, Order 2017, irrespective of the number of bidders qualifying techno-commercially.

In case of multiple H1 bidders, all H1 bidders (excluding MSEs and bidders qualifying under PPP-MII, Order 2017) shall be removed provided minimum two bidders remain in fray, else no H1 removal.

- 10.2 During RA, all bidders will see their rank and current L1 price on the screen. Once the RA is done, the ranking status would be based on the last quoted price of the bidder(s) irrespective of the quote received in RA or sealed envelope price bid.
- 10.3 No bidder shall be allowed to lower its bid below the current L1 by more than 5 decrements at one go.

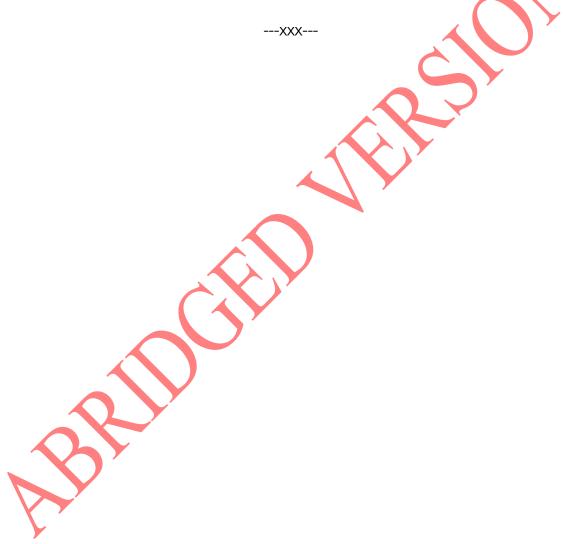
11.0 Processing of case after RA

11.2 In case of splitting requirement, bidders who were removed from participation in RA may also be considered for counter offer if the prestated (NIT) numbers of suppliers do not accept the counter offer.

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13.0 Others

- 13.2 In case of enquiry through e-Procurement, the sealed electronic price bid (e-bid) is to be treated as sealed envelope price bid.
- 13.3 BHEL will inform bidders the details of service provider who will provide business rules, all necessary training and assistance before commencement of online bidding.
- 13.4 Bidders will be advised to read the 'Business Rules' indicating details of RA event carefully, before reverse auction event.



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Business Rules for Reverse Auction

Annexure – I

This has reference to tender no **{tender number....date...**}. BHEL shall finalise the Rates for the supply of {item name} through Reverse Auction mode. BHEL has made arrangement with M/s. {Service provider}, who shall be BHEL's authorized service provider for the same. Bidders should go through the instructions given below and submit acceptance of the same.

The technical & commercial terms are as per (a) BHEL Tender Eng. No. {...} dated {...}, (b) Bidders' technical & commercial bid (in case of two part bid) and (c) subsequent correspondences between BHEL and the bidders, if any.

1. Procedure of Reverse Auctioning

- i. Price bids of all techno-commercially qualified bidders shall be opened.
- ii. Reverse Auction: The 'bid decrement' will be decided by BHEL.
- iv. Bidders by offering a minimum bid decrement or the multiples thereof can displace a standing lowest bid and become "L1" and this continues as an iterative process. However, no bidder shall be allowed to lower its bid below the current L1 by more than 5 decrements at one go.
- v. After the completion of the reverse auction, the Closing Price shall be available for further processing.
- vi. Wherever the evaluation is done on total cost basis, after Reverse Auction, prices of individual line items shall be reduced on pro-rata basis.
- **2. Schedule for reverse auction:** The Reverse Auction is tentatively scheduled on {date}: ;{Start time}: ;{Close Time: }.
- 3. Auction extension time: If a bidder places a bid in the last {...} minutes of closing of the Reverse Auction and if that bid gets accepted, then the auction's duration shall get extended automatically for another {...} minutes, for the entire auction (i.e. for all the items in the auction), from the time that bid comes in. Please note that the auto-extension will take place only if a bid comes in those last {...} minutes and if that bid gets accepted as the lowest bid. If the bid does not get accepted as the lowest bid, the auto-extension will not take place even if that bid might have come in the last {...}

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Business Rules for Reverse Auction

Annexure – I

minutes. In case, there is no bid in the last {...} minutes of closing of Reverse Auction, the auction shall get closed automatically without any extension. However, bidders are advised not to wait till the last minute or last few seconds to enter their bid during the auto-extension period to avoid complications related with internet connectivity, network problems, system crash down, power failure, etc.

The above process will continue till completion of Reverse Auction.

Complaints/ Grievances, if any, regarding denial of service or any related issue should be given in writing thru e-mail/ fax to M/s. {Service provider} with a copy to BHEL within 15 minutes prior to initial closing time of Reverse Auction.

- 5. Bidding currency and unit of measurement: Bidding will be conducted in Indian Rupees per Unit of the material as per the specifications {...}

In case of foreign currency bids, exchange rate (TT selling rate of State Bank of India) as on scheduled date of tender opening (Part-I bid) shall be considered for conversion in Indian Rupees. If the relevant day happens to be a Bank holiday, then the forex rate as on the previous bank (SBI) working day shall be taken.

- **6.** Validity of bids: Price shall be valid for {... days} from the date of reverse auction. These shall not be subjected to any change whatsoever.
- 7. Lowest bid of a bidder: In case the bidder submits more than one bid, the lowest bid at the end of Reverse Auction will be considered as the bidder's final offer to execute the work.
- 8. Unique user IDs shall be used by bidders during bidding process. All bids

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Business Rules for Reverse Auction

Annexure - I

made from the Login ID given to the bidders will be deemed to have been made by the bidders/ bidders' company.

- **9. Post auction procedure**: BHEL will proceed with the Lowest Bid in the Reverse Auction for further processing.
- 11. Reverse auction shall be conducted by BHEL (through M/s {Service Provider}), on pre-specified date, while the bidders shall be quoting from their own offices/ place of their choice. Internet connectivity shall have to be ensured by bidders themselves.

During the RA process if a bidder is not able to bid and requests for extension of time by FAX/ email/ phone then time extension of additional 15 minutes will be given by the service provider provided such requests come before 5 minutes of auction closing time. However, only one such request per bidder can be entertained.

In order to ward-off contingent situation of connectivity failure bidders are requested to make all the necessary arrangements/ alternatives whatever required so that they are able to circumvent such situation and still be able to participate in the reverse auction successfully. Failure of power or loss of connectivity at the premises of bidders during the Reverse auction cannot be the cause for not participating in the reverse auction. On account of this, the time for the auction cannot be extended and neither BHEL nor M/s. {Service provider} is responsible for such eventualities.

12. Proxy bids: Proxy bidding feature is a pro-bidder feature to safe guard the bidder's interest of any internet failure or to avoid last minute rush. The proxy feature allows bidders to place an automated bid in the system directly in an auction and bid without having to enter a new amount each time a competing bidder submits a new offer. The bid amount that a bidder enters is the minimum that the bidder is willing to offer. Here the software bids on behalf of the bidder. This obviates the need for the bidder participating in the bidding process until the proxy bid amount is decrementally reached by other bidders. When proxy bid amount is reached, the bidder (who has submitted the proxy bid) has an option to start participating in the bidding process.

The proxy amount is the minimum amount that the bidder is willing to offer.

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Business Rules for Reverse Auction

Annexure – I

During the course of bidding, the bidder cannot delete or change the amount of a proxy bid.

Bids are submitted in decrements (decreasing bid amounts). The application automates proxy bidding by processing proxy bids automatically, according to the decrement that the auction originator originally established when creating the auction, submitting offers to the next bid decrement each time a competing bidder bids, regardless of the fact whether the competing bids are submitted as proxy or standard bids. However, it may please be noted that if a manual bid and proxy bid are submitted at the same instant manual bid will be recognized as the L1 at that instant.

In case of more than one proxy bid, the system shall bid till it crosses the threshold value of 'each lowest proxy bid' and thereafter allow the competition to decide the final L1 price.

Proxy bids are fed into the system directly by the respective bidders. As such this information is privy only to the respective bidder(s).

- **13.** Bidders are advised to get fully trained and clear all their doubts such as refreshing of Screen, quantity being auctioned, tender value being auctioned etc from M/s {Service provider}.
- 14. M/s. {Service provider}, shall arrange to demonstrate/ train the bidder or bidder's nominated person(s), without any cost to bidders. M/s. {Service provider}, shall also explain the bidders, all the business rules related to the Reverse Auction. Bidders are required to submit their acceptance to the terms/ conditions/ modalities before participating in the Reverse Auction in the process compliance form as enclosed. Without this, the bidder will not be eligible to participate in the event.
- 15. Successful bidder shall be required to submit the final prices (L1) in prescribed format (Annexure VI) for price breakup, quoted during the Reverse Auction, duly signed and stamped as token of acceptance without any new condition (other than those already agreed to before start of auction), after the completion of auction to M/s. {Service provider} besides BHEL within two working days of Auction without fail.
- 16. Any variation between the final bid value and that in the confirmatory

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Business Rules for Reverse Auction

Annexure – I

signed price breakup document will be considered as tampering the tender process and will invite action by BHEL as per extant guidelines for suspension of business dealings (as available on www.bhel.com).

- 17. Bidders' bid will be taken as an offer to execute the work/ supplies the item as per enquiry no. {...} dt. {...}. Bids once made by the bidder, cannot be cancelled/ withdrawn and bidder shall be bound to execute the work as mentioned above at bidder's final bid price. Should bidder back out and not execute the contract as per the rates quoted, BHEL shall take action as per extant guidelines for suspension of business dealings (as available on www.bhel.com).
- **18.** Bidders shall be able to view the following on their screen along with the necessary fields during Reverse Auction:
 - a. Leading (Running Lowest) Bid in the Auction (only fotal price of package)
 - b. Bid Placed by the bidder
 - c. Start Price
 - d. Decrement value
 - e. Rank of their own bid during bidding as well as at the close of auction.
- 19. BHEL's decision on award of contract shall be final and binding on all the Bidders.
- **20.** BHEL reserves the right to extend, reschedule or cancel the Reverse Auction process at any time, before ordering, without assigning any reason, with intimation to bidders.
- **21.** BHEL shall not have any liability to bidders for any interruption or delay in access to the site irrespective of the cause. In such cases, the decision of BHEL shall be binding on the bidders.
- **22.** Other terms and conditions shall be as per bidder's techno-commercial offers and other correspondences, if any, till date.
- 23. If there is any clash between this business document and the FAQ available, if any, in the website of M/s. {Service provider}, the terms & conditions given in this business document will supersede the information contained in the FAQs. Any changes made by BHEL/ service provider (due to unforeseen

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Business Rules for Reverse Auction

Annexure - I

contingencies) after the first posting shall be deemed to have been accepted if the bidder continues to access the portal after that time.

24. Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action as per extant BHEL guidelines for suspension of business dealings (as available on www.bhel.com), shall be initiated by BHEL.



PROCEDURE FOR CONDUCT OF CONCILIATION PROCEEDINGS

- 1. The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided herein:
- 2. The party desirous of resorting to Conciliation shall send an invitation/notice in writing to the other party to conciliate specifying all points of Disputes with details of the amount claimed. The party concerned shall not raise any new issue thereafter. Parties shall also not claim any interest on claims/counterclaims from the date of notice invoking Conciliation till the conclusion of the Conciliation proceedings. If BHEL is to initiate Conciliation, then, the invitation to Conciliate shall be extended to the concerned Stakeholder in Format 7 hereto. Where the stakeholder is to initiate the Conciliation, the notice for initiation of Conciliation shall be sent in Format-8 hereto.
- **3.** The party receiving the invitation/notice for Conciliation shall within 30 days of receipt of the notice of Conciliation intimate its consent for Conciliation along with its counter-claims, if any.
- 4. The Conciliation in a matter involving claim or counter-claim (whichever is higher) up to Rs 5 crores shall be carried out by sole Conciliator nominated by BHEL while in a matter involving claim or counter-claim (whichever is higher) of more than Rs 5 crores Conciliation shall be carried out by 3 Conciliators nominated by BHEL. The appointment of Conciliator(s) shall be completed and communicated by the concerned Department/Group of BHEL Unit/Division/Region/Business Group to the other party and the Conciliator(s) within 30 days from the date of acceptance of the invitation to conciliate by the concerned party in the **Format-9**. The details of the Claim, and counter-claim, if any, shall be intimated to the Conciliator(s) simultaneously in **Format-5**.
- **5.** The Parties shall be represented by only their duly authorized in-house executives/officers and neither Party shall be represented by a Lawyer.
- **6.** The first meeting of the IEC shall be convened by the IEC by sending appropriate communication/notice to both the parties as soon as possible but not later than 30 days from the date of his/their appointment. The hearings in the Conciliation proceeding shall ordinarily be concluded within two (2) months and, in exceptional cases where parties have expressed willingness to settle the matter or there exists possibility of settlement in the matter, the proceedings may be extended by the IEC by a maximum of further 2 months with the consent of the Parties subject to cogent reasons being recorded in writing.

- 7. The IEC shall thereafter formulate recommendations for settlement of the Disputes supported by reasons at the earliest but in any case within 15 days from the date of conclusion of the last hearing. The recommendations so formulated along with the reasons shall be furnished by the IEC to both the Parties at the earliest but in any case within 1 month from the date of conclusion of the last hearing.
- **8.** Response/modifications/suggestions of the Parties on the recommendations of the IEC are to be submitted to the IEC within time limit stipulated by the IEC but not more than 15 days from the date of receipt of the recommendations from the IEC.
- **9.** In the event, upon consideration, further review of the recommendations is considered necessary, whether by BHEL or by the other Party, then, the matter can be remitted back to the IEC with request to reconsider the same in light of the issues projected by either/both the Parties and to submit its recommendations thereon within the following 15 days from the date of remitting of the case by either of the Parties.
- **10.** Upon the recommendations by the Parties, with or without modifications, as considered necessary, the IEC shall be called upon to draw up the Draft Settlement Agreement in terms of the recommendations.
- 11. When a consensus can be arrived at between the parties only in regard to any one or some of the issues referred for Conciliation the draft Settlement Agreement shall be accordingly formulated in regard to the said Issue(s), and the said Settlement Agreement, if signed, by the parties, shall be valid only for the said issues. As regards the balance issues not settled, the parties may seek to resolve them further as per terms and conditions provided in the contract.
- **12.** In case no settlement can be reached between the parties, the IEC shall by a written declaration, pronounce that the Conciliation between the parties has failed and is accordingly terminated.
- **13.** Unless the Conciliation proceedings are terminated in terms of para 22 (b), (c) & (d) herein below, the IEC shall forward his/its recommendations as to possible terms of settlement within one (1) month from the date of last hearing. The date of first hearing of Conciliation shall be the starting date for calculating the period of 2 months.
- **14.** In case of 3 members IEC, 2 members of IEC present will constitute a valid quorum for IEC and meeting can take place to proceed in the matter after

seeking consent from the member who is not available. If necessary, videoconferencing may be arranged for facilitating participation of the members. However, the IEC recommendations will be signed by all members. Where there is more than one (1) Conciliator, as a general rule they shall act jointly. In the event of differences between the Members of IEC, the decision/recommendations of the majority of the Members of IEC shall prevail and be construed as the recommendation of the IEC.

- **15.** The Draft Settlement Agreement prepared by the IEC in terms of the consensus arrived at during the Conciliation proceedings between the Parties shall be given by the IEC to both the parties for putting up for approval of their respective Competent Authority.
- **16.** Before submitting the draft settlement agreement to BHEL's Competent Authority viz. the Board Level Committee on Alternative Dispute Resolution (BLCADR) for approval, concurrence of the other party's Competent Authority to the draft settlement agreement shall be obtained by the other party and informed to BHEL within 15 days of receipt of the final draft settlement agreement by it. Upon approval by the Competent Authority, the Settlement Agreement would thereafter be signed by the authorized representatives of both the Parties and authenticated by the members of the IEC.
- **17.** In case the Draft Settlement Agreement is rejected by the Competent Authority of BHEL or the other Party, the Conciliation proceedings would stand terminated.
- 18. A Settlement Agreement shall contain a statement to the effect that each of the person(s) signing thereto (i) is fully authorized by the respective Party(ies) he/she represents, (ii) has fully understood the contents of the same and (iii) is signing on the same out of complete freewill and consent, without any pressure, undue influence.
- **19.** The Settlement Agreement shall thereafter have the same legal status and effect as an arbitration award on agreed terms on the substance of the dispute rendered by an arbitral tribunal passed under section 30 of the Arbitration and Conciliation Act, 1996.
- **20.** Acceptance of the Draft Settlement Agreement/recommendations of the Conciliator and/or signing of the Settlement Agreement by BHEL shall however, be subject to withdrawal/closure of any arbitral and/or judicial proceedings initiated by the concerned Party in regard to such settled issues.
- **21.** Unless otherwise provided for in the agreement, contract or the Memorandum of Understanding, as the case may be, in the event of likelihood of prolonged

absence of the Conciliator or any member of IEC, for any reason/incapacity, the Competent Authority/Head of Unit/Division/Region/Business Group of BHEL may substitute the Conciliator or such member at any stage of the proceedings. Upon appointment of the substitute Conciliator(s), such reconstituted IEC may, with the consent of the Parties, proceed with further Conciliation into the matter either de-novo or from the stage already reached by the previous IEC before the substitution.

- **22.** The proceedings of Conciliation under this Scheme may be terminated as follows:
 - **a.** On the date of signing of the Settlement agreement by the Parties; or,
 - **b.** By a written declaration of the IEC, after consultation with the parties, to the effect that further efforts at conciliation are no longer justified, on the date of the declaration; or,
 - **c.** By a written declaration of the Parties addressed to the IEC to the effect that the Conciliation proceedings are terminated, on the date of the declaration; or,
 - **d.** By a written declaration of a Party to the other Party and the IEC, if appointed, to the effect that the Conciliation proceedings are terminated, on the date of the declaration; or,
 - **e.** On rejection of the Draft Settlement Agreement by the Competent Authority of BHEL or the other Party.
- **23.** The Conciliator(s) shall be entitled to following fees and facilities:

S1 No	Particulars	Amount		
1	Sitting fees	Each Member shall be paid a Lump		
		Sum fee of Rs 75,000/- for the whole		
		case payable in terms of paragraph No.		
		27 herein below.		
2	Towards drafting of	In cases involving claim and/or		
	settlement	counter-claim of up to Rs 5crores.		
	agreement	Rs 50,000/- (Sole Conciliator)		
		In cases involving claim and/or		
		counter-claim of exceeding Rs 5 crores		
		but less than Rs 10 crores.		
		Rs 75,000 (per Conciliator)		

S1 No	Particulars	Amount
		In cases involving claim and/or counter-claim of more than Rs 10 crores. Rs 1,00,000/- (per Conciliator) Note: The aforesaid fees for the drafting of the Settlement Agreement shall be paid on the, Signing of the Settlement Agreement after approval of the Competent Authority or Rejection of the proposed Settlement Agreement by the Competent Authority of BHEL.
3	Secretarial expenses	Rs 10,000/- (one time) for the whole case for Conciliation by a Sole Member IEC. Where Conciliation is by multi member Conciliators –Rs 30,000/- (one time)- to
4	Travel and transportation and stay at outstation Retired Senior Officials of other Public Sector Undertakings (pay scale wise equivalent to or more than E-8 level of BHEL)	As per entitlement of the equivalent officer (pay scale wise) in BHEL.
	Others	As per the extant entitlement of whole time Functional Directors in BHEL. Ordinarily, the IEC Member(s) would be entitled to travel by air Economy Class.
5	Venue for meeting	Unless otherwise agreed in the agreement, contract or the Memorandum of Understanding, as the case may be, the venue/seat of proceedings shall be the location of the concerned Unit / Division / Region /

S1 No	Particulars	Amount
		Business Group of BHEL. Without
		prejudice to the seat/venue of the
		Conciliation being at the location of
		concerned BHEL Unit / Division /
		Region / Business Group, the IEC after
		consulting the Parties may decide to
		hold the proceedings at any other
		place/venue to facilitate the
		proceedings. Unless, Parties agree to
		conduct Conciliation at BHEL premises,
		the venue is to be arranged by either
		Party alternately.

- **24.** The parties will bear their own costs including cost of presenting their cases/evidence/witness(es)/expert(s) on their behalf. The parties agree to rely upon documentary evidence in support of their claims and not to bring any oral evidence in IEC proceedings.
- 25. If any witness(es) or expert(s) is/are, with the consent of the parties, called upon to appear at the instance of the IEC in connection with the matter, then, the costs towards such witness(es)/expert(s) shall be determined by the IEC with the consent of the Parties and the cost so determined shall be borne equally by the Parties.
- **26.** The other expenditures/costs in connection with the Conciliation proceedings as well as the IEC's fees and expenses shall be shared by the Parties equally.
- **27.** Out of the lump sum fees of Rs 75,000/- for Sitting Fees, 50% shall be payable after the first meeting of the IEC and the remaining 50% of the Sitting Fees shall be payable only after termination of the conciliation proceedings in terms of para 22 hereinabove.
- 28. The travelling, transportation and stay at outstation shall be arranged by concerned Unit as per entitlements as per Serial No. 4 of the Table at para 23 above, and in case such arrangements are not made by the BHEL Unit, the same shall be reimbursed to the IEC on actuals limited to their entitlement as per Serial No. 4 of the Table at Para 23 above against supporting documents. The IEC Member(s) shall submit necessary invoice for claiming the fees/reimbursements.
- **29.** The Parties shall keep confidential all matters relating to the conciliation proceedings. Confidentiality shall extend also to the settlement agreement,

- except where its disclosure is necessary for purposes of its implementation and enforcement or as required by or under a law or as per directions of a Court/Governmental authority/ regulatory body, as the case may be.
- **30.** The Parties shall not rely upon or introduce as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the Disputes that is the subject of the Conciliation proceedings:
 - **a.** Views expressed or suggestions made by the other party in respect of a possible settlement of the Disputes;
 - **b.** admissions made by the other party in the course of the Conciliator proceedings;
 - **c.** proposals made by the Conciliator;
 - **d.** The fact that the other Party had indicated his willingness to accept a proposal for settlement made by the Conciliator.
- **31.** The Parties shall not present the Conciliator(s) as witness in any Alternative Dispute Resolution or Judicial proceedings in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.
- **32.** None of the Conciliators shall act as an arbitrator or as a representative or counsel of a Party in any arbitral or judicial proceeding in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.
- or judicial proceedings in respect of a Disputes that is the subject matter of the Conciliation proceedings except that a Party may initiate arbitral or judicial proceedings where, in his opinion, such proceedings are necessary for preserving his rights including for preventing expiry of period of limitation. Unless terminated as per the provisions of this Scheme, the Conciliation proceedings shall continue notwithstanding the commencement of the arbitral or judicial proceedings and the arbitral or judicial proceedings shall be primarily for the purpose of preserving rights including preventing expiry of period of limitation.
- **34.** The official language of Conciliation proceedings under this Scheme shall be English unless the Parties agree to some other language.

STATEMENT OF CLAIMS/COUNTER CLAIMS TO BE SUBMITTED TO THE IEC BY BOTH THE PARTIES

1.	Chronol	logy	of	the	Disputes	
----	---------	------	----	-----	----------	--

- 2. Brief of the Contract/MoU/Agreement/LOI/LOA
- 3. Brief history of the Disputes:
- 4. Issues:
- 5. Details of Clam(s)/Counter Claim(s):

SI. No.	Description of claim(s)/Counter Claim	Amount (in INR)Or currency applicable in the contract	Relevant contract clause

6. Basis/Ground of claim(s)/counter claim(s) (along with relevant clause of contract)

Note– The Statement of Claims/Counter Claims may ideally be restricted to maximum limit of 20 pages. Relevant documents may be compiled and submitted along with the statement of Claims/Counter Claims. The statement of Claims/Counter Claims is to be submitted to all IEC members and to the other party by post as well as by email.

FORMAT FOR NOTICE INVOKING CONCILIATION CLAUSE BY BHEL FOR REFERRING THE DISPUTES TO CONCILIATION THROUGH IEC

M/s. (Stakeholder's name)

Subject: NOTICE FOR INVOCATION OF THE CONCILIATION CLAUSE OF THE CONTRACT BY BHEL

Rei: (Contra	ict No/ IV	ioU/Ag	reement/1	JOI/LOA	.& date		<u> </u>
Dear	Sir/I	Madam,						
	Λ -					C	4	- 1

As you are aware, with reference to above referred Contract/MoU/Agreement/LOI/LOA, certain disputes have arisen, which, in-spite of several rounds of mutual discussions and various correspondences have remained unresolved. The brief particulars of our claims which arise out of the above- referred Contract/MoU/Agreement/LOI/LOA are reproduced hereunder:

Sl. No.	Claim description	Amount involved

As you are aware, there is a provision in the captioned Contract/MoU/Agreement/LOI/ LOA for referring disputes to conciliation.

Please note that upon receipt of your consent in writing within 30 days of the date of receipt of this letter by you, BHEL shall appoint suitable person(s) from the BHEL Panel of Conciliators.

This letter is being issued without prejudice to our rights and contentions available under the contract and law.

Thanking you Yours faithfully

Representative of BHEL

Note: The Format may be suitably modified, as required, based on facts and circumstances of the case.

FORMAT FOR NOTICE INVOKING CONCILIATION CLAUSE BY A STAKEHOLDER FOR REFERRING THE DISPUTES TO CONCILIATION THROUGH IEC

To,

BHEL (Head of the Unit/Division/Region/Business Group)

Subject: NOTICE FOR INVOCATION OF THE CONCILIATION CLAUSE OF THE CONTRACT BY A STAKEHOLDER

Ref: Contract No/MoU/Agreement/LOI/LOA& date	
Dear Sir/Madam,	

As you are aware, with reference to above referred Contract/MoU/Agreement/LOI/LOA, certain disputes have arisen, which, in-spite of several rounds of mutual discussions and various correspondences have remained unresolved. The brief particulars of our claims which have arisen out of the above-referred Contract/MoU/Agreement/LOI/LOA are enumerated hereunder:

Sl. No.	Claim description	Amount involved

As you are aware, there is a provision in the captioned Contract/MoU/Agreement/LOI/ LOA for referring inter-se disputes of the Parties to conciliation.

We wish to refer the above-said disputes to Conciliation as per the said Clause of the captioned Contract/MoU/Agreement/LOI/ LOA. In terms of Clause --------of Procedure i.e., Annexure ------ to the Contract/MoU /Agreement / LOI / LOA, we hereby invite BHEL to provide its consent in writing to proceed with conciliation into the above mentioned disputes within a period of 30 days from the date of this letter along with details of counter-claims, if any, which it might have with regard to the subject Contract/ MoU/ Agreement/ LOI/ LOA and to appoint suitable person(s) as Conciliator(s) from the BHEL Panel of Conciliators.

This letter is being issued without prejudice to our rights and contentions available under the contract and law.

Thanking you Yours faithfully

Representative of the Stakeholder

Note: The Format may be suitably modified, as required, based on facts and circumstances of the case.

FORMAT FOR INTIMATION TO THE STAKEHOLDER ABOUT APPOINTMENT OF CONCILIATOR/IEC

To,				
	M/s.	(Stakeho	older's r	name)

Subject: INTIMATION BY BHEL TO THE STAKEHOLDER AND CONCILIATOR(S) ABOUT APPOINTMENT OF CONCILIATOR/IEC

Ref: Contract No/MoU/Agreement/LOI/LOA& date
Sir,
This is with reference to letter dated regarding reference of the disputes arising in connection with the subject Contract No /MoU/Agreement/LOI/LOA to conciliation and appointment of Conciliator(s).
In pursuance of the said letter, the said disputes are assigned to conciliation and the following persons are nominated as Conciliator(s) for conciliating and assisting the Parties to amicably resolve the disputes in terms of the Arbitration & Conciliation Act, 1996 and the Procedure to the subject Contract/MoU/Agreement/LOI/LOA, if possible.
Name and contact details of Conciliator(s)
a)
b)
c)
You are requested to submit the Statement of Claims or Counter-Claims (strike off

You are requested to submit the Statement of Claims or Counter-Claims (strike off whichever is inapplicable) before the Conciliator(s) in Format 5 (enclosed herewith) as per the time limit as prescribed by the Conciliator(s).

Yours faithfully,

Representative of BHEL

CC: To Conciliator(s)... for Kind Information please.

Encl: As above

Note: The Format may be suitably modified, as required, based on facts and circumstances of the case.

DOCUMENT NO: PS:MSX:GCC, REV 02, 16TH JUNE'2021 (AMENDED UPTO AMENDMENT 05 DATED 17.05.2022-SR)

General Conditions of Contract

(Common for Power Sector Regions)

2021

BHARAT HEAVY ELECTRICALS LIMITED

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CHAPTER -1

1. GENERAL INSTRUCTION TO TENDERERS

1.1. DESPATCH INSTRUCTION

- The General Conditions of Contract form part of the Tender specifications. All pages of the tender documents shall be duly signed, stamped and submitted along with the offer in token of complete acceptance thereof. (For E-Tender, bidders shall use electronic Signature viz Digital Signature Certificate while uploading on the e-procurement portal. The information furnished shall be complete by itself. The tenderer is required to furnish all the details and other documents as required in the following pages.
- Tenderers are advised to study all the tender documents carefully. Any submission of tender by the tenderer shall be deemed to have been done after careful study and examination of the tender documents and with the full understanding of the implications thereof. Should the tenderers have any doubt about the meaning of any portion of the Tender Specification or find discrepancies or omissions in the drawings or the tender documents issued are incomplete or shall require clarification on any of the technical aspect, the scope of work etc., he shall at once, contact the authority inviting the tender well in time (so as not to affect last date of submission) for clarification before the submission of the tender. Tenderer's request for clarifications shall be with reference to Sections and Clause numbers given in the tender documents. The specifications and terms and conditions shall be deemed to have been accepted by the tenderer in his offer. Non-compliance with any of the requirements and instructions of the tender enquiry may result in the rejection of the tender.
- lntegrity pact (IP) shall be applicable for all tenders / contracts if indicated in NIT. This integrity pact shall be issued as part of the Tender documents and shall be submitted by the bidder along with Techno-commercial bid duly filled, signed and stamped by the authorized signatory who signs the bid. Only those vendors / bidders who have entered into such an IP with BHEL shall be considered qualified to participate in the bidding. Entering into this pact shall be a preliminary qualification.

1.2. SUBMISSION OF TENDERS

- 1.2.1 The tenderers must submit their tenders to Officer inviting tender as per instructions in the NIT.
- 1.2.2 Tenders submitted by post (i.e. by 'REGISTERED POST / by COURIER') shall be sent with due allowance for any postal/courier delays. BHEL takes no responsibility for delay, loss or non-receipt of tenders sent by post/courier. The tenders received after the specified time of their submission are treated as 'Late Tenders' and shall not be considered under any circumstances. Offers received by Email shall be considered as per terms of NIT. E-Tenders shall be submitted through E-Procurement portal as per instruction in NIT. Tenderers to upload offers well in advance in order to avoid last minute congestion in e-procurement website. However, after submission of the tender, the tenderer can re-submit revised tender but before due date and time of submission of tender as notified.
- 1.2.3 Tenders shall be opened by Officer of BHEL at the time and date as specified in the NIT, in the presence of such of those tenderers or their authorized representatives who would like to be present (In case of Manual Tenders). BHEL reserves the right to go ahead with opening of the

Tender even in case of no representative is present on the specified date and time. For e-tenders, bidders may mark their presence online through provisions available in e-procurement portal.

- 1.2.4 Tenderers whose bids are found techno commercially qualified shall be informed about the date and time of opening of the Price Bids and such Tenderers may depute their representatives to witness the opening of the price bids (In case of Manual Tenders). BHEL's decision in this regard shall be final and binding.
- 1.2.5 Before submission of Offer, the tenderers are advised to inspect the site of work and the environments and be well acquainted with the actual working and other prevalent conditions, facilities available, position of material and labour, means of transport and access to Site, accommodation etc. No claim will be entertained later on the grounds of lack of knowledge of any of these conditions.

The tenderer may get aware about weather conditions, contingencies & other circumstances which may influence or affect their tender prices. Invariable of inspection by the tenderer, the tenderer shall be considered deemed acquainted with all site conditions such as rain patterns, hazardous conditions, soil patterns, local factors etc. Tenderer to have satisfied himself in all respect before quoting his rates and no claim will be entertained later on the grounds of lack of knowledge of any of these conditions.

1.3. LANGUAGE

- 1.3.1 The tenderer shall quote the rates in English language and international numerals. These rates shall be entered in figures as well as in words. Tenderers are requested to refer the clauses of NIT/ Vol-II "Price Bid" for more details. For the purpose of the tenders, the metric system of units shall be used.
- 1.3.2 All entries in the tender shall either be typed or written legibly in ink. Erasing and over-writing is not permitted and may render such tenders liable for rejection. All cancellations and insertions shall be duly attested by the tenderer.

1.4 PRICE DISCREPANCY:

- 1.4.1 **Price Bid opening**: During opening of price bids (submitted through conventional method or through E-Procurement system), if there is any difference between the amount in figures and in words, the amount quoted by the bidder in words shall be taken as correct.
- 1.4.2 **Reverse Auction**: In case of Reverse Auction, the successful bidder shall undertake to execute the work as per overall price offered by him during the Reverse Auction process. (Guidelines as available on www.bhel.com on "supplier registration page".).

1.5 QUALIFICATION OF TENDERERS

- i) Only tenderers who have previous experience in the work of the nature and description detailed in the Notice Inviting Tender and/or tender specification are expected to quote for this work duly detailing their experience along with offer.
- ii) Offers from tenderers who do not have proven and established experience in the field shall not be considered.
- iii) The offers of the bidders who are on the banned/ hold list and also the offer of the bidders, who engage the services of the banned/ hold firms, shall be rejected. The list of **banned/ hold firms** is available on BHEL web site www.bhel.com. (Refer clause 28.0 of NIT)
- iv) Offers from tenderers who do not comply with the latest guidelines of Ministry/Commissions of Govt. of India shall not be considered.

1.6. EVALUATION OF BIDS

- i) Technical Bids submitted by the tenderer will be opened first and evaluated for fulfilling the Pre-Qualification criteria and other conditions in NIT/Tender documents, based on documentary evidences submitted along with the offer.
- ii) In case the same qualifying experience is claimed by more than one agency, then:
 - a. The agency who has executed the work as per documentary evidence submitted shall only be qualified. Scope of qualifying work should be totally with the agency who has executed and in case it is only labour and consumables without T&P, then the credentials of execution is assigned to the first agency and not to the agency who has executed only as labour supply contractor. Further, BHEL reserves the right to ask for any other proof for the said job.
 - b. However, if the same is on account of subletting part of scope by one agency to another agency in a project of BHEL, experience of both the agencies may be considered for the sublet portion of the work provided subletting has been done with the approval of BHEL.
- iii) In case the qualifying experience is claimed by private organizations (sub-agency) based on 'Work Order' and 'Experience Certificates' from a non-BHEL organization (main agency), then it shall be the responsibility of sub-agency to submit (in addition to the experience certificate from main agency) relevant certificate regarding qualifying experience from the end Customer or the Turnkey-Contractor (if any) who has awarded the work to main agency, as a proof for having executed subject qualifying work. BHEL reserves the right to ask for any other proof for the said job.
- iv) Assessing Bidder's Capacity for executing the current tender shall be as per Notice Inviting Tender.
- v) Price Bids of shortlisted bidders shall only be opened either through the conventional/electronic price bid opening with/without Reverse Auction, at the discretion of BHEL. Unless specified otherwise in the tender, the L1 bidder amongst all the shortlisted bidders shall be considered for award. However, the L1 bidder shall have no claim on the award & BHEL reserves the right to award the tender at its sole discretion.
- vi) Price Bids of unqualified bidders shall not be opened. Reasons for rejection shall be intimated in due course after issue of LOI/LOA to successful bidder either through system generated e-mail or through letter/e-mail.
- vii) Bidders are advised to also refer to clause no 2.9.4 regarding evaluation of their performance in ongoing projects for the current tender.

1.7. DATA TO BE ENCLOSED

Full information shall be given by the tenderer in respect of the following. Non-submission of this information may lead to rejection of the offer.

i) INCOME TAX PERMANENT ACCOUNT NUMBER

Certified copies of Permanent Account Numbers as allotted by Income Tax Department for the Company/Firm/Individual Partners etc. shall be furnished along with tender.

ii) ORGANIZATION CHART

The organization chart of the tenderer's organization, including the names, addresses and contact information of the Directors/Partners shall be furnished along with the offer.

iii) An attested copy of the Power of Attorney, in case the tender is signed by an individual other than the sole proprietor.

iv) IN CASE OF INDIVIDUAL TENDERER:

His / her full name, address, PAN and place & nature of business.

v) IN CASE OF PARTNERSHIP FIRM:

The names of all the partners and their addresses, A copy of the partnership deed/instrument of partnership dully certified by the Notary Public shall be enclosed.

vi) IN CASE OF COMPANIES:

- a) Date and place of registration including date of commencement certificate in case of Public Companies (certified copies of Memorandum and articles of Association are also to be furnished).
- b) Nature of business carried on by the Company and the provisions of the Memorandum relating thereof.

1.8 AUTHORIZATION AND ATTESTATION

Tenders shall be signed by a person duly authorized/empowered to do so, for which a Power of Attorney is to be submitted along with the tender offer. For company, a Power of Attorney (as per format in Volume-I D) shall be submitted.

1.9 EARNEST MONEY DEPOSIT

- 1.9.1 Every tender must be accompanied by the prescribed amount of Earnest Money Deposit (EMD) in the manner described herein.
 - i) EMD shall be furnished before tender opening / along with the offer in full as per the amount indicated in the NIT.
 - ii) The EMD is to be paid only in the following forms:
 - a) Cash deposit as permissible under the extant Income Tax Act (before tender opening).
 - b) Electronic Fund Transfer credited in BHEL account (before tender opening).
 - c) Banker's cheque / Pay order / Demand draft, in favour of 'Bharat Heavy Electricals Limited' and payable at Regional HQ issuing the tender (along with offer).
 - d) Fixed Deposit Receipt (FDR) issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL) (along with offer). The Fixed Deposit in such cases shall be valid for at least six months from the due date of tender submission.

In case EMD amount is more than Rs. Two Lakhs, Tenderer has the option to submit Rs. Two lakhs in the forms described above in clause no. 1.9.1. (a) to (d) and the remaining amount over and above Rs. Two Lakhs in the form of Bank Guarantee from Scheduled Bank (along with the Offer). The Bank Guarantee in such cases shall be valid for at least six months from the due date of tender submission. The Bank Guarantee format for EMD shall be in the prescribed formats.

- iii) No other form of EMD remittance shall be acceptable to BHEL.
- 1.9.2 EMD by the Tenderer will be forfeited as per NIT conditions, if:
 - i) After opening the tender and within the offer validity period, the tenderer revokes his tender or makes any modification in his tender which is not acceptable to BHEL.
 - ii) The Contractor fails to deposit the required Security deposit or commence the work within the

period as per LOI/ LOA/ Contract.

EMD by the tenderer shall be withheld in case any action on the tenderer is envisaged under the provisions of extant "Guidelines on Suspension of business dealings with suppliers/ contractors" and forfeited/ released based on the action as determined under these guidelines.

- 1.9.3 EMD shall not carry any interest.
- 1.9.4 EMD given by all unsuccessful tenderers shall be refunded normally within fifteen days of award of work.
- 1.9.5 Cash portion of EMD of successful tenderer will be retained as part of Security Deposit. EMD submitted in the form of Bank Guarantee/ FDR shall be retained by BHEL until the receipt of at least 50% of the Security Deposit.

1.10 SECURITY DEPOSIT

- 1.10.1 Upon acceptance of Tender, the successful Tenderer should deposit the required amount of Security Deposit towards fulfilment of any obligations in terms of the provisions of the contract. The total amount of Security Deposit will be 5% of the contract value.
- 1.10.2 The security Deposit should be furnished before start of the work by the contractor.

Note: In case of small value contracts not exceeding Rs. 20 lakhs, work can be started before the required Security Deposit is collected. However, payment can be released only after collection/recovery of initial 50% Security Deposit.

- 1.10.3 The balance amount to make up the required Security Deposit of 5% of the contract value may be accepted in the following forms.
 - i) Cash (as permissible under the extant Income Tax Act).
 - ii) Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL.
 - iii) Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL).
- iv) Bank Guarantee from Scheduled Banks/ Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format for Security Deposit shall be in the prescribed formats.
- v) Fixed Deposit Receipt issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL).
- vi) Security deposit can also be recovered at the rate of 10% of the gross amount progressively from each of the running bills of the contractor till the total amount of the required security deposit is collected. However, in such cases at least 50% of the required Security Deposit, including the EMD, should be deposited in any form as prescribed before start of the work and the balance 50% may be recovered from the running bills as described above.

Note: BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith.

1.10.4 The Security Deposit shall not carry any interest.

- 1.10.5 In case the value of work exceeds the awarded / accepted value, the Security Deposit shall be correspondingly enhanced as given below:
 - i) The enhanced part of the Security Deposit shall be immediately deposited by the Contractor or adjusted against payments due to the Contractor.
 - ii) Contract value for the purpose of operating the increased value of Security Deposit due to Quantity Variation, shall be exclusive of Price Variation Clause, Over Run Compensation and Extra works done on manday rates.
- iii) The recoveries made from running bills (cash deduction towards balance SD amount) can be released against submission of equivalent Bank Guarantee in acceptable form, but only once, before completion of work, with the approval of competent authority of BHEL.
- 1.10.6 The validity of Bank Guarantees towards Security Deposit shall be initially up to the completion period as stipulated in the Letter of Intent/ Award + Guarantee Period + 3 months, and the same shall be kept valid by proper renewal by the contractor till the acceptance of Final Bills of the Contractor by BHEL.
- 1.10.7 BHEL reserves the right of forfeiture of Security Deposit in addition to other claims and penalties in the event of the Contractor's failure to fulfill any of the contractual obligations or in the event of termination of contract as per terms and conditions of contract. BHEL reserves the right to set off the Security Deposit against any claims of other contracts with BHEL.
- 1.10.8 Bidder agrees to submit security deposit required for execution of the contract within the time period mentioned. In case of delay in submission of security deposit, enhanced security deposit which would include interest (Base rate of SBI + 6%) for the delayed period, shall be submitted by the bidder. Further, if security deposit is not submitted till such time the first bill becomes due, the amount of security deposit due shall be recovered as per terms defined in NIT / contract, from the bills along with due interest

1.11 RETURN OF SECURITY DEPOSIT

Security Deposit shall be released to the contractor upon fulfillment of contractual obligations as per terms of the contract including completion of Guarantee Period after deducting all expenses / other amounts due to BHEL under the contract / other contracts entered into with them by BHEL.

1.12 BANK GUARANTEES

Where ever Bank Guarantees are to be furnished/submitted by the contractor, the following shall be complied with

- i) Bank Guarantees shall be from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. Bank Guarantees issued by Co-Operative Banks/ Financial Institutions shall not be accepted.
- ii) The Bank Guarantees shall be as per prescribed formats.
- iii) It is the responsibility of the bidder to get the Bank Guarantees revalidated/extended for the required period as per the advice of BHEL Site Engineer / Construction Manager. BHEL shall not be liable for issue of any reminders regarding expiry of the Bank Guarantees.
- iv) In case extension/further extensions of any Bank Guarantees are not required, the bidders shall ensure that the same is explicitly endorsed by the Construction Manager and submitted to the Regional HQ issuing the LOI/LOA.
- v) In case the Bank Guarantees are not extended before the expiry date, BHEL reserves the right to invoke the same by informing the concerned Bank in writing, without any advance notice/communication to the concerned bidder.
- vi) Bidders to note that any corrections to Bank Guarantees shall be done by the issuing Bank, only through an amendment in an appropriate non judicial stamp paper.

vii) The Original Bank Guarantee shall be submitted to Subcontracting Department of the respective Region of BHEL.

1.13 VALIDITY OF OFFER

The rates in the Tender shall be kept open for acceptance for a minimum period of **SIX MONTHS** from latest due date of offer submission (including extension, if any). In case BHEL (Bharat Heavy Electricals Ltd) calls for negotiations, such negotiations shall not amount to cancellation or withdrawal of the original offer which shall be binding on the tenderers.

1.14 EXECUTION OF CONTRACT AGREEMENT

The successful tenderer's responsibility under this contract commences from the date of issue of the Letter of Intent/ Award by Bharat Heavy Electricals Limited.

The successful tenderer shall be required to execute an agreement in the prescribed form, with BHEL, within a reasonable time after the acceptance of the Letter of Intent/Award, and in any case before releasing the first running bill. The contract agreement shall be signed by a person duly authorized/empowered by the tenderer. The expenses for preparation of agreement document shall be borne by BHEL.

1.15 REJECTION OF TENDER AND OTHER CONDITIONS

- 1.15.1 The acceptance of tender will rest with BHEL which does not bind itself to accept the lowest tender or any tender and reserves to itself full rights for the following without assigning any reasons whatsoever:
 - a. To reject any or all of the tenders.
 - b. To split up the work amongst two or more tenderers as per NIT.
 - c. To award the work in part if specified in NIT.
 - d. In case of either of the contingencies stated in (b) and (c) above, the time for completion as stipulated in the tender shall be applicable.
- 1.15.2 Conditional tenders, unsolicited tenders, tenders which are incomplete or not in the form specified or defective or have been materially altered or not in accordance with the tender conditions, specifications etc. are liable to be rejected.
- 1.15.3 Tenders are liable to be rejected in case of unsatisfactory performance of the tenderer with BHEL or tenderer under suspension (hold/banning) by any unit / region / division of BHEL or tenderers who do not comply with the latest guidelines of Ministry/Commissions of Govt of India. BHEL reserves the right to not consider a bidder for further processing of tender in case it is observed that they are overloaded and may not be in a position to execute this job as per the required schedule in line with clause no. 9.0 of the 'NIT'. The decision of BHEL will be final in this regard.
- 1.15.4 If a tenderer who is a proprietor expires after the submission of his tender or after the acceptance of his tender, BHEL may at their discretion, cancel such tender. If a partner of a firm expires after the submission of tender or after the acceptance of the tender, BHEL may then cancel such tender at their discretion, unless the firm retains its character.
- 1.15.5 BHEL will not be bound by any Power of Attorney granted by changes in the composition of the firm made subsequent to the execution of the contract. BHEL may, however, recognize such power of Attorney and changes after obtaining proper legal advice, the cost of which will be

chargeable to the contractor concerned.

- 1.15.6 If the tenderer deliberately gives wrong information in his tender, BHEL reserves the right to reject such tender at any stage or to cancel the contract if awarded and forfeit the Earnest Money/Security Deposit/any other money due.
- 1.15.7 Canvassing in any form in connection with the tenders submitted by the Tenderer shall make his offer liable to rejection.
- 1.15.8 In case the Proprietor, Partner or Director of the Company/Firm submitting the Tender, has any relative or relation employed in BHEL, the authority inviting the Tender shall be informed of the fact as per specified format, along with the Offer. Failing to do so, BHEL may, at its sole discretion, reject the tender or cancel the contract and forfeit the Earnest Money/Security Deposit.
- 1.15.9 The successful tenderer should not sub-contract part or complete work detailed in the tender specification undertaken by him without written permission of BHEL's Construction Manager/Site in charge. The tenderer is solely responsible to BHEL for the work awarded to him.
- 1.15.10 The Tender submitted by a techno commercially qualified tenderer shall become the property of BHEL who shall be under no obligation to return the same to the bidder. However unopened price bids and late tenders shall be returned to the bidders, in case of Conventional/ Paper bid.
- 1.15.11 Unsolicited discount received after the due date and time of Bid Submission shall not be considered for evaluation. However, if the party who has submitted the unsolicited discount/rebate becomes the L-1 party, then the awarded price i.e. contract value shall be worked out after considering the discount so offered.
- 1.15.12 BHEL shall not be liable for any expenses incurred by the bidder in the preparation of the tender irrespective of whether the tender is accepted or not.

1.16 INTIMATION OF CHANGE OF NAME/RE-CONSTITUTION OF THE ORGANIZATION

In the event of the organization (Proprietorship/Partnership/Company) undergoing any change of name or reconstitution, prior intimation of the same shall be given to BHEL. Upon such changes coming into effect, the same is to be intimated to BHEL immediately with supporting documents as applicable.

Further, the new entity has to intimate BHEL in writing that they will honor all the earlier commitments in respect of the subject contract.

CHAPTER-2

- 2.1 **<u>DEFINITION</u>**: The following terms shall have the meaning hereby assigned to them except where the context otherwise requires
- i) BHEL shall mean Bharat Heavy Electricals Limited (of the respective Power Sector Region inviting the Tender), a company registered under Indian Companies Act 1956, with its Registered Office at BHEL HOUSE, SIRI FORT, NEW DELHI 110 049, or its Power Sector Regional Offices or its Authorized Officers or its Site Engineers or other employees authorized to deal with any matters with which these persons are concerned on its behalf.
- ii) "EXECUTIVE DIRECTOR" or "GENERAL MANAGER (In- charge)" or "GENERAL MANAGER" shall mean the Officer in Administrative charge of the respective Power Sector Region.
- iii) "COMPETENT AUTHORITY" shall mean BHEL Officers who are empowered to act on behalf of BHEL.
- iv) "ENGINEER" or "ENGINEER IN CHARGE" shall mean an Officer of BHEL as may be duly appointed and authorized by BHEL to act as "Engineer" on his behalf for the purpose of the Contract, to perform the duty set forth in this General Conditions of Contract and other Contract documents. The term also includes 'CONSTRUCTION MANAGER' or 'SITE INCHARGE' as well as Officers at Site or at the Headquarters of the respective Power Sector Regions.
- v) "SITE" shall mean the places or place at which the plants/equipments are to be erected and services are to be performed as per the specification of this Tender.
- vi) "CLIENT OF BHEL" or "CUSTOMER" shall mean the project authorities with whom BHEL has entered into a contract for supply of equipments or provision of services.
- vii) "CONTRACTOR" shall mean the successful Bidder/Tenderer who is awarded the Contract and shall include the Contractor's successors, heirs, executors, administrators and permitted assigns.
- viii) "CONTRACT" or "CONTRACT DOCUMENT" shall mean and include the Agreement of Work Order, the accepted appendices of Rates, Schedules, Quantities if any, Offer submitted by contractor including acceptance to General Conditions of Contract, Special Conditions of Contract, Instructions to the Tenderers, Drawings, Technical Specifications, the Special Specifications if any, the Tender documents, subsequent amendments /corrigendum to Tender mutually agreed upon and the Letter of Intent/Award/Acceptance issued by BHEL. Any conditions or terms stipulated by the contractor in the tender documents or subsequent letters shall not form part of the contract unless, specifically accepted in writing by BHEL in the Letter of Intent/Award and incorporated in the agreement or amendment thereof.
 - ix) "GENERAL CONDITIONS OF CONTRACT" shall mean the 'Instructions to Tenderers' and 'General Conditions of Contract' pertaining to the work for which above tenders have been called for

- x) "TENDER SPECIFICATION" or "TENDER" or "TENDER DOCUMENTS" shall mean General Conditions, Common Conditions, Special Conditions, Price Bid, Rate Schedule, Technical Specifications, Appendices, Annexures, Corrigendums, Amendments, Forms, Procedures, Site information etc. and drawings/documents pertaining to the work for which the tenderers are required to submit their offers. Individual specification number will be assigned to each Tender Specification.
- xi) "LETTER OF INTENT/ AWARD" shall mean the intimation by a Letter/Fax/email to the tenderer that the tender has been accepted in accordance with provisions contained in the letter. The responsibility of the contractor commences from the date of issue of this letter and all terms and conditions of the contract are applicable from this date.
- xii) "COMPLETION TIME" shall mean the period by 'date/month' specified in the 'Letter of Intent/Award' or date mutually agreed upon for handing over of the intended scope of work, the erected equipment/plant which are found acceptable by the Engineer, being of required standard and conforming to the specifications of the Contract.
- xiii) "PLANT" shall mean and connote the entire assembly of the plant and equipments covered by the contract.
- xiv) "EQUIPMENT" shall mean equipment, machineries, materials, structural, electricals and other components of the plant covered by the contract.
- xv) "TESTS" shall mean and include such test or tests to be carried out on the part of the contractor as are prescribed in the contract or considered necessary by BHEL in order to ascertain the quality, workmanship, performance and efficiency of the contractor or part thereof.
- xvi) "APPROVED", "DIRECTED" or "INSTRUCTED" shall mean approved, directed or instructed by BHEL.
- xvii) "WORK or CONTRACT WORK" shall mean and include supply of all categories of labour, specified consumables, tools and tackles and Plants required for complete and satisfactory site transportation, handling, stacking, storing, erecting, testing and commissioning of the equipments to the entire satisfaction of BHEL.
- xviii) "SINGULAR AND PLURALS ETC" words carrying singular number shall also include plural and vice versa, where the context so requires. Words imparting the masculine Gender shall be taken to include the feminine Gender and words imparting persons shall include any Company or Associations or Body of Individuals, whether incorporated or not.
- xix) "HEADING" The heading in these General Conditions are solely for the purpose of facilitating reference and shall not be deemed to be part thereof or be taken as instructions thereof or of the contract.
- xx) "MONTH" shall mean calendar month unless otherwise specified in the Tender.
- xxi) 'Day' or 'Days' unless herein otherwise expressly defined shall mean calendar day or days of twenty-four (24) hours each. A Week shall mean continuous period of seven (7) days.

- xxii) "COMMISSIONING" shall mean the synchronization testing and achieving functional operation of the Equipment with associated system after all initial adjustments, trials, cleaning, re-assembly required at site if any, have been completed and Equipment with associated system is ready for taking into service.
- xxiii) "WRITING" shall include any manuscript type written or hand written or printed statement or electronically transmitted messages, under the signature or seal or transmittal of BHEL.
- xxiv) "TEMPORARY WORK" shall mean all temporary works for every kind required in or for the execution, completion, maintenance of the work.
- xxv) 'CONTRACT PRICE' or 'CONTRACT VALUE' shall mean the sum mentioned in the LOI/LOA/Contract Agreement subject to such additions thereto or deductions there from as may be made under provisions hereinafter contained.
- xxvi) 'EXECUTED CONTRACT VALUE' shall mean actual value of works executed by the contractor and certified by BHEL. This value shall not include PVC, ORC, Extra Works and Taxes.
- xxvii) "COMMENCEMENT DATE" or "START DATE" shall mean the commencement/start of work at Site as per terms defined in the Tender.
- xxviii) "SHORT CLOSING" or "FORE CLOSING" of Contract shall mean the premature closing of Contract, for reasons not attributable to the contractor and mutually agreed between BHEL and the contractor.
- xxix) "TERMINATION" of Contract shall mean the pre mature closing of contract due to reasons as mentioned in the contract.
- xxx) "DE MOBILIZATION" shall mean the temporary winding up of Site establishment by Contractor leading to suspension of works temporarily for reasons not attributable to the contractor.
- xxxi) "RE MOBILIZATION" shall mean the resumption of work with all resources required for the work after demobilization.

2.2 LAW GOVERNING THE CONTRACT AND COURT JURISDICTION

The contract shall be governed by the Law for the time being in force in the Republic of India. Subject to clause 2.21.1.1 of this contract, the Civil Court having original Civil Jurisdiction at Delhi for PSNR, at Kolkata for PSER, at Nagpur for PSWR and at Chennai for PSSR, shall alone have exclusive jurisdiction in regard to all matters in respect of the Contract.

2.3 ISSUE OF NOTICE

2.3.1 <u>Service of notice on Contractor</u>

Any notice to be given to the Contractor under the terms of the contract shall be served by sending the same by **Registered Post/Speed Post to or leaving the same at** the Contractor's last known address of the principal place of business (or in the event of the contractor being a company, to or at its Registered Office). In case of change of address, the notice shall be served at changed address as notified in writing by the Contractor to BHEL. Such posting or leaving of the notice shall be deemed to be good service of such notice and the time mentioned to the condition for doing any act after notice shall be reckoned from the date so mentioned in such notice.

2.3.2 Service of notice on BHEL

Any notice to be given to BHEL in-charge/Region under the terms of the Contract shall be served by sending the same by post to or leaving the same at BHEL address or changed address as notified in writing by BHEL to the Contractor.

2.4 USE OF LAND

No land belonging to BHEL or their Customer under temporary possession of BHEL shall be occupied by the contractor without written permission of BHEL.

2.5 COMMENCEMENT OF WORK

- **2.5.1** The contractor shall commence the work as per the time indicated in the Letter of Intent/Award from BHEL and shall proceed with the same with due expedition without delay.
- 2.5.2 If the contractor fails to start the work within stipulated time as per LOI/ LOA or as intimated by BHEL, then BHEL at its sole discretion will have the right to cancel the contract. The Earnest Money and/or Security Deposit with BHEL will stand forfeited without any further reference to him without prejudice to any and all of BHEL's other rights and remedies in this regard.
- **2.5.3** All the work shall be carried out under the direction and to the satisfaction of BHEL.

2.6 MEASUREMENT OF WORK AND MODE OF PAYMENT:

- **2.6.1** All payments due to the contractors shall be made by e mode only, unless otherwise found operationally difficult for reasons to be recorded in writing.
- 2.6.2 For progress running bill payments: The Contractor shall present detailed measurement sheets in triplicate, duly indicating all relevant details based on technical documents and connected drawings for work done during the month/period under various categories in line with terms of payment as per contract. The basis of arriving at the quantities, weights shall be relevant documents and drawings released by BHEL. These measurement sheets shall be prepared jointly with BHEL Engineers and signed by both the parties.
- 2.6.3 These measurement sheets will be checked by BHEL Engineer and quantities and percentage eligible for payment under various groups shall be decided by BHEL Engineer. The abstract of quantities and percentage so arrived at based on the terms of payment shall be entered in Measurement Book and signed by both the parties.
- 2.6.4 Based on the above quantities, contractor shall prepare the bills, along with statutory documents, in prescribed format and work out the financial value. These will be entered in Measurement Book and signed by both the parties. Payment shall be made by BHEL after effecting the recoveries due from the contractor.
- **2.6.5** All recoveries due from the contractor for the month/period shall be effected in full from the corresponding running bills unless specific approval from the competent authorities is obtained to the contrary.
- **2.6.6** Measurement shall be restricted to that portion of work for which it is required to ascertain the financial liability of BHEL under this contract.

- **2.6.7** The measurement shall be taken jointly by persons duly authorized on the part of BHEL and by the Contractor.
- **2.6.8** The Contractor shall bear the expenditure involved if any, in making the measurements and testing of materials to be used/ used in the work. The contractor shall, without extra charges, provide all the assistance with appliances and other things necessary for measurement.
- **2.6.9** If at any time due to any reason whatsoever, it becomes necessary to re-measure the work done in full or in part, the expenses towards such re measurements shall be borne by the contractor unless such re measurements are warranted solely for reasons not attributable to contractor.
- 2.6.10 Passing of bills covered by such measurements does not amount to acceptance of the completion of the work measured. Any left out work has to be completed, if pointed out at a later date by BHEL.
- 2.6.11 Final measurement bill shall be prepared in the final bill format prescribed for the purpose based on the certificate issued by BHEL Engineer that entire works as stipulated in tender specification has been completed in all respects to the entire satisfaction of BHEL. Contractor shall give unqualified "No Claim" Certificate. All the tools and tackles loaned to him should be returned in satisfactory condition to BHEL. The abstract of final quantities and financial values shall also be entered in the Measurement Books and signed by both parties to the contract. The Final Bill shall be prepared and paid within a reasonable time after completion of work.

2.7 RIGHTS OF BHEL

BHEL reserves the following rights in respect of this contract during the original contract period or its extensions if any, as per the provisions of the contract, without entitling the contractor for any compensation.

- 2.7.1 To withdraw any portion of work and/or to restrict/alter quantum of work as indicated in the contract during the progress of work and get it done through other agencies to suit BHEL's commitment to its customer or in case BHEL decides to advance the date of completion due to other emergent reasons/ BHEL's obligation to its customer.
 - In case of inadequate manpower deployed by the contractor, BHEL reserves the right to deploy additional manpower through any other agency for expediting activities in the interest of the project. Supplied manpower shall be put on job by the contractor and payments and other statutory compliances related to manpower shall be the contractor's responsibility. In case of contractor's failure to fulfill his obligations in respect of such manpower, BHEL reserves the right to take necessary action as per contract conditions.
- **2.7.2.1** To terminate the contract or withdraw portion of work and get it done through other agency, at the risk and cost of the contractor after due notice of a period of 14 days' (this period can be reduced in case of urgency or increased otherwise) by BHEL in any of the following cases:
 - i). Contractor's poor progress of the work vis-à-vis execution timeline as stipulated in the Contract, backlog attributable to contractor including unexecuted portion of work does not appear to be executable within balance available period considering its performance of execution.
 - ii). Withdrawal from or abandonment of the work by contractor before completion of the work as per contract.
 - iii). Non-completion of work by the Contractor within scheduled completion period as per Contract or as extended from time to time, for the reasons attributable to the contractor.

- iv). Termination of Contract on account of any other reason (s) attributable to Contractor.
- v). Assignment, transfer, subletting of Contract without BHEL's written permission.
- vi). Non-compliance to any contractual condition or any other default attributable to Contractor.

Risk & Cost Amount against Balance Work:

Risk & Cost amount against balance work shall be calculated as follows:

Risk & Cost Amount= $[(A-B) + (A \times H/100)]$

Where,

A= Value of Balance scope of Work (*) as per rates of new contract

B= Value of Balance scope of Work (*) as per rates of old contract being paid to the contractor at the time of termination of contract i.e. inclusive of PVC & ORC, if any.

H = Overhead Factor to be taken as 5

In case (A-B) is less than 0 (zero), value of (A-B) shall be taken as 0 (zero).

* Balance scope of work (in case of termination of contract):

Difference of Contract Quantities and Executed Quantities as on the date of issue of Letter for 'Termination of Contract', shall be taken as balance scope of Work for calculating risk & cost amount

Contract quantities are the quantities as per original contract. If, Contract has been amended, quantities as per amended Contract shall be considered as Contract Quantities.

Items for which total quantities to be executed have exceeded the Contract Quantities based on drawings issued to contractor from time to time till issue of Termination letter, then for these items total Quantities as per issued drawings would be deemed to be contract quantities.

Substitute/ extra items whose rates have already been approved would form part of contract quantities for this purpose. Substitute/ extra items which have been executed but rates have not been approved, would also form part of contract quantities for this purpose and rates of such items shall be determined in line with contractual provisions.

However, increase in quantities on account of additional scope in new tender shall not be considered for this purpose.

NOTE: Incase portion of work is being withdrawn at risk & cost of contractor instead of termination of contract, contract quantities pertaining to portion of work withdrawn shall be considered as 'Balance scope of work' for calculating Risk & Cost amount.

LD against delay in executed work in case of Termination of Contract:

LD against delay in executed work shall be calculated in line with LD clause no. 2.7.9 of GCC, for the delay attributable to contractor. For limiting the maximum value of LD, contract value shall be taken as Executed Value of work till termination of contract.

Method for calculation of "LD against delay in executed work in case of termination of contract" is given below.

- i).Let the time period from scheduled date of start of work till termination of contract excluding the period of Hold (if any) not attributable to contractor = T1
- ii). Let the value of executed work till the time of termination of contract= X
- iii).Let the Total Executable Value of work for which inputs/fronts were made available to contractor and were planned for execution till termination of contract = Y
- iv). Delay in executed work attributable to contractor i.e. T2=[1-(X/Y)] x T1
- v).LD shall be calculated in line with LD clause (clause 2.7.9) of the Contract for the delay attributable to contractor taking "X" as Contract Value and "T2" as period of delay attributable to contractor.

- 2.7.2.2 In case Contractor fails to deploy the resources as per requirement, BHEL can deploy own/hired/otherwise arranged resources at the risk and cost of the contractor and recover the expenses incurred from the dues payable to contractor. Recoveries shall be actual expenses incurred plus 5% overheads or as defined in TCC.
- **2.7.3** Recoveries arising out of Risk & Cost and LD or any other recoveries due from Contractor Following sequence shall be applicable for recoveries from contractor:
 - a) Dues available in the form of Bills payable to contractor, SD, BGs against the same contract.
 - b) Demand notice for deposit of balance recovery amount shall be sent to contractor, if funds are insufficient to effect complete recovery against dues indicated in (a) above.
 - c) If contractor fails to deposit the balance amount to be recovered within the period as prescribed in demand notice, following action shall be taken for balance recovery:
 - Dues payable to contractor against other contracts in the same Region shall be considered for recovery.
 - i) If recovery cannot be made out of dues payable to the contractor as above, balance amount to be recovered, shall be informed to other Regions/Units for making recovery from the Unpaid Bills/Running Bills/SD/BGs/Final Bills of contractor.
 - iii) In-case recoveries are not possible with any of the above available options, Legal action shall be initiated for recovery against contractor.
- **2.7.4** To terminate the contract or to restrict the quantum of work and pay for the portion of work executed in case BHEL's contract with their customer are terminated for any reason, as per mutual agreement.
- 2.7.5 To effect recovery from any amounts due to the contractor under this or any other contract or in any other form, the moneys BHEL is statutorily forced to pay to anybody, due to contractor's failure to fulfill any of his obligations. BHEL shall levy overheads of 5% on all such payments along with interest as defined elsewhere in the GCC.
- **2.7.6** While every endeavor will be made by BHEL to this end, they (BHEL) cannot guarantee uninterrupted work due to conditions beyond their control. The Contractor will not be normally entitled for any compensation/extra payment on this account unless otherwise specified elsewhere in the contract.
- 2.7.7 BHEL may permit or direct contractor to demobilize and remobilize at a future date as intimated by BHEL in case of following situations for reasons other than Force majeure conditions and not attributable to contractor:
 - i) suspension of work(s) at a Project either by BHEL or Customer, or
 - ii) where work comes to a complete halt or reaches a stage wherein worthwhile works cannot be executed and there is no possibility of commencement of work for a period of not less than three months

In such cases, charges towards demobilization and remobilization shall be as decided by BHEL after successful remobilization by contractor at site, and decision of BHEL shall be final and binding on the contractor. After remobilization, all conditions as per contract shall become applicable. In case Contractor does not remobilize with adequate resources or does not start the work within the period as intimated, then BHEL reserves the right to get the balance works done at the Risk & Cost of the Contractor. Duration of the contract/time extension shall be revised suitably. In case of any conflict, BHEL decision in this regard shall be final and binding on the contractor.

- 2.7.8 In the unforeseen event of inordinate delay in receipt of materials, drawings, fronts etc. due to which inordinate discontinuity of work is anticipated, BHEL on its own or contractor's request at its discretion may consider to short close the contract in any of the following cases:
 - a) The balance works (including but not limited to Trial Operation, PG Test etc.) are minor vis a vis the scope of work envisaged as per the contract.
 - b) There has been no significant work in past 6 months OR no significant work is expected in next 6 months (example in Hydro projects or in projects where work has stopped due to reasons beyond the control of BHEL).
 - c) The balance works cannot be done within a reasonable period of time as they are dependent on unit shut down or on other facilities of customer or any other such reasons not attributable to the contractor.

At the point of requesting for short closure, contractor shall establish that he has completed all works possible of completion and he is not able to proceed with the balance works due to constraints beyond his control. In such a case, the estimated value of the unexecuted portion of work (or estimated value of services to be provided for carrying out milestone/stage payments like Trial Operation/PG Test etc.) as decided by BHEL, shall however be reduced from the final contract value.

Note: The Contractor shall not be eligible for any compensation on account of Quantity Variation arising out of short-closure of contract as per clause no. 2.7.8 (b) above.

2.7.9 <u>LIQUIDATED DAMAGES/PENALTY</u>

At the end of total work completion as certified by BHEL Engineer, and upon analysis of the total delay, the portion of time extensions attributable to (i) Contractor alone, (ii) Force majeure conditions, and (iii) BHEL, shall be worked out. The total period of time extensions shall be the sum of (i), (ii) and (iii) above and shall be equal to period between the scheduled date of completion and the actual date of completion of contract. LD shall be imposed/levied for the portion of time extensions solely attributable to contractor and recoverable from the dues payable to the contractor.

If the contractor fails to maintain the required progress of work which results in delay in the completion of the work as per the contractual completion period, BHEL shall have the right to impose Liquidated Damage/Penalty at the rate of 0.5% of the contract value, per week of delay or part thereof subject to a maximum of 10% of the contract value. For this purpose, the period for which LD is applicable shall be worked out based on portion of time extension granted solely attributable to contractor at the end of the contract. Contract Value for this purpose, shall be the final executed value exclusive of ORC, Extra Works executed on Manday rate basis, Supplementary/ Additional Items and PVC.

In case of LD recovery, the applicable GST shall also be recovered from contractor.

2.8 RESPONSIBILITIES OF THE CONTRACTOR IN RESPECT OF LOCAL LAWS, EMPLOYMENT OF WORKERS ETC.

The following are the responsibilities of the contractor in respect of observance of local laws, employment of personnel, payment of taxes etc. The subcontractor shall fully indemnify BHEL against any claims of whatsoever nature arising due to the failure of the contractor in discharging any of his responsibilities hereunder:

- **2.8.1** As far as possible, Unskilled Workers shall be engaged from the local areas in which the work is being executed.
- 2.8.2 The contractor at all times during the continuance of this contract shall, in all his dealings with local labour for the time being employed on or in connection with the work, have due regard to all local festivals and religious and other customs.
- 2.8.3 The contractor shall comply with all applicable State and Central Laws, Statutory Rules, Regulations, Notifications etc. such as Payment of Wages Act, Minimum Wages Act, Workmen Compensation Act, Employer's Liability Act, Industrial Disputes Act, Employers Provident Act, Employees State Insurance Scheme, Contract Labour (Regulation and Abolition) Act, 1970, Payment of Bonus & Gratuity Act, Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996, The Building and Other Construction Workers' Welfare Cess Act 1996 and other Acts, Rules, and Regulations for labour/workers as applicable and as may be enacted by the State Government and Central Govt. during the tenure of the Contract and having force or jurisdiction at Site. The Contractor shall also comply with provisions of and give all such notices to the local Governing Body, Police and other relevant Authorities as may be required by the Law.
- 2.8.4 The Contractor shall obtain independent License under the Contract Labour (Regulations and Abolition) Act, 1970 for engaging contract labour as required from the concerned Authorities based on the certificate (Form- V or as applicable) issued by the Principal Employer/Customer.
- 2.8.5 The contractor shall pay and bear all taxes, fees, license charges, Cess, duties, deposits, tolls, royalties, commission or other charges which may be leviable on account of his operations in executing the contract.
- **2.8.6** While BHEL would pay the inspection fees and Registration fees of Boiler/Electrical Inspectorate, all other arrangements for site visits periodically by the Inspectorate to site, Inspection certificate etc. will have to be made by contractor. However, BHEL will not make any payment to the Inspectorate in connection with contractor's Welders/Electricians qualification tests etc.
- **2.8.7** Contractor shall be responsible for provision of Health and Sanitary arrangements (more particularly described in Contract Labour Regulation & Abolition Act), Safety precautions etc. as may be required for safe and satisfactory execution of contract.
- **2.8.8** The contractor shall be responsible for proper accommodation including adequate medical facilities for personnel employed by him.
- **2.8.9** The contractor shall be responsible for the proper behavior and observance of all regulations by the staff employed by him.
- **2.8.10** The contractor shall ensure that no damage is caused to any person/property of other parties working at site. If any such damage is caused, it is responsibility of the contractor to make good the losses or compensate for the same.
- **2.8.11** All the properties/equipments/components of BHEL/their Client loaned with or without deposit to the contractor in connection with the contract shall remain properties of BHEL/their Client.

- 2.8.12 The contractor shall use such properties for the purpose of execution of this contract. All such properties/equipments/components shall be deemed to be in good condition when received by the contractor unless he notifies within 48 hours to the contrary. The contractor shall return them in good condition as and when required by BHEL/their Client. In case of non-return, loss, damage, repairs etc. the cost thereof as may be fixed by BHEL Engineer will be recovered from the contractor.
- 2.8.13 In case the contractor is required to undertake any work outside the scope of this contract, the rates payable shall be those mutually agreed upon if the item rates are not mentioned in existing contract.
- **2.8.14** Any delay in completion of works/or non-achievement of periodical targets due to the reasons attributable to the contractor, the same may have to be compensated by the contractor either by increasing manpower and resources or by working extra hours and/or by working more than one shift. All these are to be carried out by the contractor at no extra cost.
- **2.8.15** The contractor shall arrange, coordinate his work in such a manner as to cause no hindrance to other agencies working in the same premises.
- 2.8.16 All safety rules and codes applied by the Client/BHEL at site shall be observed by the contractor without exception. The contractor shall be responsible for the safety of the equipment/material and works to be performed by him and shall maintain all light, fencing guards, slings etc. or other protection necessary for the purpose. Contractor shall also take such additional precautions as may be indicated from time to time by the Engineer with a view to prevent pilferage, accidents, fire hazards. Due precautions shall be taken against fire hazards and atmospheric conditions. Suitable number of Clerical staff, watch and ward, store keepers to take care of equipment/materials and construction tools and tackles shall be posted at site by the contractor till the completion of work under this contract.

The contractor shall arrange for such safety devices as are necessary for such type of work and carry out the requisite site tests of handling equipment, lifting tools, tackles etc. as per prescribed standards and practices.

Contractor has to ensure the implementation of Health, Safety and Environment (HSE) requirements as per directions given by BHEL/Customer. The contractor has to assist in HSE audit by BHEL/Customer and submit compliance Report. The contractor has to generate and submit record/reports as per HSE plan/activities as per instruction of BHEL/Customer.

- 2.8.17 The contractor will be directly responsible for payment of wages to his workmen. A pay roll sheet giving all the payments given to the workers and duly signed by the contractor's representative should be furnished to BHEL site for record purpose, if so called for. Contractor shall create awareness amongst their workforce by helping & encouraging in opening bank accounts and to encourage them to adopt digital mode of transactions. While releasing
 - bank accounts and to encourage them to adopt digital mode of transactions. While releasing wages/ salary to their workers/ supervisors/ staff, Contractor shall comply with the GOI's guidelines for maximizing such transactions through Non-Cash / digital means.
- 2.8.18 In case of any class of work for which there is no such specification as laid down in the contract, such work shall be carried out in accordance with the instructions and requirements of the Engineer.

- **2.8.19** Also, no idle charges will be admissible in the event of any stoppage caused in the work resulting in contractor's labour and Tools & Plants being rendered idle due to any reason at any time.
- **2.8.20** The contractor shall take all reasonable care to protect the materials and work till such time the plant/equipment has been taken over by BHEL or their Client whichever is earlier.
- **2.8.21** The contractor shall not stop the work or abandon the site for whatsoever reason of dispute, excepting force majeure conditions. All such problems/disputes shall be separately discussed and settled without affecting the progress of work. Such stoppage or abandonment shall be treated as breach of contract and dealt with accordingly.
- 2.8.22 The contractor shall keep the area of work clean and shall remove the debris etc. while executing day-to-day work. Upon completion of work, the contractor shall remove from the vicinity of work, all scrap, packing materials, rubbish, unused and other materials and deposit them in places specified by the Engineer. The contractor will also demolish all the hutments, sheds, offices etc. constructed and used by him and shall clean the debris. In the event of his failure to do so, the same will be arranged to be done by the Engineer and the expenses recovered from the contractor.
- 2.8.23 The contractor shall execute the work in the most substantial and workman like manner in the stipulated time. Accuracy of work and timely execution shall be the essence of this contract. The contractor shall be responsible to ensure that the quality, assembly and workmanship conform to the dimensions and clearance given in the drawings and/ or as per the instructions of the Engineer.
- 2.8.24 The Contractor to note that some of BHEL's T&Ps/MMDs may not be insured. The Contractor will take necessary precautions and due care to protect the same while in his custody from any damage/ loss till the same is handed over back to BHEL. In case the damage / loss is due to carelessness/ negligence on the part of the contractor, the Contractor is liable to get them repair/ replaced immediately and in case of his failure to do so within a reasonable time, BHEL will reserve the right to recover the loss from the contractor.
- **2.8.25** For all works having contract value of Rs. 5,00,000/- or above, BHEL shall recover the amount of compensation paid to victim(s) by BHEL towards loss of life/ permanent disability due to an accident which is attributable to the negligence of contractor, agency or firm or any of its employees as detailed below.
 - a) Victim: Any person who suffers permanent disablement or dies in an accident as defined below.
 - b) Accident: Any death or permanent disability resulting solely and directly from any unintended and unforeseen injurious occurrence caused during the manufacturing/ operation and works incidental thereto at BHEL factories/ offices and precincts thereof, project execution, erection and commissioning, services, repairs and maintenance, trouble shooting, serving, overhaul, renovation and retrofitting, trial operation, performance guarantee testing undertaken by the company or during any works/ during working at BHEL Units/ Offices/ townships and premises/ Project Sites.

- c) Compensation in respect of each of the victims:
- i. In the event of death or permanent disability resulting from Loss of both limbs: Rs. 10,00,000/- (Rs. Ten Lakh).
- ii. In the event of other permanent disability: Rs.7,00,000/- (Rs. Seven Lakh)
- d) Permanent Disablement: A disablement that is classified as a permanent total disablement under the proviso to section 2 (I) of the Employee's Compensation Act, 1923.
- **2.8.26** Contractor shall be fully responsible for their T&Ps and other material mobilized at site. In any case, BHEL shall not be liable for any damage/loss/misuse of any item(s) belong to the contractor.

2.9 EXECUTION PLAN, PROGRESS MONITORING, MONTHLY REVIEW AND PERFORMANCE EVALUATION

2.9.1 A tentative plan/ programme for completion of the contractual scope of work as per the time schedule given in the contract shall be made jointly by BHEL and Contractor, before commencement of work. The above programme shall be supported by month wise deployment of resources viz Manpower, T&P, Consumables, etc. Progress will be reviewed periodically (Daily/Weekly/Monthly) vis-à-vis this jointly agreed programme.

Subsequently, every month, quarterly rolling plan will be made by BHEL based on budgeted targets.

Monthly plan in F-14 format shall be drawn from this Quarterly plan. Monthly plan shall necessarily include activities required for achieving targets/ milestones unless inputs/ fronts are not available. While planning and arriving on asking rate all available inputs shall be taken into consideration.

Vendor will be required to execute the monthly plan in that month in addition to make full efforts to minimize the cumulative shortfall attributable to him up to the month.

BHEL may require monthly work plan up to one and half times of average monthly value and demand matching manpower.

Where, Average Monthly Value = Total Contract Value (as per latest revision) / Period of Contract (in months)

Provided, this requirement is reflected in the rolling quarterly plan two months in advance.

If the Contractor refuses to sign the F-14 format, those F-14 formats requiring Contractor's signature shall be deemed to have been signed and accepted by the Contractor, if communicated to the Contractor through email or any other mode as stated in clause 2.3.1.

The Contractor shall submit periodical progress reports (Daily/Weekly/Monthly) and other reports/information including manpower, consumables, T&P mobilization etc. as desired by BHEL.

- 2.9.2 Monthly progress review between BHEL and Contractor shall be based on the agreed programme as above, availability of inputs/fronts etc., and constraints if any, as per prescribed formats (i.e. Form F-14). Manpower, T&P and consumable reports as per prescribed formats shall be submitted by contractor every month. Release of RA Bills shall be contingent upon certification by BHEL Site Engineer of the availability of the above prescribed formats duly filled in and signed.
- 2.9.3 The burden of proof that the causes leading to any shortfall is not due to any reasons attributable to the contractor is on the contractor himself. The monthly progress review shall record shortfalls attributable to (i) Contractor, (ii) Force Majeure Conditions, and (iii) BHEL

2.9.4 Performance of the Contractor shall be assessed as per prescribed formats and shall form the basis for 'Assessment of Capacity of Bidder' for Tenders where the Contractor is a bidder. BHEL reserves the right to revise the evaluation formats during the course of execution of the works.

2.10 TIME OF COMPLETION

- **2.10.1** The time schedule shall be as prescribed in the Contract. The time for completion shall be reckoned from the date of commencement of work at Site as certified by BHEL Engineers.
- **2.10.2** Time being the essence of the contract, the entire work shall be completed by the contractor within the time schedule or within such extended periods of time as may be allowed by BHEL under clause 2.11.

2.11 EXTENSION OF TIME FOR COMPLETION

- **2.11.1** If the completion of work as detailed in the scope of work gets delayed beyond the contract period, the contractor shall request for an extension of the contract and BHEL at its discretion may extend the Contract.
- 2.11.2 Based on the F-14 formats, the works balance at the end of original contract period less the backlog attributable to the contractor shall be quantified, and the number of months of 'Time extension' required for completion of the same shall be jointly worked out. Within this period of 'Time extension', the contractor is bound to complete the portion of backlog attributable to the contractor. Any further 'Time extension' or 'Time extensions' at the end of the previous extension shall be worked out similarly.
- **2.11.3** However, if any 'Time extension' is granted to the contractor to facilitate continuation of work and completion of contract, due to backlog attributable to the contractor alone, then it shall be without prejudice to the rights of BHEL to impose penalty/LD for the delays attributable to the contractor, in addition to any other actions BHEL may wish to take at the risk and cost of contractor.
- **2.11.4** Planning, progress monitoring, monthly review and performance monitoring shall be carried out as per Clause 2.9 of GCC.

2.12 OVERRUN COMPENSATION

- **2.12.1 ORC during original contract period:** No ORC shall be applicable during the original contract period.
- **2.12.2 ORC** during extended period for the reasons solely attributable to contractor: No ORC shall be applicable during the extended period granted for the reasons solely attributable to contractor and work executed during this period shall be paid as per original contract rates.
- **2.12.3 ORC during extended period for the reasons not attributable to contractor:** ORC shall be payable as per following procedure:
- **2.12.3.1** For initial period of twelve months of extended period, ORC rate applicable over executed value shall be 5%. For every subsequent period of twelve months, ORC rate shall be further increased by 5% over the previous rate. For example, ORC rates applicable for initial period of 12 months and subsequent period of 12 months are given below.

SI. No.	Extended Period for the reasons attributable to BHEL	ORC rate applicable over executed value
1	First 12 months	5%
2	13th-24th month and so on	10.25% {[(1.05 x 1.05)-1] x 100}

- This process of increasing ORC rate for each subsequent period of 12 months shall continue till applicability of ORC.
- 2.12.3.2 On completion of original contract period as well as on completion of each subsequent period of twelve months i.e. at the time of change in applicable ORC rate, Delay Analysis shall be carried out and percentage shortfall attributable to both BHEL & Contractor shall be calculated.
- **2.12.3.3** For the purpose of calculation of ORC, executed value of work in the month shall be divided in Part-1 and Part-2 in proportion of percentage shortfall attributable to BHEL and contractor respectively, based on the last delay analysis as worked out in 2.12.3.2.

ORC shall be payable only on Part-1 and no ORC shall be payable on Part-2.

Value of Part-1 shall be further limited to the value of actual inputs provided by BHEL i.e. "Plan - Shortfall attributable to BHEL" for the month, as per Form-14 for calculation of ORC.

- **2.12.3.4** Payment of ORC amount shall be further regulated as follows:
 - (i) 50% of the ORC is allocated for deployment of matching resources (with weightages) agreed as per the joint programme drawn vide 2.11.4. ORC Payment against resources shall be calculated in proportion to percentage of resources actually deployed w.r.t. planned resources, as per Form-14.
 - (ii) 50% of ORC is allocated for achieving of planned progress agreed as per the joint programme drawn vide 2.11.4. ORC Payment shall be reduced in proportion to percentage shortfall attributable to contractor w.r.t.-"Plan Shortfall attributable to BHEL" for the month, as per Form-14.
- **2.12.3.5** The maximum amount of ORC payable for the month shall be limited to Rs. 5,00,000/-.
- 2.12.3.6 In case, there is no shortfall attributable to contractor for the month and also contractor has deployed the resources as agreed in Form-14 but ORC amount payable for the month worked out as per procedure mentioned in clause 2.12.3.3, 2.12.3.4 and 2.12.3.5, is less than Rs.1,00,000/-, then ORC amount payable for the month shall be Rs.1,00,000/- otherwise ORC amount payable for the month shall remain same.
- 2.12.3.7 In case execution is on HOLD (Other than Force Majeure), ORC shall be payable as per following:
 - i). Contractor has not been permitted by BHEL to de-mobilize
 - a) ORC amount of Rs. 1,00,000/- per month shall be applicable during the period of HOLD provided resources as planned are deployed (not demobilised) during the period of hold.
 - b) Subsequent to lifting of HOLD, Period of HOLD shall not be excluded in calculation of period for deciding applicable ORC rate as per clause 2.12.3.1.
 - ii). Contractor has been permitted to demobilize and to remobilize after lifting of HOLD
 - a) No ORC shall be payable to contractor for the period of HOLD.
 - b) Subsequent to lifting of HOLD, Period of HOLD shall not be excluded in calculation of period for deciding applicable ORC rate as per clause 2.12.3.1.

2.12.3.8 In case **Force Majeure** is invoked:

- i). No ORC shall be applicable during the period of Force Majeure.
- ii). Subsequent to revocation of Force Majeure, period of Force Majeure shall be excluded in calculation of period for deciding applicable ORC rate as per clause 2.12.3.1.
- **2.12.4** Applicability of ORC: ORC shall not be applicable for following activities.

- i). Area cleaning, removal of temporary structures and return of scrap.
- ii). Punch list points / pending points liquidation pending due to reasons attributable to contractor
- iii). Submission of "As built Drawing"
- iv). Material Reconciliation
- v). Completion of Contract Closure formalities like HR Clearance/ No dues from various dept./ Statutory Authorities etc.
- **2.12.5** Total Over Run Compensation shall be limited to 10% of the cumulatively executed contract value till the month (excluding Taxes and Duties if payable extra). For this purpose, executed contract value excludes PVC, ORC and Extra/Supplementary Works.

2.13 INTEREST BEARING RECOVERABLE ADVANCES

- 2.13.1 MOBILIZATION ADVANCE: Normally no advance is payable to the contractor. However, mobilization advance payment in exceptional circumstances shall be interest bearing and secured through a Bank Guarantee and shall be limited to a maximum of 5% of contract value. This 'Interest Bearing Recoverable Advance' shall be payable in not less than two installments with any of the installment not exceeding 60% of the total eligible advance.
- **2.13.2** ADDITIONAL INTERIM ADVANCE: In exceptional circumstances, with due justification, Competent Authority of BHEL is empowered to approve proposals for payment of additional interim interest bearing advance against Bank Guarantee, for resource augmentation towards expediting work for project implementation.
- **2.13.3** Bank Guarantee towards 'Interest Bearing Recoverable Advance' shall be at least 110% of the advance so as to enable recovery of not only principle amount but also the interest portion, if so required.
- 2.13.4 Contractor shall establish the utilization of advance drawn before the release of next installment.
- **2.13.5** Payment and recovery of Interest Bearing Recoverable advance shall be at the sole discretion of BHEL and shall not be a subject matter of arbitration.
- **2.13.6** The rate of interest applicable for the above advances shall be the base rate of State Bank of India prevailing on the date of release of advance plus 6%, and such rate will remain fixed till the total advance amount is recovered.
- 2.13.7 Unadjusted amount of advances paid shall not exceed 5% of the total contract value at any point of time. Recovery of advances shall be made from the Running Bills progressively such that the advance amounts paid along with the interest is fully recovered by the time the contractor's billing reaches 90% of contract value.
- **2.13.8** Recovery rate per month shall be the sum of:
 - i) Not less than 10% of Running Bill amount
 - ii) Simple interest up to the date of RA Bill on the outstanding Principle amount/amounts
- 2.13.9 Contractor to submit Bank Guarantee as per prescribed formats for each of the advance and shall be valid for at least one year or the recovery duration whichever is earlier. In case the recovery of dues does not get completed within the aforesaid BG period, the contractor shall renew the BG or submit fresh BG for the outstanding amount, valid for at least one year or the remaining recovery

duration whichever is earlier.

2.13.10 BHEL is entitled to make recovery of the entire outstanding amount in case the contractor fails to comply with the BG requirement.

2.14 QUANTITY VARIATION

2.14.1 Variation in Final Executed Contract Value

The quantities given in the contract are tentative and may change to any extent (both in plus side and minus side). No compensation becomes payable in case the variation of the final executed contract value is within the limits of Minus (-) 15% of awarded contract value. Also, no compensation becomes payable in case the contract gets partially executed/ short closed/ terminated/ work withdrawn under Rights of BHEL mentioned in Clause 2.7 of GCC. In case of work terminated / short closed under clause 2.7.4 of GCC, compensation may be considered only if BHEL receives compensation from customer.

Compensation due to variation of final executed contract value in excess of the limits defined in clause above, shall be as follows:

- i) In case the finally executed contract value reduces below the lower limit of awarded Contract Value due to quantity variation specified above, the Contractor will be eligible for compensation @ 15% of the difference between the lower limit of the awarded contract value and the actual executed contract value.
- ii) In case the finally executed contract value increases above the awarded Contract Value due to quantity variation, the Contractor is not eligible for any compensation

2.14.2 Variation in Individual Quantities of BOQ Item(s)

The quantities given in the contract are tentative and may change to any extent (both in plus side and minus side). No compensation becomes payable in case the variation of the quantity of individual BOQ item(s) is within the limits of Plus (+) 100% of the quantity in the original price schedule.

In case executed quantity for a particular BOQ item(s) exceeds two times the quantity in the original price schedule (100% increase), then the revision in rates for such BOQ item(s) for the quantity in excess of two times the quantity in the original price schedule including any subsequent increase in quantity, may be considered based on request from the Contractor, however, BHEL decision in this regard shall be final. Revised rates for subject BOQ item (s) shall be worked out on the basis of prevailing market rates mutually agreed between BHEL and Contractor. PVC/ ORC will not be applicable for these revised rates.

BHEL, however, retains the right to arrange the excess quantity through any other source for expediting activities in the interest of the Project.

- Note: (a) Revision in rates under clause 2.14.2 will remain admissible in those cases also, where, the Contractor is eligible for compensation under clause 2.14.1 i).
 - (b) The value of work executed at revised rates due to variation in Individual Quantities of BOQ Item(s) shall be included while calculating the finally executed contract value in clause no. 2.14.1 above.

2.15 EXTRA WORKS

2.15.1 All rectifications/modifications, revamping and reworks required for any reasons not due to the fault of the contractor, or needed due to any change in deviation from drawings and design of equipments, operation/maintenance requirements, mismatching or due to damages in transit, storage and

erection/commissioning and other allied works which are not very specifically indicated in the drawings, but are found essential for satisfactory completion of the work, will be considered as extra works.

- 2.15.2 Extra works arising on account of the contractor's fault, irrespective of time consumed in rectification of the damage/loss, will have to be carried out by the contractor free of cost. Under such circumstances, any material and consumable required for this purpose will also have to be arranged by the contractor at his cost.
- 2.15.3 All the extra work should be carried out by a separately identifiable gang, without affecting routine activities. Daily log sheets in the pro-forma prescribed by BHEL should be maintained and shall be signed by the contractor's representative and BHEL engineer. No claim for extra work will be considered/entertained in the absence of the said supporting documents i.e. daily log sheets. Signing of log sheets by BHEL engineer does not necessarily mean the acceptance of such works as extra works.
- **2.15.4** BHEL retains the right to award or not to award any of the major repair/ rework/modification/rectification/fabrication works to the contractor, at their discretion without assigning any reason for the same.
- **2.15.5** After eligibility of extra works is established and finally accepted by BHEL engineer/designer, payment will be released on competent authority's approval at the following rate.
 - MAN-HOUR RATE FOR ELIGIBLE EXTRA WORKS: Single composite average labour man-hour rate, including overtime if any, supervision, use of tools and tackles and other site expenses and incidentals, consumables for carrying out any major rework/ repairs/ rectification/ modification/ fabrication as certified by site as may arise during the course of erection, testing, commissioning or extra works arising out of transit, storage and erection damages, payment, if found due will be at Rs 108/- per man hour.
- 2.15.6 The above composite labour man hour rate towards extra works shall remain firm and not subject to any variation during execution of the work. PVC will not be applicable for extra works. Rate revision, Over Run Charges/compensation etc. will not be applicable due to on extra works.
- **2.15.7** Extra Works for Civil Packages shall be regulated as follows
 - i) Rates for Extra Works arising due to (1) non availability of BOQ (Rate Schedule), OR (2) change in Specifications of materials/works (3) rectification/modification/dismantling & re-erecting etc. due to no fault of Contractor, shall be in the order of the following:
 - a) Item rates are to be derived from similar nature of items in the BOQ (Rate Schedule) with applicable escalation derived from All India Consumer Price Index for Whole Sale Commodities.
 - b) As per latest edition of CPWD-DSR with applicable escalation derived from All India Consumer Price Index for Whole Sale Commodities OR Notification issued by the office of CPWD for 'Cost Index' in that Region where the project is being executed with applicable escalation derived from All India Consumer Price Index for Whole Sale Commodities, whichever is less.
 - c) Item rates are to be worked out on the basis of market rates prevailing on the date of execution mutually agreed between BHEL and Contractor.
 - ii) PVC and ORC will not be applicable for (i) above.

2.16 SUPPLEMENTARY ITEMS

2.16.1 For NON Civil Works

Supplementary items are items/works required for completion of entire work but not specified in the scope of work. Subject to certification of such items/works as supplementary items by BHEL Engineer, rates shall be derived on the basis of any one of the following on mutual agreement:

- i) Based on percentage breakup/rates indicated for similar/nearby items.
- ii) In case (i) above does not exist, then BHEL/site may derive the percentage breakup/rates to suit the type of work.

2.16.2 For Civil Works

- i) Rates for Supplementary Works/Additional Works arising out due to additions/alterations in the original scope of works as per contract subject to certification of BHEL Engineer shall be worked out as under:
- a) Item rates which are available in existing BOQ (Rate Schedule) shall be operated with applicable escalation derived from All India Consumer Price Index for Whole Sale Commodities
- b) Items of works which are not available in existing BOQ shall be operated as an 'Extra Works' and rate shall be derived as per clause no 2.15.7
- ii) Execution of Supplementary Works/Additional Works through the Contractor shall be at the sole discretion of BHEL, and shall be considered as part of executed contract value for the purpose of Quantity Variation as per clause 2.14
- iii) BHEL Engineer's decision regarding fixing the rate as above is final and binding on the contractor.
- iv) PVC and ORC will not be applicable for (i) above.

2.17 PRICE VARIATION COMPENSATION

- 2.17.1 In order to take care of variation in cost of execution of work on either side, due to variation in the index of LABOUR, HIGH SPEED DIESEL OIL, WELDING ROD, CEMENT, STEEL, MATERIALS, Price Variation Formula as described herein shall be applicable
- 2.17.2 85% component of Contract Value shall be considered for PVC calculations and remaining 15% shall be treated as fixed component. The basis for calculation of price variation in each category, their component, Base Index, shall be as under:

				PER	CENTAGE	COMPONENT	('K')
			CIVIL PACKAGES (See Note A/B/C)			Electrical, C&I Material	
SL NO.	CATEGORY	INDEX/ AVERAGE MINIMUM WAGE	Α	В	C	MECHANICAL PACKAGES	Management/ Handling and other labour oriented packages
i)	LABOUR (ALL CATEGORIES)	(a) 'MONTHLY ALL-INDIA AVERAGE CONSUMER PRICE INDEX NUMBERS FOR INDUSTRIAL WORKERS' published by Labour Bureau, Ministry of Labour and Employment, Government of India. (50% weightage out of component 'K')	40	25	30	65	80

		(Website: labourbureau.nic.in)					
		(b) Arithmetical average of minimum wages of Unskilled, Semi-skilled, Skilled and Highly skilled workers as applicable at project site location (50% weightage out of component 'K')					
ii)	HIGH SPEED DIESEL OIL	Name of Commodity: HSD Commodity Code: 1202000005 (See Note E)	5	3	5	5	5
iii)	WELDING ROD	Name of Commodity: MANUFACTURE OF BASIC METALS				15	
iv)	CEMENT	Commodity Code: 1314000000 (See Note E) Name of Commodity: ORDINARY PORTLAND CEMENT		20	30		
v)	STEEL (Structural and Reinforcement Steel)	Commodity Code: 1313050003 (See Note E) Name of Commodity: MILD STEEL: LONG PRODUCTS Commodity Code: 1314040000 (See Note E)		25			
vi)	All OTHER MATERIALS (Other than Cement & Steel)	Name of Commodity: ALL COMMODITIES Commodity Code:1000000000 (See Note E)	40	12	20		

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

- B) Cement & Steel: In Contractor Scope
- C) Cement in Contractor Scope, and Steel is Free Issue (BHEL Scope)
- D) For Composite packages (i.e. Civil+Mechanical+Electrical and/or C&I or Civil+Mechanical or Mechanical+Electrical and/or C&I), the COMPONENT ('K') for various categories shall be as per respective packages as above.
- E) 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: eaindustry.nic.in). Revisions in the index or commodity will be re-adjusted accordingly.

2.17.3

2.17.4 Payment/recovery due to variation in index shall be determined on the basis of the following notional formula in respect of the identified COMPONENT ('K') viz LABOUR, HIGH SPEED DIESEL OIL, WELDING ROD, CEMENT, STEEL, MATERIALS.

$$P = K \times R \times \underbrace{(X_N - X_0)}_{X_0}$$

Where,

P = Amount to be paid/recovered due to variation in the Index for Labour, High Speed Diesel Oil, Welding Rod, Cement, Steel and Materials

Fercentage COMPONENT ('K') applicable for Labour, High Speed Diesel Oil,
 Welding Rod, Cement, Steel and Materials

R = Value of work done for the billing month (Excluding Taxes and Duties if payable extra)

X_N = Revised Index for Labour, Revised Average Minimum Wages for Labour, Revised Index for High Speed Diesel Oil, Welding Rod, Cement, Steel and

Materials for the billing month under consideration

- Xo = Index for Labour, Average Minimum Wages for Labour, Index for High Speed Diesel Oil, Welding Rod, Cement, Steel and Materials as on the Base date
- 2.17.5 PVC shall not be payable for the ORC amount, Supplementary/Additional Items, Extra works. However, PVC will be payable for items executed under quantity variation of BOQ items under originally awarded contract.
- 2.17.6 Base date shall be calendar month of the 'last date of submission of Tender'.
- 2.17.7 The contractor shall furnish necessary monthly bulletins in support of the requisite indices from the relevant websites along with his Bills.
- 2.17.8 The contractor will be required to raise the bills for price variation payments on a monthly basis along with the running bills irrespective of the fact whether any increase/decrease in the index for relevant categories has taken place or not. In case there is delay in publication of bulletins (final figure), the provisional values as published can be considered for payments and arrears shall be paid/recovered on getting the final values.
- 2.17.9 PVC shall be applicable for the entire original contract period plus the extended period, i.e. for the complete execution period, as follows:

For PVC computation of the nth month:

Let the cumulative delay attributable to the Contractor is D_n in the nth month as per Form-14.

Considering R_n as the billing value for the n^{th} month, PVC for the n^{th} month shall be calculated as follows:

- a) PVC for the portion of R_n for an amount of $D_{(n-1)}$ shall be payable as per indices for the $(n-1)^{th}$ month.
- b) PVC for the balance portion of R_n shall be payable as per indices for the nth month

In case $D_{(n-1)}$ is greater than R_n , then entire R_n shall be payable as per indices for the $(n-1)^{th}$ month and the balance portion of $D_{(n-1)}$ shall be adjusted from $R_{(n+1)}$ of the $(n+1)^{th}$ month and will be payable as per indices for the $(n-1)^{th}$ month. The above process shall be continued for subsequent month(s) also till full $D_{(n-1)}$ is consumed.

- i)For milestones mentioned in the contract, PVC shall be applicable as per average of the indices from the month of base date till the month of execution of milestone.
- ii)PVC shall not be applicable for time extension provided for the delays solely attributable to the contractor. No PVC is payable during the period of Provisional Time Extension till grant of final time extension. Applicability of PVC will be decided at the time of grant of final time extension.

iii)The total amount of PVC shall not exceed 15% of the cumulatively executed contract value. Executed contract value for this purpose is exclusive of PVC, ORC, Supplementary/Additional Items and Extra works except items due to quantity variation.

Note: Work Planning in F-14 format to be meticulously done as per Clause 2.9 of this GCC

2.18 INSURANCE

- 2.18.1 BHEL/their customer shall arrange for insuring the materials/properties of BHEL/customer covering the risks during transit, storage, erection and commissioning.
- 2.18.2 It is the sole responsibility of the contractor to insure his materials, equipment, workmen etc. against accidents and injury while at work and to pay compensation, if any, to workmen as per Workmen's compensation Act. The work will be carried out in a protected area and all the rules and regulations of the client /BHEL in the area of project which are in force from time to time will have to be followed by the contractor.
- 2.18.3 If due to negligence and or non-observation of safety and other precautions by the contractors, any accident/injury occurs to the property / manpower belong to third party, the contractor shall have to pay necessary compensation and other expense, if so decided by the appropriate authorities.
- 2.18.4 The contractor will take necessary precautions and due care to protect the material, while in his custody from any damage/ loss due to theft or otherwise till the same is taken over by BHEL or customer. For lodging / processing of insurance claim, the contractor will submit necessary documents. BHEL will recover the loss including the deductible franchise from the contractor, in case the damage / loss is due to carelessness / negligence on the part of the contractor. In case of any theft of material under contractor's custody, matter shall be reported to Police by the contractor immediately and copy of FIR and subsequently police investigation report shall be submitted to BHEL for taking up with insurance. However, this will not relieve the contractor of his contractual obligation for the material in his custody.

2.19 STRIKES & LOCKOUT

- 2.19.1 The contractor will be fully responsible for all disputes and other issues connected with his labour. In the event of the contractor's labour resorting to strike or the Contractor resorting to lockout and if the strike or lockout declared is not settled within a period of one month, BHEL shall have the right to get the work executed through any other agencies at risk and cost of contractor under Clause 2.7.
- 2.19.2 For all purposes whatsoever, the employees of the contractor shall not be deemed to be in the employment of BHEL.

2.20 FORCE MAJEURE

- 2.20.1 "Force Majeure" shall mean circumstance which is: a) beyond a party's control, b) The party could not reasonably have provided against before entering into the contract, c) Having arisen, such party could not reasonably have avoided or overcome, and d) Is not substantially attributable to the other party. Such circumstances include but not limited to
 - i) Exceptionally adverse climatic conditions at the site which are unforeseeable having regard to climate data available or published in the country for the geographical location of the site.

- ii) War, hostilities (whether war be declared or not), invasion, act of foreign enemies.
- iii) Rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war.
- iv) Riot, commotion or disorder by persons other than the contractor's personnel and other employees of the contractor and sub-contractors.
- v) Strike or lockout not solely involving the contractor's personnel and other employees of the contractor and sub-contractors.
- vi) Encountering munitions of war, explosive materials, ionizing radiation or contamination by radioactivity, except as may be attributable to the contractor's use of such munitions, explosives, radiation or radio- activity.
- vii) Natural catastrophes such as earthquake, tsunami, volcanic activity, hurricane or typhoon, flood, fire, cyclones etc.
- 2.20.2 The following events are explicitly excluded from Force Majeure and are solely the responsibilities of the non-performing party: a) any strike, work-to-rule action, go-slow or similar labour difficulty (b) late delivery of equipment or material (unless caused by Force Majeure event) and (c) economic hardship.
- 2.20.3 If either party is prevented, hindered or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances thereof within 15 (fifteen) days after the occurrence of such event.
- 2.20.4 The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such party's performance is prevented, hindered or delayed. The Time for Completion shall be extended by a period of time equal to period of delay caused due to such Force Majeure event.
- 2.20.5 Delay or non-performance by either party hereto caused by the occurrence of any event of Force Majeure shall not
 - i) Constitute a default or breach of the Contract.
 - ii) Give rise to any claim for damages or additional cost expense occasioned thereby, if and to the extent that such delay or non-performance is caused by the occurrence of an event of Force Majeure.
- 2.20.6 BHEL at its discretion may consider short closure of contract after 1 year of imposition of Force Majeure in line with extant guidelines. In any case, Contractor cannot consider deemed short-closure after 1 year of imposition of Force Majeure.

2.21 ARBITRATION & CONCILIATION

2.21.1 ARBITRATION:

2.21.1.1 Except as provided elsewhere in this Contract, in case Parties are unable to reach amicable settlement (whether by Conciliation to be conducted as provided in Clause 2.21.2 herein below or otherwise) in respect of any dispute or difference; arising out of the formation, breach, termination, validity or execution of the Contract; or, the respective rights and liabilities of the Parties; or, in relation to interpretation of any provision of the Contract; or. in any manner touching upon the Contract (hereinafter referred to as the 'Dispute'), then, either Party may, commence arbitration in respect of such Dispute by issuance of a notice in terms of section 21 of the Arbitration & Conciliation Act, 1996 (hereinafter referred to as the 'Notice'). The Notice shall be addressed to the Head of the Power Sector Region issuing the Contract and shall contain the particulars of all claims to be referred to arbitration in sufficient detail and shall also indicate the monetary amount of such claim. Within 60 days of receipt of the complete Notice, the Head of the BHEL Power Sector

Region issuing the Contract shall offer names of three proposed Arbitrators to the invoking Party advising to choose any one of the three names to be appointed as Sole Arbitrator. On getting confirmation from the invoking Party regarding the Arbitrator chosen from among the names so offered, the Head of the BHEL Power Sector Region issuing the Contract, shall appoint such chosen person as the Sole Arbitrator for conducting the arbitration. The language of arbitration shall be English.

The Arbitrator shall pass a reasoned award.

Subject as aforesaid, the provisions of Arbitration and Conciliation Act 1996 (India) or statutory modifications or re-enactments thereof and the rules made thereunder as in force from time to time shall apply to the arbitration proceedings under this clause. The seat of arbitration shall be Chennai (the place from where the contract is Issued). The Contract shall be governed by and be construed as per provisions of the laws of India. Subject to this provision 2.21.1.1 regarding ARBITRATION, the principal civil court exercising ordinary civil jurisdiction over the area where the seat of arbitration is located shall have exclusive jurisdiction over any DISPUTE to the exclusion of any other court.

2.21.1.2 In case of Contract with Public Sector Enterprise (PSE) or a Government Department, the following shall be applicable:

In the event of any dispute or difference relating to the interpretation and application of the provisions of commercial contract(s) between Central Public Sector Enterprises (CPSEs)/ Port Trusts inter se and also between CPSEs and Government Departments/Organizations (excluding disputes concerning Railways, Income Tax, Customs & Excise Departments), such dispute or difference shall be taken up by either party for resolution through AMRCD (Administrative Mechanism for Resolution of CPSEs Disputes) as mentioned in DPE OM No. 4(1)/2013-DPE(GM)/FTS-1835 dated 22-05-2018 as amended from time to time.

- 2.21.1.3 The cost of arbitration shall initially be borne equally by the Parties subject to the final allocation thereof as per the award/order passed by the Arbitrator.
- 2.21.1.4 Notwithstanding the existence of any dispute or differences and/or reference for the arbitration, the Contractor shall proceed with and continue without hindrance the performance of its obligations under this Contract with due diligence and expedition in a professional manner unless the dispute inter-alia relates to cancellation, termination or short-closure of the Contract by BHEL.

2.21.2 **CONCILIATION**:

If at any time (whether before, during or after the arbitral or judicial proceedings), any Disputes (which term shall mean and include any dispute, difference, question or disagreement arising in connection with construction, meaning, operation, effect, interpretation or breach of the agreement, contract), which the Parties are unable to settle mutually, arise inter-se the Parties, the same may, be referred by either party to Conciliation to be conducted through Independent Experts Committee (IEC) to be appointed by competent authority of BHEL from the BHEL Panel of Conciliators.

Notes:

- 1. No serving or a retired employee of BHEL/Administrative Ministry of BHEL shall be included in the BHEL Panel of Conciliators.
- 2. Any other person(s) can be appointed as Conciliator(s) who is/are mutually agreeable to

both the parties from outside the BHEL Panel of Conciliators.

The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided in Procedure 2.3 to this GCC. The Procedure 2.3 together with its Formats will be treated as if the same is part and parcel hereof and shall be as effectual as if set out herein in this GCC.

The Contractor hereby agrees that BHEL may make any amendments or modifications to the provisions stipulated in the Procedure 2.3 to this GCC from time to time and confirms that it shall be bound by such amended or modified provisions of the Procedure 2.3 with effect from the date as intimated by BHEL to it.

2.21.3 No Interest payable to Contractor

Notwithstanding anything to the contrary contained in any other document comprising in the Contract, no interest shall be payable by BHEL to Contractor on any moneys or balances including but not limited to the Security Deposit, EMD, Retention Money, RA Bills or the Final Bill, or any amount withheld and/or appropriated by BHEL etc., which becomes or as the case may be, is adjudged to be due from BHEL to Contractor whether under the Contract or otherwise.

2.22 RETENTION AMOUNT

2.22.1 Retention Amount shall be 5% of executed contract value and shall be recovered at the rate of 5% from each Running Bill admitted, including PVC Bills. Alternatively, BG, in line with clause 1.12 of GCC, equivalent to 5% of Contract Value against Retention Amount can also be submitted before payment of first RA Bill. The validity of the said BG shall be initially for the contract period & shall be extended, if so required, up to acceptance of final bill. In case of increase in contract value, additional BG for 5% of differential amount shall be submitted by Contractor before payment of next RA Bill due. In case, contractor opts cash deduction from RA bills in the beginning & subsequently offers to submit BG later on, then refund of deducted retention amount may be permitted against submission of equivalent BG only once during the contract period.

2.22.2 Refund of retention amount shall be as follows:

100% of Retention Amount/ BG against Retention Amount shall be released along with Final Bill after deduction all expenses/ other amounts due to BHEL under the contract/ other contracts entered into with them (contractor) by BHEL.

2.23 PAYMENTS

Payments to Contractors are made in any one of the following forms: -

2.23.1 Running Account Bills (RA Bills)

- i) These are for interim payments when the contracts are in progress. The bills for such interim payments are to be prepared by Contractor in prescribed formats (RA Bill forms).
- ii) Payments shall be made according to the extent of work done as per measurements taken up to the end of the calendar month and in line with the terms of payments described in the Tender documents.
- iii) Recoveries on account of electricity, water, statutory deductions etc. are made as per terms of contract.
- iv) Full rates for the work done shall be allowed only if the quantum of work has been done as per the

specifications stipulated in the contract. If the work is not executed as per the stipulated specifications, BHEL may ask the contractor to redo the work according to the required specifications, without any extra cost. However, where this is not considered necessary 'OR' where the part work is done due to factors like non-availability of material to be supplied by BHEL 'OR' non availability of fronts 'OR' non availability of drawings, fraction payment against full rate, as is considered reasonable, may be allowed with due regard for the work remaining to be done. BHEL decision in this regard will be final and binding on the contractor.

- v) In order to facilitate part payment, BHEL at its discretion may further split the contracted rates/percentages to suit site conditions, cash flow requirements according to the progress of work, subject to following:
 - a) Provided no 'part' payment is recommended till 25% of work in the item rate is executed.
 - b) Payment of item rate to be made in not more than three instalments, last stage payment to be not lower than 20% of the item rate.

2.23.2 Final Bill

Final Bill' is used for final payment on closing of Running Account for works or for single payment after completion of works. 'Final Bill' shall be submitted as per prescribed format after completion of works as per scope and upon material reconciliation, along with the following:

- i) 'No Claim Certificate' by Contractor
- ii) Clearance certificates where ever applicable viz. Clearance Certificates from Customer, various Statutory Authorities like Labour department, PF Authorities, Commercial Tax Department etc.
- iii) Indemnity Bond as per prescribed format.

BHEL shall settle the final bills after deducting all liabilities of Contractor to BHEL.

2.24 PERFORMANCE GUARANTEE FOR WORKMANSHIP

2.24.1 Even though the work will be carried out under the supervision of BHEL Engineers the Contractor will be responsible for the quality of the workmanship and shall guarantee the work done for a period of Twelve months from the date of commencement of guarantee period as defined in Technical Conditions of Contract, for good workmanship and shall rectify free of cost all defects due to faulty erection detected during the guarantee period. In the event of the Contractor failing to repair the defective works within the time specified by the Engineer, BHEL may proceed to undertake the repairs of such defective works at the Contractor's risk and cost, without prejudice to any other rights and recover the same from the Security Deposit.

2.24.2 BHEL shall release the Security Deposit subject to the following

- i) Contractor has submitted 'Final Bill'
- ii) Guarantee period as per contract has expired
- iii) Contractor has furnished 'No Claim Certificate' in specified format
- iv) BHEL Site Engineer/Construction Manager has furnished the 'No Demand Certificate' in specified format
- v) Contractor has carried out the works required to be carried out by him during the period of Guarantee and all expenses incurred by BHEL on carrying out such works is included for adjustment from the Security Deposit refundable.

2.25 CLOSING OF CONTRACTS

The Contract shall be considered completed and closed upon completion of contractual obligations and settlement of Final Bill or completion of Guarantee period whichever is later. Upon closing of Contract, BHEL shall issue a performance/ experience certificate as per standard format, based on

specific request of Contractor as per extant BHEL guidelines.

2.26 SUSPENSION OF BUSINESS DEALINGS

BHEL reserves the right to take action against Contractors who either fail to perform or Tenderers/Contractor who indulge in malpractices, by suspending business dealings with them in line with BHEL guidelines issued from time to time.

2.27 LIMITATION ON LIABILITY:

Notwithstanding anything to the contrary in this Agreement or the Work Order or any other mutually agreed document between the parties, the maximum liability, for damages, of the contractor, its servants or agents, shall under no circumstances exceed an amount equal to the Price of the Agreement or the Work Order. The Supplier shall not in any case be liable for loss of profit or special, punitive, exemplary, indirect or consequential losses whatsoever. This shall not be applicable on the recoveries arising out of Risk and Cost, recoveries made by Customer from BHEL on account of Contractor, any other type of recoveries for workmanship, material, T&P etc. due from the contractor.

2.28 OTHER ISSUES

- 2.28.1 Value of Non judicial Stamp Paper for Bank Guarantees and for Contract Agreement shall be not less than Rs 100/- unless otherwise required under relevant statutes.
- 2.28.2 In case of any conflict between the General Conditions of Contract and Special Conditions of Contract, provisions contained in the Special Conditions of Contract shall prevail.
- 2.28.3 Unless otherwise specified in NIT, offers from consortium/ JVs shall not be considered.
- 2.28.4 BHEL may not insist for signing of Contract Agreements in respect of low value and short time period contracts like providing services for Hot water flushing, Chemical Cleaning, Transportation, Geo-Technical works, Hiring of T&Ps/ Vehicles/ Equipments etc. and work shall be executed as per the terms of LOI/LOA/Work Order. BHEL may not insist for signing of Contract Agreements in respect of works costing upto Rs. 2 lakhs (upto Rs. 5 lakhs in case scheduled completion period is not more than 3 months).

VOLUME-IB SPECIAL CONDITIONS OF CONTRACT (SCC)

ELECTRICAL AND C&I WORKS (30.03.2022, RE	v 00)
BHARAT HEAVY ELECTRICALS	LIMITED

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SPECIAL CONDITIONS OF CONTRACT (SCC)-Electrical and C&I Chapter - I : General Intent of Specifications

1.0	INTENT OF THE SPECIFICATION
1.1	The intent of this erection specification is to provide services for execution of the project according to most modern and proven techniques and codes. The omission of specific reference to any method, equipment or material necessary for the proper and efficient services towards installation of the plant shall not relieve the contractor of the responsibility of providing such services / facilities to complete the work or portion of work awarded to him. The quoted / accepted rates / price shall deem to be inclusive of all such contingencies.
1.2	The work shall conform to dimensions and tolerances given in various drawings and documents that will be provided during erection. If any portion of works is found to be defective in workmanship and not conforming to drawings / documents or other stipulations, the contractor shall dismantle and re-do the work duly replacing the defective materials at their own cost, failing which recoveries, as determined by BHEL, shall be effected from contractor's bills.
1.3	It is not the intent of this specification to specify herein all the details of erection and commissioning. However, the system shall conform in all respects to high standards of quality and workmanship for performing the required duties in a manner acceptable to purchaser who will interpret the meaning of drawings and specifications and shall be entitled to reject any work or material, which in his judgments is not in full accordance herewith.
1.4	The omission of specific reference to any fabrication / erection or other method, equipment or material necessary for proper and efficient working of the plant shall not relieve the tenderer of the responsibility of providing such facilities to complete the work at quoted rates. Any mismatch/ defect found due to mistake in fabrication / erection shall have to be rectified by the vendor free of cost. Inspection by BHEL/Customer does not relieve vendor of his responsibility of executing quality erection.
1.5	The work covered under this specification is of highly sophisticated nature, requiring the best quality workmanship, supervision, engineering and construction management. The contractor should ensure proper planning and successful and timely completion of the work to meet the overall project schedule. The contractor must deploy adequate quantity of tools & plants, modern / latest construction aids etc. He must also deploy adequate trained, qualified and experienced supervisory staff and skilled personnel.



SPECIAL CONDITIONS OF CONTRACT (SCC)-Electrical and C&I Chapter - I : General Intent of Specifications

1.6	Contractor shall erect and commission all the equipments and auxiliaries as per the sequence & methodology prescribed by BHEL depending upon the technical requirements. Availability of materials and fronts will decide this. BHEL Engineer's decision regarding correctness of the work and method of working shall be final and binding on the contractor. No claims for extra payment from the contractor will be entertained on the ground of deviation from the methods / sequence adopted in erection of similar sets elsewhere.
1 -	·
1.7	Following shall be the minimum responsibility of contractor and have to be provided within finally accepted rates / prices:
1.7.1	Provision as required of all types of labour, supervisors, engineers, watch and ward, tools & tackles, calibrated MMEs (Monitoring and Measuring Equipment) as specified and otherwise required for the work, consumables for erection, testing and commissioning including material handling
1.7.2	Achieving Proper out-turn / Turn-over as per BHEL plan and commitment.
1.7.3	Completion of work as per BHEL Schedule
1.7.4	Good quality and accurate workmanship for proper performance of the equipment
1.7.5	Repair and rectification
1.7.6	Preservation / Re-conservation of all components during storage / erection / commissioning till Commercial Operation Declaration (COD) / Trial Run Operation whichever is later.



SPECIAL CONDITIONS OF CONTRACT (SCC)-Electrical and C&I Chapter - II : General Services to be rendered by the Bidder

2.0	GENERAL SERVICES TO BE RENDERED BY THE BIDDER
2.1	Services for construction, fabrication, equipment erection testing as well as trial run & commissioning of various equipment and accessories under the contract shall include but not be limited to the following:
2.2	Issuing materials from store / open yard from time to time for erection as per the construction programme. The Contractor shall be the custodian of all the materials issued after complete erection till the plant/equipment is officially taken over by the owner / OR up to COD / Trial operation whichever is later.
2.3	Transport of material to their respective places of erection and erection of the complete plant & equipment as supplied under this specification.
2.4	Trial run and commissioning of individual equipment / sub-systems to the satisfaction of Owner / BHEL.
2.5	Deployment of all skilled and unskilled manpower required for erection, supervision of erection, watch & ward, commissioning and other services to the rendered under this specification. Brief experience details of skilled and unskilled manpower are as under. **(Quantity as mentioned below is for reference purpose only and can be determined at sites as per project milestone requirements)
	Project Manager - 5 Years' Experience in Industrial / Construction Project Site.
	2. Experienced E&C Engineers - For commissioning & erection work. Contractor must depute engineer with at least 03 Years' Experience in similar Project. Fresh engineers with less than 03 Years or no experience, if deployed by contractor at sites will not be counted as working manpower. It will be assumed that fresher staff are deployed only for training purpose at the risk & cost of contractor itself. Contractor to submit the experience details of deployed manpower to BHEL site package in charge for approval.
	3. Experienced Instrument Calibration technician for C&I Lab
	4. Experienced Foreman / Supervisors (05 Years' Experience)
	5. Planning & Billing Engineer
	6. Stores, Gate Pass
	7. IBR welder deployment should be included in the scope of C&I Contractor for exclusively for welding of High-Pressure Impulse Lines. Schedule and duration for the same to be mutually decided.
	8. Accounts & Administration
	9. Quality Control Engineer (03 Years' Experience)

SPECIAL CONDITIONS OF CONTRACT (SCC)-Electrical and C&I Chapter - III : General Technical Requirements (Codes and Standards)

	10. Safety Engineer (03 Years' Experience	
	11. Security Guards (Round The Clock) As per requirement.	
2.6	Deployment of all erection tools & tackle, construction machinery, transportation vehicles and all other implements in adequate number and size, appropriate for the erection work to be handled under scope of this specification except otherwise specified.	
2.7	Supply of all consumables, e.g. welding electrodes, cleaning agents, diesel oil, lubricant etc. as well as materials required for temporary supports, scaffolding etc. as necessary for such erection work, unless specified otherwise.	
2.8	Providing support services for the contractor's erection staff e.g. construction of site offices, temporary stores, residential accommodation and transport to work site for erection personnel, watch and ward for security and safety of the materials under the Contractor's custody etc. as required.	
2.9	Maintaining proper documentation of all the site activities undertaken by the Contractor as per the Proforma mutually agreed with BHEL, Submission of monthly progress reports and any such document as and when desired by BHEL / owner, taking approval of all statutory authorities i.e. Electrical Inspector, Factory Inspector, Inspector of Explosives etc. as applicable for respective portions of work fall under the jurisdiction of such statutes of laws.	
2.10	Any other service, although not specifically called for but required for a contract of the size and nature indicated in the specification.	

SPECIAL CONDITIONS OF CONTRACT (SCC)-Electrical and C&I Chapter - III : General Technical Requirements (Codes and Standards)

3.0	GENERAL TECHNICAL REQUIREMENTS (CODES AND STANDARDS)
3.1	Except where otherwise specified, the plant/equipment shall comply with the appropriate Indian Standard or an agreed internationally accepted Standard Specification as mentioned elsewhere in contract specifications, each incorporating the latest revisions at the time of tendering. Where no internationally accepted standard is applicable, the Bidder shall give all particulars and details as necessary, to enable BHEL to identify all of the plant/equipment in the same detail as would be possible had there been a Standard Specification.
3.2	Where the Bidder proposes alternative codes or standards he shall include in his tender one copy (in English) of each Standard Specification to which materials offered shall comply. In such case, the adopted alternative standard shall be equivalent or superior to the standards mentioned in the specification.
3.3	In the event of any conflict between the codes and standards referred above, and the requirements of this specification, the requirements which are more stringent shall govern.
3.4	Tools used during erection and commissioning shall not be accepted except with the specific approval of the Engineer.



4.0	OBLIGATIONS OF CONTRACTOR
4.1	CONSUMABLES & OTHER ITEMS
4.1.1	The contractor shall provide within finally accepted price / rates, all consumables (excepting those indicated in BHEL scope) like welding electrodes (including alloy steel and stainless steel), filler wires, TIG filler wires (over & above as supplied by the unit along with the plant materials, which will be given free of cost to bidder), gases (inert, welding, cutting), soldering material, dye penetrants, radiography films, etc. Other erection consumables such as tapes, jointing compound (As applicable), grease, mobile oil, M-seal, Araldite, petrol, CTC / other cleaning agents, grinding and cutting wheels are to be provided by the contractor. Steel, packers (<10 mm), wooden planks, scaffolding materials hardware items etc. required for temporary works such as supports, scaffoldings are to be arranged by the contractor. Sealing compounds, gaskets, gland packing, wooden/concrete sleepers, for temporary work, required for completion of work except those which are specifically supplied by manufacturing unit are also to be arranged by the contractor.
4.1.2	All the gaskets and packing, which go finally as part of plant equipment, shall be supplied by BHEL free of cost.
4.1.3	It shall be the responsibility of the contractor to plan the activities and store sufficient quantity of consumables. Non-availability of any consumable materials or equivalent suggested by BHEL cannot be considered as reason for not attaining the required progress or for additional claim.
4.1.4	It shall be the responsibility of the contractor to obtain prior approval of BHEL, regarding suppliers, type of electrodes etc. before procurement of welding electrodes. On receipt of electrodes at site these shall be subjected to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch number, date of expiry etc. and produce test certificate for each lot / batch with correlation of batch / lot number with respective test certificate. No electrode without a valid test certificate will to be used.
4.1.5	BHEL reserves the right to reject the use of any consumable including electrodes, gases, lubricants / special consumables if it is not found to be of the required standard / make / purity or when shelf life has expired. Contractor shall ensure display of shelf life on consumable wherever required and records maintained.

4.1.6	Storage of all consumables including welding electrodes shall be done as per requirement / instruction of the Engineer by the contractor at his cost.
4.1.7	In case of improper arrangement for procurement of any consumable, BHEL reserves the right to procure the same from any source and recover the cost from the Contractor's first subsequent bill at market value plus the departmental charges of BHEL from time to time. Postponement of such recovery is normally not permitted. The decision of Engineer in this regard shall be final and binding on the Contractor.
4.1.8	All the consumables viz. Cleaning Agents, PVC Tapes, Welding Electrodes, Ferrules, Lugs below 4 Sqmm etc. Required for precommissioning, commissioning, testing, preservation for trial runs of the equipment shall be supplied by Vendor without any cost implication on BHEL. All services including labour and T&P will be provided by the contractor for handling, filling, emptying, refilling etc. Surplus material if any (Issued from BHEL / Customer Store) shall be properly stacked / tagged and returned to BHEL / CUSTOMER stores at no extra cost to BHEL. BHEL reserves the right to recover costs for wastage by the contractor.
4.1.9	Transportation of oil drums, from stores, filling of oil for filtration, first filling, subsequent changeover if any, topping/making up till the unit is fully commissioned and handed over to customer is included in scope of this contract. The contractor shall have to return all the empty drums to BHEL / BHEL's client store at no extra cost. Any loss / damage to above drums shall be to contractor's account.
4.1.10	It is the responsibility of contractor to take work permit before attending the defects or carrying out troubleshooting or painting work in commissioned systems and equipment's.
4.2	TOOLS AND PLANTS / MONITORING AND MEASURING EQUIPMENT (MMEs)
4.2.1	T&Ps and MMEs to be provided by Contractor
4.2.1.1	All T&Ps and MMEs excepting those specifically indicated in BHEL scope are to be provided by the Contractor. Record of availability of T&Ps and MMEs with Valid Fitness/Calibration Certificate of T&P & MME's need to be submitted on monthly basis by contractor to site package in charge. Contractor has to make his own arrangement at his cost for completing the formalities (including arrangement of Road permits, if any) if required with GST authorities, for bringing their



	materials, plants and equipments at site for the execution of work under this contract.
4.2.1.2	All suitable cranes, lifting and transport equipments for material handling at stores/yard/siding of BHEL/Customer are included in scope. BHEL's cranes will not be available for this purpose unless otherwise specifically permitted as per contract conditions
4.2.1.3	All T&Ps to be deployed by the contractor shall have the approval of BHEL Engineer with regard to brand, quality and specification.
4.2.1.4	Indicative list of Major T&Ps in the scope of Contractor are given in the Technical Conditions of Contract. Bidders to note that these are only indicative and as such all other T&P necessary for timely and satisfactory completion of work in scope shall be mobilized by Contractor
4.2.1.5	Timely deployment of adequate T&Ps / MMEs is the responsibility of the contractor. The contractor shall be prepared to augment the T&P / MMEs at short notice to match the planned programme and to achieve the milestones.
4.2.1.6	Contractor shall maintain and operate his tools and plants in such a way that major breakdowns are avoided. In the event of major breakdown, contractor shall make alternative arrangements expeditiously so that the progress of work is not hampered.
4.2.1.7	In the event of contractor failing to arrange the required tools, plants, machinery, equipment, material or non-availability of the same owing to breakdown, BHEL will make alternative arrangement at the risk and cost of the contractor. Decision of BHEL shall be final and binding on the contractor.
	It is not obligatory on the part of BHEL to provide any tools and tackles or other materials other than those specifically agreed to do so by BHEL. However, depending upon the availability, BHEL / BHEL's Customer handling equipment and other plants may be made available to the contractor on payment of hire charges as fixed, subject to the conditions laid down by BHEL/ Customer from time to time. Unless paid in advance, such hire charges, if applicable, shall be recovered from contractor's bill / security deposit or any other due payment in one instalment.
4.2.1.8	The T&P to be arranged by the contractor shall be in proper working condition and their operation shall not lead to unsafe condition. The movements of cranes, and other equipment should be such that no



	damage / breakage occurs to foundations, other equipments, material, property and men. All arrangements for the movement of the T&P etc. shall be the contractor's responsibility.
4.2.1.9	Use of welding generators / rectifiers only shall be permitted for welding. Use of welding transformers will be subject to specific approval of BHEL engineer.
4.2.1.10	The contractor at his cost shall carry out periodical testing of his construction equipment. Test and calibration certificates shall be furnished to BHEL.
4.2.1.11	Contractor shall ensure deployment of serviced and healthy T&Ps including cranes, lifting tackles, wire ropes, manila ropes, winches and slings etc. History card and maintenance records for major T&Ps will be maintained by the contractor and will be submitted to BHEL Engineer for inspection on monthly basis. Fitness certificate / Test Certificates of T&P shall have to be submitted before it is put in use. Identification for such T&Ps will be done as per BHEL Engineer's advice.
4.2.1.12	Contractor shall ensure deployment of reliable and calibrated MMEs (Inspection measuring and Monitoring equipment). The MMEs shall have test / calibration certificates from authorized / Government approved / accredited agencies traceable to National / International standards. Each MME shall have a label indicating calibration status i.e. date of calibration, calibration agency and due date for calibration. A list of such instruments deployed by contractor at site with its calibration status is to be submitted to BHEL Engineer on monthly basis in prescribed format for control.
4.2.1.13	
4.2.1.14	BHEL shall have lien on all T&P, MMEs and other equipment of the contractor brought to the site for the purpose of work awarded by BHEL. BHEL shall continue to hold the lien on all such items throughout the period of contract / extended period. The contractor and / or his subcontractors, without the prior written approval of the Engineer, shall



	remove no material brought to the site for the purpose of work awarded by BHEL.
4.2.1.15	The month wise T&P deployment plan to execute the work is to be submitted as per relevant format as per the instruction of BHEL. It shall be the contractor's responsibility to deploy the required T&P, for timely and successful completion of the job, to any extent.
4.2.1.16	(MMEs) required for completion of the work satisfactorily. These MMEs shall be of reputed brand, quality and accuracy specified by BHEL Engineer and should have necessary calibration and other certificates as per the requirement of BHEL Engineer. Decision of BHEL Engineer regarding acceptance or otherwise of the measuring instruments/gauges/tools for the work under this specification, is final and binding on the contractor. BHEL may give an indicative list of MMEs required for this work and to be made available by the contractor. The list will be reviewed by BHEL and the contractor shall meet any augmentation needed wherever required.
4.2.1.17	It is the responsibility of the contractor to prove the accuracy of the testing/measuring/calibrating equipment's brought by him based on the periodicity of calibration as called for in the BHEL's quality assurance standards/BHEL Engineer's instructions. The monthly status of calibration and availability record of MMEs is to be submitted by contractor as per relevant format to BHEL Package in charge.
4.2.2	Obligations in respect of T&Ps and MMEs provided by BHEL
4.2.2.1	T&P / MMEs being provided by BHEL to sub-contractor free of hire charges shall be shared by other subcontractors working for BHEL at site and the allotment done by BHEL Engineer shall be final and binding.
4.2.2.2	BHEL T&P will be issued in basic assembled condition. Additional loose components / sub-assemblies / attachments as and when necessary, will be issued by BHEL. Assembly of such additional loose components / sub-assemblies / attachments is in contractor's scope.
4.2.2.3	In case of non-availability of the T&Ps to be provided by BHEL due to breakdown, major overhauls, distribution pattern or any other reason, the contractor shall plan / amend / alter his activities to meet erection / commissioning targets in consultation with BHEL.
4.2.2.4	The contractor shall engage trained and experienced operators for the operation of BHEL's T&Ps. Their skill / performance will be checked by BHEL Engineer before they are allowed to operate the same. However, checking of skills by BHEL does not absolve the contractor of his



	responsibilities for proper and safe handling of equipment, consistent good performance of operators and regular performance evaluation of operators.
4.2.2.5	The day to day operation and maintenance of BHEL's T&Ps (other than cranes) shall be carried out by contractor as per manufacturer's / BHEL's maintenance schedule at his cost. The contractor shall arrange, at his own cost, trained operators, fuel and other consumables for their operation. The contractor has to arrange for fixing of the spares; supervision in specialized cases will be provided by BHEL. For upkeep of all other T&Ps supplied by BHEL, (As per TCC). BHEL supplied T&Ps shall be maintained in good working condition during the entire period of use. T&Ps in defective / damaged condition shall be rectified promptly to the full satisfaction of BHEL engineer. Contractor shall maintain records for maintenance of major T&Ps. These shall be made available for Inspection whenever required. In case of any lapses on the part of the contractor, BHEL at its own discretion shall get the servicing / repair of equipment done at the risk and cost of the contractor along with BHEL overheads. Further, if there are breakdowns / damages due to negligence of the contractor, the complete service / repair charges and cost of all the spares damaged with BHEL overheads shall be recovered from contractor's RA bills.
4.2.2.6	Increasing / shortening of the crane boom to suit work requirements shall have to be arranged by the indenting contractor at his cost including restoration to a state as directed by BHEL. All necessary manpower tools, support, consumables, illumination etc. will have to be arranged by contractor at his cost. If required, contractor has to return the crane with original boom.
4.2.2.7	The area and infrastructure development of the area to be carried out by the customer. However, in construction projects of this magnitude it is possible that all the areas / approaches may not be ready. In such cases backfilling of approaches where ever necessary, consolidation of ground and arrangement of sleepers / sand bag filling etc. for safe operation / movement of equipment including cranes / trailers etc. shall be the responsibility of the contractor at his cost. No compensation on this account shall be payable.
4.2.2.8	In the event of contractor not using and maintaining BHEL T&Ps according to BHEL's instructions. BHEL will have the right to withdraw such item without any notice and no claim in this regard shall be



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	entertained and contractor shall be responsible for delay in execution on this account.
4.2.2.9	The contractor shall furnish regular utilization report of the BHEL T&Ps, as per requirement of BHEL.
4.2.2.10	Any loss / damage to any part of BHEL T&Ps and MMEs shall be to the contractor's account and any expenditure on these accounts by BHEL will be recovered from the contractor's bill in case the contractor fails to make good the loss.
4.2.2.11	It shall be responsibility of the contractor to take delivery of T&Ps and MMEs from stores or place of use by other contractor at project site, transport the same to site and return the same to BHEL store / place as intimated by Engineer in project site in good working conditions after use.
4.2.2.12	The contractor shall return BHEL T&Ps and MMEs issued to him in good working condition as and when desired by BHEL (on completion or reduction of workload). If contractor delays return of T&P and MME, hire charges as applicable shall be levied by BHEL from time, it was requisitioned till the time of actual return.
	T&Ps and MMEs returned in damaged / unserviceable condition shall be got repaired by BHEL at its own discretion and entire cost of repair with BHEL overheads shall be recovered from the contractor.
4.2.2.13	Replacement cost including BHEL overheads in respect of irreparable / completely damaged / non-return of T&Ps and MMEs shall be recovered from the contractor's running / final bills
4.2.2.14	Obligations in respect of Cranes provided by BHEL
a)	BHEL will make available the cranes (as per Technical Conditions of Contract) free of charge to the contractor on sharing basis mainly for the purposes enumerated/ indicated therein. BHEL cranes have to be shared with other agencies / contractors of BHEL. The allocation of cranes shall be the discretion of BHEL engineer, which shall be binding on the contractor.
b)	In case BHEL cranes / EOT (Electrically operated trolley) are covered under AMC awarded by BHEL, then the day-to-day upkeep and running maintenance as described above are excluded from scope. However, any additional helpers if any required during Preventive / Breakdown Maintenance, Assembly / disassembly shall be provided by contractor at no extra cost.



	BHEL may also provide cranes through crane hiring agencies in which case the day-to-day upkeep and running maintenance shall be excluded from scope of contractor.
c)	Minor consumables like cotton cloth, cotton waste, etc. is to be supplied by Contractor. All spares and lubricants / grease are excluded from scope. Contractor to give the requirements of these items well in advance in case the cranes provided by BHEL are BHEL owned cranes.
d)	Unless otherwise specified, trained operators for BHEL owned cranes shall be provided by the contractor. These operators should possess valid license for heavy vehicle.
e)	BHEL cranes/EOT (Electrically Operated Trolley) will be withdrawn for regular and capital maintenance as per the respective schedule of maintenance. As far as possible such schedules will be intimated to the contractor in advance and may be adjusted depending on the work requirements at site. However, no claim whatsoever will be entertained on account of non-availability of cranes.
f)	Where the services of the cranes provided by BHEL are to be shared by other agencies / contractors of BHEL, the contractor's responsibilities defined above will also be apportioned accordingly to the beneficiary agency. Working arrangements in this regard will be done at site by BHEL engineer and in any case his decision shall be final and binding.
g)	Major breakdowns will be attended to by BHEL. However, in case of breakdowns or damages due to negligence of the contractor, the complete service / repair charges including cost of spares shall be to the account of the contractor, along with BHEL overheads.

SPECIAL CONDITIONS OF CONTRACT (SCC)-Electrical and C&I Chapter - V : Responsibilities of Contractor in respect of Labour, Supervisory Staff, etc.

5.0	RESPONSIBILITIES OF CONTRACTOR IN RESPECT OF LABOUR, SUPERVISORY STAFF, ETC.
5.1	Refer relevant clauses of General Conditions of Contract (GCC) also in this regard.
5.2	The contractor shall deploy all the necessary skilled / semi-skilled / unskilled labour including highly skilled workmen etc. These workmen should have previous experience on similar job. They shall hold valid certificates wherever necessary. Commissioning staff deputed at site must have at least 3 years of experience of similar type of job. BHEL reserves the right to insist on removal of any employee of the contractor at any time if he is found to be unsuitable and the contractor shall forthwith remove him.
5.3	Contractor shall also comply with the requirements of local authorities / project authorities calling for police verification of antecedents of the workmen, staff etc.
5.4	It is the responsibility of the contractor to engage his workmen in shifts and or on overtime basis for achieving the targets set by BHEL. This target may be set to suit BHEL's commitments to its customer or to advance date of completion of events or due to other reasons. Prior Information will be communicated by BHEL to contractor for arrangement of required manpower and T&Ps / MMEs at no extra cost to BHEL. The decision of BHEL in regard to setting the erection and commissioning targets will be final and binding on the contractor.
5.5	Contractor shall provide at different elevation suitable arrangement for urinal and drinking water facility with necessary plumbing & disposal arrangement including construction of septic tank. These installations shall be maintained in hygienic condition at all times.
5.6	The Contractor in the event of engaging 20 or more workmen, shall obtain Independent license under the Contract labour (Regulation and Abolition) Act 1970 from the concerned authorities based on Form-V issued by the Principal Employer / Customer. In order to issue Form-V by Customer, Contractor shall fulfill all Statutory requirements like Insurance Policy, PF Code / PF Account number etc. as per the requirement of BHEL / Customer.
5.7	Contractor shall deduct the necessary amount towards Provident Fund and contribute equal amount as per Government of India laws. This amount will be deposited regularly to the provident Fund Commissioner. BHEL / Customer may insist for submission of the account code duly certified by PF Commissioner.
5.8	Contractor may also be required to comply with provisions of ESI Act in vogue if applicable and submit evidence to BHEL.

SPECIAL CONDITIONS OF CONTRACT (SCC)-Electrical and C&I Chapter - V : Responsibilities of Contractor in respect of Labour, Supervisory Staff, etc.

5.9	BHEL / customer may insist for witnessing the regular payment to the labour. They may also like to verify the relevant records for compliance with statutory requirements. Contractor shall enable such facilities to BHEL / Customer. Documentary proof of Labour wage payment with bank seal and sign should be submitted every month with RA Bill. All Labours should be provided with Labour ID Card as per format prescribed by Labour department. Contractor shall deploy only qualified and experienced engineers / supervisors. They shall have prefereigned expressed in executing the work.
	supervisors. They shall have professional approach in executing the work. Refer Clause No. 2.5.
5.11	The contractor's supervisory staff shall execute the work in the most professional manner in the stipulated time. Accuracy of work and aesthetic finish are essential part of this contract. They shall be responsible to ensure that the assembly and workmanship conform to dimensions and tolerances given in the drawings/instructions given by BHEL engineer from time to time.
5.12	The supervisory staff employed by the contractor shall ensure proper outturn of work and discipline on the part of the labour put on the job by the contractor. Also, in general they should see that the works are carried out in a safe and proper manner and in coordination with other labour and staff employed directly by BHEL or other contractors of BHEL or BHEL's client.
5.13	It is the responsibility of the contractor to arrange gate pass for all his employees, T&P etc. for entering the project premises. Necessary coordination with customer officials is the responsibility of the contractor. Contractor to follow all the procedures laid down by the customer for making gate passes. Where permitted, by customer / BHEL, to work beyond normal working hours, the contractor shall arrange necessary work permits for working beyond normal working hours.
5.14	The actual deployment will of Labour and Engineer / supervision staff shall be so as to satisfy the erection and commissioning targets set by BHEL. If at any time, it is found that the contractor is not in a position to deploy the required engineers / supervisors / workmen due to any reason, BHEL shall have the option to make alternate arrangements at the contractor's risk and cost. The expenditure incurred along with BHEL overheads thereon shall be recovered from the contractor.
5.15	Contractor shall not deploy women labour at night.

SPECIAL CONDITIONS OF CONTRACT (SCC)-Electrical and C&I Chapter - V : Responsibilities of Contractor in respect of Labour, Supervisory Staff, etc.

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5.16	Contractor shall arrange and ensure availability of transportable adequate
	nos. of first aid kits to take to site in case of emergencies. The first-aid
	materials shall be easily accessible for the first-aid providers for whose use
	they are intended.
	It is the responsibility of contractor to maintain the materials in first aid kits
	and replaced any item on expiration. Further contractors to follow the HSE
	Plan for subcontractors as per BHEL HSE Document Ref
	No.HSEP14_HSE_Plan_for_Subcontractors_Rev01 (HSEP:14
	Dated.20/01/2020)
	,
5.17	
	visibly on site by all the skilled and unskilled staff of contractor. Contractor
	shall issue ID to site staff as per extant site practice.
5.18	Contractor shall provide personal protective equipment to all Contractor's
	personnel working on Site which are required to use according to BHEL's
	/Customer's Site HSE regulations but shall at least provide hard helmets,
	safety boots and safety goggles.

SPECIAL CONDITIONS OF CONTRACT (SCC)-Electrical and C&I Chapter - VI : Material Handling, Storage & Preservation

6.0	MATERIAL HANDLING, STORAGE AND PRESERVATION ETC
6.1	MATERIAL HANDLING AND STORAGE
6.1.1	All the equipments/materials furnished under this contract shall be received from the project stores, sheds / storage yards and transported to preassembly area / erection site and stored in the storage spaces in a manner so that they are easily retrievable till the contractor erects them. While drawing/lifting material from BHEL / customer stores, the contractor shall ensure that the balance / other materials are stacked back immediately. No claim is admissible on this account
6.1.2	While BHEL will endeavor to store / stack / identify materials properly in their open / close / semi closed / tarpaulins covered storage yard / shed, it shall be contractor's responsibility to assist BHEL in identifying materials well in time for erection. They should take the delivery of the same, following the procedure indicated by BHEL, and transport the material safely to preassembly yard / erection site in time, according to program.
	In case of control and instrumentation, material storage should be done at site in containers/ closed shed only. Prior to mobilization of Manpower and T&P/MME's/Calibration Equipments, BHEL along with contractor will define no. of Storage containers / closed sheds to be deployed at site to cater the site requirements. Also, for Calibration of instruments separate containers with calibration Test Bench / Desktop PC with operator for Calibration Records to be included in the scope of Contractor.
6.1.3	The contractor shall take delivery of components, equipment / consumables from storage area after getting the approval of BHEL Engineer on standard indent forms.
6.1.4	The contractor shall identify and deploy necessary Engineers / supervisors / workmen for the above work in sufficient number as may be needed by BHEL, for areas covering their scope.
6.1.5	All the equipment shall be handled very carefully to prevent any damage or loss. No untested wire ropes / slings etc. shall be used for unloading / handling. Valid fitness/load test certificate need to be submitted before execution of erection/lifting/handling work. The equipment shall be properly protected to prevent damage either to the equipment or to the floor where they are stored. The equipment from the stores shall be moved to the actual location at the appropriate time so as to avoid damage of such equipment at site.

SPECIAL CONDITIONS OF CONTRACT (SCC)-Electrical and C&I Chapter - VI : Material Handling, Storage & Preservation

6.1.6	Contractor shall ensure that while lifting slings shall be put over the points indicated on the equipment or as indicated in the manufacturer's drawings. Slings / shackles of proper size shall be used for all lifting and rigging purposes. All care shall be taken to safe guard the equipment against any damage. Dragging of piping / valves should be avoided. In case of any damage the cost shall be covered from the contractor, for those equipment's which are issued, stored, erected & commissioned by contractor.
6.1.7	Approach road conditions from the stores / yards to the erection site may not be equipped and ideal for smooth transportation of the equipment. Contractor may have to be adequately prepared to transport the materials under the above circumstances without any extra cost. The contractor may familiar himself with soil conditions at site.
6.1.8	Contractor shall be responsible for examining all the plant and materials issued to him and notify the Engineer immediately of any damage, shortage, discrepancy etc. before they are moved out of the stores / storage area. The contractor shall be solely responsible for any shortages or damages in transit, handling, storage, theft and erection of the equipment once received by him. Materials once taken over will be deemed to have been received in good condition and in correct quantities except for intrinsic defects which cannot be observed by visual and dimensional inspection and weighing. As the erection work will be spread in different areas / locations of the project, contractor has to arrange sufficient number of watch / ward personal to avoid any pilferage of materials erected by the contractor.
6.1.9	The contractor shall maintain an accurate and exhaustive record-detailing out the list of all equipment received by him for the purpose of erection and keep such record open for the inspection of the engineer at any time.
6.1.10	All the material in the custody of contractor and stored in the open or dusty locations must be covered with suitable weather proof / fire retardant covering material wherever applicable and shall be blocked up on raised level above ground. All covering materials including blocks and sleeper shall be arranged by the contractor at his cost.
6.1.11	If the material belonging to the contractor are stored in area other than those earmarked for his operation the engineer will have the right to get it moved to the area earmarked for the contractor at the contractor's risk and cost.

SPECIAL CONDITIONS OF CONTRACT (SCC)-Electrical and C&I Chapter - VI : Material Handling, Storage & Preservation

6.1.12	The contractor shall be responsible for making suitable indoor storage facilities to store all equipment (drawn by the contractor from BHEL / customer stores), which require indoor storage till the time of their installation. The Engineer will direct the contractor in this regard, which item in his opinion will require indoor storage, and the contractor shall comply with Engineer's decision.
6.1.13	All materials issued by BHEL shall be utilized as directed by Engineer-in-Charge or most economically in the absence of such direction. The contractor shall ensure that all surplus / damaged / scrap / unused material, packing wood / containers/ special transporting frames etc. are returned to BHEL at a place in project area identified by the Engineer. The contractor will maintain an account for all items received and returned to BHEL. Any shortage in returning such items shall be chargeable to the contractor except allowable wastage for packing wood only.
6.1.14	The contractor shall hand over all parts / materials remaining extra over the normal requirement with proper identification tags to the stores as directed by the concerned BHEL engineer.
6.1.15	The contractor shall ensure that all the packing materials and protective devices installed on equipment during transit and storage are removed before installation.
6.1.16	It shall be the responsibility of the contractor to keep the work / storage areas in neat, tidy and working conditions. All surplus/unusable packing and other materials shall be removed and deposited at location(s) specified by BHEL within the project premises. If required weighing of the same within the project premises will have to be carried out.
6.2	PRESERVATION OF COMPONENTS
6.2.1	After taking delivery from BHEL / customer's stores, plant materials storage shall be subjected to the following protection besides other provisions indicated in these specifications elsewhere.
6.2.1.1	Items stored outdoors shall be stacked up at least six inches (6") off the ground. Items should not be stored in a low-lying area where water logging is a possibility. Contractor should have sufficient numbers of wooden / concrete / steel sleepers for the job.
6.2.1.2	Motors, valves, electrical equipment, control equipment and instruments etc. shall be stored indoors in warehouse safe keeping, watch and ward at site.



SPECIAL CONDITIONS OF CONTRACT (SCC)-Electrical and C&I Chapter - VI : Material Handling, Storage & Preservation

6.2.2	It shall be the responsibility of the contractor to apply preservatives / touch up paints (primer) on equipment handled and erected by him till such time of final painting. It shall be contractor's responsibility to arrange for required paints (primer), thinners, labour, scaffolding materials, cleaning materials like wire brush, emery sheets, etc. cleaning of surface and provide one coat of preservatives / paints (primer) from time to time as decided by BHEL engineer. The accepted rate shall include this work also. It is to be noted that such painting may have to be done as and when required till such time the final painting is carried out, as prescribed in technical conditions of contract.
6.2.3	The contractor shall effectively protect the finished work from action of weather and from damage or defacement and shall cover the finished parts then and there for their protection.
6.2.4	Any failure on the part of contractor to carry out works according to above clauses will entail BHEL to carry out the job from any other party and recover the cost from contractor.
6.2.5	The loose items supplied for the main equipment falls into various categories like tools, modules, prefabricated cables, console inserts, recorders, modules and display units, printers, sensors and transducers, PCs, monitors, cable glands, cable ducts, frames etc. are to be categorized and stored separately.

SPECIAL CONDITIONS OF CONTRACT (SCC)-Electrical and C&I Chapter - VII : Drawings and Documents

7.0	DRAWINGS AND DOCUMENTS
7.1	The detailed drawings/revised drawings / documents, specifications available with BHEL engineers will be made available to the contractor during execution of work at site. The contractor will also ensure availability of all drawings / documents at work place. Contractor to ensure that hard/soft copies of the drawings not be forwarded and transmitted in any form detrimental to the interest of BHEL.
7.2	Necessary drawings to carry out the erection work will be furnished to the contractor by BHEL on loan, which shall be returned to BHEL Engineer at site after completion of work. Contractor shall ensure safe storage and quick retrieval of these documents.
7.3	The contractor shall maintain a record of all drawings and documents available with him in a register as per format given by BHEL Engineer. Contractor shall ensure use of pertinent drawings / data / documents and removal of obsolete ones from work place and returning to BHEL.
7.4	The data furnished in various annexure enclosed with this tender specification are only approximate and for guidance. However, the change in the design and in the quantity may occur as is usual in any such large scale of work. The contractors quoted rates shall be inclusive of the above factor.
7.5	Should any error or ambiguity be discovered in the specification or information the contractor shall forthwith bring the same to the notice of BHEL before commencement of work. BHEL's interpretation in such cases shall be final and binding on the contractor.
7.6	Deviation from design dimensions should not exceed permissible limit. The contractor shall not correct or alter any dimension / details, without specific approval of BHEL.

SPECIAL CONDITIONS OF CONTRACT (SCC)-Electrical and C&I Chapter - VIII : Inspection and Quality

8.0	INSPECTION AND QUALITY				
8.1	Inspection, Quality Assurance, Quality Control				
8.1.1	Preparation of quality assurance log sheets and protocols with custome / consultants / statutory authority, welding logs, NDE records, testing & calibration records and other quality control and quality assurance documentation as per BHEL engineer's instructions, is within the scope of work / specification. These records shall be submitted to BHEL customer for approval from time to time.				
8.1.2	The protocols between contractor and customer / BHEL shall be made prior to installation for correctness of foundations, materials, procedures, at each stage of installation, generally as per the requirement of customer / BHEL. This is necessary to ensure elimination of errors or keeping them within tolerable limits and to avoid accumulation and multiplication of errors.				
8.1.3	A daily log book should be maintained by every supervisor / engineer of contractor on the job in duplicate (one for BHEL and one for contractor) for detailing and incorporating alignment/clearance / centering / leveling readings and inspection details of various equipments etc.				
	Welding details like serial number of weld joints, welders name, date of welding, details of repair etc. will be documented in welding log as per BHEL Engineer's instructions.				
	Record of heat treatments performed shall be maintained as prescribed by BHEL.				
8.1.4	The performance of welders will be reviewed from time to time as per the BHEL standards. Welders' performance record shall be furnished periodically furnished for scrutiny of BHEL's Engineer. Corrective action as informed by BHEL shall be taken in respect of those welders not conforming to these standards. This may include removal/discontinuance of concerned welder(s). Contractor shall arrange for the alternate welders immediately				
8.1.5	All the welders shall carry identity cards as per the Proforma prescribed by BHEL / Customer / Consultant. Only welders duly authorized by BHEL / customer / consultant shall be engaged on the work.				
8.1.6	Any re-laying or re-termination of cables / re-erection of instruments / recalibration of instruments etc. required due to contractor's mistake/negligence found at any stage inspection, shall be carried out by the contractor at no extra cost.				

SPECIAL CONDITIONS OF CONTRACT (SCC)-Electrical and C&I Chapter - VIII : Inspection and Quality

Date:30.03.2022, Rev 00

SPECIAL CONDITIONS OF CONTRACT (SCC)-Electrical and C&I Chapter - VIII : Inspection and Quality

8.2.1	Apart from day-to-day inspection by BHEL Engineers stationed at Site			
	and Customer's Engineers, stage inspection of equipments under erection and commissioning at various stages shall also be conducted by teams of Engineers from Field Engineering Services of BHEL's Manufacturing Units, Quality Assurance teams from Field Quality Assurance, Unit/Factory Quality Assurance and Commissioning Engineers from Technical Services etc. Contractor shall arrange all labour, tools and tackles etc. along with proper access for such stage inspections free of cost.			
8.2.2	Any modifications suggested by BHEL FES and QA Engineers' team shall be carried out. Claims of contractor, if any, shall be dealt as per Section 13, and provided such modifications have not arisen for reasons attributable to the contractor.			
8.3	Statutory Inspection of Work			
8.3.1	The work to be executed under these specifications has to be offered for inspection, at appropriate stages of work completion, to various statutory authorities for compliance with applicable regulations.			
	The work-related statutory inspections, though not limited to, are as under:			
	 Electrical Inspector Factory Inspector, Labour Commissioner, PF Commissioner and other authority connected to this project work 			
	The scope includes getting the approvals from the statutory authorities, which includes arranging for inspection visits of statutory authority periodically as per BHEL Engineer's instructions, arranging materials for ground inspection, taking rub outs for the pressure parts to be offered for inspection, submitting co-related inspection reports, documents, radiographs etc. and following up the matter with them. Contractor shall also make all arrangements for offering the Products / Systems for inspection at location, as applicable, to the concerned authority.			
8.4	The Quality Management System of BHEL, Power Sector Regions (PSNR / PSER / PSWR / PSSR) have already been certified and accredited under ISO 9002 standards in this regard. The basic philosophy of the Quality Management System is to define the organizational responsibility, work as per documented procedures, verify the output with respect to acceptance norms, identify the non-conforming product / procedure and take corrective action for removal of non-conformance			

SPECIAL CONDITIONS OF CONTRACT (SCC)-Electrical and C&I Chapter - VIII: Inspection and Quality

specifying the steps for avoiding recurrence of such non-conformities, & maintain the relevant quality records. The non-conformities are to be identified through the conduct of periodical audit of implementation of quality systems at various locations/stages of work. Suppliers / vendors of various products / services contributing in the work are also considered as part of the quality management system. .as such the contractor is expected not only to conform to the quality management system of BHEL but also it is desirable that they themselves are accredited under any quality management system standard. **Field Quality Assurance**

8.5

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



SPECIAL CONDITIONS OF CONTRACT (SCC)-Electrical and C&I Chapter - IX : Health, Safety & Environment Obligations

9.0	OCCUPATIONAL HEALTH, SAFETY & ENVIRONMENT MANAGEMENT / QUALITY ASSURANCE PROGRAMME: BHEL, Power Sector Regions (PSNR / ER / WR / SR) are each certified for ISO 9001. Quality of work to customer's satisfaction and fulfillment of system requirements are the essence of ISO 9001 certification. BHEL, PS Regions have HSE certification (ISO 14001:2015 & ISO 45001:2018) and therefore Contractor also shall organize / plan/ perform all their activities to meet with the applicable requirements of these standards.
9.1	HSE (Health, safety & Environment): Contractor will comply with HSE (Health, Safety & Environment) requirements of BHEL as per the "HSE Plan for Site Operations by Subcontractor" (Document No. HSEP: 14 Rev00) or equivalent document issued by BHEL PS Regions along with tender. In case of any ambiguity between these two documents, document issued by PS-Region will be followed.

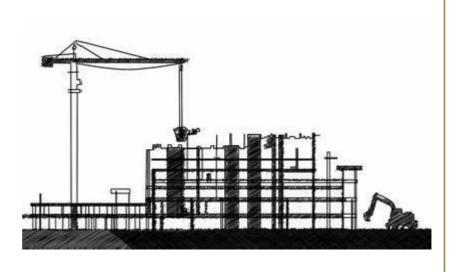
SPECIAL CONDITIONS OF CONTRACT (SCC)-Electrical and C&I Chapter - X : Suspension of Business Dealings

10.0	RA Bill Payments			
10.1	The contractor shall submit his monthly RA bills with all the details required by BHEL on specified date every month covering progress of work in all respects and areas for the previous calendar month.			
10.2	Mode of payment and measurement of work completed shall be as per relevant clauses of General Conditions of Contract			
10.3	Release of payment in each running bill including PVC Bills where ever applicable will be restricted to 95% of the value of work admitted as per stages of progressive pro rata payments.			
10.4	The 5% thus remaining shall be treated as 'Retention Amount' and shall be released as per terms specified in the General Conditions of Contract.			
10.5	The payment for running bills will normally be released within 30 days of submission of running bill complete in all respects with all documents. It is the responsibility of the contractor to make his own arrangements for making timely payments towards labour wages, statutory payments, outstanding dues etc. and other dues in the meanwhile.			
	60% of RA Bills complete and correct in all respects and certified by BHEL Engineer, shall be paid within 15 days of receipt. Balance payment shall be within 30 days.			
10.6	BHEL shall release payment through Electronic Fund Transfer (EFT)/RTGS. In order to implement this system, Contractor to furnish details pertaining to his Bank Accounts where proceeds will be transferred through BHEL's banker, as per prescribed formats:			
	Note: BHEL may also choose to release payment by other alternative modes as applicable			
10.7	Paying Authority shall be the Construction Manager of the Site. Any change in the paying Authority shall be intimated to the Contactor accordingly.			

Date:30.03.2022, Rev 00







HEALTH,
SAFETY and
ENVIRONMENT
PLAN

for

SITE OPERATIONS

by

SUB-CONTRACTORS

HSE PLAN FOR SITE OPRATIONS BY BHEL'S SUBCONTRACTORS

AT A GLANCE

BEFORE START

SIGNING OF MOU

Agree to comply to HSE requirement- Statutory and BHEL's

HSE ORGANISATION

Manpower

- 1 (one) safety officer for every 500 workers or part thereof
- 1(one) safety-steward/ supervisor for every 100 workers

Qualification

As per Cl. 7.1

HSE Roles and responsibilities

- Site In-charge- As per clause 7.2.1
- Safety officer- As per clause 7.2.2

HSE Planning

for Man, Machinery/Equipment/Tools & Tackles

HSE INFRASTUCTURE

- **PPEs**
- **Drinking Water**
- **Washing Facilities**
- **Latrines and Urinals**
- Provision of shelter for rest
- Medical facilities

- Canteen facilities
- **Labour Colony**
- **Emergency Vehicle**
- Pest Control
- Scrapyard
- Illumination

HSE TRAINING, AWARENESS & PROMOTION

Training

- Induction training
- Height work and other critical areas
- Tool Box talk & Pep Talk

Awareness & Promotion

- Signage
- Poster
- Banner
- Competition
- Awards

Incident Reporting

- Accident- Fatal & Major
- Property damage
- **Near Miss**

HSE COMMUNICATION

Event Reporting

- Celebrations
- **Training**
- Medical camp

EXECUTE SAFELY

OPERATIONAL CONTROL PROCEDURES

PERMIT TO WORK

Height work (above 2 metres), Hot Work, Heavy Lifting, Confined Space, Radiography, excavation (More than 4 metres)

SAFETY DURING WORK EXECUTION Fire

- Welding
- Rigging
- Cylinder- storage & Movement
- Demolition work
- T&Ps
- **Chemical Handling**
- **Electrical works**

- Scaffolding
- Height work
- Working Platform
- Excavation
- Ladder
- Lifting
- Hoisting appliance

HOUSE KEEPING

WASTE MANGEMENT

TRAFFIC MANAGEMENT

ENVIRONMENTAL CONTROL

EMERGENCY PREPAREDNESS AND RESPONSE PLAN

HSE AUDITS & INSPECTION

- **Daily Checks**
- Inspection of PPEs
- Inspection of T& Ps
- Inspection of Cranes & Winches
- Inspection of Height work
- Inspection of Welding and Gas cutting
- Inspection of elevators etc.

HSE PERFORMANCE EVALUATION PARAMETERS

PENALTY for NON CONFORMANCE Refer Clause 16 Incremental penalty

For repeated violation by the same person, the penalty would be double of the previous penalty

For repeated fatal incident in the same Unit incremental penalty to be imposed. The subcontractor will pay 2 times the penalty compared to previously paid in case there are repeated cases of fatal incidents under the same subcontractor for the same package in the same unit.



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POWER SECTOR

REVISION HISTORY SHEET

Date	Revision No.	Details of Changes	Reason	Prepared	Reviewed	Approved
12.08.2014	00	First Issue	First Issue	S. B. Jayant, Dy Manager- FQA & Safety	A. K. Sinha, GM-FQA & Safety	Anuj Bhatnagar, ED-FQA & Safety
20.01.2020	01	Formats added: HSEP:14-F30 – Monthly HSE Planning & Review (Page 11, Clause 8.0 - updated) HSEP:14-F13E-Excavation Inspection Format (part of F30)) HSEP:14-F32B – Job Safety Analysis Format (part of F30) HSEP:14-F31A – Daily HSE Reporting (Page 18, Clause 10.3 – added) HSEP:14-F33 – HSE Performance Evaluation (Page 31, Clause 13 – revised)	IOM No. PSHQHSE/M ONREP/02 Dated 08-Jan- 2020	Rohit Kumar	Santos GM (MS)	h Nair, (& HSE)



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1.0 **PURPOSE**

- 1.1 The purpose of this HSE Plan is to provide for the systematic identification, evaluation, prevention and control of general workplace hazards, specific job hazards, potential hazards and environmental impacts that may arise from foreseeable conditions during installation and servicing of industrial projects and power plants.
- 1.2 This document shall be followed by BHEL's subcontractors at all installation and servicing sites. In case customer specific documents are to be implemented, this document will be followed in conjunction with customer specific documents.
- 1.3 Although every effort has been made to make the procedures and guidelines in line with statutory requirements, in case of any discrepancy relevant statutory guidelines must be followed.
- 1.4 In case the customer has any specific requirement, the same is to be fulfilled.

2.0 **SCOPE**

The document is applicable for BHEL's Subcontractors at all installation / servicing activities of BHEL Power Sector as per the relevant contractual obligations.

3.0 **OBJECTIVES AND TARGETS**

The HSE Plan reflects that BHEL places high priority upon the Occupational Health, Safety and Environment at workplaces.

- Ensure the Health and Safety of all persons at work site is not adversely affected by the work.
- Ensure protection of environment of the work site.
- Comply at all times with the relevant statutory and contractual HSE requirements.
- Provide trained, experienced and competent personnel. Ensure medically fit personnel only are engaged at work.
- Provide and maintain plant, places and systems of work that are safe and without risk to health and the environment.
- Provide all personnel with adequate information, instruction, training and supervision on the safety aspect of their
- Effectively control, co-ordinate and monitor the activities of all personnel on the Project sites including subcontractors in respects of HSE.
- Establish effective communication on HSE matters with all relevant parties involved in the Project works.
- Ensure that all work planning takes into account all persons that may be affected by the work.
- Ensure fitness testing of all T&Ps/Lifting appliances like cranes, chain pulley blocks etc. are to be certified by competent person.
- Ensure timely provision of resources to facilitate effective implementation of HSE requirements.
- Ensure continual improvements in HSE performance
- Ensure conservation of resources and reduction of wastage.
- Capture the data of all incidents including near misses, process deviation etc. Investigate and analyze the same to find out the root cause.
- Ensure timely implementation of correction, corrective action and preventive action.



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HSE TARGETS

EXPLOSION ZERO FATALITY ZERO LOST TIME INJURY ZERO **FIRE ZERO VEHICLE INCIDENTS ZERO ENVIRONMENTAL INCIDENTS** 7FRO

4.0 BHEL POWER SECTOR HEALTH, SAFETY & ENVIRONMENT POLICY

Health, Safety & Environment Policy of BHEL

In BHEL, Health, Safety and Environment (HSE) responsibilities are driven by our commitment to protect our employees and people we work with, community and environment. BHEL believes in zero tolerance for unsafe work/non-conformance to safety and in minimizing environmental footprint associated with all its business activities. We commit to continually improve our HSE performance by:

- > Developing safety and sustainability culture through active leadership and by ensuring availability of required resources.
- Ensuring compliance with applicable legislation, regulations and BHEL systems.
- > Taking up activities for conservation of resources and adopting sound waste management by following Reduce/Recycle/Reuse approach.
- > Continually identifying, assessing and managing environmental impacts and Occupational Health & Safety risks of all activities, products and services adopting approach based on elimination/ substitution/reduction/control.
- Incorporating appropriate Occupational Health, Safety and Environment criteria into business decisions, design of products & systems and for selection of plants, technologies and services.
- > Imparting appropriate structured training to all persons at workplace and promoting awareness amongst customers, contractors and suppliers on HSE issues.
- > Reviewing periodically this policy and HSE Management Systems to ensure its relevance, appropriateness and effectiveness.
- Communicating this policy within BHEL and making it available to interested parties.

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CMD. BHEL



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5.0 MEMORANDUM OF UNDERSTANDING:

After award of work, subcontractors are required to enter into a memorandum of understanding as given below:

,	!	3 3
	Memorandum of Unde	erstanding
BHEL, Powe	r SectorRegion is committed to I	Health, Safety and Environment Policy (HSE Policy).
M/s	do hereby also co	ommit to comply with the same HSE Policy while
executing the Contract Nu	mber	
M/s	shall ensure that sa	afe work practices as per the HSE plan. Spirit and
content therein shall be r	eached to all workers and supervisors	for compliance.
In addition to this. M/S	shall comply to al	applicable statutory and regulatory requirements
		uirement specified in the contract document of the
principal customer.	process or project and any operation of	
	shall co-operate in HSE a	udits/inspections conducted by BHEL /customer/
	close any non-conformity observed/rep	· · · · · · · · · · · · · · · · · · ·
Signed by authorized repr	esentative of M/s	·
Name :		
Place & Date:		



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TERMS AND DEFINITIONS 6.0

6.1 **DEFINITIONS**

6.1.1 **INCIDENT**

Work- related or natural event(s) in which an injury, or ill health (regardless of severity), damage to property or fatality occurred, or could have occurred.

6.1.2 **NEAR MISS**

An incident where no ill health, injury, damage or other loss occurs, but it had a potential to cause, is referred to as "Near-Miss".

MAN-HOURS WORKED 6.1.3

The total number of man hours worked by all employees including subcontractors working in the premises. It includes managerial, supervisory, professional, technical, clerical and other workers including contract labours. Man-hours worked shall be calculated from the payroll or time clock recorded including overtime. When this is not feasible, the same shall be estimated by multiplying the total man-days worked for the period covered by the number of hours worked per day. The total number of workdays for a period is the sum of the number of men at work on each day of period. If the daily hours vary from department to department separate estimate shall be made for each department and the result added together.

FIRST AID CASES 6.1.4

First aids are not essentially all reportable cases, where the injured person is given medical treatment and discharged immediately for reporting on duty, without counting any lost time.

6.1.5 **LOST TIME INJURY**

Any work injury which renders the injured person unable to perform his regular job or an alternative restricted work assignment on the next scheduled work day after the day on which the injury occurred.

6.1.6 **MEDICAL CASES**

Medical cases come under non-reportable cases, where owing to illness or other reason the employee was absent from work and seeks Medical treatment.

6.1.7 TYPE OF INCIDENTS & THEIR REPORTING:

The three categories of Incident are as follows:

Non-Reportable Cases:

An incident, where the injured person is given medical help and discharged for work without counting any lost time.



SITE OPERATION by SUBCONTRACTORS REV:

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Reportable Cases:

In this case the injured person is disable for 48 hours or more and is not able to perform his duty.

Injury Cases:

These are covered under the heading of non-reportable cases. In these cases the incident caused injury to the person, but he still continues his duty.

6.1.8 TOTAL REPORTABLE FREQUENCY RATE

Frequency rate is the number of Reportable Lost Time Injury (LTI) per one Million Man hours worked. Mathematically, the formula read as:

Number of Reportable LTI x 1,000,000

Total Man Hours Worked

6.1.9 **SEVERITY RATE**

Severity rate is the Number of days lost due to Lost Time Injury (LTI) per one Million Man hours worked. Mathematically, the formula reads as:

Days lost due to LTI __x 1,000,000

Total Man Hours Worked

6.1.10 INCIDENCE RATE

Incidence Rate is the Number of LTI per one thousand manpower deployed. Mathematically, the formula reads as:

Number of LTIx1000

Average number of manpower deployed

7.0 **HSE ORGANISATION**

Number of safety officers:

The subcontractor must deploy one safety officer for every 500 workers or part thereof in each package. In addition, there must be one safety-steward/safety-supervisor for every 100 workers.

Deployment: The subcontractor should deploy sufficient safety officers and safety-steward/Safety-supervisor, as per requirement given above, since initial stage and add more in proportion to the added strength in work force. Any delay in deployment will attract a penalty of Rs.30,000/- per man month for the delayed period.

7.1 QUALIFICATION FOR HSE PERSONNEL

SI.no	Designation	Qualification	Experience
1	Safety officer (Construction Agency)	Degree or Diploma in Engineering with full time diploma in Industrial Safety with construction safety as one of the subjects	Minimum two years for degree holder and five years for diploma holder in the field of Construction of power plant/ major industries



SITE OPERATION by SUBCONTRACTORS REV:

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2	Safety-Steward/ Safety-	Degree or diploma in any discipline with	Minimum two years
	Supervisor	full time diploma in Industrial Safety with	
		construction safety as one of the	
		subjects	

7.2 **RESPONSIBILITIES**

7.2.1 SITE IN -CHARGE OF SUBCONTRACTOR

- Shall sign Memorandum of Understanding (MoU) for compliance to BHEL's HSE Plan for Site Operations as per clause 5.0
- Shall engage qualified safety officer(s) and steward (s) as per clause 7.0
- Shall adhere to the rules and regulations mentioned in this code, practice very strictly in his area of work in consultation with his concerned engineer and the safety coordinator.
- Shall screen all workmen for health and competence requirement before engaging for the job and periodically thereafter as required.
- Shall not engage any employee below 18 years.
- Shall arrange for all necessary PPEs like safety helmets, belts, full body harness, shoes, face shield, hand gloves etc. before starting the job. Shall ensure that no working men/women carry excessive weight more than stipulated in Factory Rule Regulation R57.
- Shall ensure that all T&Ps engaged are tested for fitness and have valid certificates from competent person.
- Shall ensure that provisions stipulated in contract Labour Regulation Act 1970, Chapter V C.9, canteen, rest rooms/washing facilities to contracted employees at site.
- Shall adhere to the instructions laid down in Operation Control Procedures (OCPs) available with the site management.
- Shall ensure that person working above 2.0 meter should use Safety Harness tied to a life line/stable structure.
- Shall ensure that materials are not thrown from height. Cautions to be exercised to prevent fall of material from height.
- Shall report all incidents (Fatal/Major/Minor/Near Miss) to the Site engineer /HSE officer of BHEL.
- Shall ensure that Horseplay is strictly forbidden.
- Shall ensure that adequate illumination is arranged during night work.
- Shall ensure that all personnel working under subcontractor are working safely and do not create any Hazard to self and to others.
- Shall ensure display of adequate signage/posters on HSE.
- Shall ensure that mobile phone is not used by workers while working.
- Shall ensure conductance of HSE audit, mockdrill, medical camps, induction training and training on HSE at site.
- Shall ensure full co-operation during HQ/External /Customer HSE audits.



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Shall ensure submission of look-ahead plan for procurement of HSE equipment's and PPEs as per work schedule.

- Shall ensure good housekeeping.
- Shall ensure adequate valid fire extinguishers are provided at the worksite.
- Shall ensure availability of sufficient number of toilets /restrooms and adequate drinking water at work site and labour colony.
- Shall ensure adequate emergency preparedness.
- · Shall be member of site HSE committee and attend all meetings of the committee
- Power source for hand lamps shall be maximum of 24 v.
- □ Temporary fencing should be done for open edges if Hand railings and Toe-guards are not available.

7.2.2 HEALTH, SAFETY AND ENVIRONMENT OFFICER OF SUBCONTRACTOR

- Carry out safety inspection of Work Area, Work Method, Men, Machine & Material, P&M and other tools and tackles.
- Facilitate inclusion of safety elements into Work Method Statement.
- Highlight the requirements of safety through Tool-box / other meetings.
- Help concerned HOS to prepare Job Specific instructions for critical jobs.
- Conduct investigation of all incident/dangerous occurrences & recommend appropriate safety measures.
- Advice & co-ordinate for implementation of HSE permit systems, OCPs & MPs.
- Convene HSE meeting & minute the proceeding for circulation & follow-up action.
- Plan procurement of PPE & Safety devices and inspect their healthiness.
- Report to PS Region/HQ on all matters pertaining to status of safety and promotional program at site level.
- · Facilitate administration of First Aid
- · Facilitate screening of workmen and safety induction.
- Conduct fire Drill and facilitate emergency preparedness
- · Design campaigns, competitions & other special emphasis programs to promote safety in the workplace.
- □ Apprise PS− Region on safety related problems.
- · Notify site personnel non-conformance to safety norms observed during site visits / site inspections.
- Recommend to Site In charge, immediate discontinuance of work until rectification, of such situations warranting immediate action in view of imminent danger to life or property or environment.
- To decline acceptance of such PPE / safety equipment that do not conform to specified requirements.
- Encourage raising Near Miss Report on safety along with, improvement initiatives on safety.
- Shall work as interface between various agencies such customer, package-in-charges, subcontractors on HSE matters



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8.0 PLANNING BY SUBCONTRACTOR

Monthly planning and review of HSE activities shall be carried out by subcontractor as per format No. HSEP:14-F30 jointly along with BHEL.

8.1 MOBILISATION OF MACHINERY/EQUIPMENT/TOOLS BY SUBCONTRACTOR

- As a measure to ensure that machinery, equipment and tools being mobilized to the construction site are fit for
 purpose and are maintained in safe operating condition and complies with legislative and owner requirement,
 inspection shall be arranged by in-house competent authority for acceptance as applicable.
- The machinery and equipment to be embraced for this purpose shall include but not limited to the following:
 - o Mobile cranes.
 - Side Booms.
 - Forklifts.
 - Grinding machine.
 - Drilling machine.
 - Air compressors.
 - Welding machine.
 - Generator sets.
 - Dump Trucks.
 - Excavators.Dozers
 - o Grit Blasting Equipment.
 - Hand tools.
- Subcontractor shall notify the engineer, of his intention to bring on to site any equipment or any container, with
 liquid or gaseous fuel or other substance which may create a hazard. The Engineer shall have the right to
 prescribe the condition under which such equipment or container may be handled and used during the
 performance of the works and the subcontractor shall strictly adhere to such instructions. The Engineer shall
 have the right to inspect any construction tool and to forbid its use, if in his opinion it is unsafe. No claim due to
 such prohibition will be entertained.

8.2 MOBILISATION OF MANPOWER BY SUBCONTRACTOR

- The subcontractor shall arrange induction and regular health check of their employees as per schedule VII of BOCW rules by a registered medical practitioner.
- The subcontractor shall take special care of the employees affected with occupational diseases under rule 230 and schedule II of BOCW Rules. The employees not meeting the fitness requirement should not be engaged for such job.
- Ensure that the regulatory requirements of excessive weight limit (to carry/lift/ move weights beyond prescribed limits) for male and female workers are complied with.
- Appropriate accommodation to be arranged for all workmen in hygienic condition.



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8.3 **PROVISION OF PPEs**

- Personnel Protective Equipment (PPEs), in adequate numbers, will be made available at site & their regular use by all concerned will be ensured
- The following matrix recommends usage of minimum PPEs against the respective job.

SI.	Type of work	PPEs
No		
1	Concrete and asphalt mixing	Nose mask, hand glove, apron and gum boot
2	Welders/Grinders/ Gas cutters	Welding/face screen, apron, hand gloves, nose mask and ear
		muffs if noise level exceeds 90dB. Helmet fitted with welding shield
		is preferred for welders
3	Stone/ concrete breakers	Ear muffs, safety goggles, hand gloves
4	Electrical Work	Rubber hand glove, Electrical Resistance shoes
5	Insulation Work	Respiratory mask, Hand gloves, safety goggles
6	Work at height	Double lanyard full body harness, Fall arrestor (specific cases)
7	Grit/Sand blasting	Blast suit, blast helmet, respirator, leather gloves
8	Painting	Plastic gloves, Respirators (particularly for spray painting)
9	Radiography	As per BARC guidelines

The PPEs shall conform to the relevant standards as below and bear ISI mark.

Relevant is-codes for personal protection

IS: 2925 – 1984	Industrial Safety Helmets.	
IS: 4770 – 1968	Rubber gloves for electrical purposes.	
IS: 6994 – 1973 (Part-I)	Industrial Safety Gloves (Leather &Cotton Gloves).	
IS: 1989 – 1986 (Part-I-II)	Leather safety boots and shoes.	
IS: 5557 – 1969	Industrial and Safety rubber knee boots.	
IS: 6519 – 1971	Code of practice for selections care and repair of Safety footwear.	
IS: 11226 – 1985	Leather Safety footwear having direct molding sole.	
IS: 5983 – 1978	Eye protectors.	
IS: 9167 – 1979	Ear protectors.	
IS: 1179-1967	Eye & Face protection during welding	
IS: 3521 – 1983	Industrial Safety Belts and Harness	
IS:8519 -1977	Guide for selection of industrial Safety equipment for body protection	
IS:9473-2002,14166- 1994,14746-1999	Respiratory Protective Devices	

The list is not exhaustive. The safety officer may demand additional PPEs based on specific requirement.



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- Where workers are employed in sewers and manholes, which are in use, the subcontractor shall ensure that the
 manhole covers are opened and ventilated at least for an hour before the workers are allowed to get into
 manhole, and the manholes so opened shall be cordoned off with suitable railing and provided with warning
 signals or boards to prevent incident to the public
- Besides the PPEs mentioned above, the persons shall use helmet and safety shoe. The visitors shall use Helmet and any other PPEs as deemed appropriate for the area of work.

Colour scheme for Helmets:

1. Workmen: Yellow

2. Safety staff: Green or white with green band

3. Electrician: Red

4. Others including visitors: White

- All the PPEs shall be checked for its quality before issue and the same shall be periodically checked. The users shall be advised to check the PPEs themselves for any defect before putting on. The defective ones shall be repaired/ replaced.
- The issuing agency shall maintain register for issue and receipt of PPEs.
- The Helmets shall have logo or name (abbreviation of agency name permitted) affixed or printed on the front.
- The body harnesses shall be serial numbered.

8.4 ARRANGEMENT OF INFRASTRUCTURE

8.4.1 DRINKING WATER

- Drinking water shall be provided and maintained at suitable places at different elevations.
- Container should be labeled as " Drinking Water"
- Cleaning of the storage tank shall be ensured atleast once in 3 months indicating date of cleaning and next due
 date.
- Potability of water should be tested as per IS10500 at least once in a year.

8.4.2 WASHING FACILITIES

- In every workplace, adequate and suitable facilities for washing shall be provided and maintained.
- Separate and adequate cleaning facilities shall be provided for the use of male and female workers. Such
 facilities shall be conveniently accessible and shall be kept in clean and hygienic condition and dully illuminated
 for night use.
- Overalls shall be supplied by the subcontractor to the workmen and adequate facilities shall be provided to enable the painters and other workers to wash during the cessation of work.

8.4.3 LATRINES AND URINALS

- Latrines and urinals shall be provided in every work place.
- Urinals shall also be provided at different elevations.
- They shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times, by appointing designated person.
- Separate facilities shall be provided for the use of male and female worker if any.



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8.4.4 PROVISION OF SHELTER DURING REST

Proper Shed & Shelter shall be provided for rest during break

8.4.5 MEDICAL FACILITIES

8.4.5.1 MEDICAL CENTRE (As per Schedule V, X and XI of BOCW central Rules, 1998)

- A medical centre shall be ensured/identified at site with basic facilities for handling medical emergencies. The
 medical center can be jointly developed on proportionate sharing basis with permission from BHEL
- · A qualified medical professional, not less than MBBS, shall be deployed at the medical centre
- The medical centre shall be equipped with one ambulance, with trained driver and oxygen cylinder.
- Medical waste shall be disposed as per prevailing legislation (Bio-Medical Waste –Management and Handling Rules, 1998)

8.4.5.2 FIRST AIDER

- Ensure availability of Qualified First-aider throughout the working hours.
- Every injury shall be treated, recorded and reported.
- Refresher course on first aid shall be conducted as necessary.
- List of Qualified first aiders and their contact numbers should be displayed at conspicuous places.

8.4.5.3 FIRST AID BOX (as per schedule III of BOCW)

- The subcontractor shall provide necessary first aid facilities as per schedule III of BOCW. At every work place first aid facilities shall be provided and maintained.
- The first aid box shall be kept by first aider who shall always be readily available during the working hours of the work place. His name and contact no to be displayed on the box.
- The first aid boxes should be placed at various elevations so as to make them available within the reach and at the quickest possible time.
- The first aid box shall be distinctly marked with a Green Cross on white background.
- Details of contents of first aid box is given in Annexure No. 01
- Monthly inspection of First Aid Box shall be carried out by the owner as per format no. HSEP:14-F01
- The subcontractor should conduct periodical first –aid classes to keep his supervisor and Engineers properly trained for attending to any emergency.

8.4.5.4 HEALTH CHECK UP (As per schedule VII and Form XI)

The persons engaged at the site shall undergo health checkup as per the format no. HSEP:14-F02 before induction. The persons engaged in the following works shall undergo health checkup at least once in a year:

- a. Height workers
- b. Drivers/crane operators/riggers



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- Confined space workers
- d. Shot/sand blaster
- Welding and NDE personnel

8.4.6 **PROVISION OF CANTEEN FACILITY**

- Canteen facilities shall be provided for the workmen of the project inside the project site.
- Proper cleaning and hygienic condition shall be maintained.
- Proper care should be taken to prevent biological contamination.
- Adequate drinking water should be available at canteen.
- Fire extinguisher shall be provided inside canteen.
- Regular health check-up and medication to the canteen workers shall be ensured.

PROVISION OF ACCOMODATION/LABOUR COLONY 8.4.7

The subcontractor shall arrange for the accommodation of workmen at nearby localities or by making a labour
colony.
Regular housekeeping of the labour colony shall be ensured.
Proper sanitation and hygienic conditions to be maintained.
Drinking water and electricity to be provided at the labour colony.
Bathing/ washing bay
Room ventilation and electrification.

8.4.8 **PROVISION OF EMERGENCY VEHICLE**

Dedicated emergency vehicle shall be made available at workplace by each subcontractor to handle any emergency

8.4.9 **PEST CONTROL**

Regular pest control should be carried out at all offices, mainly laboratories, canteen, labour colony and stores.

8.4.10 SCRAPYARD

- In consultation with customer, scrapyard shall be developed to store metal scrap, wooden scrap, waste, hazardous waste.
- Scrap/Waste shall be segregated as Bio-degradable and non-bio-degradable and stored separately.

8.4.11 ILLUMINATION

- The subcontractor shall arrange at his cost adequate lighting facilities e.g. flood lighting, hand lamps, area lighting etc. at various levels for safe and proper working operations at dark places and during night hours at the work spot as well as at the pre-assembly area.
- Adequate and suitable light shall be provided at all work places & their approaches including passage ways as per IS: 3646 (Part-II). Some recommended values are given below:



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	S. No.	Location	Illumination (Lux)
A.	Construction Are	ea	,
1.		Outdoor areas like store yards, entrance and exit roads	20
2.		Platforms	50
3.		Entrances, corridors and stairs	100
4.		General illumination of work area	150
5.		Rough work like fabrication, assembly of major items	150
6.		Medium work like assembly of small machined parts	300
7.		rough measurements etc. Fine work like precision assembly, precision measurements etc.	700
8.		Sheet metal works	200
9.		Electrical and instrument labs	450
В.	Office		
1.		Outdoor area like entrance and exit roads	20
2.		Entrance halls	150
3.		Corridors and lift cars	70
4.		Lift landing	150
5.		Stairs	100
6.		Office rooms, conference rooms, library reading tables	300
7.		Drawing table	450
8.		Manual telephone exchange	200

- Lamp (hand held) shall not be powered by mains supply but either by 24V or dry cells.
- Lamps shall be protected by suitable guards where necessary to prevent danger, in case of breakage of lamp.
- Emergency lighting provision for night work shall be made to minimise danger in case of main supply failure.

If the subcontractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instructions issued by the authorized BHEL official, BHEL shall have the right to take corrective steps at the risk and cost of the subcontractor

9.0 HSE TRAINING& AWARENESS

9.1 HSE INDUCTION TRAINING

All persons entering into project site shall be given HSE induction training by the HSE officer of BHEL /subcontractor before being assigned to work.

In-house induction training subjects shall include but not limited to:

- Briefing of the Project details.
- Safety objectives and targets.
- Site HSE rules.
- Site HSE hazards and aspects.
- First aid facility.
- Emergency Contact No.
- Incident reporting.
- Fire prevention and emergency response.
- Rules to be followed in the labour colony (if applicable)



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- Proper safety wear & gear must be issued to all the workers being registered for the induction (i.e., Shoes/Helmets/Goggles/Leg guard/Apron etc.)
- They must arrive fully dressed in safety wear & gear to attend the induction.
- Any one failing to conform to this safety wear& gear requirement shall not qualify to attend.
- On completing attending subcontractor's in-house HSE induction, each employee shall sign an induction training form (format no. HSEP:14-F03) to declare that he had understood the content and shall abide to follow and comply with safe work practices. They may only then be qualified to be issued with a personal I.D. card, for access to the work site.

9.2 **HSE TOOLBOX TALK**

- HSE tool Box talk shall be conducted by frontline foreman/supervisor of subcontractor to specific work groups prior to the start of work. The agenda shall consist of the followings:
 - Details of the job being intended for immediate execution.
 - The relevant hazards and risks involved in executing the job and their control and mitigating measures.
 - Specific site condition to be considered while executing the job like high temperature, humidity, unfavorable weather etc.
 - Recent non-compliances observed.
 - Appreciation of good work done by any person.
 - Any doubt clearing session at the end.
- Record of Tool box talk shall be maintained as per format no. HSEP:14-F04
- Tool box talk to be conducted at least once a week for the specific work.

9.3 TRAINING ON HEIGHT WORK

Training on height work shall be imparted to all workers working at height by in-house/external faculty at least twice in a year. The training shall include following topics:

- Use of PPEs
- Use of fall arrester, retractable fall arrester, life line, safety nets etc.
- Safe climbing through monkey ladders.
- Inspection of PPEs.
- Medical fitness requirements.
- Mock drill on rescue at height.
- Dos & Don'ts during height work.

9.4 **HSE TRAINING DURING PROJECT EXECUTION**

- Other HSE training shall be arranged by BHEL/ subcontractor as per the need of the project execution and recommendation of HSE committee of site.
- The topics of the HSE training shall be as follows but not limited to:
 - Hazards identification and risk analysis (HIRA)
 - Work Permit System
 - Incident investigation and reporting
 - o Fire fighting
 - o First aid
 - o Fire-warden training
 - o EMS and OHSMS
 - T & Ps fitness and operation



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- Electrical safety
- Welding, NDE & Radiological safety
- Storage, preservation & material handling.
- A matrix shall be maintained to keep an up-to-date record of attendance of training sessions carried out.

9.5 HSE PROMOTION-SIGNAGE, POSTERS, COMPETITION, AWARDS ETC

9.5.1 Display of HSE posters and banners

Site shall arrange appropriate posters, banners, slogans in local/Hindi/English languages at work place

9.5.2 Display of HSE signage

Appropriate HSE signage shall be displayed at the work area to aware workmen and passersby about the work going on and do's and don'ts to be followed

9.5.3 Competition on HSE and award

Site will arrange different competition (slogan, poster, essay etc.) on HSE time to time (Safety day, BHEL day, World Environment Day etc.) and winners will be suitably awarded.

9.5.4 **HSE** awareness programme

Subcontractor shall arrange HSE awareness programme periodically on different topics including medical awareness for all personnel working at site

10.0 **HSE COMMUNICATION**

10.1 INCIDENT REPORTING

- The subcontractor shall submit report of all incidents, fires and property damage etc to the Engineer immediately after such occurrence, but in any case not later than 24 hours of the occurrence. Such reports shall be furnished in the manner prescribed by BHEL. (Refer HSE procedure for incident investigation, analysis and reporting for details)
- In addition, periodic reports on safety shall also be submitted by the subcontractor to BHEL from time to time as prescribed by the Engineer. Compiled monthly reports of all kinds of incidents, fire and property damage to be submitted to BHEL safety officer as per prescribed formats.
- HSE incidents of site shall be reported to BHEL site Management as per Procedure for Incident Investigation and Reporting in format no. HSEP:14-F15. Corrective action shall be immediately implemented at the work place and compliance shall be verified by BHEL HSE officer and until then, work shall be put on hold by Construction Manager.

HSE EVENT REPORTING 10.2

- Important HSE events like HSE training, Medical camp etc. organized at site shall be reported to BHEL site management in detail with photographs for publication in different in-house magazines
- Celebration of important days like National Safety Day, World Environment Day etc. shall also be reported as mentioned above.

10.3 **DAILY HSE ACTIVITY REPORTING**

Daily HSE activities shall be reported by subcontractor to BHEL as per Format No. HSEP:14-F31A



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11.0 OPERATIONAL CONTROL

All applicable OCPs (Operational control procedures) will be followed by subcontractor as per BHEL instructions. This will be done as part of normal scope of work. List of such OCPs is given below. In case any other OCP is found to be applicable during the execution of work at site, then subcontractor will follow this as well, within quoted rate. These OCPs (applicable ones) will be made available to subcontractor during work execution at site. However for reference purpose, these are kept with Safety Officer of BHEL at the Power Sector Regional HQ, or available in downloadable format in the website, which may be refereed by subcontractor, if they so desire.

LIST OF OCPs

Safe handling of chemicals	Safety in use of cranes	Hydraulic test
Electrical safety	Storage and handling of gas cylinders	Spray insulation
Energy conservation	Manual arc welding	Trial run of rotary equipment
Safe welding and gas cutting operation	Safe use of helmets	Stress relieving
Fire safety	Good house keeping	Material preservation
Safety in use of hand tools	Working at height	Cable laying/tray work
First aid	Safe excavation	Transformer charging
Food safety at canteen	Safe filling of hydrogen in cylinder	Electrical maintenance
Illumination	Vehicle maintenance	Safe handling of battery system
Handling and erection of heavy metals	Safe radiography	Computer operation
Safe acid cleaning	Waste disposal	Storage in open yard
Safe alkali boil out	Working at night	For sanitary maintenance
Safe oil flushing	Blasting	Batching
Steam blowing	DG set	Piling rig operation
Safe working in confined area	Handling & storage of mineral wool	Gas distribution test
Safe operation of passenger lift, material hoists & cages	Drilling, reaming and grinding(machining)	Cleaning of hotwell / deaerator
Electro-resistance heating	Compressor operation	O&M of control of AC plant & system
Air compressor	Passivation	Safe Loading of Unit
Safe EDTA Cleaning	Safe Chemical cleaning of Pre boiler system	Safe Boiler Light up
Safe Rolling and Synchronization		

11.1 HSE ACTIVITIES

HSE activities shall be conducted at site based on the HSEMSM developed by Power Sector and issued to site by Regions.

While planning for any activity the following documents shall be referred for infrastructural requirements to establish control measures:

- 1) HSE Procedure for Register of OHS Hazards and Risks
- 2) HSE Procedure for Register of Environmental Aspects and Impacts
- 3) HSE Procedure for Register of Regulations



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- 4) Operational Control Procedures
- 5) HSE Procedure for Emergency Preparedness and Response Plan
- 6) Contract documents

11.2 WORK PERMIT SYSTEM

- ☐ The following activities shall come under Work Permit System
 - a. Height working above 2 metres
 - b. Hot working at height
 - c. Confined space
 - d. Radiography
 - e. Excavation more than 4 meter depth
 - f. Heavy lifting above 50 ton

Refer Annexure 05 for Work permit formats.

- "HSE Procedure for Work Permit System" shall be followed while implementing permit system. Where customer
 is having separate Work Permit System the same shall be followed.
- □ Permit applicant shall apply for work permit of particular work activity at particular location before starting of the work with Job Hazard Analysis.
- □ Permit signatory shall check that all the control measures necessary for the activity are in place and issue the permit to the permit holder.
- □ Permit holder shall implement and maintain all control measures during the period of permit .He will close the permit after completion of the work. The closed permit shall be archived in HSE Department of site.

11.3 SAFETY DURING WORK EXECUTION

Respective OCPS are to be followed and adherence to the same would be contractually binding

11.3.1 WELDING SAFETY

All safety precautions shall be taken for welding and cutting operations as per IS-818. All safety precautions shall be taken for foundation and other excavation marks as per IS-3764.

11.3.2 RIGGING

Rigging equipment shall not be loaded in excess of its recommended safe working load. Rigging equipment, when not in use, shall be removed from the original work area so as not to present a hazard to employees.

11.3.3 CYLINDERS STORAGE AND MOVEMENT

All gas cylinders shall be stored in upright position. Suitable trolley shall be used. There shall be flash-back arrestors conforming to IS-11006 at both cylinder and burner ends. Damaged tube and regulators must be immediately replaced. No of cylinders shall not exceed the specified quantity as per OCP

Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be intentionally dragged, struck or permitted to strike each other violently.



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When cylinders are transported by powered vehicle they shall be secured in a vertical position.

11.3.4 DEMOLITION WORK

Before any demolition work is commenced and also during the process of the work the following shall be ensured:

- All roads and open areas adjacent to the work site shall either be closed or suitably protected.
- No electric cable or apparatus which is liable to be a source of danger nor a cable or an apparatus used by the operator shall remain electrically charged.
- All practical steps shall be taken to prevent danger to persons employed from the risks of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render them unsafe.

11.3.5 T&Ps

All T&Ps/ MMEs should be of reputed brand/appropriate quality & must have valid test/calibration certificates bearing endorsement from competent authority of BHEL...Subcontractor to also submit monthly reports of T&Ps deployed and validity test certificates to BHEL safety Officer as per the format/procedure of BHEL.

11.3.6 CHEMICAL HANDLING

Displaying safe handling procedures for all chemicals such as lube oil, acid, alkali, sealing compounds etc , at work place. Where it is necessary to provide and/or store petroleum products or petroleum mixture & explosives, the subcontractor shall be responsible for carrying out such provision / storage in accordance with the rules & regulations laid down in the relevant petroleum act, explosive act and petroleum and carbide of calcium manual, published by the chief inspector of explosives of India. All such storage shall have prior approval if necessary from the chief inspector of explosives or any other statutory authority. The subcontractor shall be responsible for obtaining the same.

11.3.7 ELECTRICAL SAFETY

- Providing adequate no. of 24 V sources and ensure that no hand lamps are operating at voltage level above 24 Volts.
- Fulfilling safety requirements at all power tapping points.
- High/ Low pressure welders to be identified with separate colour clothings. No welders will be deployed without passing appropriate tests and holding valid welding certificates. Approved welding procedure should be displayed at
- The subcontractor shall not use any hand lamp energized by Electric power with supply voltage of more than 24 volts in confined spaces like inside water boxes, turbine casings, condensers etc.
- All portable electric tools used by the subcontractor shall have safe plugging system to source of power and be appropriately earthed. Only electricians licensed by appropriate statutory authority shall be employed by the subcontractor to carry out all types of electrical works. Details of earth resource ad their test date to be given to BHEL safety officer as per the prescribed formats of BHEL
- The subcontractor shall use only properly insulated and armored cables which conform to the requirement of Indian Electricity Act and Rules for all wiring, electrical applications at site.



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- BHEL reserves the right to replace any unsafe electrical installations, wiring, cabling etc. at the cost of the subcontractor.
- All electrical appliances used in the work shall be in good working condition and shall be properly earthed.
- No maintenance work shall be carried out on live equipment.
- The subcontractor shall maintain adequate number of qualified electricians to maintain his temporary electrical installations.
- Area wise Electrical safety inspection is to be carried out on monthly basis as per "Electrical Safety Inspection checklist' and the report is to be submitted to BHEL safety officer
- Adequate precautions shall be taken to prevent danger for electrical equipment. No materials on any of the sites of work shall be so stacked or placed as to cause danger or inconvenience to any person or the public
- The subcontractor shall carefully follow the safety requirement of BHEL/ the purchaser with the regard to voltages used in critical areas.

11.3.8 FIRE SAFETY

- Providing appropriate fire fighting equipment at designated work place and nominate a fire officer/warden adequately trained for his job.
- Subcontractor shall provide enough fire protecting equipment of the types and numbers at his office, stores, temporary structure in labor colony etc. Such fire protection equipment shall be easy and kept open at all times.
- The fire extinguishers shall be properly refilled and kept ready which should be certified at periodic intervals. The date of changing should be marked on the Cylinders.
- All other fire safety measures as laid down in the "codes for fire safety at construction site" issued by safety coordinator of BHEL shall be followed.
- Non-compliance of the above requirement under fire protection shall in no way relieve the subcontractor of any of his responsibility and liabilities to fire incident occurring either to his materials or equipment or those of others.
- Emergency contacts nos must be displayed at prominent locations
- Tarpaulin being inflammable should not be used (instead, only non-infusible covering materials shall be used) as protective cover while preheating, welding, stress relieving etc. at site.

11.3.9 SCAFFOLDING

- Suitable scaffolds shall be provided for workman for all works that cannot safely be done from the ground, or from solid construction except in the case of short duration of work which can be done safely from ladders.
- When a ladder is used, it shall be of rigid construction made of steel. The steps shall have a minimum width of 45 cm and a maximum rise of 30 cm. Suitable handholds of good quality wood or steel shall be provided and the ladder shall be given an inclination not steeper then ¼ horizontal and 1 vertical.
- Scaffolding or staging more than 3.6 m above the ground floor, swung or suspended from an overhead support or erected with stationery support shall have a guard rail properly bolted, braced or otherwise secured, at least 90 cm above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from saver, from swaying, from the building or structure.

11.3.10 **WORK AT HEIGHT**:

Guardrails and toe-board/barricades and sound platform conforming to IS:4912-1978 should be provided.



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Wherever necessary, life-line (pp or metallic) and fall arrestor along with Polyamide rope or Retractable lifeline should be provided.

- Safety Net as per IS:11057:1984 should be used extensively for prevention/ arrest of men and materials falling from height. The safety nets shall be fire resistant, duly tested and shall be of ISI marked and the nets shall be located as per site requirements to arrest or to reduce the consequences of a possible fall of persons working at different heights.
- Reaching beyond barricaded area without lifeline support, moving with support of bracings, walking on beams without support, jumping from one level to another, throwing objects and taking shortcut must be discouraged.
- Use of Rebar steel for making Jhoola and monkey-ladder (Rods welded to vertical or inclined structural members). temporary platform etc. must be avoided.
- Monkey Ladder should be properly made and fitted with cages.
- Jhoola should be made with angles and flats and tested like any lifting tools before use.
- Lanyard must be anchored always and in case of double lanyard, each should be anchored separately.
- In case of pipe-rack, persons should not walk on pipes and walk on platforms only.
- In case of roof work, walking ladder/ platform should be provided along with lifeline and/ or fall arrestor.
- Empty drums must not be used.
- For chimney or structure painting, both hanging platform and men should be anchored separately to a firm structure along with separate fall arrestor. Rope ladder should be discouraged.

11.3.11 WORKING PLATFORM

Working platforms, gangways and stairways shall be so constructed that they do not sag unduly or unequally and if the height of the platform gangways provided is more than 3.6 m above ground level or floor level, they shall be closely boarded and shall have adequate width which shall not be less than 750 mm and be suitably fenced as described above. Every opening in the floor or a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 90 cm.

11.3.12 EXCAVATION

Wherever there are open excavation in ground, they shall be fenced off by suitable railing and danger signals installed at night so as to prevent persons slipping into the excavations.

11.3.13 LADDER SAFETY

Safe means of access shall be provided to all working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9 m in the length while the width between side rails in rung ladder shall in no case be less than app. 29.2 cm for ladder upto and including 3 m in length. For longer ladders this width shall be increased at least ¼" for each additional foot of length.

A sketch of the ladders and scaffolds proposed to be used shall be prepared and approval of the Engineer obtained prior to Construction.

11.3.14 LIFTING SAFETY

It will be the responsibility of the subcontractor to ensure safe lifting of the equipment, taking due precaution to avoid any incident and damage to other equipment and personnel.



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- All requisite tests and inspection of handling equipment, tools & tackle shall be periodically done by the subcontractor by engaging only the Competent Persons as per law.
- Defective equipment or uncertified shall be removed from service.
- Any equipment shall not be loaded in excess of its recommended safe working load.

11.3.15 HOISTING APPLIANCE

- Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safe guards.
- Hoisting appliance should be provided with such means as will reduce to the minimum the risk of any part of a suspended load becoming incidentally displaced.
- When workers employed on electrical installations which are already energized, insulating mats, wearing apparel, such as gloves, sleeves and boots as may be necessary should be provided.
- The worker should not wear any rings, watches and carry keys or other materials which are good conductor of electricity.

11.4 ENVIRONMENTAL CONTROL

Environment protection has always been given prime importance by BHEL. Environmental damage is a major concern of the principal subcontractor and every effort shall be made, to have effective control measures in place to avoid pollution of Air, Water and Land and associated life. Chlorofluorocarbons such as carbon tetrachloride and trichloroethylene shall not be used. Waste disposal shall be done in accordance with the guidelines laid down in the project specification.

Any chemical including solvents and paints, required for construction shall be stored in designated bonded areas around the site as per Material Safety Data Sheet (MSDS).

In the event of any spillage, the principle is to recover as much material as possible before it enters drainage system and to take all possible action to prevent spilled materials from running off the site. The subcontractor shall use appropriate MSDS for clean-up technique

All subcontractors shall be responsible for the cleanliness of their own areas.

The subcontractors shall ensure that noise levels generated by plant or machinery are as low as reasonably practicable. Where the subcontractor anticipates the generation of excessive noise levels from his operations the subcontractor shall inform to Construction Manager of BHEL accordingly so that reasonable &practicable precautions can be taken to protect other persons who may be affected.

It is imperative on the part of the subcontractor to join and effectively contribute in joint measures such as tree plantation, environment protection, contributing towards social upliftment, conversion of packing woods to school furniture, keeping good relation with local populace etc.

The subcontractor shall carry out periodic air and water quality check and illumination level checking in his area of work place and take suitable control measure.

11.5 HOUSEKEEPING

 Keeping the work area clean/ free from debris, removed scaffoldings, scraps, insulation/sheeting wastage /cut pieces, temporary structures, packing woods etc. will be in the scope of the subcontractor. Such cleanings has to be done by



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subcontractor within quoted rate, on daily basis by an identified group. If such activity is not carried out by subcontractor / BHEL is not satisfied, then BHEL may get it done by other agency and actual cost along with BHEL overheads will be deducted from contractor's bill. Such decisions of BHEL shall be binding on the subcontractor

- Proper housekeeping to be maintained at work place and the following are to be taken care of on daily basis.
- All surplus earth and debris are removed/disposed off from the working areas to identified locations.
- Unused/Surplus cables, steel items and steel scrap lying scattered at different places/elevation within the working areas are removed to identified locations.
- All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from workplace to identified locations. Sufficient waste bins shall be provided at
- Different work places for easy collection of scrap/waste. Scrap chute shall be installed to remove scrap from high location.
- Access and egress (stair case, gangways, ladders etc.) path should be free from all scrap and other hindrances.
- Workmen shall be educated through tool box talk about the importance of housekeeping and encourage not to litter.
- Labour camp area shall be kept clear and materials like pipes, steel, sand, concrete, chips and bricks, etc. shall not be allowed in the camp to obstruct free movement of men and machineries.
- Fabricated steel structures, pipes & piping materials shall be stacked properly.
- No parking of trucks/trolleys, cranes and trailers etc. shall be allowed in the camp, which may obstruct the traffic movement as well as below LT/HT power line.
- Utmost care shall be taken to ensure over all cleanliness and proper upkeep of the working areas

11.6 **WASTE MANAGEMENT**

Take suitable measures for waste management and environment related laws/legislation as a part of normal construction activities. Compliance with the legal requirements on storage/ disposal of paint drums (including the empty ones), Lubricant containers, Chemical Containers, and transportation and storage of hazardous chemicals will be strictly maintained.

11.6.1 BINS AT WORK PLACE

- Sufficient rubbish bins shall be provided close to workplaces.
- Bins should be painted yellow and numbered.
- Sufficient nos. of drip trays shall be provided to collect oil and grease.
- Sufficient qty. of broomsticks with handle shall be provided.
- Adequate strength of employees should be deployed to ensure daily monitoring and service for waste management.

11.6.2 STORAGE AND COLLECTION

- Different types of rubbish/waste should be collected and stored separately.
- Paper, oily rags, smoking material, flammable, metal pieces should be collected in separate bins with close fitting
- Rubbish should not be left or allowed to accumulate on construction and other work places.
- Do not burn construction rubbish near working site.



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11.6.3 SEGREGATION

- Earmark the scrap area for different types of waste.
- Store wastes away from building.
- Oil spill absorbed by non-combustible absorbent should be kept in separate bin.
- Clinical and first aid waste stored and incinerated separately.

11.6.4 DISPOSAL

- Sufficient containers and scrap disposal area should be allocated.
- All scrap bin and containers should be conveniently located.
- Provide self-closing containers for flammable/spontaneously combustible material.
- Keep drainage channels free from choking.
- Make schedule for collection and disposal of waste.

11.6.5 WARNING AND SIGNS

- Appropriate sign to be displayed at scrap storage area
- No toxic, corrosive or flammable substance to be discarded into public sewage system.
- Waste disposal shall be in accordance with best practice.
- Comply with all the requirements of Pollution Control Board (PCB) for storage and disposal of hazardous waste.

11.7 TRAFFIC MANAGEMENT SYSTEM

11.7.1 SAFE WORKPLACE TRANSPORT SYSTEM

- Traffic routes in a work place shall be suitable for the persons or vehicles using them. This shall be sufficient in number and of sufficient size. This shall reflect the suitability of traffic routes for vehicles and pedestrians.
- Where vehicles and pedestrians use the same traffic routes there shall be sufficient space between them. Where necessary all traffic routes must be suitably indicated. Pedestrians or vehicles must be able to use traffic routes without endangering those at work. There must be sufficient separation of traffic routes from doors, gates and pedestrian traffic routes.
- For internal traffic, lines marked on roads / access routes and between buildings shall clearly indicate where vehicles are to pass.
- Temporary obstacles shall be brought to the attention of drivers by warning signs or hazard cones.
- Speed limits shall be clearly displayed. Speed ramps preceded by a warning signs or marker are necessary.
- The traffic route should be wide enough to allow vehicles to pass and re-pass oncoming or parked traffic and it may be advisable to introduce on-way system or parking restrictions.
- Safest route shall be provided between places where vehicles have to call or deliver.
- Avoid vulnerable areas/items such as fuel or chemicals tanks or pipes, open or unprotected edges and structures likely to collapse



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- Safe areas shall be provided for loading and unloading.
- Avoid sharp or blind bends. If this is not possible hazards should be indicated e.g. blind corner.
- Ensure road crossings are minimum and clearly signed.
- Entrance and gateways shall be wide enough to accommodate a second vehicle without causing obstruction.
- Set sensible speed limits which are clearly sign posted.
- Where necessary ramps should be used to retard speed. This shall be preceded by a warning sign or mark on the road.
- Forklift trucks shall not pass over road hump unless of a type capable of doing so.
- Overhead electric cable, pipes containing flammable hazardous chemical shall be shielded by using goal posts height gauge posts or barriers.
- Road traffic signs shall be provided on prominent locations for prevention of incidents and hazards and for quick
 guidance and warning to employees and public. Safety signs shall be displayed as per the project working
 requirement and guideline of the state in which project is done. Vehicles hired or used shall not be parked within
 the 15m radius of any working area. Any vehicle, that is required to be at the immediate/near the vicinity, shall be
 approved by the person in-charge of the site.

11.7.2 TRAFFIC ROUTE FOR PEDESTRIANS

- Where traffic routes are used by both pedestrians and vehicles road shall be wide enough to allow vehicles and pedestrians safely.
- Separate routes shall be provided for pedestrians to keep them away from vehicles. Provide suitable barriers/guard at entrances/exit and the corners or buildings.
- Where pedestrian and vehicle routes cross, appropriate crossing shall be provided.
- Where crowd is likely to use roadway e.g. at the end of shift, stop vehicles from using them at such times.
- Provide high visibility clothing for people permitted in delivery area.

11.7.3 WORK VEHICLE

Work vehicle shall be as safe stable efficient and roadworthy as private vehicles on public roads. Site management shall ensure that drivers are suitably trained. All vehicle e.g. heavy motor vehicle forklift trucks dump trucks mobile cranes shall ensure that the work equipment conforms to the following:

- o A high level of stability.
- o A safe means of access/egress.
- o Suitable and effective service and parking brakes.
- o Windscreens with wipers and external mirrors giving optimum all round visibility.
- o Provision of horn, vehicle lights, reflectors, reversing lights, reversing alarms.
- Provision of seat belts.
- Guards on dangerous parts.
- O Driver protection to prevent injury from overturning and from falling objects/materials.
- Driver protection from adverse weather.
- o No vehicle shall be parked below HT/LT power lines.
- o Valid Pollution Under Control certification for all vehicles



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11.7.4 DAILY CHECK BY DRIVER

- There should also be daily safety checks containing below mentioned points by the driver before the vehicle is used.
 - o Brakes.
 - o Tires.
 - o Steering.
 - Mirrors.
 - o Windscreen waters.
 - o Wipers.
 - Warning signals.
 - o Specific safety system i.e. control interlocks
- Management should ensure that drivers carry out these checks.

11.7.5 TRANSPORTATION OF PERSONNEL AND MATERIALS BY VEHICLES

- All drivers shall hold a valid driving License for the class of vehicle to be driven and be registered as an authorized BHEL driver with the Administration Department.
- Securing of the load shall be by established and approved methods, i.e. chains with patented tightening equipment for steel/heavy loads. Sharp corners on loads shall be avoided when employing ropes for securing.
- All overhangs shall be made clearly visible and restricted to acceptable limits
- Load shall be checked before moving off and after traveling a suitable distance.
- On no account is construction site to be blocked by parked vehicles Drivers of vehicles shall only stop or park in the areas designate by the stringing foreman.
- Warning signs shall be displayed during transportation of material.
 All vehicles used by BHEL shall be in worthy condition and in conformance to the Land Transport requirement.

11.7.6 MAINTENANCE

All Vehicles used for transportation of man and material shall undergo scheduled inspections on frequent intervals to secure safe operation. Such inspections shall be conducted in particular for steering, brakes, lights, horn, doors etc. Site management shall ensure that work equipment is maintained in an efficient, working order and in good repair. Inspections and services carried out at regular intervals of time and or mileage. No maintenance shall be carried below HT/LT power lines.

11.8 EMERGENCY PREPAREDNESS AND RESPONSE

- Emergency preparedness and response capability of site shall be developed as per Emergency Preparedness and Response plan issued by Regional HQ
- Availability of adequate number of first aiders and fire warden shall be ensured with BHEL and its subcontractors
- All the subcontractor's supervisory personnel and sufficient number of workers shall be trained for fire protection systems. Enough number of such trained personnel must be available during the tenure of contract. Subcontractor should nominate his supervisor to coordinate and implement the safety measures.
- · Assembly point shall be earmarked and access to the same from different location shall be shown
- Fire exit shall be identified and pathway shall be clear for emergency escape.



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- Appropriate type and number of fire extinguisher shall be deployed as per Fire extinguisher deployment plan and validity shall be ensured periodically through inspection
- Adequate number of first aid boxes shall be strategically placed at different work places to cater emergency need. Holder of the first aid box shall be identified on the box itself who will have the responsibility to maintain the same
- First aid center shall be developed at site with trained medical personnel and ambulance
- Emergency contact numbers (format given in EPRP) of the site shall be displayed at prominent locations.
- Tie up with fire brigade shall be done in case customer is not having fire station.
- Tie up with hospital shall be done in case customer is not having hospital.
- Disaster Management group shall be formed at site
- Mock drill shall be arranged at regular intervals. Monthly report of the above to be given to BHEL safety Officer as per prescribed BHEL formats
- Mock drill shall be conducted on different emergencies periodically to find out gaps in emergency preparedness and taking necessary corrective action

12.0 HSE INSPECTION

Inspection on HSE for different activities being carried out at site shall be done to ensure compliance to HSEMS requirements. The subcontractor shall maintain and ensure necessary safety measures as required for inspection and tests HV test, Pneumatic test, Hydraulic test, Spring test, Bend test etc. as applicable, to enable inspection agency for performing Inspection. If any test equipment is found not complying with proper safety requirements then the Inspection Agency may withhold inspection, till such time the desired safety requirements are met.

12.1 DAILY HSE CHECKS

Both the Site Supervisors and safety officer of Subcontractor are to conduct daily site Safety inspection around work activities and premises to ensure that work methods and the sites are maintained to an acceptable standard. The following are to form the common subjects of a daily safety inspection:

- Personal Safety wears & gear compliance.
- Complying with site safety rules and permit-to-work (PTW).
- Positions and postures of workers.
- Use of tools and equipment etc. by the workers.

The inspection should be carried out just when work starts in beginning of the day, during peak activities period of the day and just before the day's work ends.

12.2 INSPECTION OF PPE

- PPEs shall be inspected by HSE officer at random once in a week as per format no. HSEP:14-F06 for its
 compliance to standard and compliance to use and any adverse observation shall be recorded in the PPE
 register.
- The applicable PPEs for carrying out particular activities are listed below.



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12.3 **INSPECTION OF T&Ps**

- A master list of T&Ps shall be maintained by each subcontractor.
- All T&Ps being used at site shall be inspected by HSE officer once in a month as per format no. HSEP:14-F07 for its healthiness and maintenance.
- The T&Ps which require third party inspection shall be checked for its validity during inspection. The third party test certificate should be accompanied with a copy of the concerned competent person's valid qualification record.
- The validity of T&P shall be monitored as per "Status of T&Ps" format no. HSEP:14-F08

12.4 **INSPECTION OF CRANES AND WINCHES**

- Cranes and winches shall be inspected by the operator through a daily checklist for its safe condition (as provided by the equipment manufacturer) before first use of the day.
- Cranes and Winches shall be inspected by HSE officer once in a month as per format no. HSEP:14-F09 for healthiness, maintenance and validity of third party inspection.
- The date of third party inspection and next due date shall be painted on cranes and winches.
- The operators/drivers shall be authorized by sub-contractor based on their competency and experience and shall carry the I-card.
- The operator should be above 18 years of age and should be in possession of driving license of HMV man & goods), vision test certificate and should have minimum qualification so that he can read the instructions and check list.

INSPECTION ON HEIGHT WORKING 12.5

- Inspection on height working shall be conducted daily by supervisors before start of work to ensure safe working condition including provision of
 - Fall arrestor
 - Lifelines
 - Safety nets
 - Fencing and barricading
 - Warning signage
 - Covering of opening
 - Proper scaffolding with access and egress.
 - Illumination
- Inspection on height working shall be conducted once in a week by HSE officer as per format no. HSEP:14-F10.
- Medical fitness of height worker shall be ensured.
- Height working shall not be allowed during adverse weather.

INSPECTION ON WELDING AND GAS CUTTING OPERATION 12.6

- Supervisor shall ensure that no flammable items are available in near vicinity during welding and gas cutting activity.
- Gas cylinders shall be kept upright.
- Use of Flash back arrestor shall be ensured at both ends.



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- Inspection during welding and gas cutting operations shall be carried out by HSE officer once a month as per format no. HSEP:14-F11.
- Use of fire blanket to be ensured to avoid falling of splatters during welding or gas cutting operation at height.
- Availability of fire extinguisher at vicinity shall be ensured.

12.7 INSPECTION ON ELECTRICAL INSTALLATION / APPLIANCES

- Ensure proper earthing in electrical installation
- Use ELCB at electrical booth
- Electrical installation shall be properly covered at top where required
- Use appropriate PPEs while working
- Use portable electrical light < 24 V in confined space and potentially wet area.
- Monthly inspection shall be carried out as per format no. HSEP:14-F12.

12.8 **INSPECTION OF ELEVATOR**

- Elevators shall be inspected by concerned supervisors once in a week as per format no. HSEP:14-F13.
- All elevators shall be inspected by competent person and validity shall be ensured.
- The date of third party inspection and next due date shall be painted on elevator.

12.9 **INSPECTION OF EXCAVATION**

Excavation activities shall be inspected as per Format HSEP:14-F13A

13.0 **HSE PERFORMANCE**

- Contractor shall be assessed on monthly basis for HSE Compliance by BHEL Safety In-charge at site. The HSE compliance shall be based on Online HSE Evaluation System of BHEL as per Format No. HSEP:14-
- BHEL shall reserve the right to use this assessment for evaluating bidder's capacity for future tenders
- Suitable HSE reward system shall be developed at site level to promote HSE compliance amongst workmen by the subcontractor.
 - To decide HSE reward, performance towards HSE shall be evaluated for workmen and it shall be awarded regularly in public gathering.
- If safety record of the subcontractor in execution of the awarded job is to the satisfaction of safety department of BHEL, issue of an appropriate certificate to recognize the safety performance of the subcontractor may be considered by BHEL after completion of the job.



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14.0 HSE PENALTIES

- As per contractual provision HSE penalties shall be imposed on subcontractors for non- compliance on HSE requirement as per format no. HSEP:14-F14. The list in the format is only indicative. For any other violation, not listed in the format, the minimum penalty amount is to be decided as per BOCW act.
- If principal customer/statutory and regulatory bodies impose some penalty on HSE due to the non-compliance of the subcontractor the same shall be passed on to them.
- The penalty amount shall be recovered by Site Finance department from subcontractors from the RA/Final bill.

15.0 OTHER REQUIREMENTS

- In case of any delay in completion of a job due to mishaps attributable to lapses by the subcontractor, BHEL shall have the right to recover cost of such delay from the payments due to the subcontractor, after notifying the subcontractor suitably.
- If the subcontractor fails to improve the standards of safety in its operation to the satisfaction of BHEL after being given reasonable opportunity to do so and/or if the subcontractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instruction regarding safety issued by BHEL, BHEL shall have the right to take corrective steps at the risk and cost of the subcontractor after giving a notice of not less than 7 days indicating the steps that would be taken by BHEL.
- If the subcontractor succeeds in carrying out its job in time without any fatal or disabling injury incident and without any damage to property BHEL may, at its sole discretion, favorably consider to reward the subcontractor suitably for the performance.
- In case of any damage to property due to lapses by the subcontractor, BHEL shall have the right to recover the cost of such damages from the subcontractor after holding an appropriate enquiry.
- The subcontractor shall take all measures at the sites of the work to protect all persons from incidents and shall be bound to bear the expenses of defense of every suit, action or other proceeding of law that may be brought by any persons for injury sustained or death owing to neglect of the above precautions and to pay any such persons such compensation or which may with the consent of the subcontractor be paid to compromise any claim by any such person, should such claim proceeding be filed against BHEL, the subcontractor hereby agrees to indemnify BHEL against the same.
- The subcontractor shall not employ men below the age of 18 years and women on the work of painting with products containing lead in any form. Wherever men above the age of 18 are employed on the work of lead painting, overalls shall be supplied by the subcontractor to the workmen and adequate facilities shall be provided to enable the working painters to wash during the cessation of work.
- The subcontractor shall notify BHEL of his intention to bring to site any equipment or material which may create hazard.
- BHEL shall have the right to prescribe the conditions under which such equipment or materials may be handled and the subcontractor shall adhere to such instructions.



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BHEL may prohibit the use of any construction machinery, which according to the organization is unsafe. No claim for compensation due to such prohibition will be entertained by BHEL.

16. NON COMPLIANCE

NONCONFORMITY OF SAFETY RULES AND SAFETY APPLIANCES WILL BE VIEWED SERIOUSLY AND BHEL HAS RIGHT TO IMPOSE FINES ON THE SUBCONTRACTOR AS UNDER FOR EVERY INSTANCE OF VIOLATION NOTICED:

SN	Violation of Safety Norms	Fine (in Rs)	
01	Not Wearing Safety Helmet	200/- *	
02.	Not wearing Safety Belt or not anchoring life line	500/-*	
03	Not wearing safety shoe	200/-*	
04	Not keeping gas cylinders vertically	200/-	
05	Not using flash back arrestors	100/-	
06	Not wearing gloves	50/- *	
07.	Grinding Without Goggles	50/- *	
08.	Not using 24 V Supply For Internal Work	500/-	
09.	Electrical Plugs Not used for hand Machine	100/-	
10.	Not Slinging properly	200/-	
11.	Using Damaged Sling	200/-	
12.	Lifting Cylinders Without Cage 500/-		
13.	Not Using Proper Welding Cable With Lot of Joints And Not 200/-		
	Insulated Property.	operty.	
14.	Not Removing Small Scrap From Platforms 500/-		
15.	Gas Cutting Without Taking Proper Precaution or Not Using Sheet Below Gas Cutting 500/-		
16.	Not Maintaining Electric Winches Which are Operated Dangerously	500/-	
17.	Improper Earthing Of Electrical T&P	500/-	
18	No or improper barricading	500/-	
19.	Activity carried out without Safety work permit (Height work, Lifting activity, Hot work-each person/case)		
20.	Incident Resulting in Partial Loss in Earning Capacity	25,000/- per victim	
21.	Fatal Incident Resulting in total loss in Earning Capacity	1,00,000/- per victim for first instance #	

#: or as deducted by customer, whichever is higher. For repeated fatal incident in the same Unit incremental penalty to be imposed. The subcontractor will pay 2 times the penalty compared to previously paid in case there are repeated cases of fatal incidents under the same subcontractor for the same package in the same unit.

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

^{*:} per head. For repeated violation by the same person, the penalty would be double of the previous penalty. Date of "Repeated violation" will be counted from subsequent days.



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17.0 **HSE AUDIT/INSPECTION**

- Regular HSE Audit/inspection shall be carried out by Subcontractor as per Site HSE audit calendar.
- HSE checklist (Annexure 02) shall be used for carrying out audit/inspection and report shall be submitted to BHEL site management
- All non-conformities and observations on HSE identified during internal or external HSE audit shall be disposed off by site in a time bound manner and reported back the implementation status
- Corrective action and Preventive action on HSE issues raised by certification body issued by Regional HQs shall be implemented by site and reported to Site management.

18.0 MONTHLY HSE REVIEW MEETING

- Site shall hold HSE review meeting every month to discuss and resolve HSE issues of site and improve HSE performance. It will also discuss the incidents occurred since previous meeting, its root cause and Corrective action and Preventive action. The agenda is given below:
 - Implementation of earlier MOM
 - **HSE** performance
 - **HSE** inspection Ω
 - HSE audit and CAPA
 - **HSE** training
 - Health check-up camp
 - HSE planning for the erection and commissioning and installation activities in the coming month
 - HSE reward and promotional activities
- The meeting shall be chaired by Construction Manager, convened by HSE coordinator and attended by all HOS, Site Incharge of Subcontractors and HSE officer of Subcontractors.
- MOM on the discussion will be circulated to the concerned for implementation.

FORMATS USED (Details available in Annexure-04)

Format Name	Format No.	Rev No.
		140.
Inspection of First Aid Box	HSEP:14-F01	00
Health Check Up	HSEP:14-F02	00
HSE Induction Training	HSEP:14-F03	00
Tool Box Talk	HSEP:14-F04	00
Monthly Site HSE Report	As specified by BHEL	00
Inspection of PPE	HSEP:14-F06	00
	Inspection of First Aid Box Health Check Up HSE Induction Training Tool Box Talk Monthly Site HSE Report	Inspection of First Aid Box HSEP:14-F01 Health Check Up HSE Induction Training HSEP:14-F03 Tool Box Talk HSEP:14-F04 Monthly Site HSE Report As specified by BHEL



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07	Inspection of T&Ps	HSEP:14-F07	00
08	Status of T&Ps	HSEP:14-F08	00
09	Inspection of Cranes and Winches	HSEP:14-F09	00
10	Inspection on Height Working	HSEP:14-F10	00
11	Inspection on Welding & Gas Cutting	HSEP:14-F11	00
12	Inspection on Electrical Installation	HSEP:14-F12	00
13	Inspection on Elevator	HSEP:14-F13	00
14	HSE Penalty	HSEP:14-F14	00
15	Accident /incident / property damage /fire incident report	HSEP:14-F15	00



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20.0 **ANNEXURES**

ANNEXURE 01

As per Contract Labour (Regulation & Abolition Act), Central Rules, 1971,

(1) The first-aid box shall be distinctively marked with a Red Cross on a white background and shall contain the following items, namely:

(a) For establishments in which the number of contract labour employed does not exceed fifty, each first aid box shall contain the following equipment:

(i)	6 small sterilized dressings			
(ii)	3 medium size sterilized dressings			
(iii)	3 large size sterilized dressings			
(iv)	6 pieces of sterilized eye pads in separate sealed packets.			
(v)	6 roller bandages 10 cm wide.			
(vi)	6 roller bandages 5 cm wide.			
(vii)	One tourniquet			
(viii)	A supply of suitable splints			
(ix)	Three packets of safety pins.			
(x)	Kidney tray.			
(xi)	3 large sterilized burn dressings.			
(xii)	1 (30ml) bottle containing a two percent alcoholic solution of iodine			
(xiii)	1 (30 ml) bottle containing Sal volatile having the dose and mode of administration			
	indicated on the label			
(xiv)	1 snake bite lancet			
(xv)	1 (30gms) bottle of potassium permanganate crystals.			
(xvi)	1 pair scissors			
(xvii)	1 copy of the First-Aid leaflet issued by the Director General, Factory Advice Service and			
	Labour Institutes, Government of India.			
(xviii)	A bottle containing 100 tablets (each of 5 grains) of aspirin			
(xix)	Ointment for burns			
(xx)	A bottle of suitable surgical anti-septic solution			

(b) For establishment in which the number of contract labour exceeds fifty each first-aid box shall contain the following equipment:

(i)	12 small sterilized dressings
(ii)	6 medium size sterilized dressings
(iii)	6 large size sterilized dressings.
(iv)	6 large size sterilized burn dressings
(v)	6 (15 grams) packets sterilized cotton wool
(vi)	12 pieces of sterilized eye pads in separate sealed packets.



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(vii)	12 roller bandages 10 cm wide.			
(viii)	12 roller bandages 5 cm wide.			
(ix)	One tourniquet.			
(x)	A supply of suitable splints.			
(xi)	Three packets of safety pins.			
(xii)	Kidney tray.			
(xiii)	Sufficient number of eye washes bottles filled with distilled water or suitable liquid clearly indicated by a distinctive sign which shall be visible at all times.			
(xiv)	4 per cent Xylocaine eye drops, and boric acid eye drops and soda by carbonate eye drops.			
(xv)	1 (60ml) bottle containing a two percent alcoholic solution of iodine			
(xvi)	One (two hundred ml) bottle of mercurochrome (2 per cent) solution in water.			
(xvii)	1 (120ml) bottle containing Sal volatile having the dose and mode of administration indicated on the label.			
(xviii)	1 roll of adhesive plaster (6 cmX1 meter)			
(xix)	2 rolls of adhesive plaster (2 cmX1 meter)			
(xx)	A snake bite lancet.			
(xxi)	1 (30 grams) bottle of potassium permanganate crystals.			
(xxii)	1 pair scissors			
(xxiii)	1 copy of the First-Aid leaflet issued by the Director-General, Factory Advice service and labour Institutes, Government of India.			
(xxiv)	a bottle containing 100 tablets (each of 5 grains) of aspirin			
(xxv)	Ointment for burns			
(xxvi)	A bottle of a suitable surgical anti septic solution.			

(2) Adequate arrangement shall be made for immediate recoupment of the equipment when necessary.



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ANNEXURE 02

HSE AUDIT/INSPECTION CHECKLIST CUM COMPLIANCE REPORT				
PROJECT:	DJECT: SUBCONTRACTOR:			
DATE :	OW	NER	:	
INSPECTION BY:				
Note: write 'NA' wherever the items is not applicable				
Item	Y	N	Remarks	Action
	е	0		
HOUSEKEEPING	S			
Waste containers provided and used				
Passageways and walkways clear				
General neatness of working area				
Other				
PERSONNELPROTECTIVEEQUIPTMENTS				
Goggles; shields	1			
Face protection				
Hearing protection				
Respiratory masks etc.				
Safety belts				
Other				
EXCAVATIONS / OPENINGS				
Openings properly covered or barricaded				
Excavations shored				
Excavations barricaded				
Overnight lighting provided				
Other				
WELDING, CUTTING				
Gas cylinders chained upright				
Cable and hoses not obstructing				
Fire extinguisher (s) accessible				
Others				
SCAFFOLDING				
Fully decked platforms				
Guard and intermediate rails in place				
Toe boards in place				
Adequate shoring				
Adequate access				
Others				
LADDER				
Extension side rails 1 m above				
Top of landing				
Properly secured				



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7005			
Angle + 70 ^o from horizontal			
Other			
HOISTS, CRANES AND DERRICKS			
Condition of cables and sheaf OK			
Condition of slings, chains, hooks OK			
Inspection & maintenance log maintained			
Outriggers used			
Signals observed and understood			
Qualified operators			
Others			
MACHINERY, TOOLS & EQUIPMENT			
Proper instruction			
Safety devices			
Proper cords			
Inspection and maintenance			
Other			
VEHICLE AND TRAFFIC			
Rules and regulations observed			
Inspection and maintenance			
Licensed drivers			
Other			
TEMPORARY FACILITIES			
Emergency instructions posted			
Fire extinguishers provided			
Fire-aid equipment available			
General neatness			
Others			
FIRE PREVENTION			
Personnel instructed			
Fire extinguishers checked			
No smoking in prohibited areas.			
Hydrants			
Clearance			
Others			
ELECTRICAL			
Proper wiring			
ELCB's provided			
Ground fault circuit interrupters			
Protection against damage			
Prevention of tripping hazards			
Other			
HANDLING & STORAGE OF MATERIALS			
HANDLING & STORAGE OF WATERIALS			
Properly stored or stacked			
Passageways clear			
Other			
FLAMMABLE GASES AND LIQUIDS	+ +		
Containers clearly identified	+		
Proper storage			
Fire extinguisher nearby			



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Other		
WORKING AT HEIGHT	<u> </u>	
Safety nets		
Safety belts		
Safety helmets		
Anchoring of safety belt to the life line rope		
ENVIRONMENT		
Lubricant waste/engine oils properly dispose.		
Waste from Canteen, offices, sanitation etc. disposed properly.		
Disposal of surplus earth, stripping materials, expired batteries, oily rags and combustible materials done properly.		
HEALTH CHECKS		
Hygienic conditions at labor camps O.K.		
Availability of first-aid facilities		
Proper sanitation at site, office & labor camps.		
Arrangement of medical facilities.		
Measures for dealing with illness.		
Availability of potable drinking water for workmen & staff.		
Provision of crèches for children.		



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ANNEXURE 03

REFERENCES

- Contract documents
- Relevant legislations
- **HSEMSM**
- Relevant Indian standards as listed below (illustrative only):

SL	CODE NAME	TITLE
NO		
(1)	IS : 818-1888	Code of Practice for safety and health requirements in
	(Reaffirmed 2003)	Electric and Gas Welding and Cutting operations.
(2)	IS: 1179-1967	Specification for Equipment for Eye & Face protection during
	(Reaffirmed 2003)	welding.
(3)	IS : 1989 (Part 2):1986	Specification for Leather Safety Boots & Shoes
	(Reaffirmed 1997)	
(4)	IS:2925 – 1984	Specification for Industrial Safety Helmets
	(Reaffirmed 2010)	
(5)	IS:3521 : 1999	Industrial Safety Belts & Harnesses-Specification
	(Reaffirmed 2002)	
(6)	IS:3646(Part II) - 1966	Code of Practice for Interior Illumination
	(Reaffirmed 2003)	
(7)	IS:3696 (Part I) - 1987	Safety Code for Scaffolds and Ladders
	(Reaffirmed 2002)	
(8)	IS: 3696(Part 2) : 1991	Scaffolds and Ladders-Code of Safety
	(Reaffirmed 2002)	
(9)	IS:3786 – 1983	Method for Computation of Frequency and Severity Rates for
	(Reaffirmed 2002)	Industrial Injuries and Classification of Industrial Incidents
(10)	IS:4770 : 1991	Rubber Gloves – Electricals purposes-Specification
	(Reaffirmed 2006)	
(11)	IS:4912 : 1978	Safety Requirements for Floor and Wall Openings, Railings
	(Reaffirmed 2002)	and Toe Boards
(12)	IS: 5983 – 1980	Specification for Eye-Protectors
	(Reaffirmed 2002)	
(13)	IS:6519 – 1971	Code of Practice for Selection, Care and Repair of Safety
	(Reaffirmed 1997)	Footwear
(14)	IS:9167:1979	Specification for Ear-Protectors
(15)	IS:6994(Part I)-1973	Specification for Industrial Safety Gloves
	(Re affirmed 1996)	Leather and Cotton Gloves
(16)	IS:8519 – 1977	Guide for Selection of Industrial Safety Equipment for Body
-	(Reaffirmed 1983)	Protection.
(17)	IS 11006 : 2011	Flash Back(Flame Arrestor) Specification



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(18)	IS:8520 – 1977	Guide for Selection of Industrial Safety Equipment for Eye,			
	(Reaffirmed 2002)	Face and Ear Protection.			
(19)	IS:9473:2002	Respiratory Protective Devices-Filtering Half Masks to protect			
		against Particles-Specification.			
(20)	IS:9944:1992	Natural and Man-made Fiber Rope Slings-Recommendations			
	(Reaffirmed 2003)	on Safe working loads.			
(21)	IS:11057 – 1884	Specification for Industrial Safety Nets			
	(Reaffirmed 2001)				
(22)	IS:12254:1993	Polyvinyl Chloride (PVC) Industrial Boots-Specification			
	(Reaffirmed 2002)				
(23)	IS:13367(Part 1):1992	Safe Use of Cranes-Code of Practice			
	(Reaffirmed 20030				
(24)	IS:14166:1994	Respiratory Protective Devices-Full Face Masks Specification			
	(Reaffirmed 2002)				
(25)	IS:14746 : 1999	Respiratory Protective Devices-Half Masks and Quarter			
	(Reaffirmed 2003)	Masks - Specification			
(26)	IS: 15397:2003	Portable Extinguisher Mechanical Foam Type(Stored			
	(Reaffirmed 2008)	Pressure)-Specification			
(27)	IS: 19011:2002	Guidelines for Quality and/or Environmental Management			
		Systems Auditing			



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ANNEXURE 04 : SAFETY FORMATS

&

ANNEXURE 05: WORK PERMIT FORMATS



INSPECTION OF FIRST AID BOX

FORMAT NO: HSEP:14-F01

REV NO.: 00 PAGE NO. 01 OF 02

Name of Site :	
Name of Sub-Contractor:	
Inspected by :	
mopeeted by .	
Date of Inspection:	

Number of employees on the site: -_____

Sl.No.	Item	No.	Remarks
		Available	
1	No. of small sterilized dressings		
2	No of medium sized sterilized dressings		
3	No of large sized sterilized dressings.		
4	No of large sized sterilized burn dressings		
5	No of (15 grams) packets sterilized cotton wool		
6	No of pieces of sterilized eye pads in separate sealed packets.		
7	No of roller bandages 10 cm wide.		
8	No of roller bandages 5 cm wide.		
9	Whether tourniquet available		
10	Whether supply of Suitable splints available.		
11	No of packets of safety pins.		
12	Whether kidney tray available		
13	Whether sufficient number of eye wash bottles, filled with distilled water or suitable liquid, clearly indicated by a distinctive sign which shall be visible at all times, available.		
14	Whether 4%-xylocaine eye drops, and boric acid eye drops and soda by carbonate eye drops available.		
15	Whether (60ml) bottle containing a two percent alcoholic solution of iodine available		
16	Whether (two hundred ml) bottle of mercurochrome (2 per cent) solution in water available.		



INSPECTION OF FIRST AID BOX

FORMAT NO: HSEP:14-F01

REV NO.: 00 PAGE NO. 02 OF 02

Sl.No.	Item	No.	Remarks
		Available	
17	Whether 120ml bottle containing Sal		
	volatile having the dose and mode of		
	administration indicated on the label,		
	available.		
18	Whether roll of adhesive plaster (6		
	cmX1 meter) available		
19	No of rolls of adhesive plaster (2 cmX1		
	meter)		
20	Whether snake bite lancet available.		
21	Whether (30 grams) bottle of potassium		
	permanganate crystals available.		
22	Whether a pair scissors available		
23	•		
23	Whether copy of the First-Aid leaflet issued by the Director-General, Factory		
	Advice service and labour Institutes,		
	Government of India available.		
24	Whether bottle containing 100 tablets		
∠+	(each of 5 grains) of aspirin available		
25	Whether Ointment for burns available		
26	Whether bottle of a suitable surgical		
20	anti-septic solution available		
	and septic solution available	1	

Signature of Subcontractor's Site I/C:



HEALTH CHECK UP

FORMAT NO: HSEP:14-F02

REV NO.: 00 PAGE NO. 1 OF 02

Name of Site :				
Name of Sub-Contractor :				
Name of Employee :				
NAME:				
History Of Past Illness	H/O Epilep	osy		
	H/O Drug			
		tics/ Hypertension		
	H/O Uncor	nsciousness		
Personal History				
EXAMINATION			OBSERVATION	
General Physical Examination	<u>on</u>			
Height	:			
Weight	:			
ВМІ	:			
Built And nourishment	:			
Pallor	:			
Temperature	:			
Chest Expansion	:	Inspiration	Expansion	
Lymph Node Enlargement	:			
Ear, Nose, Throat	:			
Ear	:			
Nose	:			
Throat	:			



HEALTH CHECK UP

FORMAT NO: HSEP:14-F02

REV NO.: 00 PAGE NO. 2 OF 02

EXAMINATION			OBSERVATION	
Cardiovascular System Examination	on :			
Inspection	:			
Palpation	:	Pulse	ВР	
Auscultation (Heart Sounds)	:			
Respiratory System	<u>:</u>			
Inspection	:	Respiratory Rate		
Palpation:	:			
Percussion	:			
Auscultation (Breath Sounds)	:			
Examination of Abdomen	:			
Inspection	:			
Palpation	:			
Auscultation (Bowel Sounds)	:			
Any Other	:			
Clinical Impression				

Signature of the examining doctor



HSE INDUCTION TRAINING

FORMAT NO: HSEP:14-F03

REV NO.: 00 PAGE NO. 01 OF 01

Name of Site :	
Name of Sub-Contractor	
:	
Date :	
Name of Training	
Co-ordinator	

SI	Name	Designation	Organisation	Signature
No.				

Signature of Training co-ordinator :



Name of Site:

POWER SECTOR

TOOL-BOX TALK

FORMAT NO: HSEP:14-F04

REV NO.: 00

PAGE NO. 01 OF 01

Sub-Contractors Nam	e :		
Data			
Date :			
Topic	Name of person	No. of Participants	Remarks
	delivered Tool Box Talk	attended	

Signature of Site I/C of Subcontractor:



PERSONAL PROTECTIVE EQUIPMENTS

FORMAT NO: HSEP:14-F06

REV NO.: 00

PAGE NO. 01 OF 01

Name of Site:			
Name of Sub-Contract:	or		
Inspected by :			
Date of Inspection :			
Item	Issued this Month	Nos. Issued up to the Month	Percentage of usage at site
		the Month	at site
Safety Helmet			
Safety Shoes			
Full Body Harness			
Fall Arrestor			
Safety Nets			
Other PPEs.			

Signature of Site I/C of Subcontractor:



INSPECTION OF T&Ps

FORMAT NO: HSEP:14-F07

REV NO.: 00 PAGE NO. 01 OF 01

Signature-Subcontractor/ Subcontractor's

Safety Officer

Name o	f Site :		
Name o	f Sub-Contractor		
Date of	Inspection :		
Sl.No.	Description	Remarks	
1.0	Name of equipment		
2.0	Basic Information of equipment		
2.1	Specification		
2.2	Sr. No. of equipment		
2.3	Make		
2.4	Year of manufacture		
3.0	Major repairs / overhauls(Furnish details of work	carried out)	ate(s) of major
		re	epair/overhaul
3.1			
3.2			
3.3	Repairs carried out at site		
4.0	Any performance test conducted	Yes/No	
5.0	Document Submitted	Yes/No	
6.0	Manufacturer's test / guarantee certificate	Available/ Not	t available
7.0	Performance test	Done/ Not Do	ne
8.0	Acceptance Norms		
	Committee Observations		
9.0			

Signature-Site Safety Officer (BHEL)



STATUS OF T&Ps

FORMAT NO: HSEP:14-F08

REV NO.: 00 PAGE NO. 01 OF 01

Name of Site	
Name of Sub-Contractor	
Date of Inspection	

Item	Nos. Deployed	Identification	Nos. Tested by	Validity of Test
		No.	competent person	Certificate
Winches				
Chain Blocks				
Wire Rope				
Slings				
Man Cages				
D-Shackles				
Air				
Compressors				
Crawler				
Cranes				
Mobile Cranes				
Hydra Cranes				
Others				

Signature of Site I/C of subcontractor:

बीएच ईएल
_11
<i></i>

INSPECTION OF CRANES AND WINCHES

FORMAT NO: HSEP:14-F09

REV NO.: 00 PAGE NO. 01 OF 03

	PAGE NO. 01 OF 03
Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection:	
Crane Reg. No (Make/Model) Name of Driver/Operator	

Sl.no.	Description	Observation	Measures
1	Valid Driving license		
2	Hook & Hook Latch		
3	Over Hoist limit switch		
4	Boom limit switch		
5	Boom Angle Indicator		
6	Boom limit cutoff switch		
7	Condition of Boom		
8	Condition of ropes		
9	Number of load lines		
10	Size and condition of the slings		
11	Stability of the cranes		
12	Soil Condition		
13	Swing Break And Lock		
14	Proper Break And Lock		
15	Hoist Break And Lock		
16	Boom Break And Lock		
17	Main Clutch		
18	Leakage in Hydraulic Cylinders		
19	Out riggers filly extendable		
20	Tyre pressure		
21	Condition of Battery And Lamps		



INSPECTION OF CRANES AND WINCHES

FORMAT NO: HSEP:14-F09

REV NO.: 00 PAGE NO. 2 OF 03

Sl.no.	Description	Observation	Measures
22	Guards of moving and rotating parts		
23	Load chart provided		
24	Number and position of pedant ropes		
25	Reverse Horn		
26	Load Test Details		
27	Operator's fitness		
28	Pollution under control certificate		
29	Fire extinguisher of appropriate type.		
30	Training of the operator		

WINCH

SI.	Description	YES	NO	NA	Remarks
No.	Description				
1	Has the copy of Third Party Inspection				
	certificate been provided in winch machine shed?				
2	Is winch machine operator experienced				
	enough to operate the winch machine?				
3	Is the winch machine operated by				
	someone other than the winch machine				
	operator?				
4	Is there guard provided in all moving parts				
	like wheel and motor's shaft?				
5	Will it protect against unforeseen				
	operational contingencies?				
6	Are brakes, clutch and locking				
	arrangement working properly?				
7	Has it been ensured that the guard does				
	not constitute a hazard by itself?				
8	Are the cranks and the connecting rods				
	protected by guardrails?				
9	Is there provision for fully covered shed				
	with wooden plank roof?				



INSPECTION OF CRANES AND WINCHES

FORMAT NO: HSEP:14-F09

REV NO.: 00 PAGE NO. 3 OF 03

Description rope free from any kind of damage				
rone free from any kind of damage				
rope free from any kina or damage				
r and tear?				
pin provided for the protection of				
and brake locking arrangement?				
y inspected by competent person tified before use?				
y free from any wear and tear ?				
h rope barricaded with clipsheet for				
• • •				
vire rope lubricated by cardium oil?				
any friction in wire rope which				
mage the wire rope rather than the parts?				
e any oil leakage in the hydraulic of the winch machine?				
een ensured that the guard will not				
liscomfort or inconvenience to				
or?				
umber of NO:				
umber of NA:				
pliance :				
	tection of rope and person? vire rope lubricated by cardium oil? any friction in wire rope which mage the wire rope rather than the parts? any oil leakage in the hydraulic of the winch machine? een ensured that the guard will not iscomfort or inconvenience to or? umber of NO: umber of NA:	tection of rope and person? vire rope lubricated by cardium oil? any friction in wire rope which mage the wire rope rather than the parts? any oil leakage in the hydraulic of the winch machine? een ensured that the guard will not iscomfort or inconvenience to or? umber of NO: umber of NA:	tection of rope and person? vire rope lubricated by cardium oil? any friction in wire rope which mage the wire rope rather than the parts? any oil leakage in the hydraulic of the winch machine? een ensured that the guard will not iscomfort or inconvenience to or? umber of NO: umber of NA:	tection of rope and person? vire rope lubricated by cardium oil? any friction in wire rope which mage the wire rope rather than the parts? any oil leakage in the hydraulic of the winch machine? een ensured that the guard will not iscomfort or inconvenience to or? umber of NO: umber of NA:

Signature of Site I/C of subcontractor:



INSPECTION OF HEIGHT WORKING

FORMAT NO: HSEP:14-F10

REV NO.: 00

Name of Site :	
Name of Sub-Contractor	
:	
Inspected by :	
Date of Inspection:	

Sl. No.	Descriptions	Observation	Remarks
		(Yes/No)	
1	All the workers have been explained safe work method?		
2	An established communication system has been		
	established and explained to the workers.		
3	Adequate illumination has been ensured.		
4	Work area inspected prior to the start of the work.		
5	Area below the work place barricaded, particularly below		
	hot work.		
6	Workers provided with bags /box to carry bolts, nuts and		
	hand tools		
7	Arrangement for fastening hand tools made.		
8	All work platforms ensured to be of adequate strength		
	and ergonomically suitable.		
9	Fabricated makeshift arrangements are checked for		
	quality and type of material welding, anchoring etc.		
10.	Work at more than one elevation at the same segment is		
	restricted.		
	ACCESS/EGRESS		
1	Walkways provided with handrail, mid-rail and toe		
	guard?		
2	All checkered plates, gratings properly welded/ bolted?		
3	Are ladders inspected and they are in good condition?		
4	Are ladders spliced?		
5	Are ladders properly secured to prevent slipping, sliding		
	or falling?		
6	Do side rails extend 36" above top landing?		
7	Are built up ladders constructed of sound materials?		



INSPECTION OF HEIGHT WORKING

FORMAT NO: HSEP:14-F10

REV NO.: 00

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Sl. No.	Descriptions	Observation	Remarks
		(Yes/No)	
8	Are rugs and cleats not over 12" on center?		
9	Metal ladders not used around electrical hazards.		
10	Proper maintenance and storage.		
11	Ladders placed at right slope.		
12	Ladders / staircases welded/ bolted properly.		
13	Any obstruction in the stairs.		
14	Are landing provided with handrails, knee rails, toe		
	boards etc.?		
15	Whether ramp is provided with proper slope.		
16	Proper hand rails / guards provided in ramps.		
	Housekeeping		
1	Walkways, aisles & all overhead workplaces cleared of		
	loose material.		
2	Flammable materials, if any, are cleared.		
3	All the de shuttering materials are removed after de		
	shuttering is done.		
4	Platforms and walkways free from oil/grease or other		
	slippery material.		
5	Collected scrap are brought down or lowered down and		
	not dropped from height.		
	PPE And Safety Devices		
1	Use of safety helmet, safety belts ensured for all workers		
2	Anchoring points provided at all places of work.		
3	Common lifeline provided wherever linear movement at		
	height is required.		
4	Safety nets are use wherever required.		
5	Proper fall arrest system is deployed at critical		
	workplaces.		
6	Crawler boards/Safety system or works on fragile roof		
	are used.		

Signature of Site I/C of subcontractor :



INSPECTION OF WELDING AND GAS CUTTING

FORMAT NO: HSEP:14-F11 REV NO.: 00 PAGE NO. 1 OF 02

Name of Site	
Name of Sub-Contractor	
Inspected by	
Date of Inspection	

Weldin	ng			
Sl.no.	Description	Υ	N	Remarks
31.110.	Description	e	0	Remarks
		s		
1	Is electric connection given through			
	30 mA ELCB/RCCB to welding m/c?			
2	Is electric cable fitted properly in			
	junction box on m/c?			
3	Is electrical cable free from joints?			
4	Are the joints attached firmly &			
	insulated with tape?			
5	Is double earthing given to body of			
	m/c?			
6	Is the physical condition of the m/c			
	good?			
7	Is ON/OFF switch connected to the			
	m/c is working and in good			
	condition?			
8	Are indication lamps on m/c			
	working?			
9	Is the electrode holder in good			
	condition?			
10	Are the cables of the welding m/c			
	lugged & tight properly?			
11	Are return lead connected properly			
	(Rod, Angle, Channels shall not be			
	used)			
	Total No of NO			
	Total No of YES			



INSPECTION OF WELDING AND GAS CUTTING

FORMAT NO: HSEP:14-F11

REV NO.: 00 PAGE NO. 2 OF 02

Gas Cutt	ing			
Gas Cutt	····6			
Sl. no	Description	Yes	No	Remarks
1	Are Cylinders kept on trolleys?			
2	Physical condition of Gas cylinders Good?			
3	Is there Oil/Grease on valve of the cylinder?			
4	Are pressure regulators in good condition?			
5	Condition of hose pipe OK?			
6	Are hose pipe clamped with hose clip?			
7	Is flash back arrestor & NRV fitted on torch both for O2 and LPG cylinder?			
8	Is nozzle of the torch cleaned?			
	Total Number of NO			
	Total No of YES			
	% Compliance			

Signature of Site I/C of subcontractor :



INSPECTION OF ELECTRICAL INSTALLATION

FORMAT NO: HSEP:14-F12

REV NO.: 00

PAGE NO. 01 OF 02

Name of Site	
Name of Sub-Contractor	
Inspected by	
Date of Inspection:	

Sr.	Contents	Yes/No	Remarks
No.			
Α	Cable		
1.	Whether the condition of cable is checked?		
2.	Are cables received from other sites checked for		
	insulation resistance before putting them into use?		
3.	Are all main cables taken either underground / overhead?		
4.	Are welding cables routed properly above the ground?		
5.	Are welding and electrical cables overlapping?		
6.	Is any improper joining of cables/wires prevailing at site?		
В	DBs/SDBs		
1.	Is earth conductor continued up to DB / SDB?		
2.	Whether DBs and extension boards are protected from rain / water?		
3.	Is there any overloading of DBs / SDBs?		
4.	Are correct / proper fuses & CBs provided at main boards and sub-boards?		
5.	Is energized wiring in junction boxes, CB panels & similar places covered all times?		
С	ELCB		
1.	Whether the connections are routed through ELCB?		
2.	Is ELCB sensitivity maintained at 30 mA?		



INSPECTION OF ELECTRICAL INSTALLATION

FORMAT NO: HSEP:14-F12

REV NO.: 00 PAGE NO. 02 OF 02

Sr.	Contents	Yes/No	Remarks
No.			
3.	Are the ELCB numbered and tested periodically & test		
	results recorded in a logbook countersigned by a		
	competent person?		
D	Grounding		
1.	Is natural earthing ensured at the source of power		
	(main DB at Generator or Transformer)?		
2.	Whether the continuity and tightness of the earth		
	conductor are checked?		
3.	Mention the gauge of the earth conductor used at the		
	site.		
4.	Mention the value of Earth Resistance.		
E	Electrically operated Machines or Accessories.		
1.	Whether the plug top is provided everywhere.		
2.	Are all metal parts of electrical equipment and light		
	fittings / accessories grounded?		
3.	Is there any shed or cover for welding machines?		
4.	Are halogen lamps fixed at proper places?		
5.	Are portable power tools maintained as per norms?		
6.	Any other information:		

Signature of Site I/C of subcontractor:



INSPECTION OF ELEVATOR

FORMAT NO: HSEP:14-F13

REV NO.: 00

PAGE NO. 01 OF 01

Name	of Site	
Name	of Sub-Contractor	
Inspec	cted by	
Date o	of Inspection	
Sr. No.	Description	Remarks
1.0	Name of equipment	
2.0	Basic Information of equipment	
2.1	Specification	
2.2	Sr. No. of equipment	
2.3	Make	
2.4	Year of manufacture	
3.0	Major repairs/overhauls(Furnish details of work	· · · · · · · · · · · · · · · · · · ·
3.0		repair/overhau
3.1		repair/overhau

_		
3.2		
3.3	Repairs carried out at site	
4.0	Any performance test conducted	Yes/No
5.0	Document Submitted	Yes/No
6.0	Manufacturer's test / guarantee certificate	Available/ Not available
7.0	Performance test	Done/ Not Done
8.0	Acceptance Norms	
9.0	Committee Observations	
10.0	Date of next review (if accepted)	

Signature-Subcontractor/ Subcontractor's Safety Officer

Signature-Site Safety Officer (BHEL)

7	# (η,	र्ड ए	M)
7	1			7
		77		

Inspection of Excavation

FORMAT NO: **HSEP:14-F13E** REV NO.: 00 PAGE NO. 01 OF 01

Name of S	ite :	
Name of S	ub-Contractor :	
Inspected	by:	
Date of Ins	spection :	

Sl.no.	Description	Yes	No	Remarks
1	Precautions taken for Underground Electrical Cable			
2	Precautions taken for Under / Above ground sewer/ Drinking Water Line			
3	Precautions taken for Underground Telecommunication Line			
4	Precautions taken for Underground Product/Utility Line			
5	Precautions taken for Underground Fire Water Line			
6	Shoring / Shuttering / Sheet piling done to prevent collapse of excavation walls. Strength of Excavation wall ensured at all times			
7	Slope Cutting / Angle Maintained			
8	Hard Barricading & Edge Protection provided			
9	Separate Safe Access for Man and Vehicle			
10	Lighting arrangement			
11	Banksman Provided			
12	Required basic PPEs provided			
13	Excavated soil / Construction Material / equipment kept away from the edge.			
14	First aid in attendance.			
15	Other:			
	Total No of YES			



HSE PENALTY

FORMAT NO: HSEP:14-F14

REV NO.: 00 PAGE NO. 1 OF 02

Sub: MEMO for Penalty for non-compliances in Safety

Following lapse (tick marked) was observed and penalty is imposed as stated at the bottom of this memo. It is requested that such occurrences be please avoided in future.

Safety Area

SN	Violation of Safety Norms	Fine (in Rs)
01	Not Wearing Safety Helmet	200/- *
02.	Not wearing Safety Belt or not anchoring life line	500/-*
03	Not wearing safety shoe	200/-*
04	Not keeping gas cylinders vertically	200/-
05	Not using flash back arrestors	100/-
06	Not wearing gloves	50/- *
07.	Grinding Without Goggles	50/- *
08.	Not using 24 V Supply For Internal Work	500/-
09.	Electrical Plugs Not used for hand Machine	100/-
10.	Not Slinging properly	200/-
11.	Using Damaged Sling	200/-
12.	Lifting Cylinders Without Cage	500/-
13.	Not Using Proper Welding Cable With Lot of Joints And Not Insulated Property.	200/-
14.	Not Removing Small Scrap From Platforms	500/-
15.	Gas Cutting Without Taking Proper Precaution or Not Using Sheet Below Gas Cutting	500/-
16.	Not Maintaining Electric Winches Which are Operated Dangerously	500/-
17.	Improper Earthing Of Electrical T&P	500/-
18	No or improper barricading	500/-
19.	Activity carried out without Safety work permit (Height work, Lifting activity, Hot work-each person/case)	1000/-
20.	Incident Resulting in Partial Loss in Earning Capacity	25,000/- per victim
21.	Fatal Incident Resulting in total loss in Earning Capacity	1,00,000/- per victim for first instance #

Legend: -

#: or as deducted by customer, whichever is higher. For repeated fatal incident in the same Unit incremental penalty to be imposed. The subcontractor will pay 2 times the penalty compared to previously paid in case there are repeated cases of fatal incidents under the same subcontractor for the same package in the same unit.

^{*:} per head. For repeated violation by the same person, the penalty would be double of the previous penalty. Date of "Repeated violation" will be counted from subsequent days.



HSE PENALTY

FORMAT NO: HSEP:14-F14

REV NO.: 00 PAGE NO. 2 OF 02

Details (if any) related to non-compliance (Name of persons, Nature of deficiency, etc.)

Penalty imposed:
1, Rate as per above chart
2. No. of Persons/ machine/ event/ labour
3. Total Penalty= 1. X 2. =
Signature:
Witnessed by: (Sub- Contractor representative) (BHEL Personnel)
NameName
Distribution: 1 Copy: to Sub- contractor, 1 Copy to Site Construction Manager (BHEL)



Incident Report

(To be submitted within 24 hours of time of incident)

FORMAT NO: HSEP:14-F15

REV NO.: 00

PAGE NO. 01 OF 01

Type of incident: Fatal/Major/ Minor/Fire/Property Damage/Near-miss

1	NAME OF SITE			3	ACTIVITY AREA	
2	SCOPE OF WORK		4	NAME OF CONTRACTOR		
				5	NAME & DESIGNATION OF BHEL ACTIVITY I/C	
6	DATE & TIME OF ACCIDENT			7	DATE RESUMED	
8	NO. OF WORK-DAYS					
9	NO. OF MANHOURS	LOST BY OT	HERS			
10 PERSONAL DETAILS OF INJURED AND / OR DETAILS O			F M	ATERIALS / EQUIPMENT / PROPE	RTY DAMAGED	
NAME				N/	ME OF MATERIAL / EQUIPMENT	/ PROPERTY
PERIO	OD OF EMPLOYMENT					
AGE	YRS	SEX	MALE/ FEMALE		ESTIMATED COST	ACTUAL COST
MARI	TAL STATUS	SIN	GLE / MARRIED			
occi	JPATION				NATURE OF DAM	AGE
PART	OF BODY INJURED					
NATU	IRE OF INJURY					
AGENCY (OBJECT / EQUIPMENT / SUBSTANCE) MOST RESPONSIBLE FOR CAUSING ACCIDENT / INJURY / DAMAGE						
PERSON (NAME & DESIGNATION) WITH MOST CONTROL OVER AGENCY (OBJECT / EQUIPMENT / SUBSTANCE) CAUSING ACCIDENT INJURY / DAMAGE						
13 DESCRIBE CLEARLY HOW THE ACCIDENT OCCURRED (USE ADDITIONAL SHEET, IF R				E ADDITIONAL SHEET. IF REQUIR	ED ≅ED	
ANAL	YSIS.					
WHAT ACTS AND / OR CONDITIONS CONTRIBUTED MOST DIRECTLY TO THIS ACCIDENT						
15	WHAT ARE THE BASIC REASON FOR THE EXISTENCE OF THESE ACTS AND / OR CONDITION ?					
WHAT CORRECTIVE ACTIONS HAVE BEEN TAKEN TO PREVENT ACCIDENT RECURRENCE ?						
	DATE :				SIGNATURE OF SITE	HSE COORDINATOR
17	COMMENTS OF HEA	D/SOX				
	DATE:				SIG	GNATURE OF HEAD/SOX



Format for Monthly HSE Planning & Review

FORMAT NO: HSEP:14-F30

REV NO.: 00 PAGE NO. 01 OF 3

Name	of the Site		Name of the Subcontractor		
Scope	e of Work		Date		
PART- A: PLAN OF HSE ACTIVITIES FOR THE MONTH OF				PART-B: REVIEW ON	
SN.	Description of HSE Activity & Formats	;	Plan & Targets for the month	Review	
<u>l</u>	Availability of First Aid Box at Required per Format: Fo1		Areas 1		
2	Health check-up as per Format: Fo2		Health check-up for Nos 1. New inductees 2. Drivers & Operators 3. Workers in following high risk areas: a		
3	Induction training of newly joined work	ers as per Format: Fo3	Minimum No. of workers:		
+	Toolbox talks (TBT) conducted before start of work as per Format: Fo4		Locations of TBTs & No. of workers 1		
5	PPE usage and issue as per Format: Fo6				
5	Inspection of T&Ps as per Format: Fo7		List of T&Ps to be inspected 1.		
,	Identification & Inspection Status of T&	Ps as per Format: Fo8			
}	Inspection of Cranes & Winches as per Format: Fog		List of Cranes & Winches & Nos. 1		
)	Inspection of Height Working as per Format: F10		Areas: 1		
.0	Inspection of Welding & Gas Cutting operations as per Format: F11		Areas: 1		
1	Inspection of Electrical Installations as p	er Format: F12	Locations: 1		
.2	Inspection of Elevators (as applicable) a	s per Format: F13	Locations: 1		
.3	Inspection of Excavation as per Format:	F13E	Locations: 1		



Format for Monthly HSE Planning & Review

FORMAT NO: HSEP:14-F30

REV NO.: 00 PAGE NO. 02 OF 3

SN.	Description of HSE Activity & Formats	Plan & Targets for the month	Review
14	Job Safety Analysis as per Format F ₃ 2B	Activities:	
15	Regular Job Specific Training (Re-training) for workers involved in hazardous activities	Topics/ Hazards & No. of workers 1	
16	Mass housekeeping (HK) drive in work areas	Areas 1.	
17	Vertigo Test of Height workers	Minimum No. of workers:	
18	Deployment of qualified HSE Officers as per contract	Location(s) & Nos. 1	
19	Deployment of qualified HSE Stewards as per contract	Location(s) & Nos. 1	
20	Deployment of Safety tools & Equipment (Safety Nets, Lifelines, Fall arrestors, Man-cages, flashback arrestors, scaffolding etc.)	Tool/ Equipment & Location 1	
21	Safety Walks by site in charge of agency (4 -Weekly once)	Dates:	
22	Safety walks by departmental head (8-Weekly twice)	Dates:	
23	Availability/ deployment of Safety posters/ placards/ signage at strategic locations	Locations: Nos.	
24	Provision of clean drinking water sources for workers	Locations: Nos.	
25	Provision of toilets for workers (separate for male & female workers)	Locations: Nos.	
26	Rest sheds for workers during lunchtime, rain, dust storm etc.	Locations: Nos.	
27	Availability of following in Labor colony	 Clean drinking water Toilets Cleanliness & Hygiene Grass cutting, Fogging Electrical Inspection 	



Format for Monthly HSE Planning & Review

FORMAT NO: HSEP:14-F30

REV NO.: 00 PAGE NO. 03 OF 3

SN.	Description of HSE Activity & Formats	Plan & Targets for the month	Review
28	Availability of dust/ waste bins at various locations	Locations: 1	
29	Availability of Ambulance (individual/joint) in each shift	Ambulance No.	
30	Availability of emergency vehicle in each shift	Emergency vehicle	
31	Deployment/ Availability of tested Fire Extinguishers	Locations & Nos. 1	
32	Tree plantation	Locations & Nos. 1	
33	Waste disposal & Scrap Bins	Locations 1	
34	Illumination checks	Locations 1	
35	Safety award function: 1. Display of good practices Award presentation	Minimum 1 per month	
36	Submission of Daily Reports as per Format No.F31A	Daily Reports (Night & Day Shifts)	

<u>PLAN</u>			REVIEW
Agency	BHEL	Agency	BHEL
Name:	Name:	Name:	Name:
Sign:	Sign:	Sign:	Sign:
Date:	Date:	Date:	Date:



Format for Daily HSE Reporting

FORMAT NO: **HSEP:14-F31** A REV NO.: 00

REV NO.: 00 PAGE NO. 01 OF 1

Note: Following format to be submitted (preferably) in excel/ soft copy by subcontractor daily at the end of each shift. Any photographs/ records to be attached

Site													Subo	ontra	ctor												
Year	1			1			I	Mon	th									1	Day						1		
SHIFT Submitted By	, Work Area(s)	Staff	Man-Power	Safety Officers	Safety Stewards	Tool Box (Topics and No. of Participants)	Induction Training (No. of Participants)	Vertigo Test (Numbers Tested)	On-the-Job Training (Topic & participants)	Work Permits	Job Safety Analyses conducted	Height Work Inspection	Other Hazardous Activities Inspection	T&P Inspection (Names & Nos. Inspected)	Safety Walk (Designation, Areas)	HSE Meeting	Safety Reward (Details)	Housekeeping/ Dust Suppression/ Tree Plantation Activities (Locations/ Details)	Lost time Accident	Restricted Work Case	Medical Treatment Case	First Aid Case	Near miss	Property Damage/ Fire	Non-Compliances Submitted by BHEL	Complied by Agency	Any other Remarks/Inputs
Day																											
Night														NA		NA	NA	NA									



Job Safety Analysis Format

FORMAT NO: HSEP:14-F32B

REV NO.: 00 PAGE NO. 01 OF 1

Name of the Site				
Name of the Sub	ocontractor			
Activity, Area				
		HAZARDS		PRECAUTIONS
(Name)		Pavious d Pv		
(Cian) Subi	mitted By	Reviewed By (BHEL	Approved By	
(Date)	ncy HSE)	Execution)	(BHEL HSE)	



FORMAT NO: HSEP:14-F33

REV NO.: 00 PAGE NO. 01 OF 3

Checklist for Evaluation of HSE Performance

SL	Parameter for Measurement	M/ O	Wt	Supporting Documents
1a	Induction training for new workers conducted through audio-visual medium & documented ?	М	1	Induction Training Records
1b	Tool box talk conducted regularly as per plan, and documented?	М	1	Toolbox Talk Records
10	Contractor in charge and safety in charge attended safety meetings?	М	2	Minutes of Meeting
1d	Whether observations in safety meetings are complied before next meeting?	М	2	-do-
1e	Preparation and submission of Monthly HSE report within stipulated time	М	1	Report submission date
ıf	Preparation and submission of Incident/near-miss report and RCA Report (as applicable) within stipulated time	М	1	Incident/ Near Miss Records
1 g	Carrying out Inspections and submission of Inspection reports within stipulated time	М	1	Inspection Records
1h	Regular Job Specific Training ensured for High Risk Workers (through audio-visual medium) as per plan	М	1	Training & Attendance Records
2a	Whether the contractor is registered under BOCW	М	2	BOCW Registration Certificate
2b	Availability of Qualified safety officer (1 for every 500 labour)	М	2	Safety Officer qualification & experience records
2C	Availability of Qualified safety supervisor (1 for every 100 labour)	М	2	Safety Officer qualification & experience records
2d	All the workers are provided and using safety helmets and safety shoes/gum boots	М	2	PPE Issue Records, Inspection/ non-conformity records
2e	Housekeeping done on regular basis and scrap removal at site	М	1	Housekeeping records, Inspection/ non-conformity records
2f	Usage of Goggles/Face shields and Hand gloves for gas cutter and grinders		1	PPE Issue Records, Inspection/ non-conformity records
2g	Wall openings & floor openings are guarded?		1	Inspection/ non-conformity records
2h	Adequate illumination provided in all working area?		1	Inspection/ non-conformity records
2i	Safety posters, sign boards and emergency contact numbers in all prominent location are displayed?		1	Inspection/ non-conformity records
2j	Availability of automatic reverse horns, Main horn, hook latches for Vehicles, mobile cranes, Hydras		1	Inspection/ non-conformity records
2k	Ban of carrying mobile phones to work place is implemented for workers		1	Inspection/ non-conformity records
2	Availability of Tags & Inspection Certificates for Cranes of all capacities		1	Master T&P List with internal & external test details
21.2	Availability of Tags & Inspection Certificates for Winches of all capacities		1	Master T&P List with internal & external test details
21.3	Availability of Tags & Inspection Certificates, color coding for Chain pulley blocks		1	Master T&P List with internal & external test details
21.4	Availability of Tags & Inspection Certificates for Vehicles - Trailers, Dozers, Dumpers, Excavators. Mixers etc.		1	Master T&P List with internal & external test details
21.5	Availability of Tags & Inspection Certificates for Welding machines, grinders, Drilling machines, etc.		1	Master T&P List with internal & external test details
21.6	Availability of Tags & Inspection Certificates, colour coding for Wire rope slings etc.		1	Master T&P List with internal & external test details
21.7	Availability of Tags & Inspection Certificates for Batching plants		1	Master T&P List with internal & external test details



FORMAT NO: HSEP:14-F33

REV NO.: 00 PAGE NO. 02 OF 3

Checklist for Evaluation of HSE Performance

		M/		
SL	Parameter for Measurement	0	Wt	Supporting Documents
2m.1	Use of Lifting Permit as per requirement		1	Permit Records
2m.2	Use of Height Permit as per requirement		1	Permit Records
2m.3	Use of Hot Work Permit as per requirement		1	Permit Records
2m.4	Use of Excavation permit as per requirement		1	Permit Records
2m.5	Use of Confined space work permit as per requirement		1	Permit Records
2m.6	Use of Grating removal and safety net removal permit as per requirement		1	Permit Records
2m.7	Use of Lockout-Tag out permit as per requirement		1	Permit Records
2m.8	Use of Radiography permit as per requirement		1	Permit Records
2m.9	Use of Night/ Holiday Work Permit as per requirement		1	Permit Records
2m.10	Use of Any other Applicable Permit as per requirement		1	Permit Records
3a	Material safety data sheet(MSDS) available for all chemicals and displayed in usage and storage area?		1	Inspection/ non-conformity records
3p	Spillages of oil/concrete and other chemical is controlled and cleaned by proper method in case of spill?		1	Inspection/ non-conformity records
3c	Availability of adequate number of urinals in workplace and in elevations and maintained	М	1	
3d	Availability of rest rooms for workers at site	М	1	
3e	Availability of Drinking water facility at work spot		1	
3f	Hygienic Labour colony is provided for workers.		1	
4a	Is heavy/complex critical lifting permit obtained for heavy, complex materials before handling/erection activity?		1	Work Permit records
4b	Whether area below lifting activities barricaded		1	Inspection/ non-conformity records
4C	Availability of experienced rigging foreman		1	Experience details of rigging foreman
4d	Is agency is following proper storage and handling procedure as per manufacturer standard for all hazardous material?		1	Procedure for storage & handling
4e	Are oxygen and acetylene cylinders are transported to work place from storage area in trolleys		1	
5a	Whether all deep excavation has been protected by barrier		1	Inspection/ non-conformity records
5b	Sloping/benching & shoring provided for excavation as per requirement?		1	-do-
5C	Proper access and egress provided for excavations?		1	-do-
5d	Blasting is done in controlled manner?		2	-do-
6a	Whether Electrical booth is equipped with Co ₂ fire extinguishers and fire buckets filled with sand?		2	Inspection/ non-conformity
6b	Availability of Illumination lamp in electric booth?		1	records -do-
6c	whether Caution Boards have been displayed?		1	-do-
6d	Usage of Metal Plug top for all hand power tools ?		1	-do-
6e	Usage of Insulated welding cables.		1	-do-
6f	Electrical Booth/Distribution Board to be covered by proper Canopy.		1	-do-
6g	Availability of functional & individual 30ma ELCB / RCCB and MCB for protection and conducting periodical check-up?		1	-do-
6h	Double earthing for panel boards and all machinery & proper earth pit with regular inspection available?		1	-do-
6i	Whether Electrician is qualified and experienced		1	Qualification & Experience records of electrician
6ј	Availability and usage of Rubber hand gloves by electrician?		1	Inspection/ non-conformity records



FORMAT NO: HSEP:14-F33

REV NO.: 00 PAGE NO. 03 OF 3

Checklist for Evaluation of HSE Performance

SL	Parameter for Measurement	M/ O	Wt	Supporting Documents
7a	Whether Scaffolding pipes made with steel or aluminum, are being used and checked periodically by experienced/ certified scaffolder?		2	Inspection/ non-conformity records
7b	8mm Stainless Steel wire rope with plastic cladding is provided for life line (Vertical / Horizontal) during height work?		2	-do-
7C	Availability of emergency lighting in case of power failure		1	-do-
7d	Whether all the openings are covered with Safety Nets made of fire proof Nylon?		1	-do-
7e	Whether MS pipe rails around staircases & platforms in usage are provided with top, middle rails and toe guard?		1	-do-
7f	Whether Ladder with vertical life line /Fall arrestor is available to climb?		1	-do-
79	Whether all workers deployed for working at height have been issued height pass after undergoing vertigo test?		1	Height Pass records
7h	Whether all workers deployed for height work / climbing ladder are provided and using Double lanyard safety belt?		1	PPE Issue records, inspection/ non- conformity reports
7i	Is all hand tools/Small material used by height workers is tied firmly to prevent fall?		1	-do-
8a	Flash back arrestors for all gas cutting sets is available on Torch side and cylinder side		1	Inspection/ non-conformity records
8b	Oxygen/Acetylene/LPG cylinders not in use have caps in place and stored separately?		1	-do-
8c	Availability of Face screen, Hand gloves, and Apron, for welders		1	-do-
8d	Protection from falling hot molten metal during metal cutting / welding at height by providing GI sheet below the cutting area especially in fire prone areas		1	-do-
9a	Pre-employment medical check-up done for all workers and submitted?		1	Medical check records
9b	Availability of first aid center, with MBBS doctor(Own or Sharing basis)	М	2	Attendance records
9c	Availability of Ambulance facility 24 hours (Own or sharing basis)	М	2	-do-
9d	Is First aid trained personnel's are available and their names are displayed at site?	М	1	-do-
9e	Availability of Emergency vehicle at site		1	
9f	Periodical medical check-up is conducted for all the workers and submitted?		1	Medical check records
99	Availability of sufficient number of first aid box as per standard list and maintaining record		1	Inspection records
10a	Availability of Fire extinguishers, buckets at all vulnerable points		2	Fire extinguisher records
10b	Periodic fire mock drill conducted?		1	Fire, Mock drill records
100	Are all flammable materials are stored separately?		1	
10d	Periodic grass cutting is done in material storage area?		1	
10e	Availability of 24V DC lighting in confined space work area		1	
10f	Availability of exhaust fan in confined space work area		1	

Note:

- M: Mandatory; O: Optional. Points other than mandatory can be excluded with appropriate justification (scope etc.) by BHEL
- > Additionally: 30 Marks for each Fatal Accident and 10 mark for each major accident shall be deducted.



SAFETY WORK CLEARANCE	Permit no.
Project:	Emergency Contact Nos:
Subcontractor:	

BURNING/WELDING /HOT WORK PERMIT

Area	<u>:</u>	Date:		Time:	
Name	e of Site Engineer (Permit Requesting Authority):		Sign:		
Name	e of Work Performing Contractor:				
Name	e of Package In charge:	Sign:		Date:	
Desci	ription of Work:				
	Execution Date:				
	bove signing person(s) will be responsible to ensure that t e permit to work.	rne above described work will be do	one under all the s	sarety precautio	ns mentionea
The fo	ollowing precautions are to be taken:				
No.	Item			Yes	Not required
1.	Proper Access/Exit available				
2.	Proper ventilation and /or lighting provided.				
3.	Proper and safe scaffolding, platform, ladder provided.				
4.	Welding machine located in a clean and dry area.				
5.	Welding machine grounded at the equipment and prope provided for welding machine.	r leakage current protection device	(ELCB)		
6.	Emergency STOP buttons are in working condition. Wel-	der /Helper knows how to operate i	t.		
7.	Welding machine input/output cables, welding holder an good condition.	d weld return clamp (Holder) are in	sulated and in		
8.	Welder & Fitter trained to connect ground/work return clawelding machine.	amps (Holder) to work place prior to	o energization of		
9.	Gas cylinders are stacked vertically and not below the w with cylinder.	/elding / cutting area. Regulator key	/ is available		
10.	Pressure gauges/Flash back arrestor provided and in wo	orking condition.			
11.	Personal Protective equipment Minimum applicable: safe shoes, leather gloves, long sleeve and nose mask -prov		helmet, safety		
12.	In case of pits, water removed from the pit and wood/rub	ober insulation provided.			
13.	Safety signboards are in place.				
14.	Adequate and Suitable nos. of fire fighting extinguisher p	provided.			
15.	Nearby combustible material removed. Housekeeping de	one.			
16.	Other				
Name	e of Contractor Safety Officer:	Sign	Dr	nto:	Timo:
	ewed and approved by BHEL Site Engineer (Permit Iss				
	e:Sign		Date:	Tir	ne:
	e of BHEL Safety Representative:				
	erstand the precaution to be taken as described above and upervision by following all precaution and Safety Rules.	d as per project requirement and he	ereby confirm that	t work will be ex	recuted under
Name	e of Work Performing Authority:	Sign:	Date:	Time	:
Perm	it Cancellation:				
I here	by declare that the work is complete, all workers under my	/ control have been withdrawn and	the site restored	to safe tidy con	dition.
	e of Work performing Authority:				
	e of Site Engr. (Permit Requesting Authority):				
Name	e of BHEL Site Engr. (Permit Issuing Authority):	Sign:	Date:	Time: _	
	(This permit is	valid only for the date it is issued)			
Origi	nal at BHEL site Second Copy	y – BHEL SAFETY	Third Copy : C	ontractor	



SAFETY WORK CLEARANCE	Permit no.
Project:	Emergency Contact Nos:
Subcontractor:	

LIFTING ACTIVITY PERMIT

Area	•	Date	!!	
	e of Site Engineer (Permit Requesting Authority):			Name of Work
	orming Contractor:			
	e of Package In charge:)ate:
Desc	cription of Work:			
Work	Execution Date:Tim	ne Valid from:	to	
	above signing person(s) will be responsible to ensure the autions mentioned on the permit to work.	at the above described work	will be done under	all the safety
The f	following precautions are to be taken:			
No.	Item		Yes	Not require
1.	Crane used for lifting activity tested, certified and approved for	or rated lifting		
2.	All lifting tackles, gears/appliances are tested and certified fo	r lifting works.		
3.	Crane operator is trained and competent for lifting operation.			
4.	Lifting sling/ belt is protected against sharp edge of the jobs t	to be lifted.		
5.	Access and exit marked and without obstruction.			
6.	Lifting arrangement adequate.			
7.	Unwanted rubbish material removed from work platform.			
8.	Minimum 2 guidelines have been provided for balancing and	guiding jobs to be lifted.		
9.	Periphery area of crane booms as well as lifting job is barrica posted.	aded and unauthorized/no-entry	sign board	
10.	Rigger and signal man is trained and competent for lifting wo	rk.		
11.	No lifting activity to be carried out during lightening, heavy wi	nd/rain.		
12.	If scaffolding to be used during lift, scaffolding with valid tag a	available for use.		
13.	Double lanyards safety harness/belt checked an in working c	condition.		
14.	Safety shoes (non-slip), helmet with chin strap available with	employees.		
15.	Others.			
Nam	e of Contractor Safety Officer:	Sian:	Date:	Time:
	ewed and approved by BHEL Site Engineer (Permit I			
Nam	e:S	Sign:	Date:	Time:
	lerstand the precaution to be taken as described above a uted under my supervision by following all precaution an		ent and hereby cont	firm that work will be
Nam	e of Work Performing Authority:	Sign:	Date:	Time:
Perm	nit Cancellation:			
I here	eby declare that the work is complete, all workers under lition.	my control have been witho	lrawn and the site re	estored to safe tidy
	e of Work performing Authority:			
	e of Site Engr. (Permit Requesting Authority):			
Nam	e of BHEL Site Engr. (Permit Issuing Authority):	Sign:	Date:	Time:

(This permit is valid only for the date it is issued)



SAFETY WORK CLEARANCE	Permit no.
Project:	Emergency Contact Nos:
Subcontractor:	

WORKING AT HEIGHT PERMIT

Alea	l: <u> </u>	Date:	Tir	me:
Nam	e of Site Engineer (Permit Requesting Authority):		Sign: 1	Name of Work
Perfo	orming Contractor:			
	e of Package In charge:			ate:
Desc	cription of Work:			
Work	k Execution Date:Tin	me Valid from:	to	
The	above signing person(s) will be responsible to ensure to autions mentioned on the permit to work.			
The f	following precautions are to be taken:			
No.	Item		Yes	Not required
1.	All workers on job are medically fit for working at height (Pe	erson should not have vertigo)		
2.	Scaffolding with valid tag available for use			
3.	Safety harness with life line support/ fall arrester are checked	ed and in working condition		
4.	Safety shoes (non-slip), Helmet with chin strip available wit	th employees		
5.	Safety nets are provided as per design and provided 25 ft. b	below working area & extending	8 ft beyond.	
6.	Horizontal life lines are provided to cater to design specifical	ation of 2300kg per person.		
7.	Ladders have been inspected and provided as per BHEL st	andard/contract.		
8.	All lifting / tightening tools, hand tools/equipment checked a	and in good condition		
9.	Access and exit marked and without obstruction.			
10.	Lighting arrangement adequate.			
11.	Unwanted and rubbish material removed from working platf	orm.		
12.	Electrical cable, welding Hose/Compressed air hose proper	ly secured and lay down withou	t obstruction.	
13.	Signboards provided on working platforms			
14.	Hazards in the vicinity are identified and communicated to t	he worker.		
15.	Other			
Nam	e of Contractor Safety Officer:	Sign:	Date:	Time:
	lewed and approved by BHEL Site Engineer (Permit			
Nam	ie:	Sign:	Date:	Time:
	e of BHEL Safety Representative:			
	derstand the precaution to be taken as described above cuted under my supervision by following all precaution a		nent and hereby confi	irm that work will be
Nam	e of Work Performing Authority:	Sign:	Date:	Time:
Pern	nit Cancellation:			
	eby declare that the work is complete, all workers unde lition.	er my control have been with	drawn and the site re	stored to safe tidy
	e of Work performing Authority:			
	e of Site Engr. (Permit Requesting Authority):			
Nam	e of BHEL Site Engr. (Permit Issuing Authority):	Sign:	Date:	Time:

(This permit is valid only for the date it is issued)

Bharat Heavy Electricals Limited

Project - 5x800 MW Yadadri TPS

Volume-II Price Bid

Tender No. - YTPS: SCT: 202209-124

Erection, Testing & Commissioning including Handling of materials at site BHEL stores/storage yard, transporting to site of erection and supply & application of final painting of Control and Instrumentation (C&I) works for Unit 1 & 2 of 5x800 MW Yadadri Thermal Power Plant at Veerlapalem Village, Damercherla Mandal, Nalgonda DT., TSGENCO, Telangana, India.

Diddoulo Nomo						
Bidder's Name						
Ref. No.	Description	UOM	Qty	Rate	Amount	amount of each Item (Nearest to the 7 decimal
1	ERECTION AND COMMISSIONING OF LOCAL/FIELD MOUNTED INSTRUMENTS					
B.1.1	PD Type Mass flow meter in HFO,LDO/HSD & HFO return line with mounting flanges, electronics amplifier box, inter connecting cabling, etc.	SET	6	₹ 0.00	₹ 0.00	0.000106093
A.9.1, A.9.2, A.9.4, B.14.1.4, B.14.1.5, D.3.14, E.1.3, G.7.5, K.2.1, K.2.5, K.2.6, K.5.6, K.11.8, G.5.3, G.6.2	Pressure Transmitters / DP Transmitters / DP Type flow transmitters	Nos	1445	₹ 0.00	₹ 0.00	0.011077026
A.9.3, A.9.5, B.14.1.3, E.1.7, K.2.3, K.5.7	Level Transmitter (Guided Wave/Ultrasonic Type) along with accessories	Nos	178	₹ 0.00	₹ 0.00	0.005657902
A.9.7, A.9.8, B.1.2, B.6.1, B.14.1.1, C.1.1, D.3.2, D.3.13, E.1.1, E.1.2, E.4.1, F.1.4, G.5.2, G.6.1, G.7.6, G.11.3, K.2.2, K.3.2, K.4.2, K.5.8, K.6.16, K.11.11, K.11.12	Pressure / DP Gauge/Reverse Rotation Indicators	Nos	1942	₹ 0.00	₹ 0.00	0.010903499
K.11.1	Pressure Gauge with Switches	Nos	115	₹ 0.00	₹ 0.00	0.000774811
A.9.10, B.1.3, B.6.3, B.14.1.7, C.1.2, D.3.4, D.3.7, D.3.11, E.4.4, E.5.3, F.1.5, G.5.5, G.6.4, G.7.4, G.11.2, G.11.5, E.1.11	Temperature Gauge	Nos	814	₹ 0.00	₹ 0.00	0.006715238
A.9.11, B.1.5, F.1.6, F.1.7, K.2.4, K.5.9	Level Gauge	Nos	16	₹ 0.00	₹ 0.00	0.000320046
A.9.9, B.1.4, B.6.2, B.6.16, B.6.18, D.3.1, D.3.16, E.1.4, K.3.1, K.4.1, K.5.5	Pressure / Differential Pressure Switch / Temperature Switch	Nos	831	₹ 0.00	₹ 0.00	0.005835247
A.9.12, B.6.17, B.14.1.2, E.4.2, G.11.1, E.3.2, G.5.6	Level Switches (RF/Float/Capacitance/Conductivity type) along with accessories	Nos	138	₹ 0.00	₹ 0.00	0.002890561
A.9.6, B.1.6, B.14.1.6, B.14.1.15, D.3.3, D.3.8, D.3.12, E.1.5, E.2.1, G.5.4, G.6.3, G.7.1, G.7.2, E.3.1	Temperature Elements(RTD/Thermocouple with Thermowell) / Flow Elements	Nos	1500	₹ 0.00	₹ 0.00	0.010824895
A.9.14	E/P Coverters; I/P Converters,	Nos	62	₹ 0.00	₹ 0.00	0.000419581
E.1.10, D.3.15, G.7.7	Position Transmitters	Nos	40	₹ 0.00	₹ 0.00	0.000340168
B.6.19	ERV Controller with Pressure Switch App.Dimension(mm): 400x350x190; App.Wt: 10 kg	SET	8	₹ 0.00	₹ 0.00	0.000334299
B.1.7	FSSS Local Oil Gun Maintenance Switch Box	Nos	32	₹ 0.00	₹ 0.00	0.00041443
B.1.8, F.1.3	H.E.A Exciter Box with Accessories	SET	33	₹ 0.00	₹ 0.00	0.000750017
B.1.9, F.1.1	Flame Scanner Head Assembly with accessories	SET	65	₹ 0.00	₹ 0.00	0.001442271
B.5.2	Feeder Coal Flow Assembly flange mounted with Electronics	SET	16	₹ 0.00	₹ 0.00	0.001105547

	Volume-II I	Price	Bid			_
B.6.4, B.6.5, B.6.6, B.6.7, B.6.8, B.6.9, D.3.9, E.1.6, G.2.1	MTM T/C (Route Length 8 to 18 MM) - 8MM OD	Nos	578	₹ 0.00	₹ 0.00	0.009043354
B.6.10, B.6.11, B.6.12, B.6.13, B.6.14	MTM T/C (Route Length 20 to 28 MM) - 8MM OD	Nos	480	₹ 0.00	₹ 0.00	0.013978038
B.6.15	MTM T/C (Route Length 30 to 40 MM) - 8MM OD	Nos	24	₹ 0.00	₹ 0.00	0.000719025
D.3.5, G.5.1	Flow Switch/Flow meter/Flow Indicator/Vacuum Switch	Nos	12	₹ 0.00	₹ 0.00	0.000167449
D.3.6	GO No GO Switch	Nos	4	₹ 0.00	₹ 0.00	0.000163736
D.3.10	On/Off Switch Box including light assembly and interconnecting heat resistant cable	SET	4	₹ 0.00	₹ 0.00	0.0000833
E.2.2, E.4.3, G.11.6	Thermowells (Screwed & Welded)	Nos	108	₹ 0.00	₹ 0.00	0.0004091
E.1.8, G.7.8	Speed Measuring Loop/Speed Probe/Speed Sensor	Nos	24	₹ 0.00	₹ 0.00	0.000159903
B.14.1.16, J.1.1	Flow Transmitters (Other than DP type)	Nos	49	₹ 0.00	₹ 0.00	0.001557512
B.11.1.1, B.11.1.2, B.11.1.3	Air Filter Regulator-1/4"(OR) 1/2"(OR) 1"	Nos	64	₹ 0.00	₹ 0.00	0.000298007
B.14.1.8, B.14.1.9, B.14.1.10,	Analyzers (Ammonia Leak Detection/Density/pH/Conductivity)	Nos	19	₹ 0.00	₹ 0.00	0.000569228
E.1.9	Proximeter Units, Local Field Cable etc. for Governing Sytem	SET	80	₹ 0.00	₹ 0.00	0.000577328
C.1.3	Averaging Pitot Tube	SET	6	₹ 0.00	₹ 0.00	0.000142655
A.28.6	Fire protection switches & Emergency Push Buttons	Nos	16	₹ 0.00	₹ 0.00	0.000263511
II	ERECTION AND COMMISSIONING OF SPECIAL INSTRUMENTS					
A.10.1, A.10.2, B.14.1.11	High Temp/Low Temp O2 Analyzer	SET	32	₹ 0.00	₹ 0.00	0.005280273
A.10.5, D.1.1	Opacity Monitor	SET	10	₹ 0.00	₹ 0.00	0.002290895
A.10.6	SOX/NOX/CO (Combined) Analyzer	SET	2	₹ 0.00	₹ 0.00	0.001345281
A.10.3, A.10.4, A.10.7, A.10.8, B.14.1.12, B.14.1.13, B.14.1.14	CO/Velocity/HF/Mercury/NOX/SOX/NH3 Analyzer	SET	42	₹ 0.00	₹ 0.00	0.02251659
A.11.1, A.11.2, A.11.6, A.11.7	SWAS System	SET	2	₹ 0.00	₹ 0.00	0.003809914
Ш	ERECTION AND COMMISSIONING OF UPS/BATTERY & BATTERY CHARGER					
A.13.1	2X180 kVA UPS	SET	3	₹ 0.00	₹ 0.00	0.004507244
A.13.9, A.13.17	2X10 / 2X20 kVA UPS	SET	2	₹ 0.00	₹ 0.00	0.001804239
A.13.26.1	1 kVA/1.5 kVA/3 kVA/ 5kVA UPS	Nos	5	₹ 0.00	₹ 0.00	0.0000374
A.13.8, A.13.16, A.13.24	Lead Acid Plante Battery: (1285AH- 360V)/(220AH-220V)- made up of two banks of 110 cells each	SET	6	₹ 0.00	₹ 0.00	0.007277473
K.1.2, K.1.4, K.1.7, K.1.9, K.5.2	BATTERY 180 AH/6 CELLS	SET	6	₹ 0.00	₹ 0.00	0.000396973
A.13.2, A.13.10, A.13.18	ACDB	Nos	8	₹ 0.00	₹ 0.00	0.003011926
A.13.25	Power Distribution Board	Nos	2	₹ 0.00	₹ 0.00	0.000154543
IV	ERECTION AND COMMISSIONING OF CONTROL PANELS					
B.2.1, B.2.2	ASLD Panel Assy along with loose supplied items such as sensors, amplifiers, PSU, JB, Cables,etc	SET	2	₹ 0.00	₹ 0.00	0.000830268
D.2.1, D.2.2, D.2.3, D.2.4, D.2.5, D.2.6	ALCS Panels with controllers, Electronic Sensors, Interfacing box & Cables, etc.	SET	2	₹ 0.00	₹ 0.00	0.000964209
A.9.13	Coal bunker Level Monitoring System panel with accessories	SET	16	₹ 0.00	₹ 0.00	0.002559885
B.3.1	Furnace Camera CCTV head assembly panel with air filter regulators, hose, remote control box, 24" monitor and accessories	SET	4	₹ 0.00	₹ 0.00	0.000655602
G.1.1	Moisture Measurement System panel with controller and accessories	SET	4	₹ 0.00	₹ 0.00	0.000514864
G.1.2	Generator end Vibration Monitoring Cabinet with cables, monitors and accessories	SET	2	₹ 0.00	₹ 0.00	0.000266236
G.1.3	Grounding Brush Monitor (Wall mounted)	SET	2	₹ 0.00	₹ 0.00	0.000124179
G.1.4	H2 Gas Analyzer Cabinet	SET	4	₹ 0.00	₹ 0.00	0.000435152
A.8.1	HART Management System panel and	SET	2	₹ 0.00	₹ 0.00	0.001284285
	loose items					

A201, A202, A204, A205 Service Precior of Control of Co		Volume-II F	Price I	Bid			
S.5.1 Grawmeth Fleeder Ramole Power Cabriet Nos 15 ₹ 0.00 ₹ 0.00 0.00221852	A.20.1, A.20.2, A.20.4, A.20.5	· · · · · · · · · · · · · · · · · · ·	SET	1	₹ 0.00	₹ 0.00	0.0000923
A13.7, A13.15, A13.23 Battery Health Monitoring System Panels A7.2, E.5.1 TSI System for BFP Drive Turbine / Mein Turbine / Mein Turbine Congelled Sensors and Assembly A7.2, E.5.1 A12.13, A12.23, A12.23 A12.14 VMS Panels - Stripe Bay Nes 7	A.20.3	Slave Clock (RS 485 based)/NTP Based	Nos	25	₹ 0.00	₹ 0.00	0.000738878
A72,E51	B.5.1	Gravimetric Feeder Remote Power Cabinet	Nos	16	₹ 0.00	₹ 0.00	0.00221852
A 7.2 E.5.1 Turbine Complete Sensors and Assembly Nos 6 ₹ 0.00 ₹ 0.00 0.002416488 tenns A 12.13, A 12.23, A 12.33 VMS Pendes - Single Bay Nos 7 ₹ 0.00 ₹ 0.00 0.0000866999 B 1.10 \$19*Racks for Microprocessor based fisame scanner Amplifier \$10.00 ₹ 0.00 0.0000866999 B 1.10 \$10.00 \$10.00 ₹ 0.00 0.0000866999 B 1.10 \$10.00 \$10.00 \$0.000 \$0.000 0.000866999 A 7.1, A 12.12, A 12.22, A 12.32, F 1.2 \$19**Inch Recks for TSIV/MS Racks SET 29 ₹ 0.00 ₹ 0.00 0.000 0.000866999 A 8.10.2 \$1.000 \$10.00 \$10.00 0.000866999 A 8.00.2 \$1.000 \$10.00 0.000866999 A 8.000 \$1.000 0.00086699999 A 8.000 \$1.000 0.000866999999 A 8.000 \$1.000 0.00086699999999999999999999999999999999	A.13.7, A.13.15, A.13.23	Battery Health Monitoring System Panels	Nos	8	₹ 0.00	₹ 0.00	0.000808498
A.12.1.3. A.12.2.3. VMS Panels - Single Bay Nos 7	A.7.2, E.5.1	Turbine Complete Sensors and Assembly	Nos	6	₹ 0.00	₹ 0.00	0.002418488
B 1.10 197 Racks for Microprocessor based flame SET 16 ₹ 0.00 ₹ 0.00							
A.7.1, A.12.1.2, A.12.2.2, A.12.3.2, F.1.2 19 linch Racks for TSIVMS Racks B.10.2 Pulveriser Dynamic Classifier - VFD Panel Nos 16 ₹ 0.00 ₹ 0.00 0.0005693557 A.6.0.2.1, A.6.0.2.2, A.6.0.2.3 Network Panels Nos 9 ₹ 0.00 ₹ 0.00 0.000569736 A.6.0.2.4 Network Ecologues with without Ethernet Nos 18 ₹ 0.00 ₹ 0.00 0.000768641 IV-A Solitorian Nos 18 ₹ 0.00 ₹ 0.00 0.000768641 A.2.1, A.3.1, A.3.2, A.4.1, A.6.1.46 Sult of Toe Outsides Nos 22 ₹ 0.00 ₹ 0.00 0.000768641 A.2.1, A.3.1, A.3.2, A.3.5, A.3.6, A.3.7 A.3.3, A.5.1, A.3.5, A.3.6, A.3.7 A.3.3, A.5.1, A.3.5, A.3.6, A.3.7 A.3.4, A.3.5, A.3.6, A.3.7 IV-B DSWITTORY PANELS DSWITTORY PANELS Sult of Two Cubicles Nos 39 ₹ 0.00 ₹ 0.00 0.00054573 A.1.1, A.1.1, A.2.1, A.3.1,	B.1.10	19" Racks for Microprocessor based flame	SET	16	₹ 0.00	₹ 0.00	
A 6.0.2.1, A 6.0.2.2, A 6.0.2.3 Network Panels Nos 9 ₹ 0.00 ₹ 0.00 0.000545736 A 6.0.2.4 Network Enclosures with without Ethernet Switches Nos 18 ₹ 0.00 ₹ 0.00 0.000758641 NA ERECTION AND PLACEMENT OF DCSINETWORK PANEL A 2.1, A 3.1, A 3.2, A 4.1, A 6.1, A 6.4 A 1.1, A 1.2, A 1.3, A 2.2, A 3.3, A 3.4, A 5.4 A 1.4, A 1.5, A 2.3, A 3.5, A 3.6, A 3.7 A 1.4, A 1.5, A 2.3, A 3.5, A 3.6, A 3.7 A 1.4, A 1.5, A 2.3, A 3.5, A 3.6, A 3.7 A 1.4, A 1.5, A 2.3, A 3.5, A 3.6, A 3.7 NA B 1 ESTING & COMMISSIONING OF DCSINETWORK PANELS A 2.1.1, A 3.1.1, A 3.2.1, A 4.1.1, A 6.1.1 A 6.4.1 A 1.1.1, A 1.2.1, A 3.1.1, A 3.2.1, A 3.5.1 A 3.4, A 1.5, A 2.3, A 3.5, A 3.6.1 A 3.4, A 1.5, A 2.3, A 3.5, A 3.6.1 A 3.4, A 1.5, A 2.3, A 3.5, A 3.6.1 A 3.4, A 1.5, A 2.3, A 3.5, A 3.6.1 A 3.4, A 1.5, A 2.3, A 3.5, A 3.6.1 A 3.4, A 1.5, A 2.3, A 3.5, A 3.6.1 A 3.4, A 1.5, A 2.3, A 3.5, A 3.6.1 A 3.4, A 3.6, A 3.6 A 3.4, A 3.6	A.7.1, A.12.1.2, A.12.2.2, A.12.3.2, F.1.2	19 Inch Racks for TSI/VMS Racks	SET	29	₹ 0.00	₹ 0.00	0.008662162
Newtork Enclosures with without Ethernet Nots 18	B.10.2	Pulveriser Dynamic Classifier - VFD Panel	Nos	16	₹ 0.00	₹ 0.00	0.002693557
NA 0.24 Switches Nos 18	A.6.0.2.1, A.6.0.2.2, A.6.0.2.3	Network Panels	Nos	9	₹ 0.00	₹ 0.00	0.000545736
N/A ERECTION AND PLACEMENT OF DCS/NETWORK PANEL Image: Cost Procession of Cost Panel Image: Cost Panel	A.6.0.2.4		Nos	18	₹ 0.00	₹ 0.00	0.000758641
A.2.1, A.3.1, A.3.2, A.4.1, A.6.1, A.6.4 A.1.1, A.1.2, A.1.3, A.2.2, A.3.3, A.3.4, A.4.2, A.6.2 A.1.4, A.1.5, A.2.3, A.3.5, A.3.6, A.3.7, A.4.3, A.5.1, A.5.2, A.6.3 A.1.4, A.1.5, A.2.3, A.3.5, A.3.6, A.3.7, B.3.1, A.3.1, A.3.	IV-A	ERECTION AND PLACEMENT OF					
A42, A62 Sut of Two Cubicles Nos 25 ₹0.00 ₹0.00 0.00144442 A1.4, A.1.5, A.2.3, A.3.5, A.3.6, A.3.7, A.4.3, A.5.1, A.5.2, A.6.3 Suit of Turce Cubicles Nos 34 ₹0.00 ₹0.00 0.004050038 A.1.7 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.004050038 A.1.7 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.004050038 A.2.1.1, A.3.1.1, A.3.2.1, A.4.1.1, A.6.1.1, A.6.1.1, A.6.4.1 A.4.1.1, A.1.1.1, A.1.1.1, A.1.1.1, A.6.1.1, A.6.4.1 A.3.4.1, A.4.2.1, A.6.2.1 Suit of Two Cubicles Nos 22 ₹0.00 ₹0.00 0.001300095 A.1.1.1, A.1.2.1, A.1.3.1, A.2.2.1, A.3.3.1, A.3.4.1, A.4.2.1, A.6.2.1 Suit of Two Cubicles Nos 25 ₹0.00 ₹0.00 0.002166476 A.1.4.1, A.1.5.1, A.2.3.1, A.3.5.1, A.3.6.1, A.3.7.1, A.4.3.1, A.5.1.1, A.5.2.1, A.6.3.1 Suit of Two Cubicles Nos 34 ₹0.00 ₹0.00 0.004887433 A.1.6.1, A.2.4.1, A.3.8.1, A.3.9.1 Suit of Five Cubicles Nos 39 ₹0.00 ₹0.00 0.006075657 A.1.7.1 Suit of Five Cubicles Nos 39 ₹0.00 ₹0.00 0.006075657 A.1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.006075657 A.1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.008075657 A.1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.008075657 A.1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.006075657 A.1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.006075657 A.1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.006075657 A.1.7.1 Suit of Five Cubicles Nos 5 ₹0.00 ₹0.00 0.00815625 A.1.7.1 Suit of Five Cubicles Nos 5 ₹0.00 ₹0.00 0.00815625 A.1.7.1 Suit of Five Cubicles Nos 5 ₹0.00 ₹0.00 0.00815625 A.1.7.1 Suit of Five Cubicles Nos 5 ₹0.00 ₹0.00 0.00815625 A.1.7.1 Suit of Five Cubicles Nos 5 ₹0.00 ₹0.00 0.00815625 A.1.7.1 Suit of Five Cubicles Nos 6 ₹0.00 ₹0.00 0.00815625 A.1.7.1 Suit of Five Cubicles Nos 7 ₹0.00 ₹0.00 0.00815625 A.1.7.1 Suit of Five Cubicles Nos 7 ₹0.00 ₹0.00 0.00815625 A.1.7.1 Suit of Five Cubicles Nos 7 ₹0.00 ₹0.00 0.00815625 A.1.7.1 Suit of Five Cubicles Nos 7 ₹0.00 ₹0.00 0.00815625 A.1.7.1 Suit of Five Cubicles Nos 7 ₹0.00 ₹0.00 0.00815625 A.1.7.1 Suit of Five Cubicles Nos 7 ₹0.00 0.00815625 A.1.7.1 Suit of Five Cubicles Nos 7 ₹0.00 0.0081562	A.2.1, A.3.1, A.3.2, A.4.1, A.6.1, A.6.4	Suit of One Cubicles	Nos	22	₹ 0.00	₹ 0.00	0.00086662
A.1.4, A.1.5, A.2.3, A.3.5, A.3.6, A.3.7, A.4.3, A.5.1, A.5.2, A.6.3 A.1.6, A.2.4, A.3.8, A.3.9 A.1.7 Suit of Five Cubicles Nos 39 ₹ 0.00 ₹ 0.00 0.004050038 A.1.7 N°B TESTING & COMMISSIONING OF DCS. DCS.NETWORK PANELS Suit of Two Cubicles Nos 22 ₹ 0.00 ₹ 0.00 0.00130095 A.1.1.1, A.3.2.1, A.4.1.1, A.6.1.1, A.6.1.1, A.6.4.1 A.3.4.1, A.4.2.1, A.6.3.1 Suit of Two Cubicles Nos 25 ₹ 0.00 ₹ 0.00 0.00130095 A.1.1.1, A.1.2.1, A.1.3, 1.A.2.2.1, A.3.3.1, A.3.5.1, A.3.5.1, A.3.5.1 A.3.4.1, A.4.2.1, A.6.3.1 Suit of Two Cubicles Nos 25 ₹ 0.00 ₹ 0.00 0.002166476 A.1.4.1, A.1.5.1, A.2.3.1, A.3.5.1, A.3.6.1, A.3.7.1, A.4.3.1, A.5.1.1, A.5.2.1, A.6.3.1 Suit of Two Cubicles Nos 34 ₹ 0.00 ₹ 0.00 0.002166476 A.1.1.1, A.1.2.1, A.1.3, A.2.2.1, A.3.5.1, A.3.6.1, A.3.7.1, A.4.3.1, A.5.1.1, A.5.2.1, A.6.3.1 Suit of Two Cubicles Nos 34 ₹ 0.00 ₹ 0.00 0.002166476 A.1.1.1, A.1.2.3.1, A.3.5.1, A.3.6.1, Suit of Two Cubicles Nos 34 ₹ 0.00 ₹ 0.00 0.002166476 A.1.1.1, A.2.3.1, A.3.5.1, A.3.6.1, Suit of Two Cubicles Nos 34 ₹ 0.00 ₹ 0.00 0.002166476 A.1.1.1, A.2.3.1, A.3.5.1, A.3.6.1, Suit of Two Cubicles Nos 34 ₹ 0.00 ₹ 0.00 0.002166476 A.1.1.1, A.2.3.1, A.3.5.1, A.3.6.1, Suit of Two Cubicles Nos 34 ₹ 0.00 ₹ 0.00 0.000875057 A.1.7.1 Suit of Five Cubicles Nos 4 ₹ 0.00 ₹ 0.00 0.000875057 A.1.7.1 Suit of Five Cubicles Nos 4 ₹ 0.00 ₹ 0.00 0.000875057 A.1.7.1 Suit of Five Cubicles Nos 4 ₹ 0.00 ₹ 0.00 0.000875057 A.1.1.1, A.1.2.1, A.1.2.1, A.1.2.1, A.2.1.2, A.2.1.3, A.2.2.1, A.2.2.3, A.2.3.3, A.2.2.3, A.2.3.3,		Suit of Two Cubicles	Nos	25	₹ 0.00	₹ 0.00	0.001444442
A.1.7 Suit of Five Cubicles Nos 4 ₹ 0.00 ₹ 0.00 0.00054373		Suit of Three Cubicles	Nos	34	₹ 0.00	₹ 0.00	0.003258458
IV-B TESTING & COMMISSIONING OF DENNETWORK PANELS Suit of One Cubicles Nos 22 ₹ 0.00 ₹ 0.00 0.001300095 A1.11, A1.21, A.1.31, A2.21, A.3.31, A3.41, A4.21, A6.2.1 Suit of One Cubicles Nos 25 ₹ 0.00 ₹ 0.00 0.002166476 A1.41, A1.51, A2.31, A3.51, A3.61, A3.61, A3.61, A3.71, A4.3.1, A5.11, A5.11, A5.21, A6.3.1 Suit of Tree Cubicles Nos 34 ₹ 0.00 ₹ 0.00 0.004887433 A1.61, A2.41, A3.81, A3.9.1 Suit of Five Cubicles Nos 39 ₹ 0.00 ₹ 0.00 0.006075057 A1.7.1 Suit of Five Cubicles Nos 4 ₹ 0.00 ₹ 0.00 0.008075057 A1.7.1 Suit of Five Cubicles Nos 4 ₹ 0.00 ₹ 0.00 0.000815625 NSTALLATION AND COMMISSIONING OF HIM SYSTEM, STATION LAN, OFFICE WAN WITH COMPLETE ACCESSORIES FOR CCR&BOP Printers (Laser) Printers (Laser) Printers (Laser) Printers (Laser) Printers (Laser) Responsible of the printers (Laser) <							
A2.1.1, A3.1.1, A3.2.1, A.4.1.1, A.6.1.1 A6.4.1 A1.1.1, A1.2.1, A1.3.1, A2.2.1, A3.3.1 A3.4.1, A4.2.1, A6.2.1 Suit of Two Cubicles Nos 25 ₹0.00 ₹0.00 0.001300095 A1.4.1, A1.5.1, A2.3.1, A3.5.1, A3.6.1, A3.7.1, A4.3.1, A5.2.1, A6.3.1 Suit of Two Cubicles Nos 34 ₹0.00 ₹0.00 0.002166476 A1.4.1, A1.5.1, A2.3.1, A3.5.1, A3.6.1, A3.7.1, A4.3.1, A5.2.1, A6.3.1 Suit of Three Cubicles Nos 34 ₹0.00 ₹0.00 0.004887433 A1.6.1, A2.4.1, A3.8.1, A3.9.1 Suit of Four Cubicles Nos 39 ₹0.00 ₹0.00 0.006075057 A1.7.1 Suit of Five Cubicles Nos A1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.006075057 A1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.006075057 A1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.006075057 A1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.000675057 A1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.000675057 A1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.000675057 A1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.000675057 A1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.000675057 A1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.000675057 A1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.000675057 A1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.000675057 A1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.000675057 A1.7.1 A2.1.1, A2.1.2, A2.1.3, A2.1.4 Suit of Five Cubicles Nos 28 ₹0.00 ₹0.00 0.0016692534 Cubicles A1.7.1 A2.7.1, A2.2.1.2, A2.2.1.3, A2.2.1.3, A2.2.1.3, A2.2.1.3, A2.2.2.1, A2.2.2.2, A2.2.3.1, A2.2.3.2, A2.2.4.1, A2.2.4.2, A2.2.5.1, A2.2.5.1, A2.2.5.1, A2.2.5.1, A2.2.5.2, A2.2.5.1, A2.2.5.2, A2.2.7.1, A2.2.7.2, A2.2.8.1, A2.2.6.2, A2.2.7.1, A2.2.7.2, A2.2.8.1, A2.2.6.2, A2.2.7.1, A2.2.7.2, A2.2.8.1, A2.2.6.2, A2.2.7.1, A2.2.7.2, A2.2.8.1, A2.2.6.2, A2.2.7.1, A2.2.7.2, A2.2.8.1, A2.2.6.1, A2.6.2, A2.2.7.1, A2.2.7.2, A2.2.8.1, A2.2.6.2, A2.2.7.1, A2.2.7.2, A2.2.8.1, A2.2.6.2, A2.2.7.1, A2.2.7.2, A2.2.8.1, A2.2.8.2, A2.2.7.1, A2.2.7.2, A2.2.8.2, A2.2.8.1, A2.2.8.2, A2.2.8.1,			Nos	4	₹ 0.00	₹ 0.00	0.00054373
A.1.1.1, A.1.2.1, A.1.3.1, A.2.2.1, A.3.3.1, A.3.6.1, A.3.7.1, A.4.3.1, A.5.2.1, A.6.3.1 Suit of Two Cubicles Nos 25 ₹0.00 ₹0.00 0.002166476 A.1.4.1, A.1.5.1, A.2.3.1, A.3.5.1, A.3.6.1, A.3.7.1, A.4.3.1, A.5.2.1, A.6.3.1 Suit of Three Cubicles Nos 34 ₹0.00 ₹0.00 0.004887433 A.1.6.1, A.2.4.1, A.3.8.1, A.3.9.1 Suit of Four Cubicles Nos 39 ₹0.00 ₹0.00 0.006075057 A.1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.006075057 A.1.7.1 Suit of Five Cubicles Nos 4 ₹0.00 ₹0.00 0.006075057 BINSTALLATION AND COMMISSIONING OF HMI SYSTEM, STATION LAN, OFFICE WAN WITH COMPLETE ACCESSORIES FOR CRABOP A.2.1.1, A.2.1.2, A.2.1.3, A.2.1.4 Large Video Screen (67-80") with accessories Series Ser		DCS/NETWORK PANELS					
A3.4.1, A4.2.1, A.6.2.1 Suit of Two Cubicles Nos 25 ₹ 0.00 ₹ 0.00 0.002166476 A1.4.1, A.1.5.1, A.2.3.1, A.3.5.1, A.3.6.1, A.3.7.1, A.4.3.1, A.5.1.1, A.5.2.1, A.6.3.1 Suit of Three Cubicles Nos 34 ₹ 0.00 ₹ 0.00 0.004887433 A.1.6.1, A.2.4.1, A.3.8.1, A.3.9.1 Suit of Four Cubicles Nos 4 ₹ 0.00 ₹ 0.00 0.006075057 A.1.7.1 Suit of Five Cubicles Nos 4 ₹ 0.00 ₹ 0.00 0.006075057 BINSTALLATION AND COMMISSIONING OF HMI SYSTEM,STATION LAN, OFFICE WAN WITH COMPLETE ACCESSORIES FOR CCR&BOP A.2.1.1, A.2.2.3, A.2.2.3, A.2.2.7.3, A.22 Printers (Laser Jet/DofmatrixA4/A3/COLOUR/BW) Large Video Screen (67-80°) with SET 26 ₹ 0.00 ₹ 0.00 0.015692534 K.9.12 Video Wall of size 4200 (W)x1600(H) with SET 2 ₹ 0.00 ₹ 0.00 0.00144856 A.12.1.5, A.22.1.1, A.22.1.2, A.22.1.3, A.22.2.1, A.22.2.3, A.22.2.1, A.22.2.3, A.22.3.1, A.22.3.2, A.22.4.1, A.22.4.2, A.22.5.1, A.22.5.2, A.2.7.1, A.22.7.2, A.22.8.1, A.22.8.2, K.6.19, K.8.1, K.8.5, K.8.9, K.9.1		Suit of One Cubicles	Nos	22	₹ 0.00	₹ 0.00	0.001300095
A.3.7.1, A.4.3.1, A.5.2.1, A.6.3.1 Suit of Four Cubicles Nos 39 ₹ 0.00 ₹ 0.00 0.006075057 A.1.7.1 Suit of Five Cubicles Nos 4 ₹ 0.00 ₹ 0.00 0.006075057 A.1.7.1 Suit of Five Cubicles Nos 4 ₹ 0.00 ₹ 0.00 0.006075057 A.1.7.1 Suit of Five Cubicles Nos 4 ₹ 0.00 ₹ 0.00 0.000815625 INSTALLATION AND COMMISSIONING OF HMI SYSTEM, STATION LAN, OFFICE WAN WITH COMPLETE ACCESSORIES FOR CCR&BOP 22.2.3, A.22.3.3, A.22.4.3, A.22.7.3, A.22 A.21.1, A.21.2, A.21.3, A.21.4 Large Video Screen (67-80") with accessories SET 26 ₹ 0.00 ₹ 0.00 0.015692534 K.9.12 Video Wall of size 4200 (W)x1600(H) with accessories SET 2 ₹ 0.00 ₹ 0.00 0.00144856 A.12.1.5, A.22.1.1, A.22.1.2, A.22.1.3, A.22.2.4, A.22.2.1, A.22.2.2, A.22.3.1, A.22.2.2, C.22.3.1, A.22.2.2. OWS with Monitor/Servers/Stations/User PC Nos 99 ₹ 0.00 ₹ 0.00 0.004340019 A.12.1.5, A.22.1.7, A.22.7.2, A.22.7.7, A.22.7.2, A.22.8.1, A.22.8.2, K.6.19, K.8.1, K.8.5, K.8.9, K.9.1	A.1.1.1, A.1.2.1, A.1.3.1, A.2.2.1, A.3.3.1, A.3.4.1, A.4.2.1, A.6.2.1	Suit of Two Cubicles	Nos	25	₹ 0.00	₹ 0.00	0.002166476
A.1.7.1 Suit of Five Cubicles Nos 4 ₹ 0.00 ₹ 0.00 0.000815625 INSTALLATION AND COMMISSIONING OF HMI SYSTEM,STATION LAN, OFFICE WAN WITH COMPLETE ACCESSORIES FOR CCR&BOP 22.2.3, A.22.3.3, A.22.4.3, A.22.7.3, A.22 Printers (Laser Jet/DotmatrixA4/A3/COLOUR/BW)	A.1.4.1, A.1.5.1, A.2.3.1, A.3.5.1, A.3.6.1, A.3.7.1, A.4.3.1, A.5.1.1, A.5.2.1, A.6.3.1	Suit of Three Cubicles	Nos	34	₹ 0.00	₹ 0.00	0.004887433
INSTALLATION AND COMMISSIONING OF HMI SYSTEM,STATION LAN, OFFICE WAN WITH COMPLETE ACCESSORIES FOR CCR&BOP	A.1.6.1, A.2.4.1, A.3.8.1, A.3.9.1	Suit of Four Cubicles	Nos	39	₹ 0.00	₹ 0.00	0.006075057
OF HMI SYSTEM,STATION LAN, OFFICE WAN WITH COMPLETE ACCESSORIES FOR CCR&BOP 22.2.3, A.22.3.3, A.22.4.3, A.22.7.3, A.22 Printers (Laser Jet/DotmatrixA4/A3/COLOUR/BW) Nos 28 ₹ 0.00 ₹ 0.00 0.000767594 A.21.1, A.21.2, A.21.3, A.21.4 Large Video Screen (67-80") with accessories SET 26 ₹ 0.00 ₹ 0.00 0.015692534 K.9.12 Video Wall of size 4200 (W)x1600(H) with accessories SET 2 ₹ 0.00 ₹ 0.00 0.00144856 A.12.1.5, A.22.1.1, A.22.1.2, A.22.1.3, A.22.2.1, A.22.2.2, A.22.3.1, A.22.3.2, A.22.4.1, A.22.4.2, A.22.5.1, A.22.5.1, A.22.5.2, A.22.6.2, A.22.7.1, A.22.7.2, A.22.8.2, K.6.19, K.8.1, K.8.5, K.8.9, K.9.1 OWS with Monitor/Servers/Stations/User PC Nos 99 ₹ 0.00 ₹ 0.00 0.004340019	A.1.7.1	Suit of Five Cubicles	Nos	4	₹ 0.00	₹ 0.00	0.000815625
A.21.1, A.21.2, A.21.3, A.22.1.4 K.9.12 A.21.1, A.22.1.2, A.22.1.3, A.22.1.3, A.22.1.4 A.21.1, A.22.1.2, A.22.1.3, A.22.1.4 A.21.1, A.22.1.2, A.22.1.3, A.22.1.4 A.21.1, A.22.1.2, A.22.1.3, A.22.1.3, A.22.1.4 A.22.2.1, A.22.2.2, A.22.3.1, A.22.3.2, A.22.3.1, A.22.3.2, A.22.4.1, A.22.4.2, A.22.5.1, A.22.5.2, A.22.6.1, A.22.6.2, A.22.7.1, A.22.7.2, A.22.8.1, A.22.8.2, K.6.19, K.8.1, K.8.5, K.8.9, K.9.1 A.21.1, A.21.2, A.21.3, A.22.1.4 Bet/DotmatrixA4/A3/COLOUR/BW) SET		OF HMI SYSTEM, STATION LAN, OFFICE WAN WITH COMPLETE ACCESSORIES					
A.21.1, A.21.2, A.21.3, A.21.4 Large Video Screen (67-80") with accessories SET 26 ₹ 0.00 ₹ 0.00 0.015692534 K.9.12 Video Wall of size 4200 (W)x1600(H) with accessories SET 2 ₹ 0.00 ₹ 0.00 0.00144856 A.12.1.5, A.22.1.1, A.22.1.2, A.22.1.3, A.22.3.2, A.22.3.1, A.22.3.2, A.22.3.1, A.22.3.2, A.22.4.1, A.22.4.2, A.22.5.1, A.22.5.2, A.22.5.1, A.22.5.2, A.22.6.1, A.22.6.2, A.22.7.1, A.22.7.2, A.22.8.1, A.22.8.2, K.6.19, K.8.1, K.8.5, K.8.9, K.9.1 OWS with Monitor/Servers/Stations/User PC Nos 99 ₹ 0.00 ₹ 0.00 0.004340019 0.004340019	.22.2.3, A.22.3.3, A.22.4.3, A.22.7.3, A.22	,	Nos	28	₹ 0.00	₹ 0.00	0.000767594
K.9.12 Video Wall of size 4200 (W)x1600(H) with accessories SET 2 ₹ 0.00 ₹ 0.00 0.00144856 A.12.1.5, A.22.1.1, A.22.1.2, A.22.1.3, A.22.2.1, A.22.2.2, A.22.3.1, A.22.3.2, A.22.4.1, A.22.2.2, A.22.3.1, A.22.3.2, A.22.5.1, A.22.5.2, A.22.6.1, A.22.5.1, A.22.5.2, A.22.6.1, A.22.6.2, A.22.7.1, A.22.7.2, A.22.8.1, A.22.8.2, K.6.19, K.8.1, K.8.5, K.8.9, K.9.1 Nos 99 ₹ 0.00 ₹ 0.00 0.004340019	A.21.1, A.21.2, A.21.3, A.21.4	Large Video Screen (67-80") with	SET	26	₹ 0.00	₹ 0.00	0.015692534
A.12.1.5, A.22.1.1, A.22.1.2, A.22.1.3, A.22.2.1, A.22.2.2, A.22.3.1, A.22.3.2, A.22.4.1, A.22.4.2, A.22.5.1, A.22.5.2, A.22.6.1, A.22.6.2, A.22.7.1, A.22.7.2, A.22.8.1, A.22.8.2, K.6.19, K.8.1, K.8.5, K.8.9, K.9.1 OWS with Monitor/Servers/Stations/User PC Nos 99 ₹ 0.00 0.004340019	K.9.12	Video Wall of size 4200 (W)x1600(H) with	SET	2	₹ 0.00	₹ 0.00	0.00144856
V INSTALLATION OF FLIRNITURES	A.22.2.1, A.22.2.2, A.22.3.1, A.22.3.2, A.22.4.1, A.22.4.2, A.22.5.1, A.22.5.2, A.22.6.1, A.22.6.2, A.22.7.1, A.22.7.2, A.22.8.1, A.22.8.2, K.6.19, K.8.1, K.8.5,		Nos	99	₹ 0.00	₹ 0.00	0.004340019
	V	INSTALLATION OF FURNITURES					

	Volume-II F	Price I	Bid			
A.25.1, A.25.2	Unit Operator Desk-8 Section with Accessories	SET	4	₹ 0.00	₹ 0.00	0.003258787
A.25.3	Operator Desk-6 Section with Accessories	SET	1	₹ 0.00	₹ 0.00	0.00066737
A.25.4	Operator Desk-3 Section with Accessories	SET	1	₹ 0.00	₹ 0.00	0.000393394
A.25.5	Operator Desk-2 Section with Accessories	SET	7	₹ 0.00	₹ 0.00	0.001824032
A.23.1, A.23.2, A.23.3, A.25.6, A.25.7, A.25.8, A.25.9, A.25.10, A.25.12, A.25.13, A.25.14, A.25.15, A.25.16, A.25.17, A.25.18, K.6.21, K.6.22, K.8.3, K.8.4, K.8.7, K.8.8, K.8.10, K.8.11, K.9.3, K.9.4	Computer Table/Printer Table/Chairs	SET	600	₹ 0.00	₹ 0.00	0.031450586
A.25.11	PC/Server Rack	SET	4	₹ 0.00	₹ 0.00	0.000394667
A.25.19, A.25.20	Almirah/Safety Locker	SET	4	₹ 0.00	₹ 0.00	0.000123371
VI	INSTALLATION OF C&I BENCH FOR					
	CALIBRATION INSTRUMENTS	OFT	4	3. 0.00	35.0.00	0.004077000
A.24.1.1, A.24.2.1	Electronic Test Bench Inspection and Handing over-	SET	1	₹ 0.00	₹ 0.00	0.004077886
K.6.24, K.6.26	Laptops/Graphic Software licences		5	₹ 0.00	₹ 0.00	0.000275788
\ni	ERECTION AND COMMISSIONING OF					
VII	JB/PUSH BUTTONS					
A.12.1.1, A.12.2.1, A.12.3.1, A.17.1, A.17.2, A.17.3, A.17.4, A.17.5, A.17.6, A.17.7, A.17.8, A.20.13, B.9.1, B.9.2, B.9.3, B.9.4, B.9.5, B.9.6, B.10.3, B.14.3.1, B.14.3.2, B.14.3.3, B.14.3.4, B.14.3.5, E.6.7, F.1.8, F.1.9, G.10.1, G.10.2, E.3.3	Junction Boxes 6 way to 128 way	Nos	1434	₹ 0.00	₹ 0.00	0.016381704
B.14.4.1, B.14.4.2, G.10.3	Push Button Station	Nos	54	₹ 0.00	₹ 0.00	0.00036625
VIII	ERECTION AND COMMISSIONING OF LIE/LIR					
E.6.1, E.6.2, E.6.3, E.6.4	Local Gauge Boards	SET	20	₹ 0.00	₹ 0.00	0.001440025
A.14.1, A.14.2, A.14.3, B.10.1, B.14.6.1	Local Instrument Enclosure	SET	208	₹ 0.00	₹ 0.00	0.014970036
A.14.4, A.14.5, A.14.6, A.14.7, E.6.5, E.6.6, G.8.1, G.8.2	Local Instrument Rack	SET	222	₹ 0.00	₹ 0.00	0.014791028
IX	ERECTION AND COMMISSIONING OF PNEUMATIC POWER CYLINDERS (ON/OFF & REGULATING TYPE)					
B.4.1	SADC	SET	264	₹ 0.00	₹ 0.00	0.011925171
B.4.2, B.4.3	PA/ID/FD Blade Pitch & other Control Dampers	SET	44	₹ 0.00	₹ 0.00	0.003735921
B.4.4, B.4.5, F.1.14	Hot Air/Cold Air/FD Fan Regulating Dampers	SET	34	₹ 0.00	₹ 0.00	0.003507386
B.4.6	Dynavane Filter Pressure Control Damper with SMART positioner	SET	2	₹ 0.00	₹ 0.00	0.000186434
E.3.4	Solenoid Opeated Valves	SET	16	₹ 0.00	₹ 0.00	0.0000944
E.2.3, K.3.3, K.4.3, K.5.3	Solenoid Valves	Nos	331	₹ 0.00	₹ 0.00	0.001947628
Х	LAYING OF POWER CABLES					
A.13.3, A.13.4	UN 0000 - Uninyvin- Equivalent: 1Cx109 Sqmm Cu	Mtrs	3600	₹ 0.00	₹ 0.00	0.002102096
A.13.11, A.13.12, A.13.19, A.13.20	UN 4 - Uninyvin- Equivalent: 1Cx21.5 Sqmm Cu	Mtrs	440	₹ 0.00	₹ 0.00	0.000138343
K.1.14, K.5.10	1CX90 SQMM CU	Mtrs	115	₹ 0.00	₹ 0.00	0.0000672
XI	TERMINATION OF POWER CABLES	.	00	35.0.00	35.0.00	0.00044044
A.26.1, A.26.2	UN 0000 - 1CX109 SQMM CU	Nos	80	₹ 0.00	₹ 0.00	0.00014014
A.26.3, A.26.4, A.26.5, A.26.6	UN 4 - 1CX21.5 SQMM CU	Nos	12	₹ 0.00	₹ 0.00	0.0000117
K.1.15,K.5.11	1CX90 SQMM CU		24	₹ 0.00	₹ 0.00	0.0000420
XII	LAYING AND TERMINATION OF CONTROL CABLES					
K.1.17, K.3.5, K.4.5, K.11.14	2CX1.5 SQMM/2CX2.5 SQMM	1	11322	₹ 0.00	₹ 0.00	0.001525636

	Volume-II F	Price	Bid			
A.15.4.1, A.20.7, B.7.11, B.7.21,	3CX2.5 SQMM/4CX2.5 SQMM/4CX6					
B.14.2.7, G.4.1, K.6.27, K.6.28, K.1.13	SQMM	Mtrs	236010	₹ 0.00	₹ 0.00	0.031802283
A.15.4.2, B.7.12, B.7.13, B.7.22, B.14.2.8	5CX2.5 SQMM/7CX2.5 SQMM	Mtrs	29860	₹ 0.00	₹ 0.00	0.004470697
B.7.14, B.7.15, B.14.2.9, B.14.2.10, K.1.12, K.5.12	9CX2.5 SQMM/10CX2.5 SQMM/12CX2.5 SQMM	Mtrs	17905	₹ 0.00	₹ 0.00	0.003216925
XIII	LAYING AND TERMINATION OF INDIVIDUAL & OVERALL SHIELDED (TYPE G/F), TWISTED PAIR, ARMOURED/UNARMOURED CABLES					
A.15.1.1, A.15.1.3, A.15.2.1, A.15.3.1, A.15.3.6, A.20.8, B.7.1, B.7.2, B.7.6, B.7.7, B.7.17, B.7.23, B.7.24, B.14.2.4, B.14.2.11, G.16.1.1, G.16.1.5, J.3.1	2PX0.5 SQMM/ 2TX0.5SQMM/ 2PX1.5SQMM/ 2PX1.31SQMM/ 2PX16AWG KX/G CABLE	Mtrs	318854	₹ 0.00	₹ 0.00	0.038191546
.3, B.7.8, B.7.18, B.7.20, B.14.2.1, B.14.2	4PX0.5 SQMM/ 6PX0.5SQMM F/G CABLE	Mtrs	528172	₹ 0.00	₹ 0.00	0.079078926
B.7.4, B.7.9, B.7.19, B.14.2.2, B.14.2.6, G		Mtrs	505735	₹ 0.00	₹ 0.00	0.098435499
B.7.5, B.7.10, B.7.16, B.14.2.3, G.16.1.4, .	12PX0.5 SQMM/ 12PX1.31 SQMM KX CABLE	Mtrs	99740	₹ 0.00	₹ 0.00	0.022399896
J.2.4	20PX0.5SQMM	Mtrs	19200	₹ 0.00	₹ 0.00	0.004311991
.12.1.7, A.12.2.5, A.12.3.5, A.15.5.4, A.20	CAT-6 UTP CABLES/Ethernet Cables	Mtrs	30880	₹ 0.00	₹ 0.00	0.002311706
A.13.5, A.13.6, A.13.13, A.13.14, A.13.21, A.13.22, A.20.6	RS-485/RG-58 CABLE	Mtrs	22840	₹ 0.00	₹ 0.00	0.005129473
A.15.5.6, K.9.7, K.9.10	HDPE Conduits for laying OFC Cables	Mtrs	22800	₹ 0.00	₹ 0.00	0.019799227
A.12.2.4, A.12.3.4, A.15.5.5, A.20.10, K.6.29, K.9.6, K.9.9	Laying of Optical Fibre Cable	Mtrs	85500	₹ 0.00	₹ 0.00	0.019201836
A.15.5.7, A.20.11, K.6.30, K.9.8, K.9.11	Splicing of Optical Fibre Cable	Nos	710	₹ 0.00	₹ 0.00	0.001722102
K.6.11	Laying and Termination of Special Cable- OLHS Cables	Mtrs	75000	₹ 0.00	₹ 0.00	0.016843716
XIV	ERECTION OF CABLE TRAYS WITH/WITHOUT COVER					
A.16.1, A.16.3, B.8.1, B.14.5.1, E.8.2, F.1.10, K.6.33	PERFORATED CABLE TRAYS 50 MM WIDE	Mtrs	14260	₹ 0.00	₹ 0.00	0.015158745
A.16.2, A.16.4, B.8.2, B.14.5.2, K.6.32	PERFORATED CABLE TRAYS 100 MM WIDE	Mtrs	20000	₹ 0.00	₹ 0.00	0.027548833
B.8.3, E.8.3, F.1.11	PERFORATED CABLE TRAYS 150 MM WIDE	Mtrs	7690	₹ 0.00	₹ 0.00	0.012319569
K.6.31	PERFORATED CABLE TRAYS 200 MM WIDE	Mtrs	250	₹ 0.00	₹ 0.00	0.000378048
K.11.15	PERFORATED CABLE TRAYS 300 MM WIDE	Mtrs	75	₹ 0.00	₹ 0.00	0.000132504
A.28.2	Duct Tray - 60x60x1000 mm	Mtrs	216	₹ 0.00	₹ 0.00	0.000287825
A.28.3	Duct Tray - 180x100x1000 mm	Mtrs	146	₹ 0.00	₹ 0.00	0.000351936
A.28.4 XVIII	Duct Tray - 250x100x1000 mm FABRICATION AND INSTALLATION OF GI	Mtrs	180	₹ 0.00	₹ 0.00	0.000795023
	FLATS Earth Elat (50v6)	N At	250	₹ 0 00	₹ 0.00	0.000000644
B.14.8.1 B.14.8.2	Earth Flat (50x6) Earth Wire 1.219 mm Gl	Mtrs Mtrs	250 700	₹ 0.00 ₹ 0.00	₹ 0.00 ₹ 0.00	0.000209611 0.0000734
XIX	FABRICATION AND INSTALLATION OF STRUCTURAL STEEL	IVIUS	700	. 0.00	0.00	0.000707
A.28.1, B.12.1, B.14.7.1, E.5.2, E.7.1, F.1.13, G.10.4	STRUCTURAL STEEL (ISMC/ISMB/ANGLE etc)	MT	39.2	₹ 0.00	₹ 0.00	0.008705635
A.28.5	Assembly and Installation of Mountig frames	Nos	20	₹ 0.00	₹ 0.00	0.003593326
xx	ERECTION AND TESTING OF IMPULSE PIPES CS/AS/SS , INSTRUMENT VALVES AND FITTINGS					
A.11.3	AS pipes 2"	Mtrs	280	₹ 0.00	₹ 0.00	0.001115129

	Volume-II i	Price	Bid			
A.18.1, A.18.2, A.18.3, A.18.4, A.18.5, A.18.6, A.18.7, A.18.8, A.18.9, G.9.5, G.9.6, G.9.7, G.9.8, G.9.9, B.11.2.1, B.11.2.2, B.11.2.3, B.11.2.4, B.11.2.5, B.11.2.6, B.11.2.7	AS tubes upto 1"	Mtrs	55590	₹ 0.00	₹ 0.00	0.134833272
E.7.2, G.9.1, G.9.3, G.9.4	CS tubes upto 1"	Mtrs	4740	₹ 0.00	₹ 0.00	0.009438769
G.9.2 A.11.5, B.11.1.4, B.11.1.5, B.11.1.6, B.11.1.7, B.14.9, E.7.3, E.7.4, F.1.12	CS pipes above >2" upto 4" SS tubes upto 1"	Mtrs Mtrs	160 12990	₹ 0.00	₹ 0.00	0.001051647 0.008363017
A.11.4	SS pipes 2"	Mtrs	120	₹ 0.00	₹ 0.00	0.000154513
A.19.1, A.19.2, A.19.3	Instrument Valves and Accessories	Nos	46	₹ 0.00	₹ 0.00	0.000111573
XXI	ERECTION AND TESTING OF HOSES, TUBES & GI PIPES					
A.20.12	Flexible GI Conduits	Mtrs	200	₹ 0.00	₹ 0.00	0.000176672
B.11.1.8, B.11.1.9, B.11.1.10	1/4,1/2,1 INCH TEFLON HOSE 1MTR/2MTR/3MTR LONG	Nos	316	₹ 0.00	₹ 0.00	0.000373766
B.12.2	1/2" GI Pipe	Mtrs	2430	₹ 0.00	₹ 0.00	0.003019741
XXII	COMMISSIONING OF THE FOLLOWING ERECTED BY MECHANICAL AGENCY					
B.13.9	Burner Tilt Shear Pin Failure Indication JB with accessories	Nos	32	₹ 0.00	₹ 0.00	0.001696529
B.14.10.4, C.2.1, E.9.5, F.2.1, F.2.2, F.2.3, G.12.4, G.12.8, G.12.9, J.4.1, E.9.11, E.9.12	Control Valves with Smart positioner/AFR/Air Lock valves etc for LO TCV, Gland Steam Inlet/Sootblower, Dump,etc applications	SET	353	₹ 0.00	₹ 0.00	0.003551643
H.1.4, H.1.5, H.1.6	HT Drives (11 kV/3.3 kV)	Nos	75	₹ 0.00	₹ 0.00	0.001933659
D.4.5	Field Instruments (Level Gauges/Pressure/DP/Temperature Gauges)	Nos	48	₹ 0.00	₹ 0.00	0.000389517
B.13.1, B.13.7, G.12.6	Limit Switches/Level Switches	Nos	304	₹ 0.00	₹ 0.00	0.001137887
B.13.3, B.13.4, B.13.5, B.14.10.1, B.14.10.2, B.14.10.3, C.2.2, C.2.3, D.4.1, E.9.2, E.9.4, E.9.6, E.9.7, E.9.8, F.2.4, F.2.5, F.2.6, G.12.2, H.1.3, J.4.2K.1.1, K.1.3, K.1.5, K.1.6, K.1.8, K.1.10, K.5.1, G.12.19	LT Unit Directional/Bi-Directional drives of various applications	Nos	879	₹ 0.00	₹ 0.00	0.007198825
B.13.2	Motor Starter Panels	SET	2	₹ 0.00	₹ 0.00	0.0000320
B.13.6, D.4.2	Pneumatic Actuators for Dampers	Nos	88	₹ 0.00	₹ 0.00	0.006639149
D.4.6, H.1.1 B.13.8, D.4.3, G.12.7	RTDs/Thermowells of various drives Solenoid Valves for different applications like Corner Station valves, Regulating valves, etc.	Nos	1786 552	₹ 0.00	₹ 0.00 ₹ 0.00	0.005668951
XXIII	REMOVAL, CALIBRATION & RE-FIXING OF INSTRUMENTS ERECTED BY OTHER AGENCIES					
G.12.5	Field Instruments (Transmitters)	Nos	38	₹ 0.00	₹ 0.00	0.000344211
H.1.2	Field Instruments (Temperature Gauges)	Nos	92	₹ 0.00	₹ 0.00	0.000655662
G.3.1, G.7.3	Field Instruments (Temperature Elements)	Nos	294	₹ 0.00	₹ 0.00	0.001096054
D.4.4, D.4.7, D.4.8, D.4.9, E.9.1, E.9.3, G.12.11	Lub Oil System/Oil Centrifuge Unit/Lub Oil skid/Main Oil Tank	SET	42	₹ 0.00	₹ 0.00	0.001972646
G.12.3	Oil Centrifuge Unit	SET	4	₹ 0.00	₹ 0.00	0.000318968
J.4.3, J.4.4, J.4.5, J.4.6	Dosing Skid (Oxygen, Ammonia, NaOH, Hydrazine)	SET	10	₹ 0.00	₹ 0.00	0.000512049
E.9.9	Hydraulic Coupling of MDBFP	SET	2	₹ 0.00	₹ 0.00	0.000281447
G.12.1	Condenser Vacuum Pump Gravimetric Feeder comprising of Feeder	SET	4	₹ 0.00	₹ 0.00	0.000327831
B.13.10	mounted C&I equipment	SET	16	₹ 0.00	₹ 0.00	0.001138126
G.12.10	Governing System Control Rack	SET	4	₹ 0.00	₹ 0.00	0.000540137
E.9.10	Governor Console Board HP/LP Bypass/HWL-1&2/MEFCV control	SET	4	₹ 0.00	₹ 0.00	0.000415388
B.10.4, B.10.5, G.12.12 G.12.14, G.12.15	valve skid instrumentation Seal Oil Rack / Stator water rack	SET SET	6 4	₹ 0.00	₹ 0.00 ₹ 0.00	0.000604397
G.12.14, G.12.15	Joeal Oil Rack / Stator water rack	SEI	4	₹ 0.00	₹ 0.00	0.000451921

Volume-II Price Bid								
G.12.16, G.12.17	Seal Oil Level / PrTxr Instrument Rack / Stator Water DP Instrument Rack	SET	4	₹ 0.00	₹ 0.00	0.00047899		
G.12.18	H2 Dryer Unit	SET	2	₹ 0.00	₹ 0.00	0.000153076		
A.27.1	Transducers-Voltage/Current/Frequency output 4-20 mA	Nos	50	₹ 0.00	₹ 0.00	0.000632575		
XXIV	REMOVAL, CALIBRATION & RE-FIXING OF INSTRUMENTS FOR ACID CLEANING							
J.5.1	Temp. Gauges	Nos	4	₹ 0.00	₹ 0.00	0.0000285		
J.5.2	Pressuer Gauges	Nos	4	₹ 0.00	₹ 0.00	0.0000293		
J.5.3	Thermocouple Stem type and MTM	Nos	16	₹ 0.00	₹ 0.00	0.0000331		
J.5.4	Junction Boxes	Nos	6	₹ 0.00	₹ 0.00	0.0000695		
xxv	ERECTION AND COMMISSIONING OF FDA/FPS/IGES - SENSORS/SWITCHES/DEVICES							
K.6.3	Multisensor Detectors	Nos	2550	₹ 0.00	₹ 0.00	0.001832596		
K.6.4, K.6.6, K.6.8, K.3.6, K.4.6	Air Sampling/Probe/IR (Air Burge)/QB Detectors	Nos	11589	₹ 0.00	₹ 0.00	0.016830735		
K.6.7, K.6.9	Beam Detectors/IR (Flame) Detectors	Nos	24	₹ 0.00	₹ 0.00	0.000174276		
K.11.7, K.11.9, K.11.10	Special Switches-Abort/Pneumatic/Manual	Nos	45	₹ 0.00	₹ 0.00	0.000130707		
K.11.2, K.11.3, K.11.4, K.11.5, K.11.6	Sensitive Device-Release Device/Disable device	Nos	118	₹ 0.00	₹ 0.00	0.000427546		
XXVI	ERECTION AND COMMISSIONING OF FDA/FPS/IGES - LOCAL CONTROL PANELS							
K.1.11	Diesel Engine cum Battery Panel	SET	5	₹ 0.00	₹ 0.00	0.000145155		
K.1.16	Switch Box cum Battery Panel	SET	5	₹ 0.00	₹ 0.00	0.000145155		
K.3.4, K.4.4, K.5.4	Deluge Valve Control Panels	Nos	319	₹ 0.00	₹ 0.00	0.004632845		
K.7.1	PLC Panel	SET	1	₹ 0.00	₹ 0.00	0.000119778		
K.9.5	Remote IO Panel	SET	2	₹ 0.00	₹ 0.00	0.000239555		
K.6.1, K.6.2, K.11.13	Fire Alarm/Repeater/Gas Release Panels	SET	17	₹ 0.00	₹ 0.00	0.001234203		
XXVII	ERECTION AND COMMISSIONING OF FDA/FPS/IGES - SPECIAL EQUIPMENTS							
K.6.18	Erection and Commissioning of Siren and its Control Panel	SET	1	₹ 0.00	₹ 0.00	0.000145185		
K.6.14	Hooter Strobes	Nos	250	₹ 0.00	₹ 0.00	0.000905818		
K.6.12, K.6.13, K.6.15	Modules/Controllers	Nos	1232	₹ 0.00	₹ 0.00	0.017892368		
XXVIII	ERECTION AND COMMISSIONING OF FDA/FPS/IGES - MISCELLENEOUS EQUIPMENTS							
K.6.10	Manual Call points	Nos	425	₹ 0.00	₹ 0.00	0.006172286		
K.6.17	EXIT/WARNING Signs	Nos	250	₹ 0.00	₹ 0.00	0.000363076		
K.6.23, K.6.25	Establishing Network Connectivity (OPC/MODBUS)	Nos	2	₹ 0.00	₹ 0.00	0.0000290		
						1.00		

Total Price (In Rs.)

Total Price (In Words)

- The above Quoted Price shall be excluding of GST, as applicable. The same shall be paid at actual.
 Bidders to quote their most competitive price in Blue Colour Cell.
 Kindly submit this price bid with signature and sealed of authorized signatory preferebly in pdf format.
 Bidders shall quote only Total Pirce, individual values shall be calculated as per the weightage allotted.