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2012

NOTICE INVITING TENDER

(Document No PS:MSX:NIT)

TENDER NO.: BHEL/NR/SCT/OBRA/C&I/1155

NAME OF WORK: WORK OF REVIVAL/REHABILIATION i.e. ERECTION, TESTING, COMMISSIONING & HANDING OVER OF C&I WORKS AND RE-COMMISSIONING ACTIVITIES OF UNIT 12 & 13 UNDER REHABILIATION PACKAGE OF OBRA R&M (5X200 MW, OBRA TPS, UPRVUNL, U.P.)

Bharat Heavy Electricals Limited

Ref: BHEL/NR/SCT/OBRA/C&I/1155 **Date: 19/04/2019**

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NOTICE INVITING E-TENDER (NIT)
BIDDER TO SUBMIT OFFERS ON PORTAL
https://bhel.abcprocure.com

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To

Dear Sir/Madam

Sub : NOTICE INVITING E-TENDER

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

1. **Salient Features of NIT**

SL NO	ISSUE	DESCRIPTION	
i	TENDER NUMBER	BHEL/NR/SCT/OBRA/C&I/1155	
ii	BROAD SCOPE OF JOB	WORK OF REVIVAL/REHABILIATION i.e. ERECTION, TESTING, COMMISSIONING & HANDING OVER OF C&I WORKS AND RE-COMMISSIONING ACTIVITIES OF UNIT 12 & 13 UNDER REHABILIATION PACKAGE OF OBRA R&M (5X200 MW, OBRA TPS, UPRVUNL, U.P)	
iii	DETAILS OF TENDER DOCUMENT		
a	Volume-IA	*Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc*	*Applicable*
b	Volume-IB	*Special Conditions of Contract (SCC)*	*Applicable*
c	Volume-IC	*General Conditions of Contract (GCC)*	*Applicable*
d	Volume-ID	*Forms and Procedures*	*Applicable*
e	Volume-II	*Price Schedule (Absolute value).*	*Applicable*
iv	ISSUE OF TENDER DOCUMENTS	**From BHEL website (www.bhel.com) and *https://bhel.abcprocure.com*** Tender documents will be available at website till due date of submission	*Applicable*
v	DUE DATE & TIME OF OFFER SUBMISSION	***Date : 30/04/2019 , Time : 15:00 HRS*** ***Place : on https://bhel.abcprocure.com***	*Applicable*
vi	OPENING OF TENDER	***At due date / time*** ***Date : 30/04/2019 , Time : 15:30 HRS*** *Notes:* *(1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day.* *(2) Bidder may depute representative to witness the*	*Applicable*

		opening of tender. ***However it being an e-tender it shall be opened online***	
vii	**EMD AMOUNT**	***Rs. 3,30,000/-***	*Applicable*
viii	**COST OF TENDER**	***Rs 2,000/-.***	*Applicable*
ix	**LAST DATE FOR SEEKING CLARIFICATION**	***Five days before bid submission due date****.* *Along with soft version also, addressing to contact address given below* *1) Name:* ***R M CHANDRA*** *Designation: Dy. MANAGER* *Deptt: SCT* *Address: BHEL-PSNR, PLOT NO. 25, SECTOR – 16A, NOIDA - 201301* *Phone: (Landline) 0120 - 2416440* *Email : rmchandra@bhel.in* ***2)*** *Name:* ***G.V. RAJA SEKHAR*** *Designation: Sr. Manager* *Deptt: SCT* *Address: BHEL-PSNR, PLOT NO. 25, SECTOR – 16A, NOIDA - 201301* *Phone: (Landline) 0120-2416232* *Email : gvr@bhel.in*	*Applicable*
x	**SCHEDULE OF Pre Bid Discussion (PBD)**		*Not Applicable.*
xi	**INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)**	*Please refer clause no.15a.*	*Not 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) & portal https://bhel.abcprocure.com **and not in the newspapers**. Bidders to keep themselves updated with all such information	
xiii	**Tender submission**	on portal https://bhel.abcprocure.com	

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

As this tender is an E-Tender and no paper bids will be accepted therefore the scanned copy of the Demand Draft or the Cash Receipt issued by BHEL PSNR should be uploaded in the E procurement portal. Hard Copy of the demand draft should reach BHEL PSNR HQ Noida before the due date and time of bid submission. BHEL shall not be responsible for postal or any other delays in this regard.

4. Unless specifically stated otherwise, tender must be accompanied by the prescribed amount of Earnest Money Deposit (EMD) in the manner described in Clause no. 1.9 of General Conditions of Contract.

'One Time EMD' will not be considered for this tender. All the bidders who have 'One Time EMD' with BHEL and want to participate in this tender, would also submit the requisite amount of EMD as mentioned in Clause No. 1, Salient Features of NIT, Sl. No. (vii) above.

However, the One Time EMD can be adjusted against the EMD applicable against this tender on specific request of bidder.

For Electronic Fund Transfer the details are as below-:

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

b) Bank Particulars

i).	Bank Name -:	STATE BANK OF INDIA
ii).	Bank Telephone No.(with STD code)-:	011-23475566
iii).	Branch Address-:	CAG II BRANCH, NEW DELHI 4th & 5th FLOOR, REDFORT CAPITAL, PARASNATH TOWERS, BHAI VEER SINGH MARG, GOLE MARKET, NEW DELHI-110001
iv).	Bank Fax No. (with STD code) -:	011-23475566
v).	Branch Code -:	17313
vi).	9 Digit MICR Code of the Bank Branch -:	110002562
vii).	Bank Account Number -:	10813608647
viii).	Bank Account Type -:	CASH CREDIT
ix).	11 Digit IFSC Code of Beneficiary Branch-:	SBIN0017313

(Note-: In case of E-Tenders, no paper bids shall be accepted, therefore, the scanned copy of the Banker's Cheque/ Demand Draft/ Pay Order/ Details of payment made through Electronic Fund Transfer/ Fixed Deposit Receipt (FDR) / Bank Guarantee should be uploaded in the E-Procurement Portal and hard copy of the same should reach BHEL-PSNR HQ Noida before the due date and time of bid submission. BHEL shall not be responsible for postal or any other delays in this regard.)

5. **Procedure for Submission of Tenders**: This is an E-tender floated online through our E-Procurement Site ***https://bhel.abcprocure.com***. The bidder should respond by submitting their offer online only in our e-Procurement platform at ***https://bhel.abcprocure.com*****.** Offers are invited in two-parts only.

Documents Comprising the e-Tender

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

a. Technical Tender (UN priced Tender)

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

i. Tender Cost and Earnest money Deposit (EMD) furnished in accordance with NIT Clause 3.0 & 4.0.
ii. Technical Bid (without indicating any prices).

b. Price Bid:

i. Prices are to be quoted in the attached Price Bid format online on e-tender portal.
ii. The price should be quoted for the accounting unit indicated in the e-tender document.
iii. 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.
iv. A person signing (manually or digitally) the tender form or any documents forming part of the contract on behalf of another shall be deemed to warrantee that he has authority to bind such other persons and if, on enquiry, it appears that the persons so signing had no authority to do so, the purchaser may, without prejudice to other civil and criminal remedies, cancel the contract and hold the signatory liable for all cost and damages.
v. 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.
vi. In case offer is sent through hard copy/fax/telex/cable/electronically in place of e-tender, same shall not be considered.

DO NOT"S

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

Digital Signing of e-Tender

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

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The Requirement:

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

BHEL has finalized the e-procurement service Provider-:

M/s AbcProcure, Ahmedabad

A-202/208, Wall Street-II, Opp. Orient Club, Nr. Gujarat College,

Ellis Bridge, Ahmedabad-380006

The contact details of the service provider are given below:

Name	Contact Nos.	e-mail ID	Role	Location
Swapnil Hamilton	+91 79 40270549	swapnil.h@eptl.in	Support Executive	HO – Ahmedabad
Hardik Oza	+91 79 40270560	Hardik.oza@eptl.in	Support Executive	HO – Ahmedabad
Ankur Bhatt	+91 79 40270590	ankur.bhatt@eptl.in	Support Executive	HO – Ahmedabad
Prashant Rajyaguru	+91 79 40270545 / 9016859416	prashant@eptl.in	Ast. Manager – Implementation & Support	HO – Ahmedabad
Dharam Rathod	+91 79 40270596 / 9374519754	dharam@eptl.in	Manager – Implementation & Support	HO – Ahmedabad
Pradip Parmar	+91 79 40270532 / 9328657215	pradip@eptl.in	Sr Manager – Implementation & Support	HO – Ahmedabad
Devang Patel	+91 79 40270576 / 99983 05442	devang@eptl.in	Sr Manager – Implementation & Support	HO – Ahmedabad

The process of utilizing e-procurement necessitates usage of **DSC (Digital Signature Certificate) (Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION)** and you are requested to procure the same

immediately, if not presently available with you. Please note that only with DSC, you will be able to login the e-procurement secured site and take part in the tendering process.

1. The contact details of the DSC Certifying Authority as given below

1	**GNFC**	www.ncodesolutions.com
2	**e-Mudhra**	http://www.e-Mudhra.com
3	**Safescrypt**	www.safescrypt.com

Vendors are also requested to go through seller manual available on ***https://bhel.abcprocure.com***.

6. **Not Used**

7. 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. 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. **Assessment of Capacity of Bidders:**

Bidder's capacity for executing the job under tender shall be assessed 'LOAD' wise and 'PERFORMANCE' wise as per the following:

I. **LOAD**: Load takes into consideration **ALL** the contracts of the Bidder under execution with BHEL Regions, irrespective of whether they are similar to the tendered scope or not. The cut off month for reckoning 'Load' shall be the 3rd Month preceding the month corresponding to the 'latest date of bid submission', in the following manner -

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

Total number of Packages in hand = Load (P)

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

II. **PERFORMANCE**: Here 'Monthly Performance' of the bidder for all the packages (under execution/ executed during the 'Period of Assessment' in all Power Sector Regions of BHEL) **SIMILAR** to the packages covered under the tendered scope, excepting packages not commenced shall be taken into consideration. The 'Period of Assessment' shall be 6 months preceding and including the cut off month. The cut off month for reckoning 'Period of Assessment' shall be the 3rd Month preceding the month corresponding to 'latest date of bid submission', in the following manner:

(**Note**: For example, if 'latest date of bid submission' is in Jan 2017, then the 'performance' shall be assessed for a 6 months' period up to and inclusive of Oct 2016 (i.e. from May 2016 to Oct 2016), for all the unit wise identified packages (refer Table -1))

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

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

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

b) Number of Months 'T_1' for which 'Monthly Performance Evaluation' as per relevant formats, should have been done in the 'Period of Assessment' for the corresponding similar package P_1. Similarly T_2 for package P_2,T_3 for package P_3, etc. for the tendered scope. Now calculate cumulative total months '$\mathbf{T_T}$' for total similar Packages '$\mathbf{P_T}$' for all Regions (i.e. $\mathbf{T_T} = T_1 + T_2 + T_3 + T_4 + \ldots T_N$)

c) Sum 'S_1 'of 'Monthly Performance Evaluation' Scores ($S_{1\text{-}1}$, $S_{1\text{-}2}$, $S_{1\text{-}3}$, $S_{1\text{-}4}$, $S_{1\text{-}5}$…. $S_{1\text{-}T1}$) for similar package P_1, for the 'period of assessment' 'T_1' (i.e. $S_1 = S_{1\text{-}1} + S_{1\text{-}2} + S_{1\text{-}3} + S_{1\text{-}4} + S_{1\text{-}5} + \ldots S_{1\text{-}T1}$). Similarly, S_2 for package P_2 for period T_2, S_3 for package P_3 for period T_3 etc. for the tendered scope for all Regions. Now calculate cumulative sum 'S_T' of 'Monthly Performance Evaluation' Scores for total similar Packages '$\mathbf{P_T}$' for all Regions (i.e. 'S_T'$= S_1 + S_2 + S_3 + S_4 + S_5 + \ldots S_N$.)

d) **Overall Performance Rating 'R_{BHEL}' for the Similar Package/Packages** (under execution/ executed during the 'Period of Assessment') in all the Power Sector Regions of BHEL

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

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

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

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

Sl. No.	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
1	Similar Packages for all Regions → (under execution/ executed during period of assessment)	P_1	P_2	P_3	P_4	P_5	…	P_N	Total No. of similar packages for all Regions = $\mathbf{P_T}$ i.e. Sum (Σ) of columns (iii) to (ix)
2	Number of Months for which 'Monthly Performance Evaluation' as per relevant formats should have been done in the 'period of assessment' for corresponding Similar Packages (as in row 1)	T_1	T_2	T_3	T_4	T_5	…	T_N	Sum (Σ) of columns (iii) to (ix) = $\mathbf{T_T}$
3	Monthly performance scores for the corresponding period (as in Row 2)	$S_{1\text{-}1}$, $S_{1\text{-}2}$, $S_{1\text{-}3}$, $S_{1\text{-}4}$, … $S_{1\text{-}T1}$	$S_{2\text{-}1}$, $S_{2\text{-}2}$, $S_{2\text{-}3}$, $S_{2\text{-}4}$, … $S_{2\text{-}T2}$	$S_{3\text{-}1}$, $S_{3\text{-}2}$, $S_{3\text{-}3}$, $S_{3\text{-}4}$, … $S_{3\text{-}T3}$	$S_{4\text{-}1}$, $S_{4\text{-}2}$, $S_{4\text{-}3}$, $S_{4\text{-}4}$, … $S_{4\text{-}T4}$	$S_{5\text{-}1}$, $S_{5\text{-}2}$, $S_{5\text{-}3}$, $S_{5\text{-}4}$, … $S_{5\text{-}T5}$	.. … … … …	$S_{N\text{-}1}$, $S_{N\text{-}2}$, $S_{N\text{-}3}$, $S_{N\text{-}4}$, … $S_{N\text{-}TN}$	--------

Sl. No.	Item Description	Details for all 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). Calculation of Overall 'Performance Rating' ($\mathbf{R_{BHEL}}$) 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
d) 36 months preceding and including the cut-off month

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

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

Sl. no.	Overall Performance Rating (R_{BHEL})	Corresponding value of 'L'
1	=60	NA
2	> 60 and ≤ 65	0.4
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} ≥ 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 ≤ 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, 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 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). Electrical ii). C&I iii). Others (Elect. and C&I)	i). Boiler & Aux (All types including CW Piping if applicable) ii). Power Cycle Piping/Critical Piping iii). ESP iv). LP Piping v). Steam Turbine Generator set & Aux vi). Gas Turbine Generator set & Aux vii). Hydro Turbine Generator set & Aux viii). Turbo Blower (including Steam Turbine) ix). Material Management x). Others (Mechanical)

iii). Bidders who have not been evaluated for at least six package months in the last 36 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/LOA from BHEL.

The "FIRST TIMER" tag shall remain till completion of all the contracts against which vendors has been tagged as First Timer or availability of 6 evaluation scores within last 36 months preceding and including the cut-off month in the online BHEL system for contractor performance evaluation in BHEL PS Regions.

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

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

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

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

Note:- In case, the number of bidders qualified against Technical and Financial Qualification criteria itself is less than four, then all bidders (a)- having Overall Performance Rating ('R_{BHEL}') ≥60, (b)- First

timer" bidders having average of available performance scores ≥60 upto and including the Cut Off month, (c)- "First timer" bidders for whom no performance score is available in the system upto and including the Cut Off month, shall be considered qualified against criteria of 'Assessment of Capacity of Bidders' for further processing of tender.

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

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

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

c. Up to Synchronization in all Balance Packages

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

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

vii). Performance Evaluation for Activity Month shall be completed in Evaluation Month (i.e. month next to Activity Month) or in rare cases in Post Evaluation Month (i.e. month next to Evaluation Month) after approval from Competent Authority. In case scores are not acceptable, Contractor can submit Review Request to GM Site/ GM Project latest by 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.

ix). Performance evaluation in CL 9 above is applicable to prime bidder and Consortium partner (or Technical tie up partner) for their respective scope of work.

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

13. 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. Unless specifically mentioned otherwise, bidder's quoted price shall deemed to be in compliance with tender including PBD.

15. Bidders shall submit Integrity Pact Agreement (Duly signed by authorized signatory who signs in the offer), **if applicable**, along with techno-commercial bid. This pact shall be considered as a preliminary qualification for further participation. **The names and other details of Independent External Monitor (IEM) for the subject tender is as given at Clause No. 1, Salient Features of NIT, Sl. No. (xi) above.**

15a **Integrity Pact (IP)**

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

Sl	IEM	Address	Phone & Email
1.	Shri D.R.S Chaudhary, IAS (Retd.)	E-//164, Arena Colony, Bhopal 462 016 (M.P.)	dilip.chaudhary@icloud.com
2.	Mrs. Pravin Tripathi, IA & AS (Retd.)	D-243, Anupam Gardens, Lane IB, Neb Sarai, Sainik Farms, New Delhi – 110 068	pravin.tripathi@gmail.com

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

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

Note:

No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department's officials whose contact details are as per **Clause No. 1, Salient Features of NIT, Sl. No. (ix) above.**

16. 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. In case BHEL decides on a `Public Opening', the date & time of opening of the PRICE BID shall be intimated to the qualified bidders and in such a case, bidder may depute one authorised representative to witness the price bid opening. BHEL reserves the right to open 'in-camera' the 'PRICE BID' of any or all Unsuccessful/Disqualified bidders under intimation to the respective bidders.

18. Validity of the offer shall be for **six months** from the latest due date of offer submission (including extension, if any) unless specified otherwise

19. (a) BHEL reserves the right to go for Reverse Auction (RA) (Guidelines as available on www.bhel.com) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. Bidders to give their acceptance with the offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA.

(b) Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit 'Process compliance form' (to the designated service provider) as well as 'Online sealed bid' in the Reverse Auction. Non-submission of 'Process compliance form' or 'Online sealed bid' by the agreed bidder(s) will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com).

(c) The bidders have to necessarily submit online sealed bid less than or equal to their envelope sealed price bid already submitted to BHEL along with the offer. **The envelope sealed price bid of successful L1 bidder in RA, if conducted, shall also be opened after RA and the order will be placed on lower of the two bids (RA closing price & envelope sealed price) thus obtained. The bidder having submitted this offer specifically agrees to this condition and undertakes to execute the contract on thus awarded rates.**

(d) If it is found that L1 bidder has quoted higher in online sealed bid in comparison to envelope sealed bid for any item(s), the bidder will be issued a warning letter to this effect. However, if the same bidder again defaults on this count in any subsequent tender in the unit, it will be considered as fraud and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com).

(e) If reverse auction process is unsuccessful, sealed envelope price bids of all the techno-commercially qualified bidders shall be opened and the tender shall be processed accordingly. However, the envelope sealed bid(s) of techno-commercially acceptable bidder(s) who had agreed to participate in the RA and had failed to submit the online sealed bid shall not be opened.

20. On submission of offer, further consideration will be subject to compliance to tender & qualifying requirement and customer's acceptance, as applicable.

21. In case the bidder is an "Indian Agent of Foreign Principals", 'Agency agreement has to be submitted along with Bid, detailing the role of the agent along with the terms of payment for agency commission in INR, along with supporting documents.

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

23. **Consortium Bidding** (or Technical Tie up): **Not Applicable**

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

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

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

27.0 The offers of the bidders who are on the banned/ hold list as 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

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

27.1.1 **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.

27.1.2 **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.

28.0 **Not Applicable**

29.0 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.

30.0 Order of Precedence

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

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

for BHARAT HEAVY ELECTRICALS LTD

(SCT)

Enclosure:-

(i) Annexure-1: Pre Qualifying criteria.
(ii) Annexure-2: Check List.
(iii) Annexure-3: Authorization of representative who will participate in the online Reverse Auction Process
(iv) Annexure-4: Feedback form
(v) Other Tender documents as per this NIT.

ANNEXURE - 1

PRE QUALIFYING REQUIREMENTS

JOB	**WORK OF REVIVAL/REHABILIATION i.e. ERECTION, TESTING, COMMISSIONING & HANDING OVER OF C&I WORKS AND RE-COMMISSIONING ACTIVITIES OF UNIT 12 & 13 UNDER REHABILIATION PACKAGE OF OBRA R&M (5X200 MW, OBRA TPS, UPRVUNL, U.P)**
TENDER NO	**BHEL/NR/SCT/OBRA/C&I/1155**

SL. NO.	NAME AND DESCRIPTION OF PRE-QUALIFICATION CRITERIA	BIDDER'S CLAIM IN RESPECT OF FULFILLING THE PQR CRITERIA
A	Submission of Integrity Pact duly signed	**Not Applicable**
B	Assessment of Capacity of bidder to execute the work as per clause 9.0 pf NIT	**Applicable – by BHEL**
C	**Technical criteria**	**Applicable**
C-1	Bidder who wish to participate should have: a) Executed "C&I works for BTG/GT" or "C&I works consisting of DCS/DDC/Station C&I" in one unit of ≥100 MW. **OR** b) Executed one contract of C&I works consisting of DCS/DDC/Station C&I in any Industry with its executed value ≥ **Rs.140 Lakhs.**	
C-2	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. 132 Lakhs.** **OR** Two (2) works each of value not less than **Rs. 82.5 Lakhs.** **OR** Three (3) works each of value not less than **Rs. 66 Lakhs.**	
D **D-1**	**Financial criteria** **TURNOVER:** Bidders must have achieved an average annual financial turnover (Audited) of **Rs. 49.5 Lakhs** or more over last three Financial Years (FY) i.e. (2015-2016, 2016-2017, 2017-2018). Bidder shall submit audited accounts (balance sheets and profit & loss account) in support of this. In case audited financial statements have not been submitted for all the three years as indicated above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years i.e. total divided by three. If financial statements are not required to be audited statutorily, then instead of audited financial statements, financial statements are required to be certified by Chartered Accountant.	**Applicable**

D-2	**Net worth**: Net Worth (Only in case of companies) of the bidder should be positive. Net worth shall be calculated based on the latest Audited Accounts as furnished for 'D-1' above. Net worth = Paid up share capital* + Reserves (* : Share Capital OR Partnership Capital OR Proprietor Capital as the case may be)	
D-3	**Profit:** Bidder must have earned profit in any one of the three financial years as applicable in the last three financial years as furnished for 'D-1' above. **Note:** PROFIT shall be PBT earned during any one year of last three financial years as in 'D-1' above.	
D-4	Bidder must not be under Bankruptcy Code Proceedings (IBC) by NCLT or under Liquidation / BIFR, which will render him ineligible for participation in this tender, and shall submit undertaking to this effect.	
E	**Approval of Customer**	Not Applicable
F	**Consortium Criteria**	Not Applicable

Explanatory Notes for QR 'C' :

1. Completion date for achievement of the technical criteria 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.
2. For Sl no 'C.1', '**Executed**' means "SYNCHRONISATION" in case of power projects and "WORK COMPLETION of the value as defined in PQR" in case of industry. The bidder should have achieved the criteria even if the Contract has not been completed or closed.
3. For Sl no. 'C.2', '**Similar Work'** means Electrical or C&I or 'Electrical and C&I works.
4. For Sl. No. 'C-2', actual executed value shall be considered. The bidder should have achieved the criteria even if the Contract has not been completed or closed.
5. For evaluation of PQR, the credentials of the bidder alone, and not that of the Group Company shall be considered.
6. For sl.no. 'C-2' above Value of work is to be updated with indices for "All India Avg. Consumer Price index for industrial workers" and "Monthly Whole Sale Price Index for All Commodities" with base month as per last month of work execution and indexed up to three (3) months prior to the month of latest due date of bid submission as per following formula-

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

Where

P = Updated value of work
R = Value of executed work

X_N = All India Avg. Consumer Price index for industrial workers for the month, three months prior to the month of latest due date of bid submission (e.g. If latest bid submission date is 03-Apr-17, then bid submission month shall be reckoned as April'17 and index for Jan'17 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 the month, three months prior to the month of latest due date of bid submission (e.g. If latest bid submission date is 03-Apr-17, then bid submission month shall be reckoned as April'17 and index for Jan'17 shall be considered).

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

7. For the purpose of evaluation of the PQR, one MW shall be considered equivalent to 3.5 TPH where ever rating of HRSG/BOILER is mentioned in MW. Similarly, wherever rating of Gas Turbine is mentioned in terms of Frame size, ISO rating of the same in terms of MW shall be considered for evaluation.

8. 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.

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.

ANNEXURE - 2

CHECK LIST

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

1	Name and Address of the Tenderer		
2	Details about type of the Firm/Company		
3.a	Details of Contact person for this Tender	Name : Mr/Ms Designation: Telephone No: Mobile No: Email ID: Fax No:	
3.b	Details of alternate Contact person for this Tender	Name : Mr/Ms Designation: Telephone No: Mobile No: Email ID: Fax No:	
4	EMD DETAILS	DD No: Date : Bank : Amount:	
5	Validity of Offer	TO BE VALID FOR SIX MONTHS FROM DUE DATE	
		APPLICABILITY(BY BHEL)	ENCLOSED BY BIDDER
6	Whether the format for compliance with **PRE QUALIFICATION CRITERIA** (ANNEXURE-I) is understood and filled with proper supporting documents referenced in the specified format	Applicable	YES / NO
7	Audited profit and Loss Account for the last three years	Applicable	YES/NO
8	Copy of PAN Card	Applicable	YES/NO
9	Whether all pages of the Tender documents including annexures, appendices etc are read understood and signed	Applicable	YES/NO
10	Integrity Pact	Applicable	YES/NO
11	Declaration by Authorised Signatory	Applicable	YES/NO
12	No Deviation Certificate	Applicable	YES/NO
13	Declaration confirming knowledge about Site Conditions	Applicable	YES/NO
14	Declaration for relation in BHEL	Applicable	YES/NO
15	Non Disclosure Certificate	Applicable	YES/NO
16	Bank Account Details for E-Payment	Applicable	YES/NO
17	Capacity Evaluation of Bidder for current Tender	Applicable	YES/NO
18	Tie Ups/Consortium Agreement are submitted as per format	Not Applicable	YES/NO
19	Power of Attorney for Submission of Tender/Signing Contract Agreement	Applicable	YES/NO
20	Analysis of Unit rates	Applicable	YES/NO

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

DATE :

AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

ANNEXURE - 3

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

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

ANNEXURE – 4

Feedback Form: From where did you get information reg. this tender

1	NEWSPAPER ADVERTISEMENT (NAME)	
2	BHEL WEBISTE (TENDER NOTIFICATION)	
3	CENTRAL PUBLIC PROCUREMENT PORTAL OF GOVERNMENT OF INDIA (CPP PORTAL)	
4	EMAIL COMMUNICATION FROM BHEL	
5	ANY OTHER SOURCE	

Rev 01
1st June 2012

TECHNICAL CONDITION OF CONTRACT (TCC-I)

(Document No. PS: MSX:TCC)

BHARAT HEAVY ELECTRICALS LIMITED

TECHNICAL CONDITION OF CONTRACT (TCC) VOL I

TENDER NO. BHEL/NR/SCT/OBRA/C&I/1155

FOR
WORK OF REVIVAL/REHABILIATION i.e. ERECTION, TESTING, COMMISSIONING & HANDING OVER OF C&I WORKS AND RE-COMMISSIONING ACTIVITIES OF UNIT 12 & 13 UNDER REHABILIATION PACKAGE OF OBRA R&M
(5X200 MW, OBRA TPS, UPRVUNL, U.P.)

PART-I OF TCC

Bharat Heavy Electricals Limited
(A Govt. of India Undertaking)
Power Sector –Northern Region,
Plot No. 25, Sector-16 A,
Distt.GautamBudh Nagar, Noida-201301

TECHNICAL CONDITIONS OF CONTRACT (TCC) -1

PART-I : CONTRACT SPECIFIC DETAILS
TABLE OF CONTENTS

TECHNICAL CONDITIONS OF CONTRACT (TCC) -1		
CHAPTER-I: PROJECT INFORMATION		
1.0	**PROJECT INFORMATION**	
Sl. No.	**Title**	**Description**
1.1	NAME OF THE OWNER	UTTAR PRADESH RAJYA VIDYUT UTPADAN NIGAM LTD (UPRVUNL)
1.2	ADDRESS	OBRA THERMAL POWER STATION P.O. OBRA DIST. -SONEBHADRA – 231219 UTTAR PRADESH
1.3	EXISTING	5x200 MW
1.4	NEAREST RAILWAY STATION	CHOPAN – 15KM APPROX MIRZAPUR – 120KM APPROX VARANASI / MUGAL SARAI – 125KM APPROX.
1.5	NEAREST ROAD	CHOPAN - VARANASI
1.6	NEAREST CITY	ROBERSTGANJ / SONEBHADRA
1.7	NEAREST AIRPORT	VARANASI (150 KM)
1.8	HIGHEST TEMPERATURE	48 deg C
1.9	LOWEST TEMPERATURE	2 deg C
1.10	ELEVATION	170 meters

2.0	**SCOPE OF WORK**
	SCOPE OF WORK FOR ERECTION, COMMISSIONING & HANDING OVER
	BHEL has been awarded Rehabilitation Package for C&I works for restoring the system damaged during major fire incidence occurred in Unit 12 & 13 , 200 MW Sets at Obra Thermal Power Station OBRA, Distt. Sonebhadra by UPRVUN Limited. The Scope of work covers Erection, Testing, Commissioning & Handing Over of Panels viz DCS Panels , Feeder Panels etc, HMIs, LVS, UPS and battery system, & Cable laying glanding and termination in Unit 12 & 13. Re-commissioning of all C&I systems viz. Soot blower systems, field instruments, MOVs, Uni-directional drives, Pneumatic valves, Flame scanners, HEA ignitors, Static Excitation etc.in Unit # 12. Erection and commissioning of Analyzers in Unit # 12. Re-calibration of field instruments in Unit # 12. Revival, replacement, erection, painting, testing, performance guarantee and commissioning of plant as envisaged and handing over of the units viz Boiler, Turbine, C&I, Generator Exciter, Balance of plants such as CW pump House, Switchgears, HT/LT motors etc. and ESPs . Detailed Scope of work is also enclosed
2.1	**SCOPE OF C&I WORK** Scope of work of revival/rehabilitation i.e. erection, testing, commissioning of C&I works and re-commissioning activities of unit 12 & 13 under rehabilitation package of Obra R&M (5X200 MW, OBRA TPS, UPRVUNL, U.P.) **Scope of work and Bill of quantity is as per Chapter IV.** Bill of quantity mentioned in the Chapter IV is tentative and may vary at any extent on either side as per site requirement. Contractor has to complete the work as per site requirement and payment shall be made on pro-rata basis.
	The scope of these specifications are not limited to but covers mainly following:
2.1.1	Contractor shall erect, test, commission all the equipment, cabinets, panels, instruments etc. as per sequence prescribed by BHEL Engineer at site. The sequence of erection / commissioning methodology will be decided by the BHEL Engineer depending upon the availability of materials / work fronts etc. No claim 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 jobs elsewhere or for any reasons whatsoever. The Party shall be responsible for inspection, testing & submit the signed protocol. Customer UPRVUNL may depute their representative for checking and supervision in important stages of work. The contractor shall be responsible to facilitate for inspection of works, without any extra charge. Any defect in quality of work or deviations from drawings / specifications pointed out during such inspection shall be carried out without any extra cost
2.1.2	Erection Material are to be transported from the BHEL/ UPRVUNL stores after issue of material as per instruction of BHEL engineer.
2.1.3	Contractor shall submit a report of erection and commissioning of equipment's & jointly (Sub contractor, BHEL & UPRVUNL) signed protocol before handing over of equipment.
2.1.4	Finish painting including supply of paints etc. before handing over of equipment
2.1.5	Disposal of scrap/garbage & area cleaning
2.1.6	**NO DEVIATION IN SCOPE OF WORK, WHATSOEVER, SHALL BE ALLOWED BY BHEL.**

	The work to be carried out under this scope covers the complete work of Control and Instrumentation of Rehabilitation Package of Unit # 12 & 13 at UPRVUNL Obra. The work to be carried out under the scope of this specification shall broadly comprise of but not to be limited to the following:
2.2	**SITE VISIT**
2.2.1	Contractor should visit site and acquire full knowledge & information about site conditions. The bidder must visit site, to acquaint themselves with the conditions prevailing at site and in & around the plant premises, together with all statutory, obligatory, mandatory requirements of various authorities before submission of bid
2.3	**SITE ORGANISATION & ERECTION SCHEDULE**
2.3.1	The contractor shall provide adequate staffing in the following areas in addition to the staff in requirements of execution as instructed/informed by BHEL: a) Planning, monitoring & control. b) Quality control and quality assurance. c) Materials management. d) Safety, fire & security. e) Industrial relations and fulfilment of labour laws and other statutory obligations.
2.3.2	The contractor shall maintain a site organization of adequate strength in respect of manpower, construction machinery and other implements at all times for smooth execution of the contract. This organization shall be reinforced from time to time, as required to make up for slippage from the schedule without any commercial implication to BHEL. The site organization shall be headed by a competent construction manager having sufficient experience & adequate authority to take decisions at site.
2.3.3	On award of contract, the contractor shall submit to BHEL site organization chart indicating the various levels of experts to be deployed on the job. BHEL reserves the right to reject or approve the list of personnel proposed by the Contractor. BHEL Engineer may ask for the bio-data with previous experience of the Contractor's manpower and staff for understanding the expertise of the personnel deployed by contractor and may reject if personnel do not possess skills/expertise required for the subject jobs.
2.3.4	The contractor should also submit to BHEL for approval a list of construction equipment, erection tools, tackle etc. prior to commencement of site activities. These tools & tackles shall not be removed from site without written permission of BHEL.
2.3.5	The organization chart for site should indicate the various levels of experts to be posted for supervision in the various fields in erection, commissioning etc as applicable. For proper supervision of the work, the contractor shall ensure providing one qualified supervisor against deployment of 07 workmen.
2.4	**Contractor shall ensure following:**
2.4.1	Contractor shall make necessary arrangements to ensure that the atmosphere in working area (under the scope of work in this tender) and on roads is free from particulate matter like dust, sand etc. by keeping the top surface wet for ease in breathing. Provision of required tanker with spraying arrangement has to be ensured by contractor within the quoted rates, at no extra cost to BHEL
2.4.2	Contractor has to maintain contact with local hospital having ambulance scanning & other ultra modern medical facilities required during emergency.
2.4.3	Contractor has to ensure pre-employment medical check for all staff & workers.

2.4.4	Contractor has to ensure that adequate First Aid facilities with trained nurse are available at work site for emergency purpose. This emergency set-up should include, but not limited to, following ➢ Male nurse (in shifts) ➢ Oxygen set up ➢ Breathing apparatus ➢ Eye wash facility ➢ Stretcher ➢ Trauma blanket ➢ Medicines. Contractor has to maintain contact with local hospital having scanning and ultra-modern medical facilities including ambulance required during emergency.
2.4.5	**Contractor may avail the medical facilities available with the UPRVUNL at the rates applicable including medicines.**
2.5	**The contractor shall comply with following towards Social Accountability(SA);** The contractor shall not employ any employee less than 18 years of age in pursuant to ILO convention. If any child labour were found to have been engaged ,the Contractor shall be levied with expenses of bearing his education expenditure which will include stipend to substantiate appropriate education or employ any other member of family enabling to bear the child education expenditure. The contractor shall not engage Forced/Bonded Labour and shall abide by abolition of Bonded Labour System (Abolition) Act, 1976. The contractor shall maintain Health & safety requirement as stipulated in the Contract and Contract Labour Regulation & Abolition) Act, 1970. The Contractor shall abide by UN convention w.r.t Human Rights and shall be liable for Decimation /Corporal punishment for failure in meeting with relevant requirements. The Contractor shall abide the requirement of Contract Labour (Regulation & Abolition) Act,1970 for working hours. The Contractor shall abide by the statutory requirement of Minimum Wages Act 1948, payment of Wages Act 1936. The Contractor shall arrange potable drinking water to its employees & workers. It may be noted that non-compliance to HSE & SA requirements will result in penal action as may be decided by the competent authority of BHEL. The Contractor shall be fully responsible for accidents caused due to him or his agents or workmen's negligence or carelessness in regard to the observance of the safety requirements and shall be liable to pay compensation for injuries. It may be noted that non-compliance to HSE requirements will result in penal action. In case of violations of Safety and SA requirements, the Contractor shall be liable for a penalty of Rs. 1000/- for the first violation and Rs. 5000/- for the subsequent violations. For serious lapses, as decided by BHEL Engineer, fines upto Rs. 10000/- at a time can be imposed. The amount towards penalties as above will be deducted from running bills of the Contractor. The amount so collected above will be utilized for supporting the safety activities at site. The decision of BHEL on above will be final and binding on the Contractor.

2.6	Provision of supervisors by contractor shall be for direct supervision of various Works of power plant preferably works covered under this tender. The qualification and experience of the supervisors shall be acceptable to the BHEL Engineer associated with the subject work posted at Obra R&M site. The Supervisors shall possess a minimum qualification of Diploma in concerned branch and working experience in power plants. They shall be deployed in all areas covered under various specifications as well as other related areas as may be deemed essential based upon work requirements, though not specified. They shall be guided by BHEL Engineers to ensure smooth work progress as and when /where required /deployed. No separate payment shall be paid for providing the services as per this clause. The contractor shall provide these free of cost services within the quoted rates as per Rate Schedule.
2.7	Contractor should submit the daily progress report, weekly report, man power status, T&P status on regular basis to BHEL. Monthly agreed program to be submitted by contractor on regular basis. Daily review meeting has to be done at BHEL site office and daily plan to be submitted by Contractor in consultation with BHEL. Agreed program can be revised and pre-poned by BHEL Engineer seeing the site urgency and work requirements
2.8	**Gate pass & POLICE VERIFICATION OF PERSONNEL:** ***The agency shall arrange entry/exit gate passes for Manpower, Materials & Vehicles from concerned Security Agency of the Customer at their own cost as per the prescribed procedures of the customer. The agency must get the character & antecedents of all personnel deployed to site duly verified from the concerned Police station/ S. P. Office as required by CISF.It shall also be the duty of the contractor for submission of all cancelled gate pass at the end of the job and contract closure.***
2.9	**Consumables :** The contractor shall provide within finally accepted rates, all consumables like, gland packing, all welding electrodes (including alloy steel Aluminum, stainless steel), filler wires , tig wires , all inert / welding gases, soldering material, dye penetrates, other erection consumables such as tapes, jointing compound , grease, mobile oil, M-seal, Araldite , Parmali wood, petrol , CTC / other cleaning agents, emery/sand paper, petroleum jelly, insulation tape, PVC sealing compound, sleeves , cable nylon ties , cable ferrules, cable lugs upto 2.5 sqmm, copper washer for gauges/switches, nut- bolts , studs, screws , washers, anchor fasteners, gaskets and shims , wooden, sleepers, steel required for temporary works such as supports, packing hardware items, fire proof sealing compound required for completion of work except those which are specifically supplied by manufacturing unit. BHEL approved welding electrode shall be used. All charges on account of Octroi, terminal or sales tax and other duties on materials obtained for the works from any source shall be borne by the contractor.

CHAPTER-III: ERECTION, TESTING, COMMISSIONING & HANDING OVER GUIDELINES

3.0	**ERECTION, TESTING, COMMISSIONING & HANDING OVER GUIDELINES**
3.1	**All commissioning activities in scope of work and required for synchronization of machine for C&I portion shall be carried out as per direction of BHEL**
3.2	**ERECTION GUIDELINES**
3.2.1	**Erection Of max DNA DCS Panels/UCP/ACDBs/Control desk/LVS/UPS panels/Feeder panels ETC.** Erection of Panels after foundations checking / fabrication of base frames or stools (wherever applicable) and carrying out minor modification wherever required, Jointing of panels, inter-panel wiring, busbar & earthbar connections, earthing,mounting of loose supplied items, testing of complete board & including testing / calibration of all instruments and schemes, commissioning including loop checking, system checking, and putting necessary controls on automatics, Dummy load test of UPS Chargers including arranging of dummy load and temporary power supply etc. The cleaning of panels have to be done with electrical vacuum cleaner, besides conventional cleaning with brush etc. The drilling of holes in the gland plates for cable entry shall be part of panel erection. All blank holes / gaps in the gland plates / boxes etc. shall be properly sealed with **fire proof** ceiling material & material to be arranged by contractor. The base frames shall be painted suitably. The contractor shall carry out the plugging and sealing of left out holes in the gland plates and other openings at the bottom of panels at his own cost by using fire retardant mortar or good quality sealing material as advised by BHEL**. Any minor alterations required in panels/cubicles, wiring in the panels/ cubicles shall also form part of the work. During testing, commissioning, some equipment / modules may need replacement / repairs/servicing. All such replacements / repairs /servicing and assistance during commissioning and running of the unit till handing over to the Customer are part of the scope as some of the test / commissioning will have to be done after the machine is running on various loads.**
3.2.2	**ERECTION OF CABLE RACK AND TRAY** Cable trays shall be supplied either ladder, perforated, slotted or duct type. **Cost of cable tray erection as per BOQ Cum Rate Schedule shall include fabrication of supports to suit site requirement, fixing of support in position by welding / bolting as per BHEL Engineer's instruction, erection and fixing of cable trays and racks by welding or by bolts and nuts.** Jointing of trays can be carried out by bolting / welding as per direction of Engineer. Contractor shall carryout cutting of tray only by Hacksaw for obtaining proper routing from standard lengths supplied. Materials for support fabrication like flats, channels, angles etc. shall be supplied by BHEL free of cost. The cutting & welding points on trays will be painted by primer & Al paint by the contractor including supply of paint within the quoted price and no extra cost to BHEL. These cable trays may also be required for laying copper/SS tubing, plica type / GI flexible conduits, local cabling and metal temp. thermocouples. Beside above angles / channels of various sizes may have to be fabricated / erected, for use as cable trays, from structural steel to be supplied by BHEL free of cost. Payment for fabrication / erection of these type trays shall be released as per applicable rates for structural fabrication. In many cases, trays are supplied with tray covers. These covers have to be erected after completion of bottom cable tray and laying of cables, tubes etc. The covers are to be properly secured on the bottom trays and no separate payment will be made for putting these covers.

	If required, GI / Al strip clamps to be used.No extra charges will be claimed by contractor for any modification carried out after laying of trays due to site requirement in general.
3.2.3	**Re-Commissioning and Installation of Field INSTRUMENTS (TRANSMITTERS / GAUGES / SWITCHS / TEMPERATURE SENSING ELEMENTS LIKE RTDs & THERMOCOUPLES)** For instruments already mounted on skids /racks/enclosures and elsewhere, the scope includes removal from skids / racks/enclosures, reinstallation after testing / calibration, restoring electrical connections, pressure testing of connected piping and charging / loop checking. Servicing of manifolds, PG valves, drain & isolation valves shall also form part of re-commissioning jobs within the quoted prices. Any modification in location of already erected instruments, impulse pipes and other hook-up accessories of instruments and frames as per site conditions shall be carried out by contractor within the quoted price. Cleaning/servicing and replacement (if required) of isolation and drain valves and impulse pipes, tubes and other fitting accessories as per hook-up erected alongside with instruments shall also be the part re-commissioning activity. For instruments supplied loose, the scope includes issue from stores, calibration, erection (including fabrication and fixing of frames / stands by welding to steel structure or by chipping & grouting with RCC columns / floor) and charging / loop checking. The work includes installation of housing connecting manifold / PG valve on supports / racks to be suitably fabricated for the instruments being supplied loose The instruments may need repeated calibration / replacement; the same will be carried out by the contractor without any extra cost including calibration of instruments needed for replacement, which will be supplied by BHEL. Erection of thermo elements like RTDs & Thermocouples includes erection of thermowells, wherever required, at no extra cost to BHEL. Tags on all the instruments will be provided by the contractor as directed by BHEL Engineer at no extra cost to BHEL. **Tenderer may note that fabrication / fixing / painting of stands for instruments will be included in quoted / accepted price of respective instrument. However in case the supporting structure required to be fabricated for installation/re-installation of above equipment is more than 50 Kg. Per Instrument the contractor will be paid extra for fabrication etc. for excess of structure as per item rate for structure work.** The contractor shall paint the name / put tag numbers on all the equipment / instruments / cables etc. erected by him. Materials for tagging shall be supplied by BHEL. The adhesive etc. shall be arranged by contractor at his cost. Certain instrumentation like gauges, transmitters, switches and indicators are received in assembled condition and will be erected along with main equipment by other agency. Contractor for subject work will get these equipment dismantled for calibration and will reinstall them in original location as and when directed by BHEL. Payment for above work shall be released as per respective items indicated in the price bid.
3.2.4	**<u>ERECTION OF GI PIPES FOR INSTRUMENT AIR LINE & RIGID PIPE/CONDUITS/ IMPULSE LINE</u>** Fabrication and erection of channel / angle / slotted angle supports, cleaning GI pipes/ conduits/IMPULSE PIPE, cutting, fitting, laying at required elevation, clamping, connecting, valves, fitting, making stations, **Hydro testing,** fitting of moisture eliminator and auto drain traps etc as per drawings within the quoted rate of pipe laying. Flexible conduits are to be laid in tray or pipes. No extra charges will be claimed by contractor for any modification carried out after laying of GI pipe/impulse pipes/conduits lines due to site requirement in general. Painting on laid pipes/impulse line will be done by the contractor within quoted rate. All the paints and consumables required for painting work is in the scope of contractor.

3.2.5	**ERECTION OF PNEUMATIC TUBES (COPPER / SS TUBING):** Fabrication and erection of single angle supports / tray supports for single multi run tube. Laying tubes in the angles / trays from the panel to the equipment, instrument to instrument, air supply line to drive / instrument, air line connections, clamping properly as per standard ferruling and termination at both ends. This includes all fittings and needle valves, stop valves etc. also. Proper tagging of valves and pneumatic tubes on both ends shall be done for proper identification. No extra charges will be claimed by contractor for any modification carried out after laying of pneumatic tubes / draft pipe lines due to site requirement in general.
3.2.6	**CABLE LAYING** Laying, dressing & clamping (by Nylon / PVC ties or Aluminium strips or any other method specified by BHEL Engineer) of the cables in the cable trays / angles. The final dressing of cables on cable trays not erected by contractor shall also be done with Nylon Cord / Aluminium strip. **Cost of cable laying as per BOQ Cum Rate Schedule shall include the cost of Nylon / PVC ties & Aluminium strip, required for dressing / clamping.** The cable run number shall be provided by punching Aluminium Tag plates and tying suitably with nylon ties (at both ends and at regular intervals as advised by BHEL Engineer) which shall be arranged by contractor at his cost. While laying cables, existing cable tray covers and false flooring may require to be removed and re-fixed. The same has to be done at no extra cost to BHEL. The screen of signal cables shall be run in insulated sleeve (of approved quality to be provided by the Contractor) and shall be terminated as per the instruction of the BHEL Engineer. Old cables are also be reused so the contractor has to search the cable at both end and to connect as per revised drawings with proper ferruling and lugging. The dressing of old cables is also in the scope of work. Cable laying includes cutting to the required length, laying in overhead cable racks / underground cable trenches, pipes, flexible conduits, dressing/clamping in tray, drilling of holes in gland plates in panels and junction box, glanding, splicing, dressing of spliced wire inside the panel and JBs, providing printed ferrules(ferrule printing machines to be provided by contractor for printing necessary cross ferruling details) / PVC numerical / alphabetical ferrules(where printed ferrules not possible at all) machine engraved ferrules sleeve/ferrule, termination by using crimp type copper tinned/aluminum lugs, insulated/un- insulated, crimp and soldered termination, plug-in connections with insert type crimping, providing identification cable tags of PVC/aluminum at both the ends and at appropriate interval (Approximately 30meters) throughout the route length, continuity checking, insulation resistance checking. Contractor to arrange adequate numbers of his own ferrule printing machines. Entry to the panels, JB's may be at top, side or bottom. All cable are required be supported and clamped near to the panel. All care should be taken to avoid abrasion, tension, twisting, kinking and stretching of cables during installation. Cable shielding – all signal cables are supplied with bare shielded copper wire/with braided wire shield. Generally, shield wire is kept isolated at instrument/field device end and continuity is maintained through JBs and earthed at panel end only. While terminating the shield wire in either panel or JBs, PVC sleeves are to be used to avoid two-point earthing. Wherever cables run through ducts, conduits, valves, etc., they shall be sealed using fire/weather proof compound. In addition to this, cable entry in panels, MCCs, instruments, electrical actuators etc., are also required to be sealed. The required material for doing so shall be included by contractor in the cabling. Contractor shall carefully plan the cutting schedule of each cable drum in consultation with BHEL site engineer such that wastages are minimized. Recovery will be made in case the

	wastages are exceeding the wastage allowances fixed in this contract. The cabling will be done as per the requirement of IS-1255.
3.2.7	**CABLE TERMINATION** **For Cables, The Cost Of Cable Laying As Per BOQ Cum Rate Schedule shall Also Include the cost of Termination With Suitable Crimping Type Lugs and Ferrules. The contractor shall ensure crimping of lugs with suitable crimping tools** . Only Cable Glands Shall Be Issued By BHEL as Free Issue Item. Drilling of holes in gland plates of HT / LT switchgear, control panels, JBs etc as per requirement shall also be part of cabling at no extra cost to BHEL. The contractor shall carryout insulation testing, simulation testing etc. as per the instructions of Engineer at site. Screen of signal cables shall run in insulated sleeve (to be arranged by contractor at no extra cost) and shall be terminated as per the instructions of the BHEL Engineer.
3.2.8	**ERECTION OF JUNCTION BOX AND PUSH-BUTTONS** Assembly / fabrication, welding of semi-prefabricated limbs of the racks / cable ducts / other related supporting structural parts, chipping of floor and grouting etc. drilling of bottom gland plates for cable entry and earthing with earth pads. For fabrication of steel items Hacksaw cutting or shearing by machine only is permitted. **Tenderer may note that fabrication / fixing / painting of JBs, LPBs and LCPs will be included in quoted / accepted price of respective equipment. However in case the supporting structure required to be fabricated for installation of above equipment is more than 50 Kg. Per Instrument the contractor will be paid extra for fabrication etc. for excess of structure as per item rate for structure work.**
3.2.9	**ERECTION OF COMPUTERS / PLC BASED EQUIPMENTS** All computer related items / equipment like diagnostic station, CRT, monitors, printers, key boards, pre-fabricated connecting leads etc shall be installed in control room and control desk as per direction of BHEL Engineer. **Cost of PC set (including printer, monitor, UPS, interconnecting leads etc) installation as per BOQ Cum Rate Schedule shall also include the cost of installation / placement of furniture (to be issued by BHEL as free issue item) as per requirement / instruction of BHEL Engineer.** The Software installation and commissioning is not included in the scope of this contract. However, any assistance required for testing / commissioning have to be provided by the contractor within the quoted price. Hardware found defective during testing / commissioning and till handing over to Customer, have to be removed for repair / replacement and reinstalled within the quoted rates.
3.2.10	**ERECTION/ CALIBRATION & COMMISSIONING OF CONTROL VALVES AND ACTUATORS** The work includes checking, testing and Limit setting and re-commissioning of motorized valves, replacement of any malfunctioning card of actuator if required is also covered under the scope. In case of pneumatic actuators, re-commissioning of regulating control valve/On-off valve with positioner/LS/PFT/i/p/AFR/air lock relay/volume boosters/Solenoids and erection/modification of associated tubings & fittings, installation/ replacement/ servicing/repairing (if required) of positioner/ ls/pft/i/p/afr/air lock relay/volume boosters/ diaphragm/links/Solenoids and other associated parts wherever required is inclusive
3.2.11	**ERECTION OF ELECTRONIC EARTH PITS** The work includes excavation of pit , installation of Copper plate , Cu/GI pipes, Charcoal ,earth plast and salt as per approved drawings or as per direction of BHEL Engineer. All the materials / consumables required for erection of Electronic earth pits for DCS and DAVR shall be in the scope of contractor. Contractor shall provide the material within the quoted rate for erection of electronic earth pit. Contractor shall arrange equipment for testing of earth pits as per

	guideline of BHEL engineer and ensure the earthing values of pits required for Electronic system viz. DCS and DAVR.
3.2.12	**TESTING/CALIBRATION OF EQUIPMENTS .** The contractor has to ensure the recommissionig of equipments like actuators, control valve, power cylinder, solenoid valves and instruments etc. Contractor has to set-up the calibration lab for testing of C&I instruments and deploy all the IMTEs as per indicative list of Annexure-IV in the lab. Contractor has to arrange qualified and experienced calibration technician in the lab. Contractor has to maintain all the document of calibration report & commissioning protocol in proper format/report duly verified by customer and BHEL**.** In case contractor fails to provide above-mentioned technician as desired by BHEL, the latter shall have the right to hire such services from other agencies at the risk and cost of the contractor
3.3	**COMMISSIONING GUIDELINES**
3.3.1	**TESTING, PRE-COMMISSIONING, COMMISSIONING AND HANDING OVER.** Site testing shall be carried-out for all equipment installed by the contractor to ensure proper installation, setting, connection and functioning in accordance with drawings, specifications and manufacturer's recommendations. Commissioning protocols are to be prepared as advised by BHEL Engineer for getting approved by customer/ Consultant. Testing, and pre-commissioning checks shall be as per relevant codes / practices and BHEL drawings / specifications/ approved commissioning Protocols and same shall include, but not be limited to the following : **INSTRUMENTATION-** All instruments shall be checked, tested and calibrated and re-commissioned. All instruments shall be calibrated before commissioning and proper calibration record shall be maintained to the satisfaction of BHEL Engineer. All impulse and pneumatic lines shall be be checked and if found choked , the choking shall be removed for proper measurements of process parameters. Some of the instruments may require re-calibration during commissioning. The contractor shall remove such instruments, recalibrate and install within the quoted rates. **DRIVES, PANELS AND CONTROLLERS** All drives such as pneumatic / motorised valves / LOPs / solenoid valves etc. and controllers shall be checked and re-commissioned. All transmitters, PFT, I/P converter, positioner shall be calibrated and limit switches shall be adjusted for re-commissioning of system. All drives shall be operated by simulating various conditions to ensure healthiness of components of the system. Re-calibration / rectification wherever required shall be carried out by the contractor within the quoted rates. Remote operation of all drives, valves, dampers shall be checked from control room as per instruction of BHEL Engineer.

3.4.	**GENERAL CONDITIONS FOR COMMISSIONING** The scope of commissioning work covers commissioning of all instruments/equipment/systems covered in the BOQ including loop checking and establishing the operation of instruments/equipment/systems to meet plant commissioning /operation. BHEL will provide vendor supports for special or proprietary type instruments/systems if necessity is accessed by engineer-in charge BHEL and contractor engineers/supervisors shall associate with the vendors and provide necessary manpower, T&P, IMTE's etc. The contractor shall be responsible for overall commissioning of all the instruments and systems covered in the BOQ. Scope of commissioning starts with the commissioning of various equipment/ instruments/ systems erected by the contractor and making them available, as required, for the various commissioning activities of the main plants. The commissioning activities of the main plant shall be as below: i. Light up of boiler. ii. Turbine barring gear. iii. Turbine rolling. iv. Synchronization and full loading of unit.
3.4.1	The above commissioning activities, tests, trial runs may have to be repeated till satisfactory results are obtained to the satisfaction of customer / consultant / statutory authorities like boiler inspector, inspector etc.
3.4.2	The contractor shall co-ordinate with other contractor's during the above main plant commissioning activities to ensure successful commissioning of total plant.
3.4.3	The pre commissioning activities of the plant will start with run of various equipment prior to light up of boiler and commissioning operations shall continue till the unit is handed over to customer. The contractor shall simultaneously start commissioning activities for the equipment erected to match with the various milestone activities of commissioning programme of the project.
3.4.4	Contractor shall arrange specialized commissioning engineers, supervisors, electricians, and instrument technician in each area to be associated with BHEL commissioning staff. Contractor shall earmark separate manpower for various commissioning activities. The manpower shall not be disturbed or diverted. It shall be specifically noted that above employees of the contractor may have to work round the clock along with BHEL commissioning engineers involving considerable payment of overtime, which forms part of Contractors Scope
3.4.5	The mobilization of these commissioning groups shall be such that planned activities are taken up in time and also completed as per schedule and the work undertaken round the clock if required. It is the responsibility of contractor to discuss on day to day / weekly / monthly basis the requirement of manpower, consumables, tools and tackles with BHEL engineer and arrange for the same.
3.4.5	If at any time the requisite manpower, consumables, T & P are not arranged by the contractor to meet the schedule, BHEL shall make alternate arrangements and recover the cost with overhead from the running bills of the contractor.

3.4.6	After erection of various equipment prior to commissioning and after commissioning, protocols have to be made with BHEL's customer. The formats will be given by BHEL and have to be printed by the contractor in adequate numbers.
3.4.7	For works, 415 volts and above, the contractor has to bring qualified electricians and the total work has to be certified by license holder
3.4.8	In case any rework/repair/rectification/modification/fabrication etc. is required because of contractor's faulty erection which is noticed during commissioning at any stage, the same has to be rectified by the contractor at his cost. If during commissioning, any improvement / repair / rework / rectification / fabrication / modification due to design improvement / requirement is involved, the same shall be carried out by the contractor promptly and expeditiously. Claims if any, for such works from the contractor shall be governed by clauses covered elsewhere.
3.4.9	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
3.4.10	**REQUIREMENT OF MANPOWER** The contractor shall deploy all the skilled workmen like engineers, supervisors, mill wright fitters, welders, gas cutter, masons, carpenters, electricians, instrument technician and unskilled workmen required for all the works of Erection & commissioning of C&I items of U- 12 & 13 for completing the work within schedule. A tentative list of manpower is given as below which are to be deputed on requirement basis- Engineer – 3 Nos. Supervisor– 5 Nos. Store-keeper- 1No. Calibration Technician – 2 no. Electrical/Pneumatic Valves /Wall Blowers Technician -3 Nos. Instrument/Impulse pipes/tubes/GI pipe Fitter- 2 Nos. HP/LP Welders – 2 Nos. Cable laying Group- 4 Gangs. Each gang comprising of supervisor -1 No. and 8 Nos. Cable puller Electrician – 16 Nos. Helper- 20 Nos. For any additional manpower as per site requirement the same shall be arranged by the contractor within the quoted rates.
3.4.11	Minimum requirement of Man Power for commissioning works per unit shall be as follows: Engineer (C&I) – 2 Supervisor (C&I) – 4 Technician (C&I) –4 The above commissioning group shall be identified at the Pre-commissioning and commissioning time. The above commissioning group shall have the knowledge of various systems referred in the tender and also should have adequate experience. The above manpower for commissioning is only tentative and for any additional manpower as per site requirement the same shall be arranged by the contractor within the quoted rates.

	If the contractor fails to deploy the above Engineer/Supervisor/ Technician at appropriate time of commissioning, no payment shall be made against commissioning activities as per terms of payment and BHEL reserves the right to required manpower on risk and cost of Contractor. All the T&P, IMTE's and other Erection & commissioning instruments/tools required for commissioning are to be arranged by the contractor.
	Note: 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/NBPPL FQPs/ norms. All the above will be witnessed by the BHEL engineers and a joint report/protocol shall be made and signed by contractor. It shall be responsibility of contractor to get signed all protocols /reports from BHEL and or NBPPL and handing over to BHEL Engineer-in-charge. Contractor shall follow checklist of BHEL and testing & commissioning activities shall be carried out in accordance with the checklist.
3.5	**FINISH PAINTING-**
3.5.1	All equipment within the scope of these specifications shall be received duly painted. However during storage and handling the same may get peeled off / damaged / deteriorate. All such surfaces are to be thoroughly cleaned and to be touch up painted with suitable approved primer / finish paint matching with shop paint / approved final colour. Besides above two coats of approved primer paint and at least two coats of approved finish paint to get the desired dry film thickness, is to be applied on various loose equipment, all impulse lines and structures fabricated and erected at site. **All paints, tools and other consumables including scaffolding materials required for painting shall be arranged and provided by contractor within the quoted rates. Paint and other materials so purchased shall be ISI marked and painting should be as per colour scheme and quality approved / specified by Engineer.** Certain equipment shall require spray painting (touch up). The contractor shall make arrangements of the required equipment for spray painting of such equipment at his own cost. Spray painting at the job site shall be permitted only at times and locations approved by the owner / Engineer. Contractor has to supply all paints, primers and other consumables required for painting of relevant area of C&I. BHEL reserves the right to reject any material not found satisfactory. Contractor shall produce manufacturer's test certificate.
3.6	**Miscellaneous Work**
3.6.1	Re-rolling of fresh supplied cables on drums as required by site engineer. Providing missing hardware/ substitute hardwares and clamps. Grouting by portland cement including material and arrangement is to be made by the contractor. Providing supports for impulse lines, instruments, air lines, cable trays wherever required by fabricating at site. Required material for these will be provided by BHEL & all consumables including gas, welding electrodes etc. will be arranged by the contractor.
3.7	**SCOPE OF WORK FOR BATTERY/UPS system:**
	Lump sump rate shall be quoted for Erection and commissioning of Battery & UPS system. No additional payment shall be made for any variation in the number of cells. The rate quoted for erection of battery and UPS systemwill include the following works:

	Collecting the batteries and UPS panels 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, Filling the individual cells with Acid/alkali – if applicable. Arranging suitable resistive load banks for charging and discharging during charging and discharging cycles. 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. Modifications or changes if any for the loose supplied items or any minor changes in wiring. Arranging necessary tools, T&P, Testing equipment, required for erection and commissioning of the battery. Erection of battery after assembly of battery stands, inter-connection of batteries and first charging; Capacity testing using dummy load and subsequent recharging (in case of failure of capacity test, the charging Discharging cycle is to be repeated) Dummy load test of UPS includes arrangement of dummy load and temporary connection in absence of regular power supply. Erection , Testing and Commissioning of UPS system as per electrical schemes & Calibration of all indicating and measuring instruments.
3.8	**MEASUREMENTS & WASTAGE & CUTTING ALLOWANCES**
3.8.1	For all payment purposes, measurement shall be made on the basis of the actual execution of work in line with drawings/documents/site requirements. Physical measurements shall be made by the contractor in the presence of the Engineer. Measurement for cable, impulse pipes/tubes, GI pipe, conduits, flexible conduits, trays etc., shall be made on the basis of length actually laid
3.8.2	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.
3.8.3	All materials returned to stores should carry aluminium tag indicating the size and type. Cables more than 15 meters length is termed as serviceable material and shall be returned size wise and category wise to the owner's stores/yard. Cable of serviceable length being returned to the stores in drums shall have their free ends sealed and the balance lengths on the drum(s) shall be noted and certified by the Engineer-in-charge. This shall be applicable only for the purpose of accounting the cables issued for installation
3.8.4	While carrying out material reconciliation with contractor, all the above points will be taken into account. All serviceable material returned by the contractor shall be deducted from the quantities issued for the respective sizes and categories and the balance quantity (ies) will be taken as the net quantity (ies) issued to the contractor. Material reconciliation shall be done and allowable scrap quantity calculated as per wastage allowance percentage specified above. Any scrap/wastage generated by the contractor in excess of the allowable percentage shall be charged at the rates decided by the Engineer whose decision shall be final and binding on the contractor.
3.8.5	For all site-fabricated steel items such as supports, racks, frame, Canopy etc. physical measurement shall be made and then converted to tonnage. For steel material supplied to the contractor, all scrap shall be returned to BHEL stores with due accounting.
3.8.6	Every month the contractor shall submit an account for all the materials issued to him by BHEL in the standard Performa prescribed for this purpose by the site in-charge.
3.8.7	The erection contractor shall make every effort to minimize wastage during erection work. Cutting and wastage allowance shall be computed on length, weight of material actually used, measured and accepted. In any case, the wastage shall not exceed the following limits;

	Sl No.	Item Description	**% Wastage on issued Qty.**
	1	Each iron/steel section	2
	2	Each size of control / shielded cable	2
	3	Each size of power cables	1
	4	Impulse pipe/tubes/GI pipes/copper tube/Cable trays	1
3.8.8	If the actual wastage is more than the specified figure, then equivalent price of the excess portion will be deducted from the contractor's bill.		
3.8.9	Cable take off from drums shall be planned strategically such that jointing in the run of cables and wastage are avoided. For this purpose the exact route length between various equipment/panels as per the cable schedule shall be measured and the route length recorded before laying of the cables. Depending upon the route length and the type of cable required for various destinations, the cable drums shall be suitably selected for cable laying. Any jointing shall have to be approved by BHEL engineer. All the cut pieces/bits of cables, which are not used, shall be returned to the purchaser for accounting towards wastage. The cables damaged by the contractor shall have to be replaced by the contractor at his own cost.		

TECHNICAL CONDITIONS OF CONTRACT (TCC) -1

CHAPTER-IV: BILL OF QUANTITY FOR C&I WORKS OF REHABILIATION PACKAGE OF OBRA UNIT # 12 & 13

Sl No.	Item Description	QUANTITY	UNIT
1	DCS BASED PANELS APPX SIZE (800L*2000H*800W)	116	Nos.
2	HMI SYSTEM CONSISTS OF INSTALLATION OF OWS (8 NOS.), EWS (1 NO.) AND STORIAN PC (1 NO.) , PRINTERS(3 Nos.) AND ASSOCIATED FURNITURE AND OPERATOR CONTROL DESK	2	set
3	UNIT CONTROL PANEL	2	Nos.
4	UPS ACDB PANEL	4	Nos.
5	GRAVEMETRIC FEEDER PANEL	12	Nos.
6	JUNCTION BOX UPTO 12 WAYS / LOCAL GUN M AINTENACE SW ITCH / LOCAL PUSH BUTTONS / SHEAR PIN FAILURE INDICATION BOX/	20	Nos.
7	JUNCTION BOXES UPTO 48 WAYS	20	Nos.
8	JUNCTION BOXES UPTO 64 WAYS	10	Nos.
	ERECTION & COMMISSIONING (LADDER/PERFORATED TYPE CABLE TRAYS)		
9	LADDER /PERFORATED CABLE TRAY 600/ 500/ 450/ M M WIDE INCLUDING COVER AND OTHER ASSESSORIES	200	MTRS
10	LADDER /PERFORATED CABLE TRAY 150 M M WIDE INCLUDING COVER AND OTHER ASSESORIES	100	MTRS
11	LADDER /PERFORATED CABLE TRAY 100 M M WIDE INCLUDING COVER	100	MTRS
12	LADDER /PERFORATED CABLE TRAY 50 M M WIDE INCLUDING COVER	100	MTRS
	ERECTION & COMMISSIONING (IMPULSE PIPES/GI PIPES/GI FLATS)		
13	1/ 2" , 3/ 4" CS/ AS / SS IM PULSE PIPE UPTO 120 SCHEDULE,	**150**	MTRS
14	1/ 2" , 3/ 4" CS/ AS / SS IM PULSE PIPE 160 & 180 SCHEDULE	**100**	MTRS
15	1" CS/AS/SS IMPULES PIPE UPTO 160 SCHEDULE	**100**	MTRS
16	GI PILICA CONDUCT / PIPE WITH FITTING INCLUDING VALVE (UPTO 1")	**150**	MTRS
17	GI PILICA CONDUCT / PIPE WITH FITTING INCLUDING VALVE (Above 1” and UPTO 2")	**100**	MTRS
18	GI FLATE (50X6MM/30X5MM)	600	MTRS
	ERECTION & COMMISSIONING (LT POWER/CONTROL/SCREENED SIGNAL CABLES)		
	LT POWER CABLES,1.1 kV Aluminium/Copper conductor XLPE/PVC insulated Armoured/Unarmoured cable		

19	2 CORE / 1 PAIR CABLE (ARM OURED / UNARM OURED) CORE SIZE UPTO 2.5 SQ. M M	50000	MTRS
20	3 CORE / 1 TRAID CABLE (ARM OURED / UNARM OURED) CORE SIZE UPTO 2.5 SQ. M M	40000	MTRS
21	4 CORE / 2 PAIR CABLE (ARM OURED / UNARM OURED) CORE SIZE UPTO 2.5 SQ. M M	45000	MTRS
22	7 CORE / 8 CORE / 4 PAIR / 2 TRAID CABLE (ARM OURED / UNARM OURED) CORE SIZE UPTO 2.5 SQ. M M	210000	MTRS
23	10-16 CORE / 8 PAIR CABLE (ARM OURED/ UNARM OURED) CORE SIZE 2.5 SQ M M	60830	MTRS
24	17-24 CORE / 12 PAIR CABLE (ARM OURED/ UNARM OURED) CORE SIZE 2.5 SQ M M	40000	MTRS
25	1C/2C/3C/3.5C CABLE ABOVE 2.5 SQMM AND UPTO 35 SQ. M M CABLE (ARM OURED / UNARM OURED)	25000	MTRS
26	1C/2C/3C/3.5C CABLE ABOVE 35 SQM M AND UPTO 90 SQ. MM (ARMOURED/UNARM OURED)	10000	MTRS
27	4P UTP E-CAT LAN CABLE	8000	mtrs
28	PRE-FABRICATED CABLE (UP TO LENGTH 30 MTR)	16	NOS.
29	RE-COMMISSIONING OF SOOT BLOWER MCC, LOCAL STARTER BOXES, CHECKING & COMMISSIONING OF SOOT/ WALL BLOWERS FROM LOCAL, REMOTE AND DCS. REPLACEMENT/SERVICING/REPAIRING OF ANY MALFUNCTIONING/ DAMAGED/RUSTED ACCESSORIES MOUNTED IN SOOT BLOWER, MCC MODULES AND LOCAL CONTROL BOXES MOUNTED ON SOOT/WALL BLOWERS.	1	set
30	RE-COMMISSIONING OF DC SCANNER FAN STARTER BOX (900L X 1120H X 375W), REPLACEMENT / SERVICING /REPAIRING OF ANY MALFUNCTIONING/ DAMAGED/RUSTED ACCESSORIES MOUNTED IN DC SCANNER STARTER BOX.	1	set
31	RE-COMMISSIONING OF 110 V AC POWER DISTRIBUTION PANEL	1	Nos.
32	RE-COMMISSIONING OF STATIC EXCITATION SYSTEM INCLUDES COMMISSIONING OF DIGITAL AVR REGULATING PANEL, FIELD FLASHING PANEL AND THYRISTOR PANEL, INTERFACING WITH OLD AND NEW AVR PANEL, WIRING & DRESSING, MOUNTING OF NEW TBS AS PER REQUIREMENTS, REPLACEMENT/ SERVICING/REPAIRING OF ANY MALFUNCTIONING/ DAMAGED/RUSTED ASSESORIES MOUNTED IN SEE SYSTEM, BUSBAR CONNECTION (IF REQUIRED), INSULATION OF BUSBAR WHEREVER REQUIRED, SEALING OF PANELS, IDENTIFICATION OF OLD CABLES AND THEIR TERMINATION, MINOR MODIFICATIONS IN SEE SYSTEM. CLEANING OF SEE ROOM/EQUIPMENTS FOR PROPER OPERATION OF SYSTEM.	1	SET
33	RECOMMISSIONING OF ELECTROM AGNET RELEIF VALVE INCLUDES CONTROLLER BOX, SWITCH AND\TUBES & PIPING, CALIBRATION OF BOURDN TYPE PRESSURE SWITCH.	1	Nos.

34	SWAS SYSTEM ERECTION AND COMMISSIONING INCLUDES COMMISSIONING OF WET PANEL, DRY PANEL & CHILLER UNIT, CHARGING AND LEAKAGE ARRESTING OF DRAIN PIPING, CW LINE PIPING. INSTALLATION ,TESTING AND CALIBRATION OF PH, CONDUCTIVITY, DISSOLVED OXYGEN AND SILICA SENSORS, TRANSMITTERS AND ANALYSERS, 1/4" TUBING AMONG CHILLER, WET PANEL AND DRY PANEL, INTERNAL WIRING AND TERMINATION OF TRANSMITTERS, REAGENT PREPARATION, PREFABRICATED CABLE LAYING BETWEEN SENSOR AND TRANSMITTER. REFILLING OF R-22 GAS IN CHILLER UNIT COMPRESSORS, INSTALLATION OF WINDOW AC IN DRY PANEL ROOM	1	SET
35	RE-COMMISSIONING OF EWLI SYSTEM INCLUDES CLEANING AND RE-MOUNTING OF LOOSE SUPPLIED ELECTRODES AND WASHERS, PTFE CABLING & TERMINATION BETWEEN ELCTRODES AND ASCERTOR CABINET, MOUNTING OF DISPLAY UNITS IN UCP/CP PANEL AND CABLING & TERMINATION BETWEEN UCP/CP DISPLAY UNITS AND ASCERTOR CABINET.	2	SET
36	OXYGEN ANALYSER COMPLETE SET OF SENSOR, CALIBRATION UNIT, CALIBRATION GAS CYLINDER AND JB WITH ALL ACCESSORIES	2	SET
37	COMMISSIONING OF GENERATOR H2 ANALYSER SYSTEM WITH PANEL (800LX800WX2200H), CALIBRATION GAS CYLINDER, SENSOR, ANLAYSER, INTERCONNECTION OF CABLES, TUBING ETC.	1	SET
38	SOX ANALYSIS SYSTEM WITH PANEL ACCESSORIES AND STANDARD CALIBRATION UNIT CYLENDER GAS CYLENDER RACK FSHS BOXES ASSOCIATED CABLING SS TUBING ETC INSTALATION OF PROBE SENSER RTD TEFLON TAPE IN DUCTS LEADING TO CHIMNEY	1	SET
39	OPACITY ANALYSER CONSISTING OF BLOWERS, TRANSCEIVER, REFLECTOR UNITS, MOUNTING OF FILTER, BLOWER HOSES ANALYSER PANEL/JBs, PREFABRICATED CABLES ETC	1	SET
	ERECTION & COMMISSIONING/of (FIELD INSTRUMENTS/PNEUMATIC VALVES/MOVs/ERVs/LIMIT SWITCHES)		
40	FLAME SCANNER HEAD ASSY INCLUDING CABLE UPTO JB, Re- installation and checking and commissioning	20	Nos.
41	MANUAL VALVE LIMIT SWITCHES AND CORNER SKID, LOTV,HOTV & HORV LIMIT SWITCHES INSTALLATION (if required) , SETTINGS AND COMMISSIONING AFTER REMOVAL OF OLD LIMIT SWITCHES INSTALLED ON PNEUMATIC ON/OFF VALVES.	150	Nos.
42	SADC SYSTEM INCLUDES re-COMMISSIONING OF CONTROL STATION CONSISTS OF I/P CONVERTERS, PRESSURE SWITCHES, AFRS, ISOLATION VALVES, ASSOCIATED TUBINGS REQUIRED IN CONTROL STATION, TUBINGS FROM CONTROL STATION TO SADC POWER CYLINDERS, RE-INSTALLATION (IF REQUIRED) OF FLEXIBLE HOSES OF 1/4'' AND 1'' SIZE WITH AFR AS PER TUBING SCHEME OF SADC SYSTEM, PURGING AND LEAK TESTING OF TUBINGS AND ASSOCIATED INSTRUMENT AIR PIPINGS,DRESSING/ Re-INSTALLATION (IF REQUIRED) OF TUBING IN PERFORATED CABLE TRAYS. COMMISSIONING, TESTING AND SETTINGS (IF ANY) AND REPAIR/SERVICING/REPLACEMENT (IF REQUIRED) OF SADC POWER CYLINDER (48 NOS.) AND ASSOCIATED EQUIPMENTS OF CONTROL STATION, TUBES AND PIPES WITHIN QUOTED RATE.	1	SET

43	CHECKING, TESTING LIMIT SWITCH SETTING re-COMMISSIONING OF ELECTRICAL ACTUATORS OR ELECTRICALS DAMPER OR LT MOTORS, INCLUDING COMMISSIONING OF MCC MODULE, REPLACEMENT OF MALFUNCTIONING CARDS IF REQUIRED	165	Nos.
44	CALIBRATION, re-COMMISSIONING OF REGULATING CONTROL VALVE WITH POSITIONER/LS/PFT/I/P/AFR/AIR LOCK RELAY/VOLUME BOOSTERS, ERECTION OF ASSOCIATED TUBINGS & FITTINGS, INSTALLATION/ REPLACEMENT/ SERVICING/REPAIRING (IF REQUIRED) OF POSITIONER/ LS/PFT/I/P/AFR/AIR LOCK RELAY/VOLUME BOOSTERS/ DIAPHRAGM/LINKS and OTHER ASSOCIATED PARTS WHEREVER REQUIRED IS INCLUSIVE IN re-COMMISSIONING WORKS OF CONTROL VALVES. INSTRUMENT AIR LINE PURGING, ATTENDING OF LEAKAGES AND WELDING/REPLACEMENT OF INSTRUMENT AIR PIPING AND TUBINGS, VALVES AND OTHER ASSOCIATED FITTINGS (IF REQUIRED) ARE INCLUSIVE IN THIS WORK. ALL THE LEAKS ARRESTING/REPAIR/REPLACEMTS IN INSTRUMENT AIR CIRCUITS ARE INCLUSIVE IN THIS WORK FOR SUSTAINING THE REQUIRED INSTRUMENT PRESSURE REQUIRED FOR COMMISSIONING OF PNEUMATIC VALVES.	45	Nos.
45	CALIBRATION, re-COMMISSIONING OF PNEUMATIC ON/OFF SOLENOID OPERATED VALVE WITH SOLENOIDS/LS/AFR/AIR LOCK RELAY, ERECTION OF ASSOCIATED TUBINGS & FITTINGS, INSTALLATION/REPLACEMENT/ SERVICING/REPAIRING (IF REQUIRED) OF SOLENOIDS/LS/AFR/AIR LOCK RELAY/DIAPHRAGM/FITTINGS/LINKS WHEREVER REQUIRED IS INCLUSIVE IN RE-COMMISSIONING WORKS OF ON/OFF VALVES.ATTENDING OF LEAKAGES AND WELDING/REPLACEMENT OF INSTRUMENT AIR PIPING AND TUBINGS, VALVES AND OTHER ASSOCIATED FITTINGS (IF REQUIRED) ARE INCLUSIVE IN THIS WORK. ALL THE LEAKS ARRESTING/REPAIR/REPLACEMTS IN INSTRUMENT AIR CIRCUITS ARE INCLUSIVE IN THIS WORK FOR SUSTAINING THE REQUIRED INSTRUMENT PRESSURE REQUIRED FOR COMMISSIONING OF PNEUMATIC VALVES.	85	Nos.
46	RECOMMISSIONING AND CHECKING OF M ETAL TEM PERATURE M EASURING THERM OCOPLES (SIM PLEX/ DUPLEX), REPLACEMENT OF MTMs IF FOUND DAMAGED/MALFUNCTIONING	110	Nos.
47	RE-CALIBRATION, ERECTION AND COMMISSIONING OF PRESSURE/ DIFF PRESSURE/ TEMPERATURE/ LEVEL GAUGE INCLUDES FLUSHING/ BACK FLUSHING/HYRO TEST OF EXISTING/NEWLY LAID IMPULSE LINE,INSTALLATION AFTER RE-CALIBARTION OF LOCAL GUAGES , PURGING OF IMPULSE PIPING, HYDRO AND LEAK TEST OF PIPINGS, REPLACEMENT/REPAIR/RE-ROUTING OF IMPULSE PIPES (IF REQUIRED),INSTALLATION OF FRAMES IF INSTRUMENT LOCATION IS CHANGED,CHECKING/REPLACEMENT (IF REQUIRED) FOR ALL FITTINGS, TUBINGS, MANIFOLD, DRAIN/ISOLATION VALVES ETC. AS PER HOOK UP SCHEME	390	Nos.

48	RE-CALIBRATION, ERECTION AND COMMISSIONING OF PRESSURE/DIFF PRESSURE/ TEMPERATURE/LEVEL SWITH CAN BE FLANGE TYPE OR WELDED TYPE/WITH OR WITHOUT ELECTRONIC UNIT, INCLUDES INSTALLATION AFTER RE-CALIBRATION, PURGING OF IMPULSE PIPING, HYDRO AND LEAK TEST OF PIPINGS, REPLACEMENT/REPAIR/RE-ROUTING OF IMPULSE PIPES (IF REQUIRED),INSTALLATION OF FRAMES IF INSTRUMENT LOCATION IS CHANGED,CHECKING/REPLACEMENT (IF REQUIRED) FOR ALL FITTINGS, TUBINGS, MANIFOLD, DRAIN/ISOLATION VALVES ETC. AS PER HOOK UP SCHEME	170	Nos.
49	RE-CALIBRATION/CHECKING, ERECTION & COM M ISSIONING OF RTD/THERM OCOUPLES ALONG WITH THERMOWELL AND FITTINGS,REPLACEMENT OF RTD/THERM OCOUPLES IF FOUND DAMAGED/MALFUNCTIONING	270	Nos.
50	RE-CALIBRATION/CHECKING, ERECTION & COM M ISSIONING OF BEARING TEMPERATURE CAPSULE TYPE RTD , THRUST PAD RTD, SEAL OIL LINER RTDS ,REPLACEMENT OF CAPSULE TYPE RTD IF FOUND DAMAGED/MALFUNCTIONING	40	Nos.
51	RE-CALIBRATION, ERECTION & COMMISSIONING OF PRESSURE / DIFF PRESURE / LEVEL / FLOW/ MASS FLOW TRANSMITTERS WITH FITTINGS, MANIFOLD, DRAIN VALVES, FLUSHING/HYDRO TEST OF EXISTING/NEW LAID IMPULSE LINE, INCLUDES INSTALLATION AFTER RE-CALIBRATION, PURGING OF IMPULSE PIPING, HYDRO AND LEAK TEST OF PIPINGS, REPLACEMENT/REPAIR/RE-ROUTING OF IMPULSE PIPES (IF REQUIRED),INSTALLATION OF FRAMES IF INSTRUMENT LOCATION IS CHANGED,CHECKING/REPLACEMENT (IF REQUIRED) FOR ALL FITTINGS, TUBINGS, MANIFOLD, DRAIN/ISOLATION VALVES ETC. AS PER HOOK UP SCHEME	200	Nos.
52	INSTALLATION AND COMMISSIONING OF SOV OPERATED PNEUMATIC HEA ROD POWER CYLINDER, IGNITOR BOX,IGNITOR TIP,HEA ROD AND ASSOCIATED CONNECTION BETWEEN IGNITOR BOX AND HEA ROD ASSEMBLY ERECTION AND COMMISSIONING. COMMISSIOING OF SOV OPERATED PNEUMATIC HEA ROD POWER CYLINDER INCLUDES SERVICING OF POWER CYLINDER ASSEMBLY (IF REQUIRED). REPAIR/REPLACEMENT/SERVICING OF ANY PART OF RETRACTOR ASSEMBLY, HEA ROD, SPARK TIP AND IGNITOR BOX (IF REQUIRED) ARE INCLUSIVE IN THIS WORK	12	Nos.
53	REPLACEMENT/CHECKING OF 1/ 2" / 3/ 4"/1" INSTRUMENT ROOT/ISOLATION VALVES.	100	Nos.
54	SMALL ELECTRONIC EARTHPIT AS PER APPROVED DRAWING	1	Nos.
55	LVS SYSTEM (2 Nos.) WITH CPUs AND LEDs (5 Nos.)	2	set
56	INSTALLATION OF SLAVE CLOCKS	2	Nos.
57	UPS system with Battery bank installation, Testing and commissioning	1	set
58	Erection and commissioning of TSI system	1	set

REMARKS -

1. All dimensions are in mm unless otherwise specified and size is approximate.
2. Quantities indicated against each item above are tentative and same are liable to vary at any extent on either side depending upon 'the site requirement. The contractor has to dismantle, erect / commission all items indicated by BHEL Engineer for achieving unit wise milestone.

	TECHNICAL CONDITIONS OF CONTRACT (TCC) -1 CHAPTER-V: MATERIAL HANDLING AND STORAGE
5.0	**MATERIAL HANDLING AND STORAGE**
5.1	All the equipment and material furnished under this contract (except those which are mentioned specifically in the scope of work) shall be identified, unpacked and to received from the BHEL/UPRVUNL project stores, sheds/storage yards (any place within site & storage area) and transported to be pre-assembly area/ erection site and stored in the storage spaces in a manner so that they are easily retrievable till they are erected by the contractor. While drawings/ lifting material from BHEL/ customer stores, contractor shall ensure that the balance / other materials are stacked back immediately. This is included in the quoted rate and to be done by contractor at no extra cost.
5.2	The contractor shall follow the BHEL and UPRVUNL procedure for issuing the material from BHEL/UPRVUNL store yards.
5.3	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.
5.4	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 to BHEL.
5.5	Contractor shall be responsible for examining all the plant and material 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 submit to the Engineer every week, a report detailing all the receipts during the week. However, contractor shall be solely responsible for any shortages or damages in transit, handling, storage and erection of the equipment once received by him. 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.
5.6	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.
5.7	Electrical panels, control gear, motors and such other devices shall be properly dried by heating before they are installed and energized. Exposed parts those required special protection such as bearings, slip rings, commutators shall be protected against moisture ingress and corrosion during storage and are periodically inspected.
5.8	The contractor shall ensure that all the packing materials and protective devices used for various equipment during transit and storage are removed before the equipment are installed. Contractor will return back all the excess materials & defective material to BHEL store with proper procedure.
5.9	Party has to arrange own transportation, (hydra and trailor) for transporting material from BHEL/UPRVUNL store to site and yard. Party has to arrange suitable lifting arrangement for lifting the material from different elevation.
5.10	**All existing equipments being dismantled are to be carefully removed, properly identified and shifted to the stores area indicated by the Engineer. Instruments have to be carefully removed, tagged and returned to stores.**

CHAPTER-VI: FACILITIES IN THE SCOPE OF CONTRACTOR/BHEL

6.0 Scope Matrix

S.No	Description	To be Taken care by		Remarks
		BHEL	CONTRACTOR	
6.1	**ESTABLISHMENT**			
6.1.1	**FOR CONSTRUCTION PURPOSE**			
A.	Open space for office	**YES**		Free of charge. As and where made Available by customer M/s UPRUNL /BHEL
B.	Open space for storage	**YES**		Free of charge. As and where made Available by customer M/s UPRVUNL /BHEL
6.1.2	**FOR LABOUR COLONY**			
A	**Quarter**	**-**	**YES**	Contractor have to make own arrangement. If quarter is available from UPRVUNL, the same shall be provided on chargeable basis.
6.2	**ELECTRICITY**			
6.2.1.	Electricity for construction purposes			
6.2.1.1	Single point source	**YES**		FREE OF CHARGE
6.2.1.2	Further distribution for the work to be done Which include supply of materials & Execution		**YES**	
6.2.1.3	Electricity for the office, stores, canteen etc of the bidder which include: Distribution from single point including supply of materials & service		**YES**	
6.2.1.4	Demobilization of the facilities after completion Of works		**YES**	
6.2.1.5	Electricity for living accommodation of the bidder's Staff, engineers, supervisors etc. on the above Lines		**YES**	**Chargeable** As per UPPCL standard rates. **Contractor shall install calibrated energy meter for metering electricity consumption.**
6.3	**WATER SUPPLY**			

6.3.1	**FOR CONSTRUCTION:**			
6.3.1.1	Making the water available at single point	**YES**		As and where made Available by BHEL/ UPRVUNL
1.3.1.2	Further distribution as per the requirement of work including supply of materials & Execution		**YES**	
6.3.2	**LABOUR COLONY:**			
6.3.2.1	Making the water available at single point			Contractor has to arrange on his own.
6.4.0	**LIGHTING**			
6.4.1	For construction work (supply of all materials) 1. At office storage area 2.At preassembly area 3.At construction site/area		**YES**	
6.4.2	For construction work (execution of lighting work/arrangements) 1. At office storage area 2. At preassembly area 3. At construction site/area		**YES**	
6.5.0	**Communications facilities for site operations of the bidder**			
6.5.1	Telephone, fax , internet , intranet, email etc.		**YES**	
6.6.0	**COMPRESSED AIR SUPPLY**			
6.6.1	Supply of compressed air at already available point	**Yes**		**Free of charge**
6.7.0	**ERECTION FACILITIES**			
6.7.1	Providing erection drawings for all the Equipments covered under this scope	**YES**		
6.7.2	Drawings for construction method	**YES**	**YES**	In consultation with BHEL
6.7.3	As-built-drawings-where ever deviations Observed & executed and also based on Decisions taken at site		**YES**	**do**
6.7.4	Shipping lists etc for reference & planning the Activities	**YES**	**YES**	**do**
6.7.5	Preparation of site erection schedules and other input requirements.		**YES**	**do**
6.7.6	Review of performance & revision of site erection schedules in order to achieve the end dates & commitments	**YES**	**YES**	**do**
6.7.7	Daily & weekly erection schedule based on **Sl. No.2.10**		**YES**	**do**

6.7.8	Periodic visit of senior official of bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every month minimum.		**YES**	

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

6.9 The Contractor shall be responsible for providing all necessary facilities like residential accommodation, transport, electricity, water, medical facilities etc. at his own cost as required under various labour laws and statutory rules and regulations framed there under to the personnel employed by him.

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

6.11 **The contractor should follow below points. while drawing construction power supply from Dist. Board**

- All electrical installations should be as per Indian Electricity rules.
- All distribution Boards installed by the contractor should be constructed with fireproof materials viz. Steel frames, Bakelite sheets etc.
- Connection for single phase should be taken from phase and neutral. Nowhere the connection should be taken with earth as neutral.
- Contractors have to make their own arrangement for their equipment/ DB earthing
- All electrical connections should be made through connectors, nuts and bolts, switches, plug and sockets. Loose connections or hooking up of wires shall not be permitted.
- All electrical equipment / tools and plants should be properly earthed. DBs to be earthed diagonally opposite at two points.
- Contractor should use "MCCB" and "ELCB" either on incoming or outgoing connections to the DBs.
- Contractor should ensure that all the CBs / TPNs/ Fuses/ MCCB / ELCB cables etc. should be of adequate rating/ capacity. For permission of supply connections contractor has to submit a test report of their installations with a single line diagram of connected/ proposed loads.

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

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

6.14 On completion of work or as and when required by BHEL, all the temporary buildings, structures, pipe lines, cables etc shall be dismantled and leveled and debris shall be removed, as per instructions of BHEL.

	TECHNICAL CONDITIONS OF CONTRACT (TCC) -1			
	CHAPTER-VII: T&PS AND MMES TO BE DEPLOYED BY CONTRACTOR			
7.0	**T&PS AND MMES TO BE DEPLOYED BY CONTRACTOR**			
	DESCRIPTION		**Capacity**	**QTY**
7.1	Welding Generators & Transformers, Rectifiers & TIG Welding sets			APR
7.2	Chain pulley blocks		5/10 T	APR
7.3	Trailer with Pulling Unit		10 MT	APR
7.4	Hydra crane		14 MT	APR.
7.5	Copper/SS tube bender and cutter sizes 6mm, 8mm, 1/2", 1/4"			2 Nos. each
7.6	Pipe bending machine		Upto 2" size	2 Nos.
7.7	Dye sets for threading		upto 2" pipe.	2 Set
7.8	Tap sets for both BSP and NPT		threads upto 1" each	2 Set each
7.9	Crimping tools up to all size of cables under scope of work		up to all size of cables under scope of work	Adequate nos.
7.10	Vacuum Cleaner (Industrial)			2 Nos.
7.11	Grinding Machine			2 No
7.12	Pedestal mountable/portable Drilling Machines			APR
7.13				
7.14	Hacksaw Blades & tolls		Upto300 mm	APR
7.15	500 V / 1000V, (Hand operated) digital meggar			1 No.
7.16				
7.17	Tong Testers AC/ DC 5/10,25 Amp Range, of reputed make			APR
7.18	Tong Testers mA Range, of reputed make			3 Sets
7.19	Digital Multimeters 3½ digit of reputed make			06 Nos.
7.20	Analog Multimeters			2 Nos
7.21	Ferrule printing machine			APR
		RANGE	ACCURACY	
7.22	Dead Weight Tester	0-600Kg/cm2	LC-0.5Kg/cm2	1 set
7.23	Comparison test set (With standard Press. Gauge)	0-1 Kg/cm2 0-4 k g/cm2 0-4 k g/cm2 0-10kg/cm2 0-25Kg/cm2 0-60Kg/cm2 0-250Kg/cm2 0-400Kg/cm2	±0.25% ±0.25% ±0.25% ±0.25% +0.25%Lc-0.25 Kg/cm2 ±0.25%Lc-1.0 Kg/cm2 ±0.25%Lc-0.20 Kg/cm2 ±0.25%Lc-0.20 Kg/cm2	1 Set
7.24	Variable DC regulated (Electronic voltage source with digital indication).		0-30V DC 0.2%	1 Set
7.25	Oil bath with thermostat Stirrer and sub-standard Glass Thermometers in Multiple ranges		0-300 Deg Cel	1 set
7.26	Glass U tube mercury mano-meter with standard steel Scale having leveling arrangement		0-760 mm	APR

7.27	Glass U tube mercury mano-meter with standard steel Scale having leveling arrangement	0-1000 mm	APR
7.28	Inclined tube manometer	0-1000 mm	APR
7.29	mA/mV source with Digital display	0-200 mA /200mV	02 Nos.
7.30	Precision Digital Multimeter	4-1/2 Digits	01 No
7.31	High temperature. Instrument calibration kit	up to 600 deg	01 No
7.32	Continuity testers		10 Nos
7.33	Telephone set for loop checking		04No
7.34	Portable Low pressure/Vaccum calibrator		1 No.
7.35			1
7.36	Blower		2 nos.
7.37	Gas Cutting Set		APR

***APR**-(As per requirement)**Contractor have to deploy as per the requirement of the BHEL site as decided by BHEL Engineer In-Charge**

NOTES:

1. The above list specifies only major T&P/MMD (may not be complete) to be deployed by the contractor. All additional/ other tools and plants, IMTEs required in different quantity and specification for satisfactory & timely completion of work shall also be deployed by the contractor within finally accepted rate/ price.

2. Phase wise requirement of T&P's and IMTE's etc shall be decided by Engineer-in-charge at the start of the contract along with duration of deployment of T&Ps and IMTEs.

3. If works gets delayed due to non-availability of T&P and MMD, BHEL reserves the right to get work done at the risk & cost of contractor without prejudice to right of BHEL as in GCC

4. All testing instruments shall have calibration certificate issued by recognized /accredited agencies.

5. Contractor shall maintain calibration records as per the BHEL format andproduce them whenever called for by BHEL Engineers.

6. Wherever frequent calibration is required, contractor shall arrange adequate number of instruments such that the work does not suffer for want of test instruments.

7. Contractor must re-ascertain/ recheck range and accuracy of each IMTE from BHEL Engineer well in advance before arranging calibration/ deployment.

8. Other terms and conditions regarding above items shall be as per T&P clause in SCC.

CHAPTER-VIII: T&PS AND MMES TO BE DEPLOYED BY BHEL ON SHARING BASIS

8.0 **LIST OF T&P and MMD being provided by BHEL / UPRVUNL for use of contractor Free of hire charges on sharing basis.**

	T&Ps	CAPACITY	QTY	REMARKS
8.1	EOT crane in TG Hall	120/20 MT	01	*APR

***APR-As per the requirement of the site as decided by BHEL Engineer In-charge and availability of T&Ps/IMTEs.**

NOTES:

8.1.1	The cranes at Sl. No.1 will be provided as per requirement on sharing basis for the purpose of loading/unloading and lifting to locations as stated above at erection site at the discretion of the BHEL Engineer but operator has to be arranged by the agency.
8.1.2	After handing over/ commissioning/load test of The EOT to Customer by BHEL, BHEL's EOT vendor shall provide skilled operation and maintenance personnel for EOT cranes available in TG hall for the next 24 months.

CHAPTER-IX: TIME SCHEDULE & DEFECT LIABILITY PERIOD

9.1	**TIME SCHEDULE**
9.1.1	The contractor is required to commence the work within 07 days from the date of issue of LOI unless BHEL decides to fix any other later date. However, the actual date of start of work, to fix up the zero date of the contract, will be certified by BHEL Engineer after adequate mobilization of manpower and T&Ps by the contractor.
9.1.2	Delivery Period: Entire work as detailed in the tender specifications shall be completed within **7.5 months** from the Zero date as per program/milestones indicated by BHEL Engineer-In Charge. Contractor has to mobilize adequate resources to meet BHEL's commitments to their customer as indicated from time to time.
9.1.3	The contractor has to augment his resources in such a manner that following tentative dates of major milestones of erection & commissioning are achieved on specified schedules as below:

MILE STONES	MONTHS
Start of Work	Zero date
Completion of Erection Work	4 months
Commissioning of System(M1)	6 months
Synchronization of Unit (M2)	7 months
Coal firing and Full Loading of Units	7.5 months

9.1.4	**PROVISION OF PENALTY IN CASE OF SLIPPAGE OF INTERMEDIATE MILESTONES:**
9.1.4.1	M1& M2 are the intermediate LD milestone. Milestones LD shall be applicable if the delay in achieving the milestone solely attributable to the contractor.
9.1.4.2	In case of slippage of these identified Intermediate Milestones, Delay Analysis shall be carried out on achievement of each of these two Intermediate Milestones
9.1.4.3	In case delay in achieving M1 Milestone is solely attributable to the contractor,0.5% per week of executable contract value*, limited to maximum 2% of executable contract value, will be withheld.
9.1.4.4	In case delay in achieving M2 Milestone is solely attributable to the contractor, 0.5% per week of executable contract value*, limited to maximum 3% of executable contract value , will be withheld.
9.1.4.5	Amount already withheld, if any against slippage of M1 milestone, shall be released only if there is no delay attributable to contractor in achievement of M2 Milestone.
9.1.4.6	Amount required to be withheld on account of slippage of identified intermediate milestone(s) shall be withheld out of respective milestone payment (corresponding RA Bill) and balance amount (if any) shall be withheld @10% of RA Bill amount from subsequent RA bills.
9.1.4.7	Final deduction towards LD (if applicable), on account of delay attributable to contractor shall be based on final delay analysis on completion/ closure of contract. Withheld amount, if any due to slippage of identified intermediate milestone(s) shall be adjusted against LD or released as the case may be.

9.1.4.8	In case of termination of contract due to any reason attributable to contractor before completion of work, the amount already withheld against slippage of intermediate milestones shall not be released and be converted into recovery
9.1.4.9	* 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
9.1.5	Contractor shall plan their work in such a manner so as to meet the above project schedule, in consultation with BHEL/ customer. To achieve the above schedule contractor shall work in the all the available fronts concurrently and be prepare for working in the shift operation as per the instruction of BHEL Engineer.
9.1.6	Completion in all respects only when on successful errection,trial run of individual equipment and successful commissioning , trial operation, attending punch points ,handing over of the Unit.
9.1.7	The work under the scope of this contract shall be deemed to have been completed in all respects only when so certified by BHEL. The decision of BHEL shall be final and binding on the contractor.
9.1.8	If the completion of work as detailed in the scope of work gets delayed beyond the contract/ completion period, the contractor shall request for an extension of the contract and BHEL at its discretion may extend the contract as per the GCC clause 2.11
9.1.9	Commencement of performance guarantee shall be as per clause no.2.24 (Performance Guarantee for Workmanship) of General Conditions of Contract. The commencement of guarantee period for the quality of the workmanship shall start from the date of trial operational acceptance of facilities/handing over to the customer for the respective unit
9.1.10	In case due to reasons not attributable to the contractor, the work gets delayed and additional manpower / resources have to be mobilized so as to expedite the work to meet various milestones, same shall be done within the quoted rates as per Rate Schedule, at no extra cost to BHEL. In the event the contractor fails to respond to these requirements, BHEL shall take appropriate actions to meet customer's commitments in line with the provisions of General Conditions of Contract.
9.1.11	The contractor has to ensure that work is completed in all respects leaving no pending points. However the punch list/ pending points, which are possible to be attended at site, shall be fully liquidated **within one month from successful operation of the unit as full load achieved.**
9.1.12	The work under the scope of this contract is deemed to be complete in all respects, only when the contractor has discharged all the responsibilities laid down in the contract. The decision of BHEL on completion date shall be final and binding on the contractor.
9.2	**DEFECT LIABILITY PERIOD**
9.2.1	**Defect liability period will be 1 year from first Synchronization of Unit # 12 & 13 whichever is later. Contractor shall attend the defects noticed during stabilization & defect liability period.**

	TECHNICAL CONDITIONS OF CONTRACT (TCC) -1 **CHAPTER-X: TERMS OF PAYMENT**
10	**TERMS OF PAYMENT**
10.1	BHEL 'Engineer' will certify regarding the actual work executed in the measurement books and bills, which shall be accepted by the contractor in measurement book.
10.2	Contractor shall submit bills for the work completed under the specification, once in a month detailing work done during the month. The format for billing shall be approved by BHEL before raising invoices.
10.3	Subject to any deduction that BHEL may be authorized to make under the contract, the contractor on the certificate of the Engineer at site be entitled for payment as explained hereunder
10.4	**Interest bearing recoverable advance: Applicable as per Clause No. 2.13 of GCC.**
10.5	**PROGESSIVE PAYMENT ON PRORATA BASIS**
10.5.1	85 (Eighty Five) % of the contract value along with corresponding tax as monthly progressive payments on pro rata basis as per percentage break-up given in the CHAPTER-XII-B billing Break-Up of Rate Schedule, applicable on items Sl. No. 1 to 58 for actual completed work.
	85 % of item rate payable on fulfillment of following conditions*:*
10.5.1.1	
	Cable tray and accessories(Applicable for Sr. No. 09-12 of BOQ) Fabrication and fixing/welding/bolting in position — 60% Earthing of cable trays — 15% Tagging of cable trays (painting cable tray numbers on sides) — 5% Covering of trays where ever envisaged — 5% **Total = 85%** **Cable laying (Control and Signal Cables & Power Cables) (Applicable for Sr. No. 19-28 of BOQ)** Laying of cables — 45% Glanding, Termination and tagging of cables — 15% Dressing and clamping of cables — 10% Shielding of cables — 5% Testing and charging of cables — 10% **Total = 85%** **Junction box/Push button station (local) (applicable for Sr. No. 6-8 of BOQ)** Erection including fixing of terminal blocks where ever applicable — 75% Name plate fixing where ever applicable , Labelling (both inside and outside) and Commissioning of connected equipment — 10% **Total = 85%** **Conduits/impulse pipe/tubes/flats (Applicable for Sr. No. 13-18 of BOQ)**

	Fabrication, Laying and Erection	50%
	Leak Test/Hydraulic Test (where ever applicable, other wise clubbed with next activity)	20%
	Dressing, clamping, tagging and painting where ever applicable	8%
	Testing & commissioning of associated equipment/system	7%
	Total =	**85%**
	Panels/Cubicles/Desks/Racks/Enclosures/Monitors/Computers/Computer peripherals/PLCs/UPS/Batteries(Applicable for Sr no. 1-5 and 55-58 of BOQ)	
	Erection and alignment	50%
	Fixing of loose items/instruments where ever applicable	5%
	Pre commissioning checks, Charging of panel and Loop testing etc	15%
	System commissioning	15%
		85%
	Commissioning and Testing activities for Equipments erected by other agencies, like control valves, on/off valves, electrical/pneumatic valves, actuators, solenoid valves, valves, limit switches, ERV controllers, power cylinders, Pressure & Temperature Guages/Transmitters,etc (applicable for Sr. No. 29-54 of BOQ)	
	Removal & refixing/Fixing loose supplied components, including tubing/hose, regulators, etc	30%
	Calibration/Local testing - commissioning readiness	30%
	Local Commissioning & Loop Testing as required	10%
	System Commissioning or Remote Commissioning as required	15%
	Total =	**85%**
	Further Billing Break-up for sub-activity will be decided with mutual consent, if required.	
10.5.2	**FOR STAGE/ MILESTONE PAYMENTS** **15 (Fifteen) % of the contract value along with corresponding service tax shall be paid on achievement of following milestones (as per percentage break-up given below) for actual completed work.**	
	STAGE/MILESTONE PAYMENTS (15% of Contract Value)	**% Payment**
10.5.2.1	Boiler Light up (a) BLU of Unit # 12 (1 % of CV) (b) BLU of Unit # 13 (1 % of CV)	**2%**
10.5.2.2	Barring Gear (TG) (a) Barring gear of Unit # 12 (0.5 % of CV) (b) Barring gear of Unit # 13 (0.5 % of CV)	1%
10.5.2.3	Synchronization (a) Synchronization of Unit # 12 (1 % of CV) (b) Synchronization of Unit # 13 (1 % of CV)	2%
10.5.2.4	Full Loading (a) Full Loading of Unit # 12 (1 % of CV) (b) Full Loading of Unit # 13 (1 % of CV)	2%

10.5.2.5	Stabilization of Unit (a) Stabilization of Unit # 12 (0.5 % of CV) (b) Stabilization of Unit # 13 (0.5 % of CV)	1%
10.5.2.6	Painting (including arrow marking, nomenclature, tag plate)etc	2%
10.5.2.7	Area cleaning, temporary structures, cutting/removal and return of scrap	1%
10.5.2.8	Punch List points/pending points liquidation	0.50%
10.5.2.9	Material Reconciliation	2.5%
10.5.2.10	Completion of Contractual Obligations and contract closing	1%
	Total	**15%**
	Further breakup of milestone activities may be decided at site as per BHEL site Engineer.	

TECHNICAL CONDITIONS OF CONTRACT (TCC) -1	
CHAPTER-XI: TAXES AND OTHER DUTIES	
11.0	**TAXES AND OTHER DUTIES**
11.1	Price quoted should be inclusive of all applicable Taxes/charges but **Excluding GST.** The Contractor shall pay all other taxes, fees, royalty, commission etc. which may be levied on the contractor in executing the contract. In case BHEL is forced to pay any of such taxes, it shall be recovered from Contactor's bills or otherwise as deemed fit. **GST Shall be payable extra as per following**
11.2	Contractor/Vendor has to issue invoice indicating HSN/SAC code, Description, Value, Rate, applicable tax and other particulars in compliance with the provisions of relevant GST Act and Rules made thereunder. With the implementation of e way bill provisions, contractor shall comply with same as applicable.
11.3	Vendor has to submit GST compliant invoice within seven days from the due date of invoice as per GST Law. In case of delay, BHEL reserves the right of denial of GST payment if there occurs any hardship to BHEL in claiming the input thereof. In case of goods, vendor has to provide scan copy of invoice & GR/LR/RR to BHEL before movement of goods starts. Special care should be taken in case of month end transactions.
11.4	GST amount claimed in the invoice shall be released on fulfilment of all the following conditions by the Contractor : - a. Supply of goods and/or services have been received by BHEL. b. Original Tax Invoice has been submitted to BHEL. c. Respective invoice has appeared in BHEL's GSTR - 2A for the month corresponding to the month of invoice. Alternatively, BG of appropriate value may be furnished which shall be valid at least one month beyond the due date of confirmation of relevant payment of GST on GSTN portal or sufficient security is available to adjust the financial impact in case of any default by the contractor.
11.5	TDS under GST law as applicable shall be deducted
11.6	Contractor shall be solely responsible for discharging his GST liability according to the provisions of GST Law and BHEL will not entertain any claim of GST/interest/penalty or any other liability on account of failure of contractor in complying the provisions of GST Law or discharging the GST liability in a manner laid down thereunder
11.7	In case declaration of any invoice is delayed by the vendor in his GST return or any invoice is subsequently amended/altered/deleted on GSTN portal which results in any adverse financial implication on BHEL, the financial impact thereof including interest/penalty shall be recovered from the Contactor's due payment.
11.8	Any denial of input credit to BHEL or arising of any tax liability on BHEL due to non-compliance of GST Law by the Contractor in any manner, will be recovered along with liability on account of interest and penalty (if any) from the payments due to the Contactor.
11.9	The admissibility of GST, taxes and duties referred in this chapter or elsewhere in the contract is limited to direct transactions between BHEL & its Contractor. BHEL is not responsible for any liability that may arise due to any transaction beyond the direct transaction between BHEL & its Contractor.
11.10	**Variation in Taxes & Duties**: Any upward variation in GST shall be considered for reimbursement provided supply of goods and services are made within schedule date stipulated in the contract or approved extended schedule for the reason solely attributable to BHEL. However downward variation shall be subject to adjustment as per actual GST applicability. In case the Government imposes any new levy/tax on the output service/goods after price bid opening, the same shall be reimbursed by BHEL at actual. The reimbursement under this clause

	is restricted to the direct transaction between BHEL and its contactor only and within the contractual delivery period only. In case any new tax/levy/duty etc. becomes applicable after the date of Bidder's offer but before opening of the price Bid, the Bidder/Contractor must convey its impact on his price duly substantiated by documentary evidence in support of the same before opening of price bid. Claim for any such impact after opening the price bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.
11.11	**Modalities of Tax Incidence on BHEL:** Where GST law permits more than one option or methodology for discharging liability of tax/ levy/ duty; the contractor shall approach BHEL before choosing any option to discharge his tax liability. BHEL shall have the right to direct the contractor to adopt the appropriate option considering the amount of tax liability on BHEL as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the contractor for discharging the obligation of BHEL in respect of the tax liability to the contractor.
11.12	**BUILDING & OTHER CONSTRUCTION WORKERS (REGULATION OF EMPLOYMENT AND CONDITIONS OF SERVICE) ACT, 1996 (BOCW Act) AND RULES OF 1998 READ WITH BUILDING & OTHER CONSTRUCTION WORKERS CESS Act, 1996 & CESS RULES, 1998.**
11.12.1	In case any portion of work involves execution through building or construction workers, then compliance to the above titled Acts shall be ensured by the contractor and contractor shall obtain license and deposit the cess under the Act. In the circumstances it may be ensured as under:-
11.12.2	It shall be the sole responsibility of the contractor in the capacity of employer to forthwith (within a period of 15 days from the award of work) apply for a licence to the Competent Authority under the BOCW Act and obtain proper certificate thereof by specifying the scope of its work. It shall also be responsibility of the contractor to furnish a copy of such certificate of licence / permission to BHEL within a period of one month from the date of award of contract.
11.12.3	It shall be the sole responsibility of the contractor as employer to ensure compliance of all the statutory obligations under these act and rules including that of payment / deposit of 1% cess on gross payment made for value of work involving building or construction workers engaged by the contractor within a period of one month from the receipt of payment.
11.12.4	It shall be the responsibility of the sub-contractor to furnish the receipts /challans towards deposit of the cess together with the number, name and other details of beneficiaries (building workers) engaged by the sub-contractor during the preceding month..
11.12.5	It shall be the absolute responsibility of the sub-contractor to make payment of all statutory payments & compensations to its workers including that is provided under the Workmen's Compensation Act, 1923.
11.12.6	The contractor shall, however ensure before deposit of any BOCW Cess, that customer is not depositing the same in order to avoid excess deposit of cess.
11.12.7	The contractor shall bear cost of BOCW cess either by way of deposit or through recovery by BHEL in case the same is deposited by the customer.
11.12.8	In case of failure in above mentioned compliances, BOCW Cess @ 1% as well as applicable penalty as specified in BOCW Act/Rules shall be deducted from the contractor.

TECHNICAL CONDITIONS OF CONTRACT (TCC) -1		
CHAPTER-XII- A : RATE SCHEDULE		
12	**RATE SCHEDULE**	
Sl No.	**DESCRIPTION OF WORK**	**Total Value (T) in INR (In figure & words)**
12.1	**Total Lumsum Price For WORK OF REVIVAL/REHABILIATION i.e. ERECTION, TESTING, COMMISSIONING OF C&I WORKS AND RE-COMMISSIONING ACTIVITIES OF UNIT 12 & 13 UNDER REHABILIATION PACKAGE OF OBRA R&M (5X200 MW, OBRA TPS, UPRVUNL, U.P.)**	
Notes:	The rates of individual item of the entire scope of work as defined in BOQ at chapter IV and scope of work of tender shall be arrived as per calculation defined in Chapter XII 'B'.	

SI No.	Item Description	QUANTITY (Q)	UNIT	FACTOR (F)	RATE={(T*F/100)/Q}	AMOUNT = Rate * Quantity
1	DCS BASED PANELS APPX SIZE (750L*2355H*750W) AND UPS PANELS	116	Nos.	6.30708792		
2	HMI SYSTEM CONSISTS OF INSTALLATION OF OWS (8 NOS.), EWS (1 NO.) AND STORIAN PC (1 NO.) , PRINTERS(3 Nos.) AND ASSOCIATED FURNITURE AND OPERATOR CONTROL DESK	2	set	1.61251158		
3	UNIT CONTROL PANEL	2	Nos.	0.19975228		
4	UPS ACDB PANEL	4	Nos.	0.35197299		
5	GRAVEMETRIC FEEDER PANEL	12	Nos.	0.97340417		
6	JUNCTION BOX UPTO 12 WAYS / LOCAL GUN M AINTENACE SW ITCH / LOCAL PUSH BUTTONS / SHEAR PIN FAILURE INDICATION BOX/	20	Nos.	0.19452644		
7	JUNCTION BOXES UPTO 48 WAYS	20	Nos.	0.19452644		
8	JUNCTION BOXES UPTO 64 WAYS	10	Nos.	0.11349978		
	ERECTION & COMMISSIONING (LADDER/PERFORATED TYPE CABLE TRAYS)					
9	LADDER /PERFORATED CABLE TRAY 600/ 500/ 450/ M M WIDE INCLUDING COVER AND OTHER ASSESSORIES	200	MTRS	0.31128646		
10	LADDER /PERFORATED CABLE TRAY 150 M M WIDE INCLUDING COVER AND OTHER ASSESORIES	100	MTRS	0.10375482		
11	LADDER /PERFORATED CABLE TRAY 100 M M WIDE INCLUDING COVER	100	MTRS	0.08452162		
12	LADDER /PERFORATED CABLE TRAY 50 M M WIDE INCLUDING COVER	100	MTRS	0.07108118		
	ERECTION & COMMISSIONING (IMPULSE PIPES/GI PIPES/GI FLATS)					
13	1/ 2" , 3/ 4" CS/ AS / SS IM PULSE PIPE UPTO 120 SCHEDULE,	**150**	MTRS	0.17266878		
14	1/ 2" , 3/ 4" CS/ AS / SS IM PULSE PIPE 160 & 180 SCHEDULE	**100**	MTRS	0.11656547		
15	1" CS/AS/SS IMPULES PIPE UPTO 160 SCHEDULE	**100**	MTRS	0.13640909		
16	GI PILICA CONDUCT / PIPE WITH FITTING INCLUDING VALVE (UPTO 1")	**150**	MTRS	0.09706014		

17	GI PILICA CONDUCT / PIPE WITH FITTING INCLUDING VALVE (Above 1" and UPTO 2")	**100**	MTRS	0.0774679		
18	GI FLATE (50X6MM/30X5MM)	600	MTRS	0.54610002		
	ERECTION & COMMISSIONING (LT POWER/CONTROL/SCREENED SIGNAL CABLES)					
	LT POWER CABLES,1.1 kV Aluminium/Copper conductor XLPE/PVC insulated Armoured/Unarmoured cable					
19	2 CORE / 1 PAIR CABLE (ARM OURED / UNARM OURED) CORE SIZE UPTO 2.5 SQ. M M	50000	MTRS	4.68849752		
20	3 CORE / 1 TRAID CABLE (ARM OURED / UNARM OURED) CORE SIZE UPTO 2.5 SQ. M M	40000	MTRS	4.11543281		
21	4 CORE / 2 PAIR CABLE (ARM OURED / UNARM OURED) CORE SIZE UPTO 2.5 SQ. M M	45000	MTRS	4.93988246		
22	7 CORE / 8 CORE / 4 PAIR / 2 TRAID CABLE (ARM OURED / UNARM OURED) CORE SIZE UPTO 2.5 SQ. M M	210000	MTRS	26.1846258		
23	10-16 CORE / 8 PAIR CABLE (ARM OURED/ UNARM OURED) CORE SIZE 2.5 SQ M M	60830	MTRS	8.06993083		
24	17-24 CORE / 12 PAIR CABLE (ARM OURED/ UNARM OURED) CORE SIZE 2.5 SQ M M	40000	MTRS	5.89482684		
25	1C/2C/3C/3.5C CABLE ABOVE 2.5 SQMM AND UPTO 35 SQ. M M CABLE (ARM OURED / UNARM OURED)	25000	MTRS	3.67665299		
26	1C/2C/3C/3.5C CABLE ABOVE 35 SQM M AND UPTO 90 SQ. MM (ARMOURED/UNARM OURED)	10000	MTRS	2.16811519		
27	4P UTP E-CAT LAN CABLE	8000	mtrs	1.02343497		
28	PRE-FABRICATED CABLE (UP TO LENGTH 30 MTR)	16	NOS.	0.05196093		
29	RE-COMMISSIONING OF SOOT BLOWER MCC, LOCAL STARTER BOXES, CHECKING & COMMISSIONING OF SOOT/ WALL BLOWERS FROM LOCAL, REMOTE AND DCS. REPLACEMENT/SERVICING/REPAIRING OF ANY MALFUNCTIONING/ DAMAGED/RUSTED ACCESSORIES MOUNTED IN SOOT BLOWER, MCC MODULES AND LOCAL CONTROL BOXES MOUNTED ON SOOT/WALL BLOWERS.	1	set	0.60620297		
30	RE-COMMISSIONING OF DC SCANNER FAN STARTER BOX (900L X 1120H X 375W), REPLACEMENT / SERVICING /REPAIRING OF ANY MALFUNCTIONING/ DAMAGED/RUSTED ACCESSORIES MOUNTED IN DC SCANNER STARTER BOX.	1	set	0.0309299		
31	RE-COMMISSIONING OF 110 V AC POWER DISTRIBUTION PANEL	1	Nos.	0.06624626		

32	RE-COMMISSIONING OF STATIC EXCITATION SYSTEM INCLUDES COMMISSIONING OF DIGITAL AVR REGULATING PANEL, FIELD FLASHING PANEL AND THYRISTOR PANEL, INTERFACING WITH OLD AND NEW AVR PANEL, WIRING & DRESSING, MOUNTING OF NEW TBS AS PER REQUIREMENTS, REPLACEMENT/ SERVICING/REPAIRING OF ANY MALFUNCTIONING/ DAMAGED/RUSTED ASSESORIES MOUNTED IN SEE SYSTEM, BUSBAR CONNECTION (IF REQUIRED), INSULATION OF BUSBAR WHEREVER REQUIRED, SEALING OF PANELS, IDENTIFICATION OF OLD CABLES AND THEIR TERMINATION, MINOR MODIFICATIONS IN SEE SYSTEM. CLEANING OF SEE ROOM/EQUIPMENTS FOR PROPER OPERATION OF SYSTEM.	1	SET	0.21036054		
33	RECOMMISSIONING OF ELECTROM AGNET RELEIF VALVE INCLUDES CONTROLLER BOX, SWITCH AND\TUBES & PIPING, CALIBRATION OF BOURDN TYPE PRESSURE SWITCH.	1	Nos.	0.09508575		
34	SWAS SYSTEM ERECTION AND COMMISSIONING INCLUDES COMMISSIONING OF WET PANEL, DRY PANEL & CHILLER UNIT, CHARGING AND LEAKAGE ARRESTING OF DRAIN PIPING, CW LINE PIPING. INSTALLATION ,TESTING AND CALIBRATION OF PH, CONDUCTIVITY, DISSOLVED OXYGEN AND SILICA SENSORS, TRANSMITTERS AND ANALYSERS, 1/4" TUBING AMONG CHILLER, WET PANEL AND DRY PANEL, INTERNAL WIRING AND TERMINATION OF TRANSMITTERS, REAGENT PREPARATION, PREFABRICATED CABLE LAYING BETWEEN SENSOR AND TRANSMITTER. REFILLING OF R-22 GAS IN CHILLER UNIT COMPRESSORS, INSTALLATION OF WINDOW AC IN DRY PANEL ROOM	1	SET	0.1344011		

35	RE-COMMISSIONING OF EWLI SYSTEM INCLUDES CLEANING AND RE-MOUNTING OF LOOSE SUPPLIED ELECTRODES AND WASHERS, PTFE CABLING & TERMINATION BETWEEN ELCTRODES AND ASCERTOR CABINET, MOUNTING OF DISPLAY UNITS IN UCP/CP PANEL AND CABLING & TERMINATION BETWEEN UCP/CP DISPLAY UNITS AND ASCERTOR CABINET.	2	SET	0.22400862		
36	OXYGEN ANALYSER COMPLETE SET OF SENSOR, CALIBRATION UNIT, CALIBRATION GAS CYLINDER AND JB WITH ALL ACCESSORIES	2	SET	0.15546508		
37	COMMISSIONING OF GENERATOR H2 ANALYSER SYSTEM WITH PANEL (800LX800WX2200H), CALIBRATION GAS CYLINDER, SENSOR, ANLAYSER, INTERCONNECTION OF CABLES, TUBING ETC.	1	SET	0.03206362		
38	SOX ANALYSIS SYSTEM WITH PANEL ACCESSORIES AND STANDARD CALIBRATION UNIT CYLENDER GAS CYLENDER RACK FSHS BOXES ASSOCIATED CABLING SS TUBING ETC INSTALATION OF PROBE SENSER RTD TEFLON TAPE IN DUCTS LEADING TO CHIMNEY	1	SET	0.34274939		
39	OPACITY ANALYSER CONSISTING OF BLOWERS, TRANSCEIVER, REFLECTOR UNITS, MOUNTING OF FILTER, BLOWER HOSES ANALYSER PANEL/JBs, PREFABRICATED CABLES ETC	1	SET	0.32695598		
	ERECTION & COMMISSIONING/of (FIELD INSTRUMENTS/PNEUMATIC VALVES/MOVs/ERVs/LIMIT SWITCHES)			0		
40	FLAME SCANNER HEAD ASSY INCLUDING CABLE UPTO JB, Re- installation and checking and commissioning	20	Nos.	0.4541918		
41	MANUAL VALVE LIMIT SWITCHES AND CORNER SKID, LOTV,HOTV & HORV LIMIT SWITCHES INSTALLATION (if required) , SETTINGS AND COMMISSIONING AFTER REMOVAL OF OLD LIMIT SWITCHES INSTALLED ON PNEUMATIC ON/OFF VALVES.	150	Nos.	3.50567931		

42	SADC SYSTEM INCLUDES re-COMMISSIONING OF CONTROL STATION CONSISTS OF I/P CONVERTERS, PRESSURE SWITCHES, AFRS, ISOLATION VALVES, ASSOCIATED TUBINGS REQUIRED IN CONTROL STATION, TUBINGS FROM CONTROL STATION TO SADC POWER CYLINDERS, RE-INSTALLATION (IF REQUIRED) OF FLEXIBLE HOSES OF 1/4'' AND 1'' SIZE WITH AFR AS PER TUBING SCHEME OF SADC SYSTEM, PURGING AND LEAK TESTING OF TUBINGS AND ASSOCIATED INSTRUMENT AIR PIPINGS,DRESSING/ Re-INSTALLATION (IF REQUIRED) OF TUBING IN PERFORATED CABLE TRAYS. COMMISSIONING, TESTING AND SETTINGS (IF ANY) AND REPAIR/SERVICING/REPLACEMENT (IF REQUIRED) OF SADC POWER CYLINDER (48 NOS.) AND ASSOCIATED EQUIPMENTS OF CONTROL STATION, TUBES AND PIPES WITHIN QUOTED RATE.	1	SET	1.26484542		
43	CHECKING, TESTING LIMIT SWITCH SETTING re-COMMISSIONING OF ELECTRICAL ACTUATORS OR ELECTRICALS DAMPER OR LT MOTORS, INCLUDING COMMISSIONING OF MCC MODULE, REPLACEMENT OF MALFUNCTIONING CARDS IF REQUIRED	165	Nos.	4.01909564		
44	CALIBRATION, re-COMMISSIONING OF REGULATING CONTROL VALVE WITH POSITIONER/LS/PFT/I/P/AFR/AIR LOCK RELAY/VOLUME BOOSTERS, ERECTION OF ASSOCIATED TUBINGS & FITTINGS, INSTALLATION/ REPLACEMENT/ SERVICING/REPAIRING (IF REQUIRED) OF POSITIONER/ LS/PFT/I/P/AFR/AIR LOCK RELAY/VOLUME BOOSTERS/ DIAPHRAGM/LINKS and OTHER ASSOCIATED PARTS WHEREVER REQUIRED IS INCLUSIVE IN re-COMMISSIONING WORKS OF CONTROL VALVES. INSTRUMENT AIR LINE PURGING, ATTENDING OF LEAKAGES AND WELDING/REPLACEMENT OF INSTRUMENT AIR PIPING AND TUBINGS, VALVES AND OTHER ASSOCIATED FITTINGS (IF REQUIRED) ARE INCLUSIVE IN THIS WORK. ALL THE LEAKS ARRESTING/REPAIR/REPLACEMTS IN INSTRUMENT AIR CIRCUITS ARE INCLUSIVE IN THIS WORK FOR SUSTAINING THE REQUIRED INSTRUMENT PRESSURE REQUIRED FOR COMMISSIONING OF PNEUMATIC VALVES.	45	Nos.	1.31360907		

45	CALIBRATION, re-COMMISSIONING OF PNEUMATIC ON/OFF SOLENOID OPERATED VALVE WITH SOLENOIDS/LS/AFR/AIR LOCK RELAY, ERECTION OF ASSOCIATED TUBINGS & FITTINGS, INSTALLATION/REPLACEMENT/ SERVICING/REPAIRING (IF REQUIRED) OF SOLENOIDS/LS/AFR/AIR LOCK RELAY/DIAPHRAGM/FITTINGS/LINKS WHEREVER REQUIRED IS INCLUSIVE IN RE-COMMISSIONING WORKS OF ON/OFF VALVES.ATTENDING OF LEAKAGES AND WELDING/REPLACEMENT OF INSTRUMENT AIR PIPING AND TUBINGS, VALVES AND OTHER ASSOCIATED FITTINGS (IF REQUIRED) ARE INCLUSIVE IN THIS WORK. ALL THE LEAKS ARRESTING/REPAIR/REPLACEMTS IN INSTRUMENT AIR CIRCUITS ARE INCLUSIVE IN THIS WORK FOR SUSTAINING THE REQUIRED INSTRUMENT PRESSURE REQUIRED FOR COMMISSIONING OF PNEUMATIC VALVES.	85	Nos.	2.06745777		
46	RECOMMISSIONING AND CHECKING OF M ETAL TEM PERATURE M EASURING THERM OCOPLES (SIM PLEX/ DUPLEX), REPLACEMENT OF MTMs IF FOUND DAMAGED/MALFUNCTIONING	110	Nos.	0.62141477		
47	RE-CALIBRATION, ERECTION AND COMMISSIONING OF PRESSURE/ DIFF PRESSURE/ TEMPERATURE/ LEVEL GAUGE INCLUDES FLUSHING/ BACK FLUSHING/HYRO TEST OF EXISTING/NEWLY LAID IMPULSE LINE,INSTALLATION AFTER RE-CALIBARTION OF LOCAL GUAGES , PURGING OF IMPULSE PIPING, HYDRO AND LEAK TEST OF PIPINGS, REPLACEMENT/REPAIR/RE-ROUTING OF IMPULSE PIPES (IF REQUIRED),INSTALLATION OF FRAMES IF INSTRUMENT LOCATION IS CHANGED,CHECKING/REPLACEMENT (IF REQUIRED) FOR ALL FITTINGS, TUBINGS, MANIFOLD, DRAIN/ISOLATION VALVES ETC. AS PER HOOK UP SCHEME	390	Nos.	2.94008794		
48	RE-CALIBRATION, ERECTION AND COMMISSIONING OF PRESSURE/DIFF PRESSURE/ TEMPERATURE/LEVEL SWITH CAN BE FLANGE TYPE OR WELDED TYPE/WITH OR WITHOUT ELECTRONIC UNIT, INCLUDES INSTALLATION AFTER RE-CALIBRATION, PURGING OF IMPULSE PIPING, HYDRO AND LEAK TEST OF PIPINGS, REPLACEMENT/REPAIR/RE-ROUTING OF IMPULSE PIPES (IF REQUIRED),INSTALLATION OF FRAMES IF INSTRUMENT LOCATION IS CHANGED,CHECKING/REPLACEMENT (IF REQUIRED) FOR ALL FITTINGS, TUBINGS, MANIFOLD, DRAIN/ISOLATION VALVES ETC. AS PER HOOK UP SCHEME	170	Nos.	1.0707613		

49	RE-CALIBRATION/CHECKING, ERECTION & COM M ISSIONING OF RTD/THERM OCOUPLES ALONG WITH THERMOWELL AND FITTINGS,REPLACEMENT OF RTD/THERM OCOUPLES IF FOUND DAMAGED/MALFUNCTIONING	270	Nos.	1.99036669		
50	RE-CALIBRATION/CHECKING, ERECTION & COM M ISSIONING OF BEARING TEMPERATURE CAPSULE TYPE RTD , THRUST PAD RTD, SEAL OIL LINER RTDS ,REPLACEMENT OF CAPSULE TYPE RTD IF FOUND DAMAGED/MALFUNCTIONING	40	Nos.	0.28305994		
51	RE-CALIBRATION, ERECTION & COMMISSIONING OF PRESSURE / DIFF PRESURE / LEVEL / FLOW/ MASS FLOW TRANSMITTERS WITH FITTINGS, MANIFOLD, DRAIN VALVES, FLUSHING/HYDRO TEST OF EXISTING/NEW LAID IMPULSE LINE, INCLUDES INSTALLATION AFTER RE-CALIBRATION, PURGING OF IMPULSE PIPING, HYDRO AND LEAK TEST OF PIPINGS, REPLACEMENT/REPAIR/RE-ROUTING OF IMPULSE PIPES (IF REQUIRED),INSTALLATION OF FRAMES IF INSTRUMENT LOCATION IS CHANGED,CHECKING/REPLACEMENT (IF REQUIRED) FOR ALL FITTINGS, TUBINGS, MANIFOLD, DRAIN/ISOLATION VALVES ETC. AS PER HOOK UP SCHEME	200	Nos.	2.13249779		
52	INSTALLATION AND COMMISSIONING OF SOV OPERATED PNEUMATIC HEA ROD POWER CYLINDER, IGNITOR BOX, IGNITOR TIP, HEA ROD AND ASSOCIATED CONNECTION BETWEEN IGNITOR BOX AND HEA ROD ASSEMBLY ERECTION AND COMMISSIONING. COMMISSIOING OF SOV OPERATED PNEUMATIC HEA ROD POWER CYLINDER INCLUDES SERVICING OF POWER CYLINDER ASSEMBLY (IF REQUIRED). REPAIR/REPLACEMENT/SERVICING OF ANY PART OF RETRACTOR ASSEMBLY, HEA ROD, SPARK TIP AND IGNITOR BOX (IF REQUIRED) ARE INCLUSIVE IN THIS WORK	12	Nos.	0.30483552		
53	REPLACEMENT/CHECKING OF 1/ 2" / 3/ 4"/1" INSTRUMENT ROOT/ISOLATION VALVES.	100	Nos.	0.39491615		
54	SMALL ELECTRONIC EARTHPIT AS PER APPROVED DRAWING	1	Nos.	0.52315595		
55	LVS SYSTEM (2 Nos.) WITH CPUs AND LEDs (5 Nos.)	2	set	0.5476553		
56	INSTALLATION OF SLAVE CLOCKS	2	Nos.	0.07823647		
57	UPS system with Battery bank installation, Testing and commissioning	1	set	0.46728173		
58	Erection and commissioning of TSI system	1	set	1.31882483		

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Rev 01
1st June 2012

TECHNICAL CONDITION OF CONTRACT (TCC -II)

(Document No. PS: MSX:TCC)

BHARAT HEAVY ELECTRICALS LIMITED

TECHNICAL CONDITIONS OF CONTRACT (TCC-PART-II)

TENDER NO. BHEL/NR/SCT/OBRA/C&I/1155

FOR

WORK OF REVIVAL/REHABILIATION i.e. ERECTION, TESTING, COMMISSIONING & HANDING OVER OF C&I WORKS AND RE-COMMISSIONING ACTIVITIES OF UNIT 12 & 13 UNDER REHABILIATION PACKAGE OF OBRA R&M

(5X200 MW, OBRA TPS, UPRVUNL, U.P.)

PART-II OF TCC

Bharat Heavy Electricals Limited
(A Govt. of India Undertaking)
Power Sector –Northern Region,
Plot No. 25, Sector-16 A,
Distt.GautamBudh Nagar, Noida-201301

1.0	**GENERAL GUIDELINES**
1.1	**BHEL-Power Sector (NR) is ISO 9001-2000, ISO 14001-1996, OHSAS 18001-1999, ISO 27001 and SA-8000 certified company. Quality of work, to customer's satisfaction and system requirements is the essence of these certifications. The contractor in all respects will organize his work, systems, environment, process control documentation, tools, plant, inspection, measuring and testing equipment etc. as per instructions of BHEL engineer**. **The contractor shall also comply with applicable legislation and regulations with regards to Health, Safety and Environmental aspects for minimizing risk arising from occupational health & safety hazards, controlling pollution and wastage. The Contractor will be responsible for Health, Safety & Environment management (HSE) at site for the construction activities to be carried out by them in accordance with requirements given under section I (a) of GCC and elsewhere in this tender document. The contractor, who is awarded the work, shall have to sign an MOU w.r.t implementation of HSE conditions with BHEL (Safe Work Practices).**
1.2	The contractor shall carry out the work in accordance with the standard principle/codes/instructions/drawings/documents/specification supplied by BHEL from time to time

2.0	**CIVIL WORKS, FOUNDATION, GROUTING**
2.1	BHEL/UPRUNL shall provide all equipment foundations. For the correctness of these foundations as per drawings, the contractor shall check the dimensions & locations of the foundations, pockets, anchor-bolt pitch. Further, top elevation of foundations shall be checked with respect to benchmark. All minor adjustments of foundation level, dressing and chipping for achieving the required elevation of the base of columns, enlarging the pockets in foundations etc., as may be required for the erection of equipment / plants shall be carried out by the contractor. The foundations pockets shall be cleaned with compressed air.
2.2	While on the job, care is essential to avoid too much chipping and resultant lowering of level. In case of excess chipping, contractor has to arrange additional packing plates as per requirements provided BHEL Engineer allows it. When required by manufacturers, the embedded sub-sole plates shall be scraped and checked with Prussian blue to get the required contact with frames.
2.3	The contractor shall ensure perfect matching of packer plates including machining, scraping and blue matching with foundation by dressing the foundation, as well as perfect matching between the packer plates and the base plate of equipment to the satisfaction of BHEL Engineer. If required the packer plates may have to aligned and fixed on the foundations using special high strength, non-shrinking and quick-setting grouts. The minimum thickness below the packer plate should be 20 mm. The material required for this has to be arranged for by the contractor at his cost.
2.4	The contractor shall check and verify the alignment of equipment. The Grouting of all the equipment will have to be carried out by the Contractor. The contractor has to arrange for all materials required for carrying out the grouting including supply of the Special Grout as indicated in the drawings and as approved by the Engineer.
2.5	The contractor has to ensure that all the matching joints which are not to be grouted shall be kept free from the grouting mixture by applying tape or any other alternative method approved by Engineer. All assistance required has to be provided by the contractor
2.7	Besides grouting as above, any civil works required for safe and efficient operation of tools and tackles like grouting / excavation/ casting of foundation / anchor points for derricks, winches, guy ropes fastening, etc. / foundations required for chemical cleaning pumps, tanks and any other temporary supports shall also be the contractor's responsibility. For these civil works all materials including cement and required facilities will have to be arranged by contractor at his own cost.

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3.0	**TOOLS AND PLANTS / IMTE's**
3.1	Indicative lists of T&Ps and IMTEs to be arranged by the contractor are given as per TCC-I chapter VII. He should ensure that these are in good working condition. In the event of the failure of contractor to bring necessary and sufficient T&Ps and IMTEs, BHEL will be at liberty to arrange the same and hire charges as applicable shall be deducted from contractor's bill. Decision of BHEL in this regard shall be final and binding on contractor.
3.2	T&P/IMTE's being provided by BHEL as per TCC-! Chapter VIII, to subcontractor free of hire charges shall be shared by other subcontractors working for BHEL at site and allotment done by BHEL engineer shall be final and binding.
3.3	All distribution boards, connecting cables, wire ropes, hoses, pipes etc., including temporary air / water / electrical connections etc. shall have to be arranged by the contractor at his own cost.
3.4	All tools and tackles, machinery, equipment, instruments required for the work have to be arranged by the contractor including its transportation before and after work and including storage, insurance etc.
3.5	The contractor shall provide all required tools and plants, inspection, measuring and test equipment and handling & transportation equipment for the scope of work covered under these specifications. Some of the major T & Ps to be necessarily provided by the contractor is listed in TCC-I chapter VII.
3.6	All tools and tackles to be deployed by the contractor for the work shall have the prior approval of BHEL engineer with regard to brand, quality and specification.
3.7	Contractor shall provide all the necessary scaffolding materials, temporary structures, as may be required and necessary safety devices etc.
3.8	Timely deployment of adequate quantity of T & P is the responsibility of the contractor. The contractor shall be prepared to augment the T & P at short notice to match the planned program and to achieve the milestones
3.9	Contractor shall maintain and operate his tools and plants in such a way that major breakdowns are avoided. In the event of major breakdown, contractor shall make alternative arrangements expeditiously so that the progress of work is not hampered and arrange at his cost all spares needed for upkeep of all T&Ps supplied by BHEL/UPRVNL. For cranes, replacement of filter and repair of batteries, self, dynamo shall be responsibility of contractor.
3.10	The contractor at his cost shall carry out periodical testing of his construction equipment and calibration of measuring instruments (MMDs) and tests. Test/ calibration certificates shall be furnished to BHEL. MMDs shall be calibrated only at accredited laboratory as per the list available with BHEL or any other laboratory approved by BHEL
3.11	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 made available to BHEL Engineer for inspection as and when required. Fitness certificate 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.
3.12	Contractor shall ensure deployment of reliable and calibrated IMTEs (Inspection measuring and testing equipment). The IMTEs shall have test / calibration certificates from authorized / Government approved / accredited agencies traceable to National / International standards. Each IMTE shall have a label indicating calibration status i.e. date of calibration, calibration agency and due date for calibration. A list of such instruments deployed by contractor at site with its calibration status is to be submitted to BHEL Engineer for control.

3.13	Re-testing / re-calibration shall also be arranged at regular intervals during the period of use as advised by BHEL Engineer within the contract price. The contractor will also have alternate arrangements for such IMTE so that work does not suffer when the particular instrument is sent for calibration. If any IMTEs not found fit for use, BHEL shall have the right to stop the use of such item. It will be necessary for the contractor to deploy proper item. Any readings taken by the defective instrument will be recalled and repeat the readings taken by that instrument with a proper one. In case he fails to do so, BHEL may deploy IMTEs and retake the readings at contractor's cost.
3.14	BHEL shall have lien on all T&P, IMTEs and other equipment of the contractor brought to the site for the purpose of erection, testing and commissioning. BHEL shall continue to hold the lien on all such items throughout the period of contract / extended period. The contractor and / or his sub-contractors, without the prior written approval of the Engineer, shall remove no material brought to the site.
3.15	The contractor has to maintain a logbook and shall furnish regular maintenance and utilization report of the BHEL T&P's under his possession, as per requirement of BHEL

4.0	**SUPERVISORU STAFF AND WORKMEN**
4.1	The work shall be executed under the usual conditions affecting major plant construction and in conjunction with numerous other operation/activities at site. The contractor and his personnel shall cooperate with other personnel/contractors, coordinating his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.
4.2	The contractor shall deploy the necessary number of qualified and approved full time electricians at his cost to maintain his temporary electrical installation till the completion of work.
4.3	During the course of erection, ➢ If the progress is found unsatisfactory ➢ If the target dates fixed from time to time for milestones are to be advances/not being met, ➢ It is found that the skilled workmen like fitters, operators, technicians etc deployed are not sufficient, BHEL after giving reasonable opportunity to the contractor will induct on the work the required workmen in addition to the contractor's workmen to improve the progress. The expenses so incurred will be recovered from the contractor's bills with overheads
4.4	If the contractor or his workmen or employees shall break, deface, injure or destroy any part of a building, road kerb, fence, enclosure, water pipes, cables, drains, electric/telephone poles, wires, trees or any other properties or any part of erected components the Contractor shall make the same good at his own expense. In default, BHEL may cause the same to be made good by other workmen or by other means and deduct the expenses from any money due to contractor. BHEL's decision will be final and binding.
4.5	Though every endeavor shall be made to ensure that all plan materials are supplied as per schedule. However in a job of this kind it is possible that some materials may be delayed. In order to achieve the ultimate targets, the contractor may have to augment his manpower and resources as on when required. No compensation on this account shall be admissible.
4.6	The month wise manpower deployment plan to be submitted as per format (at Annexure –s to GCC) is only to assess the capability as well as understanding of the contractor to execute the work. It shall be contractor's responsibility to deploy the required manpower, for timely and successful completion of the job, to any extent over and above those indicated in the above deployment plan(including those which are not covered in the plan submitted) without any compensation on this account. The contractor shall identify separate persons at site for quality control and safety.

5.1	**ERECTION**
5.1.1	All normal erection and assembly techniques necessary for completion of works under this specification and magnitude have to be carried out. It is not possible to specifically list out all of them. Absence of any specific reference will not absolve the contractor of his responsibility for the particular operation. These would include, Scaffolding and rigging operations, Machine / flame / electric cutting, grinding, welding, radiography and stress relieving. Fitting, fettling, filing, straightening, chamfering chipping, scrapping, reaming, as cleaning, checking, leveling, blue matching, aligning and assembly. Machining, surface grinding, drilling, doweling, shaping Temporary erections for alignment, dismantling of certain equipment for checking, cleaning, servicing and site fabrication.
5.1.2	Any fixtures, scaffolding materials, approach ladder, concrete block supports, steel structures required for temporary supporting, pre-assembly or checking, welding, lifting and handling during pre-assembly and erection shall be arranged by contractor at his cost.
5.1.3	No members of any ladder / structure / platform should be cut without specific approval of BHEL. In case it is necessary to cut, the contractor shall rectify / repair in a manner acceptable to BHEL / customer without any additional cost.
5.1.4	The contractor shall erect scaffolding / temporary platforms for erection. These should be of adequate capacity and shall never be over loaded. These should be replaced when not found suitable during erection work and dismantled on work completion and removed from work site.
5.1.5	It shall be the responsibility of the contractor to provide ladders on columns for initial work till such time stairways are completed. For this, the ladder should not be welded on the column and should be pre-fabricated clamping type ladders. No temporary welding on any structural member is permitted except under special circumstances with the approval of BHEL. In case it is absolutely necessary then the contractor shall cut the temporary structure and rectify the column as directed by the engineer
5.1.6	The contractor is strictly prohibited in using Turbine/Auxiliary components for any temporary supporting or scaffolding works etc. In case of such misuse a sum as determined by the Engineer will be recovered from contractor's bill.
5.1.7	The material for platform section may be supplied in running meters. These shall be cut to size/shape/fabricated to required size/shape and to be welded by contractor.
5.1.8	Certain adjustments in length nay be necessary while erecting pipelines/casings etc. The contractor should remove the extra lengths/add extra lengths to suit the final layout after preparing edges afresh by adopting specified heat treatment procedure
5.1.9	The contractor shall carry out the trial run of all motors including checking the direction of rotation in the uncoupled condition. Checking of alignment and re-coupling of the motor to the driven equipment as per the instruction of BHEL engineer and to their satisfaction.
5.1.10	Some of the rotating equipment and electrical motors are provided with protective greases only. Contractor shall arrange for cleaning of the same with kerosene or any other suitable cleaning agent. If necessary dismantling in full or part of the equipment would be necessary. He shall arrange for re-greasing /lubricating them with recommended lubricants and for assembling back the dismantled parts, within the rate quoted only. However lubricants shall be supplied free of cost by BHEL
5.1.11	After initial trial of rotating equipment, control and power cabling for motors and other equipment/instrumentation shall have to be disconnected for checking alignment and resetting/re-alignment/hot alignment. Contractor shall have to arrange for disconnecting control and power

	cabling as per BHEL engineer's instruction and clearance and further reconnect the control and power cable again after realignment. Quoted tonnage rate shall be inclusive of the above.
5.1.12	Packer plates supplied may have to be machined to the correct dimensions. It may also be necessary to blue match the same with each other/with equipment /with foundations as per BHEL Instruction.
5.1.13	Contractor shall arrange changing of preservative oil in the gearboxes, journal and other bearing assemblies of rotating equipment when in storage areas or after erection of equipment as the case may be as per instruction of BHEL engineer. Necessary lubricants/oil will be supplied by BHEL and the same will be drawn by contractor from BHEL/customer's store and transporting to site. No additional payment will be made for such works even though supply of lube oil might have been made under the regular dispatch able unit (DU) number against product group main assembly (PGMA) and appearing the shipping list. Prior to the commissioning of the equipment, oil should be drained and collected in drums provided by BHEL and returned to BHEL/customer's store.
5.1.14	Whenever required the contractor shall arrange for pre-qualification of process task performers.
5.1.15	The contractor shall check and verify the alignment of equipment, alignment of shafts of rotating machinery, the slopes of all bearing pedestals, centering of rotors with respect to their sealing bores, couplings etc. as applicable and the like items to ensure that no displacement had taken place during grouting. The values recorded prior to grouting shall be used during post grouting checkup and verifications. Such pre and post grout records of alignment details shall be maintained by the contractor in a manner acceptable to the Engineer. All rotating machines should be cleaned lubricated and checked for their smooth rotation and if necessary by dismantling and refitting. If in the opinion of the BHEL engineer the equipment is to be checked for clearance, tolerance at any stage of work or during commissioning period, all such works are to be carried by the contractor at his cost.
5.1.16	The contractor at no extra cost to BHEL shall carry out servicing and realignment of skid mounted equipment.
5.1.17	Certain instruments like pressure gauges, pressure transmitters, temperature gauges, flow switches and indicators etc. are received in assembled condition as integral part of equipment. Contractor shall be responsible for safe receipt, installation and custody of these instruments supplied mounted on skids/equipment. The calibration of skid/equipment mounted instruments shall be arranged by contractor. The contractor shall arrange for removal, calibration and re-installation of the instruments. The contractor will maintain the list of all instruments removed & reinstalled. Instruments prior to removal and after re-installation shall be considered in custody of the contractor for this package. All instruments such as pressure gauges/temperature gauges, switches etc. forming part of group (PG) are under the scope of erection of this contract and shall be installed and commissioned by the contractor of this package at no extra cost to BHEL. However the calibration of these instruments shall be done by the contractor as above.
5.1.18	All electrical cabling including proper glanding, termination, dressing etc., control and instrumentation works required for completion of Electrostatic Precipitator including its commissioning shall be part of this work. This will include erection of all electrical equipment such as rectifier, transformers, and power supply and control panel, laying of trays and cables and other associated equipment including covering of trenches. For cabling job as included in above in the scope, contractor shall supply all types of cable lugs of different sizes free of cost, bidder shall supply necessary copper-tinned cable lugs, clamp, ferrule, wire markers, pvc binding strap, adhesive tape etc. Bidder's quoted rates shall be inclusive of this. Cable gland shall be of double compression type and of brass material.
5.1.19	It is possible that a few flanges may not be matching. The contractor shall be required to cut and re-weld the same as and when required without any additional cost.

5.1.20	All the dampers, actuators etc. shall be serviced and lubricated to the satisfaction of Engineer before erecting the same and during pre- commissioning also.
5.1.21	The Erection, testing and commissioning of all electrically operated valves, actuators and dampers is covered within the scope of this specification.
5.1.22	The sub-contractor shall carry out Dismantling, Removal, Shifting of any obstructing structures, pipe lines, **cables & cable trays, trench pipes, trenches, equipment,** facilities etc. as required including **restoration of the same on completion of work**. Any rerouting of pipelines, cables and cable trays, trench pipes, trenches, equipment facilities etc., if required, shall be carried out by subcontractor free of cost.
5.1.23	All Necessary Preparation, Development, Barricading and Marking of the Area has to be made by the sub-contractor for Storage, Fabrication, and Pre Assembly & Erection of the Materials.
5.2	**WELDING**
5.2.1	Engineer may stop any welder from the work if his performance is unsatisfactory for any technical reason. The welder's is having passed qualification tests does not absolve the contractor of contractual obligation to continuously check the welder's performance.
5.2.2	Faulty welds caused by the poor workmanship shall be cut and re-welded at the contractor's expense. The Engineer prior to any repair being made shall approve the procedure for the repair of defective welds. After the repair has been carried out, the compliance shall be submitted to the quality engineer.
5.2.3	All expenses for testing of contractor's welders including destructive and nondestructive tests conducted by BHEL at site or at laboratory shall have to be borne by the contractor only. Limited quantity of tube and pipe material required for making test pieces will be supplied by BHEL free of cost.
5.2.4	The regulators used on welding machines shall be calibrated before putting these into use for work. The Contractor at his cost shall also arrange periodic calibration for the same.
5.2.5	Only BHEL/CUSTOMER approved electrodes and filler wire will be arranged and used by the contractor, within the finally quoted price. BHEL reserves the right to test any approved electrode being used by the contractor. Testing charges for the same shall be borne by the contractor. All electrodes shall be baked and dried in the electric electrode-drying oven to the required temperature for the period specified by the Engineer before these are used in erection work. All welders shall have electrodes drying portable oven at the work spot. The electrodes brought to the site will have valid manufacturing test certificate. The test certificate should have a co-relation with the lot number / batch number given on electrode packets. No electrodes will be used in the absence of above requirement. The thermostat and thermometer of electrode drying oven will be also calibrated and test certificate from Govt. approved / accredited test house traceable to National / International standards will be submitted to BHEL before putting the oven in use. The contractor shall also arrange periodical calibration for the same.

6.0	**TESTING, PRE-COMMISSIONING, COMMISSIONING AND POST-COMMISSIONING.**
6.1	The contractor shall carry out all the required tests and pre-commissioning and commissioning activities required for their successful and reliable operation. All required tests (Mechanical and electrical) indicated by BHEL and their clients for successful commissioning are included in the scope of these specifications. These tests/activities may not have been listed in these specifications. Specialized test equipment, if any, shall be provided by BHEL/ its client free of hire charges. However contractor has to take proper care of the equipment issued to him. Commissioning of Turbine& Auxiliaries shall involve required activities such as Flushing, steam blowing, related testing, pre-commissioning, commissioning activities of lube oil system, governing oil, gas systems, TG vacuum system, water lines and other systems of Turbine, Generator, Condenser, BFP and other auxiliaries. This includes preparation for flushing (By steam & Oil), hydro-test, steam blowing, other cleaning activities, actual execution of the activities, normalization etc. The contractor shall provide all consumables, labour, scaffoldings and items required for satisfactory testing. All the tests may have to be repeated till all the equipment satisfy the requirement/obligation of BHEL at various stages. The contractor shall do all the repairs for site-welded joints arising out of the failure during testing.
6.2	The contractor may note that no separate payment shall be released for any temporary works that are to be carried out for conducting pre-commissioning and commissioning tests. Bidders are advised to include expenses on temporary works along with the rates being quoted by them. Broadly the work on temporary systems will be divided as under. Erection etc. Dismantling of the temporary equipment will be done by the agency that has erected the equipment. He will also return the equipment to the stores.
6.3	It shall be the responsibility of the contractor to provide various category of workers in sufficient numbers along with Supervisors during Pre-commissioning, commissioning and post commissioning of equipment and attending any problem in the equipment erected by the contractor till handing over. The contractor will provide necessary consumables, T&Ps, IMTEs etc., and any other assistance required during this period. Association of BHEL's/Client's staff during above period will not absolve contractor from above responsibilities.
6.4	It shall be specifically noted that the above employees of the contractor may have to work round the clock along with BHEL Engineers and hence overtime payment by the contractor to his employees may be involved. The contractors finally accepted rates should be inclusive of all these factors also.
6.5	In case, any rework is required because of contractor's faulty erection, which is noticed during pre-commissioning and commissioning, the same has to be rectified by the contractor at his cost. If any equipment/part is required to be inspected during pre-commissioning and commissioning, the contractor will dismantle/open up the equipment/part and reassemble/redo the work without any extra claim.
6.6	During commissioning, opening/closing of valves, changing of gaskets, realignment of rotating and other equipment, attending to leakage and adjustments of erected equipment may arise. The finally accepted price/rates shall also include all such work.
6.7	In case any defect is noticed during tests, trial runs and commissioning such as loose components, undue noise or vibration, strain on connected equipment etc., the contractor shall immediately attend to these defects and take necessary corrective measures. If any readjustment and realignment are necessary, the contractor as his cost shall do the same as per Engineer's

	instructions including repair, rectification and replacement work. The parts to be replaced shall be provided by BHEL.
6.8	At the time of each inspection, the contractor shall take note of the decisions/changes proposed by the Engineer and incorporate the same at no additional cost. The contractor shall carry out any other test as desired by BHEL Engineer/Manufacturer on erected equipment covered under scope of this contract during testing and commissioning to demonstrate the physical completion of any part of or parts of the work performed by the contractor.
6.9	Other activities as deemed necessary for commissioning.

7.0	**FINISH PAINTING**
7.1	The following Indian Standards may be referred to for carrying out the painting job: IS -1303, 2379, 1477,2524,2395,2338,6278,3140,158,2074,104, and 2932.
7.2	All exposed metal parts of the equipment, structures, auxiliaries, piping, and other items (covered within the scope of this contract) after installations are to be painted. The surfaces are to be thoroughly cleaned of all dirt, rust, scales, grease, oils and other foreign materials by wire brushing, scrapping, any other method as per requirement of BHEL. The same will be inspected and approved by the engineer before painting.
7.3	Mostly the equipment/items/components will be supplied with one coat of primer paint and one coat of finish paint. However during long storage and handling, the same may get peeled off/deteriorate. Before erecting the material it is essential that 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 color. Besides above two coats of approved primer paint is to be applied on all the bare/unpainted surfaces. The gas cut stubs would require being ground and rounded.
7.4	After the surface is prepared, one coat of Zinc Phosphate primer conforming to IS: 2074 shall be applied. After first coat is dried up completely, second coat of red oxide primer shall be applied by brushing to ensure continuous film. The dry film thickness of each coat shall be minimum 25 microns.
7.5	Synthetic enamel paint conforming to IS: 2932 shall be used for finish coats. The color/shade shall be as approved by the customer. After cleaning the dust on the dried up primer, first coat of synthetic enamel shall be applied. After this first coat dries up hard, the surface should be wet scrubbed cutting down to smooth finish and ensuring that at no place the first coat is completely removed. After applying second coat, allowing the water to get evaporated completely, third finish coat of painting shall be applied.
7.6	Certain equipment like control panels, valves etc. shall require spray painting. The contractor shall make arrangements of the required equipment for spray painting.
7.7	Painting and Marking/Labeling of the materials erected. Arrangement of paints is included in the scope of work of the Contractor within quoted rate.
7.8	After applying the primer paints, wherever required, all structure/equipment/items, shall be finish pair with paints as specified by BHEL engineer. The number of coats/paint thickness shall be as indicate the drawing/ documents. However at least two coats of finish painting is to be applied. In case pro finish is not obtained in two coats, the contractor shall apply additional coat (s) till proper finish/p thickness is achieved. Certain equipment/Items are required to be painted with approved quality resistant paint/primer. After completion of painting all bright spots shall be cleaned to the satisfaction Engineer.
7.9	Contractor at no extra cost to BHEL shall supply all paints; primers, tools and other consumables including scaffolding materials required for finish painting. Paint is to be BHEL approved make only and painting should be as per color scheme and quality approved/specified by Engineer. Valid Test Certificate for the paint so supplied shall be made available before use of the same on work.
7.10	The contractor may be required to fill up dents/marks by applying putty before final painting of equipment. All materials and arrangements have to be made within quoted lumpsum price/rates.
7.11	The contractor shall provide legends with direction of flow on equipment and piping in size specified by Engineer. Letter writing shall be done in Hindi/English or in both languages.
7.12	The painters have to undergo test and only qualified painters will be allowed to work.