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NOTICE INVITING TENDER

(Document No PS:MSX:NIT)

Bharat Heavy Electricals Limited

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NOTICE INVITING E-TENDER (NIT)
BIDDER TO SUBMIT OFFERS ON PORTAL
https://bheleps.buyjunction.in

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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/BALLIMELA /HTG & OTHER (CIVIL)/1066**	
ii	Broad Scope of job	"DISMANTLING OF OLD TG SET INCLUDING AUXILIARIES; RENOVATE AND REUSE THE FIXED/EMBEDDED COMPONENTS; COLLECTION OF ALL INFORMATION/ DIMENSION, TAKING MEASUREMENTS AS REQUIRED, ASSESSING/ MEASURMENT THE CONDITION AND STRENGTH OF VARIOUS CIVIL FOUNDATIONS AND RESTRENGTHEN (IF REQUIRED) AND REUSE THE FOUNDATIONS, UNLOADING AT STORE, LOADING, TRANSPORTATION, STORING & PRESERVATION AT SITE, LOADING & UNLOADING OF DISMANTLED MATERIAL FROM SITE TO DUMPING YARD, COMPLETE ERECTION OF ALL THE COMPONENTS TESTING, COMMISSIONING AND HANDING OVER OPERATING PLANT TO OHPC (CUSTOMER) UNIT 1 TO 6 ALOGNWITH CIVIL, ARCHITECTURAL (INTERIOR DECORATION OF POWER HOUSE), MECHANICAL, ELECTRICAL, CONTROL & INSTRUMENTATION WORKS AS REQUIRED INCLUDING DEMONSTRATION OF PERFORMANCE GUARANTEES AT (6X60MW) BALIMELA HEP, DISTT-MALKANGIRI, ODISHA "	
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://bheleps.buyjunction.in* Tender documents will be available at website till due date of submission	*Applicable*
v	DUE DATE & TIME OF OFFER SUBMISSION	*Date : 05/06/2017, Time : 1500 HRS* *Place : on https://bheleps.buyjunction.in*	*Applicable*
vi	OPENING OF TENDER	*At due date / time* *Date : 05/06/2017, Time : 1530 HRS* *Notes:* *(1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day.* *(2) Bidder may depute representative to witness the opening of tender. However being an e-tender it shall be opened online*	*Applicable*
vii	EMD AMOUNT	*Rs. 33,44,000/-*	*Applicable*
viii	COST OF TENDER	*Rs. 2000/-*	*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) Ms. Susmita Basu, Sr. DGM /SCT, Bharat Heavy Electricals Limited, Power Sector Northern Region, Plot No. 25, Sector-16A, Distt. Gautam Budh Nagar, NOIDA-201301(UP), Tel No. 0120-2416262, Fax- 01202416528, Email – susmitabasu@bhel.in/ susmitabasu@bhelpsnr.co.in* *2) Ms. Aditti Gupta, Engineer /SCT, Bharat Heavy Electricals Limited, Power Sector Northern Region, Plot No. 25, Sector-16A, Distt. Gautam Budh Nagar,, NOIDA-201301(UP), Tel No. 0120-2416511, Fax- 01202416528, Email: aditi@bhel.in/ aditi@bhelpsnr.co.in*	*Applicable*
x	SCHEDULE OF Pre Bid Discussion (PBD)		*Not applicable.*
xi	INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)	*Mrs.Pravin Tripathi, IA & AS (retd.)* *D-243,Anupam Gardens, Lane IB, Neb Sarai, Sainik Farms, New Delhi-110 068* *Ph:+91 11 29533206 / 29531715* *Pravin.tripathi@gmail.com*	*Applicable*

xii	Latest updates	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com -->Tender Notifications →View Corrigendums) & portal https://bheleps.buyjunction.in and not in the newspapers. Bidders to keep themselves updated with all such information	
xiii	Tender submission	on portal https://bheleps.buyjunction.in	

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, bidder shall deposit EMD through Cash Deposit (as permissible under the extant Income Tax Act) (before tender opening), Electronic Fund Transfer credited in BHEL account (before Tender Opening) or Banker's Cheque/ Demand Draft/ Pay Order in favour of Bharat Heavy Electricals Ltd, payable at Noida (along with offer).

   '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)-:	011-23352180
iii).	Branch Address-:	CAG BRANCH, NEW DELHI
iv).	Bank Fax No. (with STD code) -:	011-23353101
v).	Branch Code -:	SBIN0009996
vi).	9 Digit MICR Code of the Bank Branch -:	110002201
vii).	Bank Account Number -:	10813608647
viii).	Bank Account Type -:	CASH CREDIT
ix).	11 Digit IFSC Code of Beneficiary Branch-:	SBIN0009996

   (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 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.)

For other details please refer General Conditions of Contract.

5. Procedure for Submission of Tenders: This is an E-tender floated online through our E-Procurement Site https://bheleps.buyjunction.in. The bidder should respond by submitting their offer online only in our e-Procurement platform at https://bheleps.buyjunction.in. 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. Alternatively, documentary evidence for claiming exemption as per clause 29 of NIT
ii. Technical Bid (without indicating any prices).

b. Price Bid:

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

Godrej Water Side, 3rd Floor, Tower-1, Plot-V, Block - DP
Sector - V, Salt Lake, Kolkata-700091, West Bengal, INDIA

The contact details of the service provider are given below:

1. **First level:**
   - MJ Helpdesk : 033-66011717, eps.customercare@mjunction.in
2. **Second Level:**
   - Bhaskar Chakraborty: 8584008205, bhaskar.chakraborty@mjunction.in, eps.customercare@mjunction.in
   - Santosh Kumar: 9717149600, santosh.kumar@mjunction.in
3. **Third Level:**
   - Rimi Ghosh: 9650044156, rimi.ghosh@mjunction.in

1. Customer care Help Desk of M/s MJUNCTION SERVICES LIMITED, Kolkata:
   Tel ~ 033 - 66011717 (From 9.30 am to 5.30 pm),
   Mob - 91633 48283 - 86/ 85840 08116 (From 5.30 pm to 8.30 pm)
   HELPDESK email: eps.customercare@mjunction.in,
   The process of utilizing e-procurement necessitates usage of DSC (Digital Signature Certificate) (Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION) and you are requested to procure the same immediately, if not presently available with you. Please note that only with DSC, you will be able to login the e-procurement secured site and take part in the tendering process.

2. 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 www.bheleps.buyjunction.in

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

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 '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 = P_T i.e. Sum (Σ) of columns (iii) to (ix)
2	Number of Months for which 'Monthly Performance Evaluation' as per relevant formats should have been done in the 'period of assessment' for corresponding Similar Packages (as in row 1)	T_1	T_2	T_3	T_4	T_5	…	T_N	Sum (Σ) of columns (iii) to (ix) = T_T
3	Monthly performance scores for the corresponding period (as in Row 2)	S_{1-1}, S_{1-2}, S_{1-3}, S_{1-4}, … S_{1-T1}	S_{2-1}, S_{2-2}, S_{2-3}, S_{2-4}, … S_{2-T2}	S_{3-1}, S_{3-2}, S_{3-3}, S_{3-4}, … S_{3-T3}	S_{4-1}, S_{4-2}, S_{4-3}, S_{4-4}, … S_{4-T4}	S_{5-1}, S_{5-2}, S_{5-3}, S_{5-4}, … S_{5-T5}	.. … … … …	S_{N-1}, S_{N-2}, S_{N-3}, S_{N-4}, … S_{N-TN}	--------
4	Sum of Monthly Performance scores of the corresponding Package for the corresponding period (as in row-3)	S_1	S_2	S_3	S_4	S_5	…	S_N	Sum (Σ) of columns (iii) to (ix) = S_T

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

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

a) 'Period of Assessment' i.e. 6 months preceding and including the cut-off month
b) 12 months preceding and including the cut-off month
c) 24 months preceding and including the cut-off month
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 $P \leq P_{Max}$

(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 from BHEL.

The "FIRST TIMER" tag shall remain till execution of work for a period of not less than 09 months from the commencement of work of first package or completion of contract or availability of 6 evaluation scores including the previous scores (if any).

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

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. A panel of Independent External Monitors (IEMs) have been appointed to oversee implementation of IP in BHEL.

The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory who signs in the offer) along with techno-commercial 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. Details of IEM for this tender is given at point 1 (xi) above.

ii) 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 the IEM mentioned in the tender.

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.

For all clarifications/issues related to the tender, 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) shall be allowed only if specified in Pre Qualifying Requirement (PQR) criteria, and in such a case the following shall be complied with:

23.1 Prime Bidder and Consortium Partner or partners are required to enter into a consortium agreement with a validity period of six months initially. In case the consortium is awarded the contract, then the Consortium Agreement between the Prime Bidder and Consortium Partner or partners shall be extended till contractual completion period including extension periods if any applicable.

23.2 'Stand-alone' bidder cannot become a 'Prime Bidder' or a 'Consortium bidder' or 'Technical Tie up bidder' in a consortium (or Technical Tie up) bidding. Prime bidder shall neither be a consortium partner to other prime bidder nor take any other consortium partners. However, consortium partner may enter into consortium agreement with other prime bidders. In case of non compliance, consortium bids of such Prime bidders will be rejected.

23.3 Number of partners for a consortium Bidding (or Technical Tie up) shall be as specified in the PQR

23.4 Prime Bidder shall be as specified in the Pre Qualification Requirement, else the bidder who has the major share of work

23.5 In order to be qualified for the tender, Prime Bidder and Consortium partner or partners shall satisfy (i) the Technical 'Pre Qualifying Requirements' specified for the respective package, (ii) "Assessment of Capacity of Bidder' as specified in clause 9.0

23.6 Prime Bidder shall comply with additional 'Technical' criteria of PQR as defined in 'Explanatory Notes for the PQR'

23.7 Prime Bidder shall comply with all other Pre Qualifying criteria for the Tender unless otherwise specified

23.8 In case customer approval is required, then Prime Bidder and Consortium Partner or partners shall have to be individually approved by Customer for being considered for the tender.

23.9 Prime Bidder shall be responsible for the overall execution of the contract

23.10 In case of award of job, Performance shall be evaluated for Prime Bidder and Consortium Partner or partners for their respective scope of work(s) as per prescribed formats

23.11 In case the Consortium partner or partners back out, their SDs shall be encashed by BHEL. In such a case, other consortium partner or partners meeting the PQR have to be engaged by the Prime Bidder, and if not, the respective work will be withdrawn and executed on risk and cost basis of the Prime Bidder. The new consortium partner or partners shall submit fresh SDs as applicable.

23.12 In case the prime Bidder withdraws, the whole contract shall be considered cancelled and short closed.

23.13 After execution of work, the work experience shall be assigned to the Prime Bidder and the consortium partner or partners for their respective scope of work. After successful execution of two similar works with the same consortium partner or partners under direct orders of BHEL, the Prime Bidder shall be eligible for becoming a 'stand alone' bidder for similar works, subject to certification from BHEL about the active involvement of the Prime Bidder for satisfactory execution of the works.

23.14 The consortium partner shall submit SD equivalent to 2% of the total contract value in addition to the SD to be submitted by the prime Bidder for the total contract value. In case there are two consortium partners, then each partner shall submit SD equivalent to 1% of the total contract value in addition to the SD to be submitted by the prime Bidder for the total contract value.

23.15 In case of a Technical Tie up, all the clauses applicable for the Consortium partner shall be applicable for the Technical Tie up partner also

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. 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.

27.0 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".

The offers of the bidders who are under suspension as also the offers of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL website (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 Micro and Small Enterprises (MSE)

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

Type under MSE	SC/ST owned	Others
Micro		
Small		

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

a) MSE suppliers can avail the intended benefits only if they submit along with the offer, attested copies of either Udyog Aadhaar or EM-II certificate having deemed validity (five years from the date of issue of acknowledgement in EM-II) or valid NSIC certificate or EM-II certificate along with attested copy of a CA certificate (format enclosed as Annexure – 3) where deemed validity of EM-II certificate of five years has expired applicable for the last audited financial year. Date to be reckoned for determining the deemed validity will be the last date of Technical Bid submission. Non submission of such documents will lead to consideration of their bids at par with other bidders. No benefits shall be applicable for this enquiry if the above required documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal.
b) MSEs shall be exempted from payment of tender fee.
c) MSEs shall be exempted from payment of earnest money at the time of tender deposit. However, there is no exemption of security deposit submission.
d) Participating MSEs quoting price within price band of L1+15 % shall be considered for award of complete scope of work by bringing down their price to L1 price in a situation where L1 price is from someone other than a MSE. In case of more than one such MSE, MSE with lowest price shall be given the first option to match the L1 price. However, MSEs owned by the Scheduled Caste or the Scheduled Tribe entrepreneurs

shall be given the preference for matching the L1 price irrespective of their standing in comparative statement of MSE bidders within price band of L1+15 %.

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
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: Chartered Accountant certificate for MSMED
(iv) Annexure-4: Authorization of representative who will participate in the online Reverse Auction Process
(v) Annexure-5: Feedback form
(vi) Annexure-6: Integrity Pact
(vii) Other Tender documents as per this NIT.

ANNEXURE - 1

PRE QUALIFYING REQUIREMENTS

JOB	"DISMANTLING OF OLD TG SET INCLUDING AUXILIARIES; RENOVATE AND REUSE THE FIXED/EMBEDDED COMPONENTS; COLLECTION OF ALL INFORMATION/ DIMENSION, TAKING MEASUREMENTS AS REQUIRED, ASSESSING/ MEASURMENT THE CONDITION AND STRENGTH OF VARIOUS CIVIL FOUNDATIONS AND RESTRENGTHEN (IF REQUIRED) AND REUSE THE FOUNDATIONS, UNLOADING AT STORE, LOADING, TRANSPORTATION, STORING & PRESERVATION AT SITE, LOADING & UNLOADING OF DISMANTLED MATERIAL FROM SITE TO DUMPING YARD, COMPLETE ERECTION OF ALL THE COMPONENTS TESTING, COMMISSIONING AND HANDING OVER OPERATING PLANT TO OHPC (CUSTOMER) UNIT 1 TO 6 ALOGNWITH CIVIL, ARCHITECTURAL (INTERIOR DECORATION OF POWER HOUSE), MECHANICAL, ELECTRICAL, CONTROL & INSTRUMENTATION WORKS AS REQUIRED INCLUDING DEMONSTRATION OF PERFORMANCE GUARANTEES AT (6X60MW) BALIMELA HEP, DISTT-MALKANGIRI, ODISHA ".
TENDER NO.	BHEL/ NR/SCT/BALIMELA /HTG & OTHER (CIVIL)/1066

Sr. No.	Name and Description of qualifying criteria	Bidders claim in respect of fulfilling the PQR Criteria
A	**Submission of Integrity Pact duly signed.**	Applicable
B	**Assessment of Capacity of Bidder to execute the work as as per clause 9.0 of NIT**	Applicable
C	**TECHNICAL CRITERIA**	Applicable
1.0	Bidder should have **executed** in the last 7 years from the latest date of bid submission, at least two units of any one type or from any of the combinations below (C1.1. to C1.5):	
1.1	Vertical Hydro Turbine generator with Pelton Turbine of ≥30 MW	
	'OR'	
1.2	Vertical Hydro Turbine generator with Francis Turbine of ≥10 MW	
	'OR'	
1.3	Vertical Hydro Turbine generator with Kaplan Turbine of ≥6 MW	
	'OR'	
1.4	Vertical Reversible Pump Turbine generator of ≥10 MW	
	OR'	
1.5	Vertical Francis Type Pump motor of ≥10 MW	
	AND	
2.0)	Bidder should have executed similar work for any one of the following in the last 7 years from the latest date of bid submission:	
2.1)	One (01) work of value not less than Rs. 750.08 Lakhs	
	'OR'	
2.2)	Two (02) works each of value not less than Rs. 468.80 Lakhs 'OR'	

2.3)	Three (03) works each of value not less than Rs. 375.04 Lakhs	
3.0)	If bidders have executed only the works as per sl. no. C.1.0 as above, they shall be allowed to have a technical tie up or consortium with another experienced party meeting the criteria at sl. no. C 2.0. as above. Conditions of consortium shall be as per Sl. No. 23 of NIT. Consortium Bidder meeting the criteria at sl. no. C.1.0 shall be considered as **Prime bidder**.	
D	**FINANCIAL CRITERIA**	Applicable
D-1	**TURNOVER** Bidders must have achieved an average annual financial turnover (Audited) of INR 703.20 Lakhs or more over last three Financial Years (FY) i.e 2013-2014, 2014-2015, 2015-2016. Bidders shall submit audited annual 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. 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.	
D-2	**NETWORTH** Net Worth (Only in case of companies) of the bidder should be positive. Note-: Net worth shall be calculated based on the latest Audited Accounts as furnished for '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	
E	**APPROVAL OF CUSTOMER** Note: Names of bidders who stand qualified after compliance of criteria A to D shall be forwarded to customer for their approval. Price bid of only those bidders shall be opened who are approved by customer	Applicable

F	**CONSORTIUM CRITERIA**	Applicable as per sl.no.C-3.0 above.

Explanatory Notes

1. For evaluation of PQR, the credentials of the bidder alone, and not that of the Group Company shall be considered.

2. In case of Consortium bidding, the financial criteria as mentioned in sl. no. D above shall be exclusively complied by the Prime bidder.

3. For sl. no. 'C.1.0', 'Executed' means SPINNING".The bidder should have achieved this criteria, even if the total contract has not been completed or closed.

4. For sl. no. 'C.2.0,
   - Similar works means Civil works like construction and development of offices or buildings (industrial/ residential/ commercial)
   - Actual executed value shall be considered, irrespective of completion status of contract (s) under consideration.

5. For sl.no. 'C.2.0' 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-

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

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.

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-1) is understood and filled with proper supporting documents referenced in the specified format	Applicable	YES / NO
7	Audited profit and Loss Account for the last three years	Applicable/~~Not Applicable~~	YES/NO
8	Copy of PAN Card	Applicable/~~Not Applicable~~	YES/NO
9	Whether all pages of the Tender documents including annexures, appendices etc are read understood and signed	Applicable/~~Not Applicable~~	YES/NO
10	Integrity Pact	Applicable/~~Not Applicable~~	YES/NO
11	Declaration by Authorised Signatory	Applicable/~~Not Applicable~~	YES/NO
12	No Deviation Certificate	Applicable/~~Not Applicable~~	YES/NO
13	Declaration confirming knowledge about Site Conditions	Applicable/~~Not Applicable~~	YES/NO
14	Declaration for relation in BHEL	Applicable/~~Not Applicable~~	YES/NO
15	Non Disclosure Certificate	Applicable/~~Not Applicable~~	YES/NO
16	Bank Account Details for E-Payment	Applicable/~~Not Applicable~~	YES/NO
17	Capacity Evaluation of Bidder for current Tender	Applicable/~~Not Applicable~~	YES/NO
18	Tie Ups/Consortium Agreement are submitted as per format	Applicable/~~Not Applicable~~	YES/NO
19	Not used		
20	Analysis of Unit rates	Applicable/~~Not Applicable~~	YES/NO

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

DATE :

AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

ANNEXURE - 3

Certificate by Chartered Accountant on letter head

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

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

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

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

(Strike off which is not applicable)

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

Or

The company has been graduated from its original category (Micro/Small) (Strike off which is not applicable) and the date of graduation of such enterprise from its original category is ..... (dd/mm/yyyy) which is within the period of 3 years from the date of graduation of such enterprise from its original category as notified vide S.O. No. 3322(E) dated 01.11.2013 published in the gazette notification dated 04.11.2013 by Ministry of MSME.

Date:

(Signature)

Name -

Membership Number -

Seal of Chartered Accountant

ANNEXURE - 4

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 – 5

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	

INTEGRITY PACT

Between

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

and

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

Preamble

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

_____

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

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

Section 1 – Commitments of the Principal

1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

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

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

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

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

2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.

2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved

in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he / she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant IPC/ PC Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

2.1.4 The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

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

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

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

Section 4 – Compensation for Damages

4.1 If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent Earnest Money Deposit/Bid Security.

4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/Performance Bank Guarantee, whichever is higher.

Section 5 – Previous Transgression

5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

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

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

6.2 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.

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

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

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

Section 8 –Independent External Monitor(s)

8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.

8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/ Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Sub-contractor(s) with confidentiality.

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

8.5 As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or heal the situation, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

8.6 The Monitor will submit a written report to the CMD, BHEL within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.

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

8.8 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant IPC / PC Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the

Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8.9 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.

8.10 The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

9.1 This Pact begins and shall be binding on and from the submission of bid(s) by bidder(s). It expires for the Contractor 12 months after the last payment under the respective contract and for all other Bidders 6 months after the contract has been awarded.

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

Section 10 – Other Provisions

10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.

10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

10.3 If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.

10.4 Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10.5 Only those bidders/ contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

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

Place----------

Date----------

Witness: _____	Witness: _____
(Name & Address) _____	(Name & Address)_____
_____	_____

Rev 00
6th JULY
2010

VOLUME- IA (PART-I): TECHNICAL CONDITIONS OF CONTRACT (TCC)

NAME OF WORK:

DISMANTLING OF OLD TG SET INCLUDING AUXILIARIES; RENOVATE AND REUSE THE FIXED/EMBEDDED COMPONENTS; COLLECTION OF ALL INFORMATION/ DIMENSION, TAKING MEASUREMENTS AS REQUIRED, ASSESSING/ MEASURMENT THE CONDITION AND STRENGTH OF VARIOUS CIVIL FOUNDATIONS AND RESTRENGTHEN (IF REQUIRED) AND REUSE THE FOUNDATIONS, UNLOADING AT STORE, LOADING, TRANSPORTATION, STORING & PRESERVATION AT SITE, LOADING & UNLOADING OF DISMANTLED MATERIAL FROM SITE TO DUMPING YARD, COMPLETE ERECTION OF ALL THE COMPONENTS TESTING, COMMISSIONING AND HANDING OVER OPERATING PLANT TO OHPC (CUSTOMER) UNIT 1 TO 6 ALOGNWITH CIVIL, ARCHITECTURAL (INTERIOR DECORATION OF POWER HOUSE), MECHANICAL, ELECTRICAL, CONTROL & INSTRUMENTATION WORKS AS REQUIRED INCLUDING DEMONSTRATION OF PERFORMANCE GUARANTEES AT (6X60MW) BALIMELA HEP, DISTT-MALKANGIRI, ODISHA.

BHARAT HEAVY ELECTRICALS LIMITED

VOLUME – I A (PART – I): CONTRACT SPECIFIC DETAILS

Sl. No.	Title	Description
1.	**Name of the Owner:**	ODISHA HYDRO POWER CORPORATION LTD. (OHPC)
2.	**Address**	BALIMELA Hydro Power Station Village: BALIMELA, District: MALKANGIRI (ODISHA)
3.	**New Installation**	6 x 60 MW
4.	**Nearest Railway station**	KORAPUT (120 KM) on South Central Railway
5.	**Nearest Road**	BALIMELA (5 KM)
6.	**Nearest City**	MALKANGIRI- 40 KM/ JEYPORE- 110 KM/ KORAPUT (120 KM)
7.	**Nearest Airport**	BHUBHANESHWAR (625 KM), VISHAKHAPATNAM (322 KM)
8.	**Highest Temperature**	50 deg C
9.	**Lowest Temperature**	5 deg C
10.	**Elevation**	418 Meter's

Note: - The bidder is advised to visit and examine the site of WORKS and its surroundings and obtain for himself on his own responsibility all information that may be necessary for preparing the bid and entering into the CONTRACT. All costs for and associated with site visits shall be borne by the bidder.

1. BROAD SCOPE OF WORKS:

The scope of work under the contract shall include Dismantling of Old TG set including auxiliaries; renovate and reuse the fixed/embedded components; collection of all information/ dimension, taking measurements as required, assessing/ measurment the condition and strength of various civil foundations and restrengthen (if required) and reuse the foundations, unloading at store, loading, transportation, storing & preservation at site, loading & unloading of dismantled material from site to dumping yard, complete erection of all the components testing, commissioning and handing over operating plant to ohpc (customer) unit 1 to 6 alognwith civil, architectural (interior decoration of power house), mechanical, electrical, control & instrumentation works as required including demonstration of performance guarantees for successful R & M with new TG of the units and hand over to the OHPC as an operating plant and the project shall include material & equipment and facilities within the defined battery limits. The total scope of work is covered in two parts: Part 1 & Part 2.

The scope of work under this tender shall comprise dismantling of the complete machine and safe storage of all the dismantled components and transportation of certain identified assemblies/ components from Balimela HEP to identified dumping ground by OHPC and also to BHEL, Bhopal plant for repair if required. All parts should be properly match marked before dismantling. The machine shall be handed over to sub-contractor after de-watering of machine by the OHPC. Packing, Loading & Transportation of various dismantled components/ assemblies envisaged to be repaired at BHEL plant from Balimela site to BHEL Plant shall be carried out by subcontractor and further its successful assembly at Balimela after repair.

I. Total plant materials/equipments involved for material handling work under this tender will be approx. - 10065 MT. This quantity shall include new supply as well as old dismantled material.

II. The total new material to be supplied from the BHEL manufacturing units for the project is approximately 5500 MT for ETC. The contractor has to handle whatever actual materials are dispatched for the project irrespective of any variations and payments shall be released for the actual gross tonnage handled.

III. The Contractor shall make all arrangements to deliver the equipment at site by trucks/ trailers, build his own stores (covered, uncovered, air-conditioned, if necessary) for the proper storage of equipment, maintain the stores and all related documents and records, transport the new/renewed equipment to site for erection purpose. All security arrangements also shall be made by the Contractor. Space only for stores and site office shall be made available, free of cost, to the Contractor by the OHPC/BHEL. Security arrangements means all necessary arrangement for security of equipment, tools and tackles etc of the contractor at site.

IV. Dismantling of all the items through the agreed dismantling procedure or mutually decided procedure between OHPC & BHEL without affecting day to day operation of running units of Power house. All the items so dismantled are to be tagged properly recorded with customer OHPC & Shifted to earmarked dumping yard after Handing Over to OHPC.

V. The Contractor shall be responsible for proper and neat storage and also undertake conservation of all consignments including damaged boxes. During storage of equipment, the Contractor shall take into account deterioration and carry out the reconservation of the complete equipment/parts/supplies as may be necessary as per the storage instructions of the Manufacturer of equipment/components. The Contractor shall also supply the consumables required for such reconservation work and repair/replace parts required thereof for the proper functioning of the equipment after erection and commissioning.

VI. The Contractor shall take the equipment from stores and transport the same to erection site. In case of dismantling & repair, the Contractor shall take the equipment/components from site to their repair shop

(preferably most of the repair work shall be done at site only) and transport back the same to site after repair.

VII. The Contractor shall unpack and do visual checking against physical damages to the equipment/cases, clean equipment before start of erection as well as before taking delivery in case of equipment/components required for repair. Damages/shortage, if any, will be reported to the BHEL.

VIII. The Contractor shall provide all necessary erection equipment and tools & tackles including material handling equipment, mobile cranes, fork lift machine, trailers, cranes, machine tools & repair kit, compressors and other equipment and instruments and consumables, all commissioning equipment and instruments, welding equipment, winches, alignment tools, precision levels, theodolite etc. which may be required for carrying out the erection and commissioning work efficiently. All instruments shall be properly calibrated before use. Unless otherwise specified, the above erection equipment/ materials shall be the property of the Contractor. However, OHPC/BHEL's prior permission shall be required for removal of these erection and repair equipment/ materials from the site. The Contractor shall ensure that proper documentation is followed at entry gate of OHPC's premises for such items which shall be carried back by Contractor after completion of work. **The Contractor shall provide within 60 days from the date of effective date of Contract, his scheme for mobilization with Bar Chart indicating clearly the resources, manpower and machinery proposed to be deployed to ensure timely completion of work and quality of workmanship.**

IX. The Contractor shall provide all temporary ladders, scaffolding materials, platforms, supports and other necessary facilities required for dismantling, material handling, erection, testing and visual inspection of supplies at the point of installation and shall also provide necessary packing plates, wedges, shims, levelling screws etc. required for erection of equipment and structures.

X. **The Contractor shall provide erection consumables like oxygen and acetylene gas, welding rods, solder lugs, oil, grease, kerosene, cotton waste, etc. required for erection, installation and repair of equipment and steel structures.**

XI. The Contractor shall maintain in a neat manner the area placed at the Contractor's disposal.

XII. The Contractor shall provide sufficient fencing, notice boards and lights to protect and warn others as may be considered necessary by the OHPC/BHEL. All materials used for providing these facilities shall be properties of the Contractor. A safety notice board containing warnings written in English, Hindi & Odia Languages shall be placed by the Contractor.

XIII. The plant and equipment will be erected as per the instructions of the OHPC/BHEL and under the supervision of the supervisory personnel, to be deputed by the Contractor at site. The Contractor will also undertake rectification work on account of manufacturing defects, if any, required for proper erection and assembly which can be done at site only according to site condition.

XIV. The Contractor will align, level, couple and securely fix all equipment, steel structures, appurtenances and accessories in accordance with drawings and/or instructions.

XV. All precision survey instruments including leveling instruments will be arranged by the Contractor. The Contractor will carry out flushing and first filling of oil and lubricants, grease, chemicals and as required till successful commissioning. Laying and termination of cables, bus bars, bus ducts and earthing will be done by the Contractor.

XVI. Installation and connection of all pipings and fittings from the headers termination points to the equipment and inter-connection of all service lines within the design limit after the main headers/termination points will be Contractor's responsibility.

XVII. The Contractor will check electrical connections to individual items. The Contractor will be responsible for checking the correctness of erection of mechanical equipment, auxiliary systems, electrical equipment, other equipment, etc. as per the specification and relevant drawings.

XVIII. The Contractor will arrange all facilities at site to undertake Ultrasonic testing and stress relieving of butt welded pipe joints, as required.

XIX. The Contractor will be responsible for the management of erection work with proper and adequate supervision for ensuring progress of erection work and quality of workmanship. The Contractor will deploy required number of supervisory, skilled, unskilled and auxiliary labor as required, for the erection work and comply with such reasonable instructions of the OHPC/BHEL in the interest of satisfactory progress and completion of the work according to the schedule.

XX. The Contractor will be responsible for total commissioning of the Plant including mechanical run, commissioning and demonstration of Performance Guarantee Tests. The Contractor will organize the work in a manner that other work at site is not impeded and the workmen therein not endangered. He will arrange temporary access at site, if required, for the erection work. Field efficiency test of (Turbine & Generator) shall be done on all the six units.

XXI. The Contractor will intimate the OHPC/BHEL/concerned Plant authorities in writing well in advance about the requirement of shut down of any of the existing units/facilities for inter-connection/ incorporation of additional facilities. The shutdown period will be mutually discussed and finalized. The work to be undertaken during the shutdown period will be planned meticulously by the Contractor to reduce the shutdown period to the minimum.

XXII. The Contractor will return to the OHPC all crates, packing cases and packing materials and all returnable supplies belonging to the OHPC at a place designated by the OHPC at the erection site in the conditions these exist during and after erection work is completed.

XXIII. The tests/checks to be conducted during erection by the Contractor will be as per the BHEL/manufacturer's instructions. The Contractor will attend to the rectification of erection defects, if any, expeditiously. The Contractor will arrange all testing instruments for such testing at site.

XXIV. The Contractor will carry out final painting of the plant & equipment and pipelines, etc. erected as per the instructions of the OHPC/BHEL.

XXV. Grouting of the equipment on the foundations with Shrinkkomp/Ferro grout will be the responsibility of the Contractor.

XXVI. The Contractor will indicate to the OHPC/BHEL well in advance the requirement of services such as electric power, water, EOT crane, etc. required during Dismantling/construction/erection period. The Contractor will arrange for the staying facilities of his working personnel. All safety, health and pollution control measures, as required to be adopted as per the Statutory Regulations and the Safety Codes for projects issued along with the tender documents otherwise required or implied by statutory regulations or practices, will be strictly followed by the Contractor during the execution of the Contract. The Contractor will set up a suitable safety organization of his own at site in this regard.

XXVII. The Contractor will comply with all Statutory Rules & Regulations with respect to the employment of labour at site including payment of minimum wages as per Govt. rules, deduction of employee’s contribution to

Provident Funds, depositing the same along with Contractor's contribution to the Provident Fund Commissioner, Employees State Insurance and other statutory deductions/ obligations.

XXVIII. At the end of the work the Contractor will remove all such temporary structures put up by him and hand over the site to the OHPC/BHEL in neat and tidy manner.

2. DETAILED SCOPE OF WORK, EXISTING FACILITIES & BATTERY LIMIT

2.1 SCOPE OF WORK

The broad scope of work for units 1 to 6 is as below:

a) Dismantling of existing TG sets including associated auxiliaries, like cooling water system, dewatering & drainage system, Firefighting system, air conditioning system, ventilation system, drinking water system, compressed air system, and place these at a suitable storage space / yard (storage space will be provided by OHPC within 5 km of plant boundary).

b) Renovate and reuse the Fixed/embedded components: spiral case, stay Vane, foundation ring, draft tube, draft tube liner, pit liner, and foundation plates and anchorages etc.

c) Total plant materials/equipments involved for material handling work under this tender will be approx. - 10065 MT. This quantity shall include new supply as well as old dismantled material.

d) Assess the condition of various existing civil foundations, its re-design, strengthen and reuse the foundations. Collect all the information/dimension, take all measurement, if any, required to carry out for redesigning.

e) Complete dismantling, erection of all the components testing, commissioning, start up and performance testing and handing over of Units 1 to 6, 60 MW each Hydro turbine-generator sets (TG sets). The TG sets includes Francis turbine, Synchronous Generator along with associated Auxiliaries; Electricals including Step-up transformer, Unit Auxiliary transformer and associated equipment; Control & Instrumentation; associated civil work and Architectural Works. Contractor will ensure that the TG set will be completed with all materials and equipment whether specifically mentioned herein or not but required for satisfactory operation of the Units.

2.2 BROAD SCOPE OF COMPLETE WORK:

2.2.1 MATERIAL HANDLING WORKS:

a) The plant material shall be unloaded at power house with E.O.T cranes and shall be unloaded/loaded at BHEL stores /work site by contractor Mobile cranes/ Hydra. The E.O.T cranes shall be provided by BHEL/customer on free of cost for material handling/erection work. Arrangement of operator shall be responsibility of the contractor, if not provided by OHPC. In case EOT cranes are not available or under breakdown at Power house contractor shall arrange his own Hydra/cranes /alternative arrangement which is acceptable to BHEL site engineer for material handling work loading / unloading of the plant materials /equipment and shall carry out the material handling work at project site.

b) Keeping records and status of all materials as per BHEL practices. Verification of all the materials to be received at site. Prepare shortages/damage reports if any and assisting in insurance claim lodging.

c) Transportation of materials from project store to the powerhouse service bay or the pre assembly area or any other work area of installation & vice-versa as per site requirement and the instructions of site engineer.

d) Construction of temporary sheds/shelters (along with material) on some of the special equipments/ items as per the instruction of the site engineer.

e) Providing sufficient illumination, firefighting equipment, warning signs in and around the place of work. Providing all necessary support/assistance for efficiency testing. Handing over of all the spares to

customer at their stores. Handling and Transportation of scrap (packing wood and steel) from power house to OHPC scrap yard/stores/Dumping yard as per the instructions of BHEL engineer.

f) Unloading and stacking of items in the service bay / work area with the help of EOT cranes/unloading arrangement as per the instruction of BHEL engineer. Proper Housekeeping and safe working.

g) Dismantling of the existing equipments and Erection, Testing, Commissioning, trial operation and Handing over of all new equipments covered in this tender (See table below).

The broad facilities/equipment to be dismantled (common as well as unit specific) are given in Table below:

Sl. No.	Name of the Equipment/Facility
1	Turbine and associated equipment including Turbine shaft, cone, runner, guide bearing, shaft seal, Guide vane, discharge ring etc of all six units.
2	Governing System including PMG, Oil pressure system, Governor panels etc. of all six units.
3	Generator and associated equipment including stator, rotor, generator shaft, Thrust bearing, guide bearings, Generator Air Coolers of all six units.
4	Excitation System including Pilot Exciter, Main Exciter, Slip rings, Excitation panels etc. of all six units.
5	Cooling water system (common as well as unit specific) including, pump- motor sets, pipe, valves, filters, etc. for all six units.
6	Dewatering & drainage system including pipes, valves, and pump-motor sets etc. Common for all six units.
7	Fire protection system (fire hydrant, HVWS etc) including pipes, valves, pump-motor sets etc. common for all six units.
8	04 nos. vacuum pump-motor sets including pipelines, valves etc. common for all six units.
9	Air conditioning unit including duct, damper, louver etc. and Ventilation duct.
10	Drinking water system including piping, valves, pump-motor sets, filter etc.
11	2 nos. HP compressors & 1 no. LP old compressor including compressed air piping, valves etc. common for all the six units.
12	Generator Transformer and associated facilities of all six units.
13	Unit Auxiliary transformer and other associated facilities of all six units.
14	11 KV switchboards, Unit Auxiliary board panels, Control panels, Protection panels etc. of all six units.
15	Bus ducts, Power, Control and other cables within battery limit of all six units.
16	HT, LT, Control and instrumentation cables of all six units and also of common auxiliary systems.
17	Miscellaneous items used in all the six Units.

Generator will be dismantled by segregating copper & iron by contractor. Copper materials to be stored in PH space provided by BHEL/OHPC and iron materials within 5Km of power house (storage space provided by BHEL/ OHPC).

NOTE: - 01 No MOT Crane of 5T capacity is to be installed by contractor closed storage sheds of BHEL/OHPC. Also operation and maintenance during entire contract period is the responsibility of contractor. It is the property of the contractor and shall be dismantled and taken back after completion of work.

h) Development of furnishing and its maintenance: Furnishing and maintenance of residential flats & guest houses at site including mess facilities at site and Open storage area, closed storage shed, office premises

including Office furniture, equipments etc shall be done by contractor within quoted price. Also providing internet connection, computers & accessories with latest software at site within quoted price (**facilities to be provided as per List at annexure 2**). All the items as per annexure 2 shall be exclusively for BHEL use. The items shall be taken back by the contractor after completion of project in the used condition. Running maintenance (including replacement if required) of above items shall be done by contractor free of cost till completion of project (schedule contract period including extended period). No extra/additional payment shall be made to contractor for arranging the above facility for BHEL at site.

i) Re-conciliation of materials with BHEL and OHPC. Documentation and records (Films/ Movies/ Photographs) from embedment to evacuation.

j) All the dismantled components that are not envisaged to be used back in the unit are required to be stored/preserved properly till the completion of work. All nuts bolts studs & dowels shall be cleaned, applied grease and kept in polythene packs with proper tagging/ bin cards. Responsibility for arrangement of wooden boxes as required shall be of the contractor at his own cost.

k) All consumables like old dhoties, markeen cloth, kerosene oil, petrol, diesel, jute, grease and other preservatives shall be arranged by the contractor at his own cost.

l) All measurements like levels & clearances shall be recorded at each stage of dismantling of machines as per directions of BHEL Engineer. For design/ manufacturing purpose, if BHEL requires the measurement of Structure/existing components extra, contractor has to perform on this instruction of BHEL. Necessary measuring instruments for this are to be made available by the contractor.

m) All consumables required for grinding, welding, gas cutter etc required shall be arranged by the sub-contractor at his own cost for completion of dismantling and erection work. All material required for platform shall be arranged by the sub-contractor at his own cost. Welding generators, grinders, cutters etc. shall be arranged by the sub-contractor at his own cost.

n) Erection devices, special T&P etc. as available with OHPC shall be supplied free of cost. However special spanners, slings, required for the job but not available with OHPC in usable conditions shall be arranged by the contractor at his own cost. In case of any damage during dismantling to devices, T&P etc. provided by OHPC free of cost to the sub-contractor, sub-contractor will have to bear the replacement/ repair cost.

o) Chain pulley blocks, jacks, pull lift machines, D-shackles and general T&P shall be arranged by the sub-contractor at his own cost with due test certificates. **Existing old Rotor of all six units having single shaft forging provided with six ribs upon which are shrunk forged discs. Forming thus a rotor body. Induction heating machine required for dismantling of discs is to be arranged by contractor or any suitable arrangement required for dismantling is to be arranged/adopted.**

p) There is only one rotor erection pit in power house. The ways and means of cutting and dismantling of other rotors (while the assembly of one rotor in rotor erection pit is underway) within transportable limit of power house shall be responsibility of the Contractor. Necessary procedure for the same shall be submitted by the Contractor to owner for information/acceptance.

q) All dismantled equipment shall be stored on the wooden planks and preserved properly. All safety rules in respect of handling of equipment of material is also to be observed. If any other part required to be dismantled for complete & successful dismantling of M/c the same shall be done by the contractor within the scope of this work.

r) Any component if damaged during dismantling due to negligence of contractor shall be replaced by the contractor at the time of assembly at his own cost. Such components should be of best quality manufactured as per the BHEL drawing.

s) Any petty works required to be carried in-hand to BHEL is responsibility of contractor.

PART 1 DETAILS REGARDING THE SYSTEM IS AS GIVEN BELOW:

IA: SECTION IA: TURBINE, GENERATOR & OTHER MECHANICAL EQUIPMENT

2.3 EXISTING FACILITIES OF UNITS 1 TO 6 TO BE DISMANTLED:

The following existing facilities will be dismantled:

- Unit 1 to 6 Turbine Generator set including the associated equipment up to Generator transformer adjacent to power house towards tail race side and auxiliary transformer located at upstream of power house.
- All facilities associated with the above including cables, cable structures, maintenance platforms etc. Transport/shift and place all the dismantled equipment to the storage space ear marked for the purpose.
- Lifting devices and special tools required for dismantling shall be provided by BHEL/OHPC as per availability. Healthiness is to be assessed by the Contractor. Necessary device if available will be provided 'As is where is Basis'. Dismantling of stator (removal of winding bar segregation of copper, capping and dismantling of stator segments) shall be done in erection pit only. Generator/Transformer/cable etc will be dismantled by segregating copper & iron, aluminium by contractor. Copper materials properly recorded with OHPC and to be stored in PH space provided by BHEL/OHPC and iron materials within 5Km of power house (storage space provided by BHEL/ OHPC).
- There is only one rotor erection pit in power house. The ways and means of cutting and dismantling of other rotors (while the assembly of one rotor in rotor erection pit is underway) within transportable limit of power house shall be responsibility of the Contractor. Necessary procedure for the same shall be submitted by the Contractor to owner for information/acceptance.
- Further details of major components to be dismantled are given below for information:

EXISTING FACILITIES OF UNITS 1 TO 6 TO BE DISMANTLED FOR MAKING WAY FOR NEW UNIT

The complete TG sets of all six units are to be dismantled. Following are some of the details of major components

WATER TURBINE		
Sl No.	**Description**	**Technical data/ information**
1	Type	Vertical Francis
2	Make	USSR
3	Year of Commissioning	1973-77
4	Rated Output	62 MW
5	Rated Head Maximum Head Minimum Head	257m 289.4m 253.9m
6	Rated Discharge	28.3m^3/s
7	Rated Speed	375RPM
8	Run away speed	620RPM
9	Efficiency at full load and rated head	92%
10	No. of Runner blades	19
11	Runner Diameter	2800mm
12	Shaft diameter	650mm
13	No. of Stay vanes	12
14	No. of Guide Vanes	24
15	Time of closing Guide vanes	8 Seconds
16	Draft Tube	Elbow type
17	Maximum alowable suction height	-2m
18	Weight of runner	10.893Tons

19	Axial Hydraulic Thrust	240T
20	**Turbine Guide Bearing** No. of guide pads Lubrication system Cooling	 8 Oil lubricated Cooled by water through oil Coolers

GOVERNOR		
Sl No.	Description	Technical data/ information
1	Type	Hydro-Mechanical
2	Oil pressure	40 kg/cm^2

OIL PUMPING UNIT FOR GOVERNOR		
Sl No.	Description	Technical data/ information
Motor		
1	Type	3 phase induction motor
1	No. of Pump Motor	2
2	Capacity of each motor	22kW
3	Frequency	50 Hz
4	Voltage	230/ 400 V
Pump		
1	Discharge capacity	3.5 l/s
2	Pressure	40 kg/cm^2
3	RPM	2910
Oil Pressure Tank		
1	Oil Volume	2.0 m^3

Sl No.	Description	Technical data/ information
GREASE PUMP MOTOR Set(Guide Vane)		
1.	Make	Russian
2.	Motor rating	1.0 kW
3.	Voltage	230/400V
4.	Current	3.8/2.2 A
5.	Speed	1435 RPM
EMERGENCY OIL PUMP MOTOR Set		
1.	Make	Russian
2.	Motor rating	55 kW
3.	Voltage	220/380V
4.	Current	174/100 A
5.	Speed	1435 RPM
TOP COVER DEWATERING PUMP MOTOR Set(2 nos. for each unit)		
1.	Make	
2.	Motor rating	5.5 kW
3.	Voltage	420V
4.	Current	11.5 A
5.	Speed	2850 RPM
Dewatering PUMP MOTOR Sets (Pump Room)		
1.	Make	
2.	Motor rating	2x28 kw + 1x30kw
3.	Voltage	400 V
4.	Current	5.25 A
5.	Speed	2900 RPM
6	Pump discharge Pump Head	300m3/hr 21m each of first 2 pumps and 25m of third one
Drainage PUMP MOTOR Sets		

1.	Type	Horizontal centrifugal
2.	Nos.	5 (2 permanent in pump room and 3 temporary in SRV floor)
3.	Motor rating	7.5 kW/10 HP
4.	Voltage	400 V
Vacuum Pump Motor Set		
1	Nos.	4

COMPRESSED AIR SYSTEM		
HP Compressor		
1	Nos.	2
2	Capacity	1m3/min
3	Discharge pressure	40 Kg/cm2
LP Compressor		
1	Nos.	1
2	Capacity	3m3/min
3	Discharge pressure	8 Kg/cm2

Centralized Air Conditioning System		
	Nos.	1

COOLING WATER SYSTEM (For all six units)		
1	Cooling water Pump.	
	Type	Horizontal Centrifugal
	Nos.	7 (6W+1S)
	Capacity	900m3/hr
	Discharge pressure	37mwc

2	Cooling water pump motor	
	Type	3 phase induction motor
	Nos.	7 (6W+1S)

DRINKING WATER SYSTEM (For all six units)		
1	**1st Stage drinking water pump.**	
	Nos.	2
	Motor for first stage pump	
	Nos.	2
2	**2nd Stage drinking water pump**	
	Nos.	2
	Motor for 2nd stage pump	
	Nos.	2
3	**Bactrocidal plant(Water treatment system)**	
	Nos.	1

AC SYNCHRONOUS GENERATOR		
Sl No	Description	Technical data/ information
1	Year of Manufacture	1971
2	Make	Electrosila,USSR
3	Arrangement	Vertical
4	KVA	66700
5	Rated Speed	375 RPM
6	Runaway Speed	620RPM
7	Phase	3

8	Poles	16
9	Voltage	11000V
10	Stator Current	3510A
11	Rotor Current	865A
12	Cycle	50
13	PF	0.9
14	Connection of stator	Star
15	Efficiency at full load at 0.9 pf	97.6%
16	Mode of Grounding	High impedance
17	Nominal Excitation Voltage	165 V
18	Weight Stator Rotor with Shaft Complete Generator	 60 tons 190 tons 425 tons
19	Load on Thrust bearing	600ton
20	Fly wheel moment	1520 tm2

EXCITATION SYSTEM

Sl. No.	Description	Technical Data / Information	
1	Type	Rotating type Main – pilot Exciter system	
2	Mounting Arrangement	Pilot and main exciter mounted on Generator shaft	
		Main Exciter	Pilot-Exciter
3	Excitation Voltage	200 V	230V
4	Excitation Current	1050 A	30A
5	Output	210 kW	7kW
6	RPM	375	375

BEARINGS

Sl No.	Descripton	Technical data/ information
	THRUST BEARING	
1.	Type	
2.	No. of Thrust pads	8
3.	No. of Guide pads	8
4.	No. of bearing coolers	02 nos.(1W + 1S) lies outside the bearing
	UPPER GUIDE BEARING	
	No. of guide pads	8
	LOWER GUIDE BEARING	
2.	No. of Guide pads	8

GENERATOR AIR COOLER

Sl No.	Description	Technical data/ information
1.	No. of coolers	8
2.	Material of cooling tube	Brass
3.	Water consumption	900 m3/hr

GENERATOR BRAKE & JACK

Sl No.	Description	Technical data/ information
1.	No. of cylinders	8
2.	Air pressure reqd. for braking	7 kg/cm2
3.	Brake applied at	30% speed of Generator
4	Oil pressure for jacking	100 Kg/cm2

GENERATOR TRANSFORMER		
Sl No.	Description	Technical data/ information
1	Make	Electrozovod. USSR
2	Year of manufacture	1961
3	Capacity	3x 23400KVA
4	HT/LT Voltage	242000/√3/11000V
5	HT/LT Current	118/1417A
6	Phase	3 nos. single phase per unit
7	Cooling	OFW
8	Frequency	50 Hz
9	Impedance Voltage	10%
10	Oil Circulation	350 gallons/min
11	Water Circulation	90 gallons/min
12	Weight Core & Winding Oil Total	 39 tons 12 tons 65 tons

Note : I. All equipment/system given above is for one unit excluding the following which is common for all.

1. Compressed air system
2. Drainage / Dewatering system
3. Cooling water system
4. Drinking water system
5. Air Conditioning system
6. Ventilation system
7. Vacuum pump system

II. There is no asbestos material in the existing Power plant Equipment.

2.4 EXISTING FACILITIES TO BE RENOVATED AND UTILISED:

Fixed/embedded components of Units 1 to 6 e.g. spiral case, stay ring, stay vanes, foundation ring, draft tube, draft tube liner, pit liner, and foundation plates and anchorages are to be renovated and reused. Penstock, SRV, Draft tube gate of all six units to be renovated and reused.

The required renovation details are enumerated in the Table.

Sl.No	Name of the equipment	Details of Renovation
1	Penstock and associated facilities	As detailed in this chapter
2	Spiral Case and associated facilities	As detailed in this chapter
3	Stay vanes, Stay rings	As detailed in this chapter
4	Draft tube and associated facilities	As detailed in this chapter
5	Shut-off Rotary Valve (SRV)	As detailed in this chapter
6	Draft tube gate	As detailed in this chapter
7	Ventilation System (fans & blower)	As detailed in this chapter
8	Complete Units 1 to 6 area including generator transformer	As detailed in this chapter
9	Butterfly Valve	As detailed in this chapter

a) Penstock and associated facilities:

For improving the efficiency and life of the penstock, painting of the outer surfaces will be done and inner surfaces will be chemically cleaned for enhancing the effective flow diameter of the pipeline. Penstock integrated device will be provided for safety of penstock. For detail painting scheme of pipelines. Penstock is provided with dewatering valve & piping to drain out water to draft tube during maintenance. Penstock dewatering valves will be replaced. Strengthening of anchor blocks are to be done, if necessary.

Penstock length	:	548 mtrs (1798 ft)
Penstock Dia	:	2591mm to 2362mm
Plate Thk	:	19 to 54mm
No. of anchor block	:	8 nos

Penstock (both inside & outside) will be cleaned through mechanical wire, shot blasting and water jet. Inside will be epoxy painted and painting of outside will be with water resistant paint.

b) Spiral Case and associated facilities:

Spiral case is of circular cross section made up of steel plates of varying thickness welded with stay ring. The spiral case is made up of two parts bolted together. The inlet connection is 1800mm in diameter. The equipment is in working state. However, cleaning of spiral case will be done, eroded portion will be examined by ultrasonic method, weld filled to bring back the original profile and protection coating will be applied. New IDV for each unit will be provided. Pier and gate of each idle discharge valve (IDV) will be renovated.

c) Stay Vane and stay ring:

There are 12 stay vanes for each unit. There is corrosion on the surface of stay vanes and stay ring. The surface of the stay vanes and stay ring will be cleaned of mud and rust etc. The eroded portion of the stay vanes and stay ring will be weld filled and machined smooth to bring back the original profile. The surface of stay vanes will be shot blasted and painted with water resistant epoxy paint after surface preparation.

d) Draft Tube:

The turbine discharge is through one pier called Draft tube and IDV discharge is through another pier. Minor pitting is observed in the lower portion of draft tube of some units. Due to absence of protection coating in water passage, there is corrosion and minor pitting in lower portion of draft tube of some units. Surface state of sealing ring is satisfactory, protection coating are absent. All surfaces of ring are covered by corrosion. There is leakage of water through Draft tube drain valve and Damper drain valve when the machines are running. Operating handle of damper drain valve remains submerged in SRV floor drainage water causing difficulty in operation. Cavitation damages of lower cone should be smoothened out. Protection coatings will be restored. The rubber sealing cords should be replaced with new ones. The groove under “O” ring will be chemically cleaned from corrosion. All the cavities will be filled up by welding, ground finish and painted with water resistant epoxy after suitable surface preparation. Draft tube manhole will be refurbished and drainage valve will be replaced. The machine will be handed over to the Contractor in the dewatered condition. Dewatering during execution of the project will be the responsibility of the Contractor.

e) Shut-off Rotary valve:

Main Inlet valve of each unit is a Shut off rotary valve. It is a spherical valve having the bore diameter 1800mm. This valve also having an integrated by pass valve & Seal valve. The main valve is operated by a servomotor, and servomotor has its own oil pressure unit, and actuator which are governed by high pressure compressed air of 40 Kg/cm2 pressure. There is a separate 40 kg/cm2 oil pressure unit (OPU) for SRV consisting of oil tank, accumulator, main and standby pump-motor set etc. There is also an oil leakage unit to collect leakage oil and pump the oil back to the tank. By pass valve of Unit-1 SRV has crack on its body resulting in leakage of water.

Servomotors, by-pass valve and seal valve of SRV will be renovated. Renovation of OPU will be done including replacement of OPU oil pump-motor sets, complete oil leakage unit, Solenoid valves, complete oil and air piping will be replaced by new one.

Complete renovation of SRV will also include replacement of trunion bearing of self-lubricated type, repair of rotor by weld filling, grinding and machining as required to bring back to original profile, cleaning and painting of valve body. New control panel of SRV will be provided.

f) Draft Tube Gates:

There is leakage of water through draft tube gate seals and between adjoining primary & secondary concrete. Concrete leakage is more in unit 3 & 5 than in other units. Refurbishment of draft tube gate will include replacement of rollers, damaged bolts; repair of guides; strengthening, shot blasting and painting of gate leaf and frame and replacement of seals with musical note type seals. Concrete grouting and repair of damaged portion of concrete will be done as indicated under civil works.

Overhauling of draft tube crane (of capacity 20 tons) will also be included under the scope of work. The draft tube gates and damper gate will be lowered by OHPC before handing over of the unit. No test plugs are available at site to plug draft tube and PRV, Contractor has to make necessary arrangement to stop the leakage water from tail race.

g) Ventilation System:

There are three ventilation rooms at different locations to meet the total ventilation requirement of the power house.

Location	System
Service bay side at transformer cooler floor At EL. 159.725m	Ventilation Fan – 1No. Blower – 1 No.
Service bay side at SRV floor at EL. 159.725m	Ventilation Fan – 1No.
Near Control Desk of Auxiliary Room at El. 170.12m	Ventilation Fan – 1No.

Ventilation air duct to various premises such as cable cellar room, MCC room, Generator & turbine floor etc is available. All the ventilation systems are working in satisfactory condition. Blower and ventilation fan will be overhauled. Existing duct will be replaced with new one. Ventilation system should be interlocked with the fire protection system i.e. in the event of fire in any area; fire sensor will give signal for tripping the ventilation fan of that area.

h) Complete Units 1 to 6 area:

Cleaning of the area including minor repairs.

Butterfly Valve

Each TG unit has a butterfly valve (BFV) located in the valve house. Parameters of each BFV are Bore dia 2600 mm, Static head 58.8m, rated head 88.8m, maximum discharge 41.5 m3/s, valve closing time 120 seconds, opening time 120 seconds. The BFV is hydraulically operated by a servomotor at an operating pressure of 40 Kg/cm2. There are 3 nos. of OPU each of which supplies pressure oil for opening/closing of the BFV of two units. There are 2 nos. of oil pumps with motors (1M+1S) for each of this OPU. There are two nos. of HP air compressors (1M+1S) with common receiver are there to supply air for sealing of the BFV.

Complete BFV including servomotors, by-pass valve will be renovated with replacement of seals, trunion bearings of self-lubricated type, repair of disc by weld filling, grinding and machining as required to bring back to original profile, cleaning and painting of valve body. The scope will also include renovation of OPU, replacement of OPU oil pump motor sets, pump for oil leakage unit, Solenoid valves, complete oil and air piping with new one. New control system including instruments, panel of BFV will be provided. Replacement of the HP and LP compressors with supply of one HP air receiver with control panel and pressure switches."

While working in BFV the surge tank gates will be lowered by Purchaser. Two nos. of test plugs are available at site are to be put before the BFV to the end of the penstock to prevent the leakage of water. The condition of test plugs will be ascertained by the Contractor before plugging.

2.5 NEW PLANT & EQUIPMENT FOR ERECTION, TESTING & COMMISSIONING:

The broad scope of new equipment/facility is as follows.

Sl. No.	Name of Equipment /Facility	Unit	Qty
A	**TURBINE, GENERATOR & ASSOCIATED EQUIPMENT**		
1	Francis Turbine (suitable for producing 60 MW at Generator terminals at rated head and discharge) complete with all associated equipment and auxiliaries	Sets	6
2	Governor and its accessories	Sets	6
3	Generator and its associated equipment	Sets	6
4	Excitation system & Voltage regulator	Sets	6
5	Cooling water system	Sets	6+1(S/B)
6	Drainage and Dewatering system (common)	Set	1
7	Two HP compressors along with associated electrics & control, and entire compressed air piping (pipes, valves & fittings and instruments) for all 6 units	Set	1
8	Fire protection system (common)	Set	1
9	Power house Oil handling facilities (transfer pump-motor sets, pipes, valves , fittings, instruments for all the six units)	Set	1
10	Vacuum pump system including valve, pipe, instruments etc. for all six units	Sets	4
11	Drinking water system including water filtration units (for 150 persons)	Set	1
12	Air conditioning unit including air ducts, louvers etc.	Set	1
13	Ventilation duct	Lot	1
14	Passenger Elevator (Lift)	Sets	2
B	**Electrical Equipment: Detailed in this chapter in Section IIA**		
C	**Control & Instrumentation: Detailed in this chapter in SECTION IIB**		
D	**Civil Works: Detailed in this chapter in SECTION IB**		
E	**SPARES AND TOOLS & TACKLES**		
F	**MISCELLANEOUS ITESMS, IF ANY**		

2.6 BATTERY LIMITS:

On the power house upstream side, the battery limit will be up to valve house (valve house is excluded from the scope of contractor but BFV is included) of each unit. On the downstream side, the battery limit will be up to draft tube gate of each unit.

2.7 FACILITIES ALREADY INSTALLED FOR THE PROPOSED UNIT

Penstock, MIV, Scroll case, Stay vane, Draft tube, Power House, EOT Crane (2 Nos each of capacity 125/20/5 Ton), Compressed air system (compressors, air receivers), Turbine & transformer oil tanks, Draft tube gate and its hoist and Tailrace are constructed/installed and to be utilized for the proposed Units 1 to 6.

2.8 BRIEF OF EQUIPMENT

a. Head cover

The head cover will be fabricated from carbon steel plate of pressure vessel quality. It will be of heavy construction, adequately ribbed and shaped so as to give rigid support to the turbine guide bearing, regulating ring and the bearings for the upper stems of the guide vane. It will be bolted and dowelled to a flanged on the stay ring and also along the radial joints where the head cover is sectionalized for handling and shipment.

b. Pressure relief valve PRV will be connected to a special pipe of the spiral case, serves to discharge the water when pressure in delivery pipe line has built up at a load drop and a rapid closure of the gate apparatus. The PRV is pressed in closed position by the gate apparatus servo motor through a control gear at a set pressure,

when the pressure inside scroll case increase the set point PRV opens and water is released and when pressure comes below to the set pressure it is quickly closed. Water from PRV is discharged into Drainage pit.

A new set of pressure relief valve will be provided.

c. Discharge ring

The discharge ring will be fabricated from carbon steel plate of pressure vessel quality, sectionalized as necessary to facilitate shipment and handling. The welds will be fully penetrated and stress relieved before final machining. It will be of heavy section and adequately ribbed externally to prevent distortion.

d. Guide vanes and Guide vane regulating mechanism

New sets of guide vane will be provided. The tips and contact surfaces will be machined in such a fashion as to provide uniform contact when in the closed position. All guide vanes will be interchangeable. The final surface finish of the guide vane will be in accordance with the latest relevant standards. Self-lubricated bush bearings for guide vane with proven and established performance in high silt content water will be provided. Each upper guide vane stem will be provided with a thrust bearing or collar. Positive means will be provided for adjustment of vertical clearance for the guide vanes from above the head cover. Wear washers are not acceptable.

e. Servomotors

The turbine will be provided with twin double acting hydraulic servomotors having a combined capacity sufficient to supply the maximum force necessary to open/close the guide vanes under maximum operating head, at the minimum oil pressure.

f. Rotating parts, guide bearings and seals

I. Runner

The runner will be a cast fabricated construction of 13Cr-4Ni stainless steel. The runner will be coupled to the turbine shaft with nuts, bolts and locking keys in accordance with ANSI/IEEE Std 810 “IEEE Standard Hydraulic Turbine and Generator-integrally forged shaft coupling and shaft run out tolerances” or applicable standards. The coupling bolt holes in the runner will be lined reamed with the runner and shaft assembled. The connection will be designed for tightening and holding from above as required for incremental assembly. The coupling bolts will be designed for tightening using hydraulic torque tightening system. Rotating labyrinth ring will be provided upper part of runner to accommodate the stationary labyrinth fitted below the head cover. Fixed labyrinth will be provided on discharge ring.

II. Turbine shaft

The function of the turbine shaft is to transfer the torque from the turbine runner to the generator shaft and generator rotor. The shaft typically will have a bearing journal for oil lubricated hydrodynamic guide bearings on the turbine runner end or wearing sleeve for oil lubricated water cooled. The turbine and generator manufacture will coordinate for proper design and construction.

III. Guide Bearing

The turbine bearing will be babbit lined oil lubricated and oil circulation should be natural recirculation by centrifugal action. The coolers will be installed outside the TGB nearer to spiral case and circulated through pipelines for easy maintenance. The bearing arrangement will permit axial movement of the shaft necessary for adjusting the thrust bearing and for uncoupling. The bearing will prevent foreign matter from entering the bearing running surfaces.

IV. Shaft seals

The contractor will provide two (2) shaft seals, one as main working seal and another as maintenance seal. The turbine sealing proposed by the Contractor will be of special design. The arrangement and design of these seals will be such that they remain fail proof even while the turbine is operating in water having high silt concentration and maximum leakage will be guaranteed by the Contractor. The arrangement defined will be as accepted by the Purchaser at the time of award of contract/detailed engineering.

V. Regulating ring

The regulating ring will be ample strength to withstand the maximum load likely to be imposed on it in the most severe operating conditions. All working points with relative motion will be bronze bushed self-

lubricated. Each guide vane will be individually connected to the regulating ring through suitable levers and links. Shear pins / breaking link or some other suitable arrangements will be provided on each guide vane to protect the guide vane and to provide alarm on foreign body getting wedged between guide vanes. The regulating ring will be fabricated from welded steel plates. Provision for self-lubrication will be made.

VI. Levers and Linkages

All the working joints with relative motion will be self-lubricated bushes. All the linkages and levers are designed in such a way that it can transmit the necessary torque to give the rotary motion to the guide vanes without failure.

g. Turbine Governor: Governor Monitors speed deviations in the turbine; converts that speed variation into a change of wicket gate servomotor position which changes the wicket gate opening; to maintain optimal efficiency of the turbine for a given load. It is also used to start the unit, synchronize the unit to the grid, load, and shut down the unit. Renovation of OPU tank will be done by contractor if required by customer/BHEL including replacement of OPU oil pump-motor sets, Solenoid valves, complete oil and air piping will be replaced by new one.

h. GENERATOR AND ASSOCIATED EQUIPMENT

1. GENERATOR

The each generator will comprise the following:

One no. synchronous generator, direct driven, vertical shaft with 10% continuous overload each to match the turbines as given in Clause 04.04.03.01 of this Volume, complete with air cooled stator, rotor, shaft, Thrust Guide Bearing, Upper Guide bearing, Lower Guide Bearing, safety devices etc., Instruments for measuring flow, vibrations, temperatures, etc with provision of extra contacts / ports for integration with plant SCADA.

One (1) set of fire protection systems for generator complete in all respects, Brake / jack systems complete with high pressure oil jacking pumps, piping, valves etc. for braking, jacking, etc. of the generator rotor, Brake dust collection systems, Carbon dust collection system, High-pressure, automatic, lubricating systems for lubrication of thrust bearing at the time of starting / stopping of the unit, Anti-condensation heaters, Stator air coolers, Oil coolers for thrust, upper and lower guide bearings, All required oil, air and water pipes, fittings, valves, pressure gauges and flow relays, Interconnecting cables, termination, etc. between various parts, Moisture detector system, Sole plates, foundation bolts, sleeves and anchor plates etc. required for proper erection, leveling and alignment of the generators and their components, Access doors, stairs, railings, and platforms. All special tools and devices for handling, assembly, installation, erection, dismantling and testing of the generators and auxiliaries. Any other item not specified above but necessary to complete the assembly or mentioned hereunder, erection, testing, commissioning including field acceptance testing of generator and associated auxiliaries.

2. Main Shaft and Coupling

The generator shaft will be made of the best quality forged carbon or alloy steel, properly heat-treated.

The design and construction of turbine and generator shafts will be adequately coordinated by the generator.

3. Bearing

The generator will be provided with thrust bearing arranged in upper bracket, upper guide bearing arranged central part of the upper bracket, and lower guide bearing arranged on the lower bracket.

4. Brakes and Jacks

The generator brakes will consist of asbestos free brake liners mounted on a vertical piston moving in a cylinder and will operate against a polished circular steel brake track.

5. Generator Air coolers

RTDs will be provided at the inlet and outlet of the air cooler cooling water header. Contractor will confirm that the opening of the generator barrel is sufficient to draw the quantity of air. Any modification on the barrel required will be done by the Contractor.

6. Stator and Stator Winding

The stator will consist of a frame, a core and a winding. The stator frame will be in two or more sections as per transport limits. The stator frame section joining will be as per manufacturers design practice. Due to tight erection schedule, parallel erection of two stator is envisaged simultaneously. Erection of one stator

shall be done in service bay and one stator erection shall be done in pit, contractor to envisage this accordingly. The stator frame will be designed for lifting the completely built stator and provided with suitable lifting lugs and devices for handling. Stator shall be supplied from MUs partially wound in four segments.

7. **Rotor**

   The design and construction of rotor will be in accordance with most modern practices details of which will be furnished by the Contractor.

   The rotor will be designed for assembly on the rotor assembly bay in the erection area of the powerhouse. The Contractor will provide all suitable rotor erection pedestals and sole plate adapters for the permanent use by the Purchaser. "The brake track of the rotor will be designed to withstand all loads/vibrations/ stresses etc. for the braking at 50% of the rated speed".

8. **Collector Rings**

   The collector rings will be in an accessible location above the rotor and provision will be made for reversing the polarity of the collector rings. The brushes and collector rings will also be so positioned as to avoid contamination by oil vapours or oil leakage from the bearing.

9. **Rotor Temperature Measurement**

   One shunt, to be mounted in the generator field leads, will be furnished complete with calibrated shunt leads for connection to a field temperature recorder for measurement of rotor temperature.

10. **Rotor Ground Fault Detection**

    A collector ring and brush assembly will be mounted on the generator shaft for field winding ground detector relays.

11. **Brake Dust Collector**

    Suitable exhausting arrangements for sucking and collection of brake dust, will be provided during braking operation of the machine, consisting of extraction unit, hoppers around brake assembly for trapping dust and flexible hoses for connecting hoppers to the extraction unit. The extraction unit will have a motor driven exhaust fan to be fitted with an easily removable sheet steel bin for collecting heavy dust. The lighter particles of the dust will be collected by suitable fabric based filter.

12. **Carbon dust collector**

    Suitable exhausting arrangement for sucking and collection of carbon produced/emitted by the brushes will be provided so as to avoid the conduction through carbon deposition resulting in earth faults.

13. **Speed measurement**

    For measurement of speed of the unit for governor operation etc. a toothed wheel & necessary probes will be provided and mounted on the generator shaft.

14. **Rotor lifting device**

    The contractor will design the rotor lifting device in an optimum manner and submit the lifting arrangement drawing. Existing rotor lifting device can be used, but, healthiness of device is to be assessed by Contractor. If the existing rotor lifting device is not available/cannot be used then Contractor will supply new lifting device as per requirement.

15. **Cooling System**

    The unit will be self-ventilating by its own circulation action. The generator will be totally enclosed. Pit seals will be provided for separation of the generator air-cooling system from the turbine pit. The air-water heat exchangers (stator air coolers) will be mounted on the stator frame, each provided with shut -off valves at inlet and outlet. Each cooler will be readily removable without disturbing the others when the machine is not in operation.

16. **Safety / Monitoring Devices**

- **Vibration Monitoring System**

  A continuous vibration monitoring system complete with proximity probes, input/output module, control/processor unit, relays, junction boxes, cabling and associated accessories will be supplied for on-line monitoring of vibration in the generating units. It will comprise:

- **Anti-Condensation Heating**

  In order to avoid water condensation during long non-operative period of the machine, heating elements will be installed inside the generator barrel. These elements will be rated for three-phase 415 V A.C., 50 Hz; and their terminals will be connected to an easily accessible terminal box. The heating will be controlled

automatically by adjustable hygrostat, setting range about 50-100% relative humidity. The anti-condensing heating will also be provided with manual ON/OFF switch and corresponding indication lamps in the local control panel. Provision will also be made for adjustable thermostat for automatic control of the heaters.

17. Miscellaneous Provisions

i. EXCITATION SYSTEM AND DIGITAL VOLTAGE REGULATOR

The excitation system and DVR will consist of: -

One (1) set of dry type excitation Transformer, Full wave fully controlled rectifier system with thyristor bridge arrangement for 100% redundancy, Digital voltage regulators with all limiters & power system stabilizer, Power supply units, Field flashing equipment, including transformers, DC field circuit breakers, Discharge resistors, Digital control and metering equipment, Excitation cable connecting the rotor to DC field breaker, Any other items not specified above but are necessary to complete the system for satisfactory operation.

j. Cooling Water System

Six new sets of cooling water system (one set for each unit) will be envisaged. One cooling water pump for each unit and one standby common for all six units. The source of the cooling water is tail race. The existing embedded cooling water pipelines will be cleaned and reused after renovation. Isolation valve, strainer/ filter in suction line of each set of pump set will be provided. Non return valve, strainers, differential pressure gauge across the strainer, pressure gauge, motorized valves etc. will be provided in discharge line of individual pump sets. The discharge of all pumps will be connected through a common header and an isolation valve will be provided between two consecutive units. Through the common header cooling water is fed to individual unit such as generator air cooler, generator thrust bearing cooler, upper guide bearing, lower guide bearing, turbine guide bearing, provision for shaft seal cooling, transformer oil coolers, Air conditioning system etc. Suitable capacity of pump, size of valves, pipeline, instruments etc will be designed to meet the above water requirement. After cooling, return cooling water will be directly discharged through a common header into tail race.

k. Dewatering System

Water from draft tube (during maintenance), scroll case (during maintenance) are collected in to the dewatering pit located at an elevation of 155.90m. Dewatering pit is common for all six units. From the dewatering pit water is dewatered and transferred to tail race by dewatering pump. Two nos.(1W+1S) new submersible pumps sets of suitable capacity with pipes, valves, instruments, electric motor drive with accessories etc. for dewatering the water from dewatering pit will be provided. The capacity of pump is such that it is capable to dewater the dewatering pit within 6 hours operation without raising the level in the sump as per standard norms for maintenance. Sump water level controllers with float/level switches will be provided for startup of both the pumps and for stopping them at appropriate preset levels. All pipes will be of CS ERW as per IS1239 & IS 3589. Draft tube dewatering valve of suitable size and associated piping for each unit will also be provided. Valve hand wheel will be located at turbine floor for ease of operation. All existing embedded pipelines for above system will be chemically cleaned. .

l. Drainage System

Seepage through concrete into the underwater premises of the powerhouse and due to leakage of water from the equipment assemblies, SRV etc is discharged through gravity into the existing drainage gallery at elevation of 158.40m and accumulated in the sump well located at gallery end in the vicinity of unit no.1

Two nos.(1W+1S) submersible pumps sets of suitable capacity with pipeline valves, instruments, electric motor drive with accessories etc. for dewatering the water from drainage pit will be installed/provided. The capacity of pump is such that it is capable to dewater the drainage pit in shortest possible time. Dewatered water is transferred to the tail race through these pumps. Sump water level controllers with float/level switches will be provided for operational control of the pumps at appropriate preset levels and alarms for high water level. All existing embedded pipelines if any for above system will be chemically cleaned.

m. Compressed Air system

Two numbers new High pressure (HP) compressors of Indian make having capacity & discharge pressure similar to existing HP compressor with control panels will be provided for OPU of governor and SRV of all six

units. Complete pipes, valves will be replaced by new one. Automatic as well as manual operation control of HP compressors will be provided. All necessary instrumentation like pressure gauge and temperature gauge etc will be provided. Temperature sensor, pressure switch and auxiliary relays etc as per requirement will be provided. Cooling water, if required, for the proposed HP compressors will be taken from the nearest cooling water header. Existing LP compressor system for braking system of each unit, station services such as in transformer deck, mechanical shop, service bay, turbine premises, apparatus room, machine hall etc will be reused however complete pipes, valves, fittings, , instruments etc. will be replaced by new one.

n. FIRE PROTECTION SYSTEM (Fire Detection & Alarm system):-

Fire Detection and Alarm System (FDA) will be intelligent addressable microprocessor based automatic system. The Intelligent Addressable Microprocessor based Automatic Fire Detection and Alarm system will be software controlled automatic system and will provide necessary programmed activities and various controls. The system will consist of central processing units, man machine interface, communication system, microprocessor based fire alarm control panels, TFT monitor, printer Addressable Intelligent Automatic sensors and Interface unit as applicable.

Fire alarm control panel will function as communication interface between Central Processing Unit and sensors and controlled devices. Addressable Intelligent type microprocessor based Detectors / Manual Pull Stations and required field devices in the various areas will be connected to fire alarm control panels by class A wiring to the loop module.

In all the electrical premises Intelligent addressable type microprocessor based photo- electric detector in double configuration / rate of rise-cum- fixed type heat detectors will be provided as applicable. Siren/hooter will be mounted on suitable support. There will be interlocks to shut off the exhaust fans and simultaneous tripping of A/C and ventilation system.

Scope of work

The scope of work includes design, engineering, supply, erection, testing, commissioning, performance tests and handing over of intelligent addressable type Fire Detection and Alarm system for various premises of the project as mentioned in Table-1.

TABLE-I

Sl. No.	Description	False Ceiling	Type of System
1	11kV and LT aux room, Reactor/ LAVT room, Cable Gallery, M/c hall	No	Addressable Automatic Fire Detection and Alarm (FDA) system (microprocessor based FDA system) and Passive Fire Protection including fire extinguisher
2	Control Rooms, Protection Room	Yes	FDA system (microprocessor based FDA system) with fire extinguisher
3	UAT	No	Fire Extinguisher
4	Battery & Battery charger room	No	FDA (microprocessor based FDA system) system including Fire Extinguisher
5	Office room	Yes	FDA system (microprocessor based FDA system) with Fire Extinguisher
6	AC & Ventilation room	No	FDA (microprocessor based FDA system) system with Fire Extinguisher
7	All other areas including above areas	No	Fire Extinguishers
8	Switchyard Control Room	No.	Fire Extinguishers

Fire hydrant system

Existing pump house which will house pumps to meet fire hydrant as well as for water spray system requirement. There will be common headers for both systems.

For water spray system, the same hydrant pump will serve the purpose and the same stand by pump along with 2 nos. of Jockey pumps. Pump-Motor Set and Pipe lines etc. are to be provided new.

Water spray system comprising of HVWS and MVWS –

For protection of Cable rooms/ tunnels/galleries etc. from fire, Medium Velocity Water Spray (MVWS) system will be provided. For protection of generator transformers, station transformer (20MVA, 220/11KV) located in switchyard High Velocity Water Spray (HVWS) system will be provided. The system will be designed as per TAC, BIS and NFPA guidelines. For protection of Generators from fire High Velocity Water Spray (HVWS) system will be provided.

Description of the System

HVWS & MVWS envisaged is a special fixed pipe system connected to a reliable supply of adequate quantity of water and equipped with spray nozzles (projectors) for specific water discharge and impingement over the surface or area to be protected. The piping system is to be connected to the water supply through an automatically actuated valve (deluge valve) which can initiate flow of water. Deluge valves for the spray system are to be actuated by an automatic detection system which in the case of transformers consists of quartzoid bulb detectors mounted around the protected area and for cable galleries these are part of fire detection & alarm system.

Main components of the system

The HVWS/MVWS System will be provided with the following major components:

a. Water Supply at high Pressure
b. Arrangement of Spray Nozzles
c. Arrangement of Quartzoid Bulb Detectors (for HVWS)
d. Deluge Valve
e. Y-type Strainers just before deluge valve
f. Pipes, fittings and fixtures
g. Basket strainers in HVWS system header
h. Pressure gauges, pressure switches and solenoid valves
i. Fire detectors

Portable fire extinguishers –

Different types of portable fire extinguishers will be deployed in various area of the complex as a measure of first-aid fire-fighting. Major units of Balimela power complex where extinguishers are to be deployed are enumerated below:

j. Turbine/generator complex
k. Fire water Pump house
l. Unit control room
m. Main control room
n. Protection room
o. All other services rooms /units not listed above
p. Control room of switchyard

Portable extinguishers will be conforming to IS 15683-2006 code

o. Oil handling facilities

Power plant oil handling facilities comprise of four storage tanks of 20KL capacity each for turbine oil and four storage tanks of 20KL capacity each for transformer oil, oil purification units, gear type pumps and pipelines. Oil storage tanks are located at elevation of 160.055m in a special premise on the upstream side in the SRV floor. One (1) no. new portable(trolley mounted) oil centrifuge system of capacity 500 gallons/hr will be provided for turbine oil and one (1) no. new portable(trolley mounted) oil centrifuge system of capacity 1000 gallons/hr will be provided for transformer oil. Existing gear type pump motor sets (4.5 kW motor rating for turbine and 2.8 kW for transformer) will be replaced with new of same rating. In addition, one new gear type pump motor set will be provided as standby for turbine oil handling and one transformer

oil handling oil facility separately. All storage tanks will be cleaned and painted. Pipes, valves, instruments will be replaced. Local control panels, cables etc will be replaced.

p. Vacuum Pumps
q. Drinking water system
r. Air-conditioning & Ventilation

IB: SECTION – IB: ELECTRICS

2.9 DESCRIPTION OF EXISTING PLANT

Balimela Power House at Balimela consists of eight units of which Units 1 to 6 each of 60 MW and units 7 & 8 each are of 75 MW.

Existing units 1 to 6 (for which renovation and modernization with new TG work is to be taken up) are connected to 220kV power system through 11/220 kV generator transformers. Generator transformers are located in transformer yard towards downstream side of power house.

The important parameters of existing generator transformer for each unit are as follows:

Rating	- 3x 23400 kVA (Three Single Phase Transformer per Unit		
Type of cooling	- OFWF (Forced oil circulation with forced water cooling)		
Vector group	- Delta/star- (DYn 11)		
Location	- Outdoor		
Connection	- Bus duct	-	11kV side
	- Overhead conductor	-	220 kV side

Generator output is taken through isolated phase bus ducts and connected to Generator step up transformer. Neutral side terminal of generator has been shorted. Tapping has been taken for LA PT panel. For auxiliary supply, 11 kV is tapped from generator bus ducts of units 1,3,5 & 7 and connected to 11kV bus of auxiliary supply system through isolator, reactor, and MOCB. From the 11kV bus four auxiliary transformers (named 11T, 12T, 13T and 14T) feed unit and station LT boards. These transformers are located upstream side of the Power House in the LT transformer yard Existing LT board is fixed type.

A common control room housing control, protection and annunciation panels for generators, generator transformer, generator aux. and turbine control desks is provided. For the indication & relays duplex type panels are provided. Summation MW, MVAR meters are also located in this control room. Generator is being synchronized at 220 kV through synchronization arrangement.

The Main Control Room, Battery Room, Battery Charger Room and Unit Control Room (one per unit) located at EL 174.65 m. The HT and LT Switchgear room are located at EL 170.12m. Generator is synchronized at 220kV through synchronization arrangement.

2.10 SCOPE AND BRIEF DESCRIPTION OF WORK:

The scope of work for the R&M of Units- 1 to 6 with new TG and extension of 220kV Switchyard includes dismantling and proper storage of the dismantled equipment/facility, reuse of existing 2 nos. 11/0.415 kV, 1500kVA transformers for LT Auxiliary.

Dismantling, Storage at site, loading/unloading & handling, erection, pre-commissioning tests and commissioning of all equipment/system including preliminary acceptance test, performance guarantee, post commissioning services.

Scope of contractor will also include following:

Storage, erection and commissioning. Minor civil works required for fixing of electrical equipment/ panels/ cables, bus duct opening, support and reinforcement of existing foundation etc.

The Contractor will be responsible for complete satisfactorily working of system with guaranteed parameters. All the major equipment will be installed, tested and commissioned.

Miscellaneous Activities

Following miscellaneous works will also be included in the scope of Contractor:

- Obtaining certificate from Chief Electrical Inspectorate of the state and CEA for installation and energizing the complete electrical system and equipment covered under the package. Necessary inspection fees/licenses/documents etc are to be deposited by the contractor (Fees paid to statutory authorities will be reimbursed to the contractor against production of receipt).
- Any modification or additional requirements by Statutory Authorities will have to be carried out without time and cost implication to the BHEL.
- Necessary clearance for the charging of equipments from electrical inspector is to be obtained by the contractor. Arranging any other statutory approval, if required.

2.11 ERECTION, TESTING COMMISSIONING:

The scope of Contractor will include all electrical equipment required for the power plant units and auxiliaries covered under their scope for R&M of units 1 to 6 with new TG of Balimela Power House at Balimela.

The major equipment covered under scope of supply will be as follows:

- Generator 60 MW, 11kV, 375 rpm 0.9 PF – 6 Nos.
- Static excitation system & Digital AVR with thyristor controlled dual channel – 6 set.
- Generator line side terminal cubicles consisting of Surge suppressors, Voltage transformer, surge capacitor, etc. – 6 Nos.
- 11kV Current Transformers for metering, protection, AVR, synchronization etc.
- Generator neutral side with suitable bus duct links for formation of STAR POINT. The Generator will be grounded through neutral grounding transformer.
- Generator protection panel with numerical protection relays. Protection scheme will also be hard-wired.
- Generator metering, synchronizing and annunciation panel.
- Microprocessor based control system.
- Unit control desk
- HT Bus duct
- 11/220 kV, **6x**3x 23.4 MVA or 24.45 MVA Generator Transformer
- 220 / 11kV, 20 MVA Station Transformer
- Control & protection panel with numerical protection relays for Generator Transformer, 220/11 kV Station Transformer, Unit Auxiliary Transformer and Station Auxiliary Transformer.
- High velocity water spray system for generator transformer and 20 MVA, 220/11kV Station Transformer.
- 11/ 0.433kV, 3 phase, 750 kVA cast resin dry type unit auxiliary transformer for each unit.
- 11 KV Switchboard
- 415 V Unit Auxiliary Board consisting of incomer, bus coupler and outgoing feeders.
- 415 V Station Switchboard consisting of incomers, bus couplers and outgoing feeders.
- Electric Motors and Actuators including LT motors for drives and MOVs etc.
- AC distribution board / Power Distribution Board
- DC switchboard for each battery set
- Unit Auxiliary Transformer: 750kVA, 11/0.433 kV, cast resin dry type transformer will be erected for each unit.
- 11/0.433 kV Station Transformer: Existing 2 nos. 11/0.433 kV, 1500kVA transformers will be reused.
- Local Push Button stations for drive motors, Junction boxes etc.
- HT & LT Power and control cables, instrumentation and special cables as per requirement and accessories including their termination at both ends. All kind of cables of power house equipment as well as switchyard equipment is in the scope of Contractor.
- Cable supporting structures, GI cable trays (ladder type and perforated type), cable racks, other associated accessories and fire sealing materials for laying, termination and sealing of cables are under contractor's scope of supply. Cable trestles, if needed within the battery limit for supporting contractor's cables, will be in the contractor's scope. Contractor will lay separate trays for laying different type of cables like power, control and screened cables.

- Complete earthing system for all the equipment/systems - equipment earthing and electronic earthing as per actual requirement. Earthing connection of all new equipment to existing network.
- Welding sockets (415V), Power receptacles, 240 V sockets, 240V Industrial type sockets etc. are included in the scope of the contractor.
- UPS system complete in all respect.
- 220 kV Switchyard bay extension (Material handling only)
- Illumination within battery limit including DC emergency lighting.
- Lightening Protection for area under extension of 220 kV Switchyard

In addition to above following are also the scope of Contractor:

- Supply of hand gloves and shock treatment charts in English and Oriya.
- All the test required for successful commissioning of the system (Transformer, CT/PT) is to be done by vendor after arranging necessary instruments/equipments like SFRA, DGA, PPM, BDV, Tan-delta test etc as per the guidelines issued by concerned supplier. Agencies to carry out these test are to be deployed among the approved list of the supplier (to be provided in due course of time). These tests are to be repeated till charging clearance from the supplier.
- Electrical Protection System: The protection required for the various electrical equipment e.g generator, generator transformer, 220/11 kV, 20 MVA Station transformer, unit aux. transformers, station auxiliary transformer, auxiliary motor etc. All the relays including generator protection relays will be microprocessor based numeric type irrespective of their use with communication facilities.
- Arrangement of temporary work yards, material depots and access as required, as well as removal from site of all erection equipment, packing materials etc.
- Any item not mentioned in the specification, but considered by the Contractor necessary for satisfactory operation and maintenance of the plant will be included by the Contractor in his scope of installation.

2.12 Dismantling

The scope of the Contractor will also include the following;

- Dismantling of all equipment within battery limit. Contractor has to remove all the old/existing equipment along with cables. All the unused existing equipment will be removed, packed and placed in a proper place within 5 km as decided by the purchaser. Following major existing equipment will be dismantled.
- Generator Transformer.
- 11 kV Isolators, Reactors
- All electrical panels including 11 kV Switchboards, Unit Aux. Board, Station Aux. Boards and control cables pertaining to Units # 1 to 6
- All station switchboard
- Battery banks, battery chargers and DCDBs
- HT, LT and Control cables
- Cable trays, supporting structures, cable racks etc
- Excitation-AVR-PT Panel
- Generator Bus-ducts.
- Generator control & relay panel, generator metering panel, generator transformer control, relay & metering panel.
- CTs, PTs, LAs etc.
- All steel structures required under battery limit to complete the job.
- Complete civil works will be included for the switchyard extension including new bays in existing portion of the switchyard, Extension of cable trenches and road of existing switchyard to the extended portion, illumination, rail track for transportation of station transformer, foundations, gravels, oil pits, cable channels, pipe grouting, cable ducts etc as per requirement Construction of foundation for the station transformer and bay equipment is in the scope of Contractor. Fencing and structural gate of 20 MVA, 220/11kV Transformer is in the scope of Contractor. Dismantling of existing wall and gate for extension of

bay and construction of wall alongwith fixing of dismantled gates is in the scope of Contractor. Approach road upto extended part of the wall is in the scope of Contractor.

- All steel structures required under battery limit to complete the job.
- **Cabling (Cables, Cable supporting materials, trays etc)**
  - All HT/LT power, control cables and cable accessories supporting structures, cable installation, cable terminations with necessary junction boxes and fire sealing are under the scope of Contractor for all areas and also including all HT cables includes cables from station transformer to 11kV switchboard and 11 kV switchboard to 2 nos. 11/0.433, 1500 kVA Station Auxiliary Transformer.
  - All control and protection cables required for connection to relays, meters, signaling alarm, control, monitoring etc. at main station building will be provided, laid glanded and terminated at both ends by the Contractor. Existing cables will be removed and placed in proper condition in a place identified by the purchaser's store.
  - In addition to the above equipment dismantling and storage of other equipment / structures etc as required to complete the job is in the scope of Contractor.

2.13 Battery Limits and termination points

A. Generator Transformer Side

Power evacuation up to generator transformer will be included in Contractor's scope. Control cable including cable termination at both ends wherever signals are required to be tapped/transmitted including control cable termination in yard equipment as per the need.

B. Auxiliary Side

Existing DG set.

2.14 Exclusions

The following equipment have been excluded from the scope:
Units 7 & 8.

IC: SECTION IC: CONTROL & INSTRUMENTATION:

2.15 GENERAL

This specification is intended to define the basic requirements of instrumentation & control system for R&M with New TG for the Unit- 1 to 6 along with their auxiliaries as specified in the contract document. The basic philosophy of C&I system will cover entire 6 units in totality and will be based on the state–of– the–art microprocessor based control system. The C&I system will ensure safe, efficient and smooth operation of the plant and equipment with minimum intervention of the operating personnel during normal working of the plant, load fluctuation/shut-down and start-up of the unit.

2.16 SCOPE OF WORK

The scope of work will include transportation to site, storage, erection, testing and commissioning of all instrumentation and control equipment, cables, pipes, auxiliaries and erection hardware necessary for completion and handing over of instrumentation and control work for the unit after integrated final commissioning.

The Contractor shall do all erection and commissioning of the complete Control and Instrumentation system including Distributed Control System (DCS) or Programmable Logic Control (PLC) based system, Primary and Secondary Instruments, Panels, Control Desks, Alarm Annunciation System, Electric Power Supply System, Actuators, Instrumentation Cables and Process Connection impulse tubing, Actuators/MOV (Motor Operated Valve).

The scope of work will also include all civil works, like chipping, digging, concreting including filling material etc. associated with erection of instruments and associated equipment. Installation of all HT/LT power, control cables and cable accessories supporting structures, cable installation, cable terminations with necessary junction boxes and fire sealing are under the scope of Contractor for all areas covered in the scope including all HT cables. All control and protection cables required for connection to relays, meters, signalling alarm, control, monitoring etc. at main station building will be provided, laid glanded and terminated at both ends by the Contractor. Existing cables will be removed and placed in proper condition in a place identified by the purchaser's store. All existing Impulse tubes, conduits will be replaced by new SS impulse tubes and conduit. Erection, testing and commissioning of the total equipment for successful commissioning/completion of the project are in scope of contractor.

Measurement and control equipment will be complete in all respect and any equipment / accessories not explicitly indicated in this specification, but considered essential for proper functioning of equipment and process will be included in the Contractor’s scope of work. The instrumentation system will cover for New TGs and its auxiliaries. A proven dedicated 1:1 hot redundant centralized Distributed Control System (DCS)/ PLC based system for each unit will be envisaged with this package. Redundant Electro Hydraulic Turbine Control system with redundant actuator will be envisaged for each turbine. Electro – Hydraulic control unit will be envisaged for Servo Rotary Valves. The instrumentation equipment for all units of Hydel power plant with their auxiliary facilities as covered in the specification and also as felt necessary by the BHEL shall be completed by Contractor for the completeness of the job. Fully wired panels, cabinets, desks, racks, transmitter cabinets and junction boxes. All signal, control & Power cables will be FRLS armoured types or manufacturer standards cables required for instrumentation work. All field instruments (4-20mA) will be replaced by new SMART type 2 wire transmitters. All local field mounted instruments for New TGs will be newly envisaged. Turbine Vibration monitoring system and measurements with sensor and converter box will be provided for New TGs as per manufacturer standards. Erection, calibration, testing and commissioning of the total equipment included in this specification. All tools and tackles, special testing equipment and consumables required for erection and commissioning activities will be arranged by the contractor.

PART 2 ID: SECTION – ID: CIVIL WORKS

General

Civil works include civil works detailed in Section-I for units 1 to 6 and Section-II for Architectural finishing works of Power House.

The project comprises of renovation & modernization of Unit No. 1 to 6 out of total 8 units in Balimela Power house. Work will be executed such that the new constructions match with the existing structure. Utmost care will be taken while carrying out dismantling work so that no damage is done to the existing structures. Also safety of the existing structure will be looked into while making new construction. The Contractor will visit and carefully examine the site and surroundings to satisfy himself about the nature of all existing structure, existing underground services, general site condition, extent of dismantling work, the site for disposal of surplus materials, debris etc. and all other matter affecting the works. Claim and objection due to ignorance of site condition will not be considered after submission of tender. The architectural finish will be carried out through an Interior decorator of repute with relevant experience in the field. The credential of the interior decorator engaged, will be submitted for approval by Client/ Consultant.

SECTION-I: Civil Works of Units 1 to 6

1 Scope of work

The Contractor's scope will include complete engineering and construction inclusive of detail design, basic engineering, detailed engineering, supply of all materials, construction and testing in respect of all facilities required for completion and handing over of the work as per technical specification.

All civil works for the buildings, equipment foundations, facilities and miscellaneous civil works to be provided for the project will include but not be limited to the following:

- **Draft tube** - The lining of draft tube should be inspected by hammer taping. The loose area where de-lamination has taken place should be repaired by pressure grouting. The area where the lining plate are missing and the base concrete is exposed, the same should be given a layer of concrete with fiber reinforcement and finished with hardener at top. The delaminated lining of the draft tube will be re-fixed.
- **Embedment of Draft tube gate** - The loose concrete around the embedment of gates should be removed and the concrete around the area should be made dense and water tight by putting fresh concrete with applying epoxy based bonding agent between old and new concrete or by injecting cement-slurry with water proofing compound. The damaged embedment will be refurbished / replaced wherever required. Re-anchoring of guides including making the concrete near guide water proof and facing plates of gates (if required).
- **Civil foundations for equipment** - The repair, refurbishment and modification / strengthening of existing TG & Auxiliary equipment foundations should be done as per the requirement of the equipment base profile and static/dynamic loading. Strengthening should be done by injecting cement slurry with admixture. The existing concrete surface should be given treatment to develop adequate bond between old and new concrete. Anchor bolts should be provided by drilling holes in the existing concrete and fixing it by epoxy based mortar. The grouting under the base plate should be done with non-shrink free flow grout.
- **Unit Control Room** - Unit control room of each of six units is to be modified into glass cabinet with wood-work below windows will be as per requirement and will be finalized during detail engineering.
- **Main Control Room** - It contains all the eight units. The whole main control room including Unit No. 7 & 8 is under the scope of work. The control room floor, false ceiling, doors & windows will be replaced to suit the requirement of the modification of power house.
- Refilling redundant recesses in floor
- Drilling panel cable access holes through floors/RCC wall
- Modification of turbine foundation and the pit to accommodate new runner.
- Strengthening of existing concrete structure
- Rehabilitation of distressed concrete structure and inserted parts/steel linings.
- Stoppage of leakage of water from surface of concrete.
- Cleaning of dewatering pit.

- Repair of expansion joints and providing MS plate all along external and internal surfaces for the protection of the joint.
- The complete works shall be carried out as per scope. If any work covered in the scope of contract cannot be executed using items available in BOQ, additional / extra items shall be made and rates for such items shall be worked out as per GCC clause 2.15.7. However contractor shall be bound to execute all the works under the scope of the contract and decision whether an extra item is applicable or not, shall be taken by BHEL Engineer, which shall be binding on the contractor.
- In case the description/specifications as per BOQ are found to be incomplete, Indian Standard Codes (IS Codes) specifications shall be followed. Quantities mentioned in the BOQ cum Rate Schedules, are approximate only and liable for variation due to change of scope of work / variation in schedule of quantities, changes in design etc. The tenderers shall undertake to execute actual quantities as per advice of BHEL Engineer and accordingly the final contract price shall be worked out on the basis of quantities actually executed at site and payments will also be regulated for the same. The quantities indicated against each item may vary to any extent and no compensation will be payable in variation of Individual quantity.
- Any activity which is necessarily required for satisfactory execution of any item of BOQ in line with technical specifications shall be deemed to be included in BOQ item even if it is not described in the item description and no extra payment shall be made against such activity.
- Furnishing samples of all materials required by the BHEL Engineers for testing / inspection and approval, for use in the works. The samples may be retained by the BHEL Engineer for final incorporation in the works.
- Furnishing test reports for the products used or intended to be used, if called for the specifications or if so desired by the BHEL Engineer. Contractor shall furnish the manufacturers test certificate for the steel & cement procured by them. Apart from this all the field test shall be arranged by contractor for concrete, bricks, coarse & fine aggregate, Gravels /Boulders etc. either at site or nearby Field Quality Lab. approved by BHEL if so desired by BHEL's Engineer. All the expenses in these regards shall be borne by contractor. Contractor shall procure Reinforcement Steel, Structural Steel & Cement* from reputed manufacturer & approval for the same shall be obtained from BHEL well in advance before ordering for the materials. *Cement shall be PPC Equivalent to OPC Grade 43 or Higher.
- Supply and Replacement of Main entrance rolling shutter of Powerhouse building with new one.
- Installation of 2 Nos. of Passenger Elevator (lifts): Installation of elevators is not in scope of contractor; only lift well is to be made for installation of elevator is in the scope of contractor. The existing staircase at two locations are to be dismantled. In these space passenger elevator/lift well is to be made by contractor (for installation of elevator by another contractor/vendor). Removal of debris after completion of construction. The checking and correctness of all main centerlines is the responsibility of the Contractor irrespective of any checking by Purchaser/Consultant. All other civil works that will be necessary to complete the work in all respects.
- White Washing internal/external of power house with all-weather paints shall be done by the contractor after clearance from engineer in-charge.

2 Civil works – General details:

- **Concrete and reinforced concrete structure:**

  All concrete and reinforced concrete structures will be constructed. The mix design adopted will be suitable for proper strength, workability and service condition of the structure. Minimum cement content and maximum water cement ratio will be normally as per stipulations of BIS codes. However, in case of exposure to aggressive environments, the mix design adopted will be suitable to ensure durability of the concrete under the condition. Unless specifically approved by the Engineer the maximum nominal size of coarse aggregates for concrete will be 20mm and down. Steel reinforcement to be used will be Fe415 grade or equivalent will be used unless otherwise specified. Wherever there is a joint of old and new concrete, suitable chemical treatment will be given to the surface of old concrete to develop adequate bond between them.

- **Turbine & Generator and auxiliary equipment foundations:**

  Modification of existing foundations of turbine, generator and other equipment is to be done as per the base profile of the equipment. The Contractor will check the adequacy of the strength / serviceability of the existing foundation considering the static and dynamic loads of the equipment. The preparation of

strengthening scheme/plan, if required and implementation of the same will be under the scope of Contractor. The Contractor has to furnish the calculations justifying adequacy of the proposed scheme strengthening. Strengthening of existing concrete structure will be carried out where it is expected to carry more superimposed loads than the original design due to new/ upgraded technological requirement. All necessary modification in the existing structure will be simultaneously considered to accommodate the new set up.

The Contractor will submit the following with regard to strengthening work.

1) As built drawing of the existing portion as per availability with the Purchaser/ Consultant.
2) Load data of the new structure.
3) Scheme and design calculation for all new structures. The design calculation will include static design calculation for all structures and dynamic analysis for all important structures subjected to impact, vibrations etc. induced by equipment.
4) After getting approval of the Purchaser / Consultant for the scheme and design calculations, the Contractor will prepare construction drgs. for the same and submit for Purchaser/ Consultant's approval.
5) The Contractor will stand fully responsible for design/safety of all structures irrespective of approval of the same by the Purchaser/ Consultant.

- **Design Loads**

  Loads due to normal operating condition as well as due to extra ordinary conditions will be taken into account. For normal operating condition, following loads will be considered.

  - Dead loads
  - Live loads (not less than 2T/m2)
  - Load throw loads
  - Piping loads
  - Thermal loads
  - Unbalanced dynamic loads from turbine and generator
  - Torque load
  - Temperature load (as specified by manufacturer) for extra ordinary conditions, following loads will be considered.
  - Seismic load (as per IS: 1893)
  - Wind load (as per IS: 875)
  - Short Circuit load
  - Any other abnormal load due to machine breakdown, as specified by manufacturer.
  - The load combinations will be as per IS: 2974(part-3)

- **Material of construction**

  All reinforced concrete work will be of grade M30. Corrosion inhibitors of approved make will be used in Concrete for all RCC work excepting for storm water drains as per manufacturer's specification and details.

  The following standards will be taken as guidelines unless otherwise specified above

  1) IS: 2974(Part-3)
  2) IS: 1893-2002
  3) IS: 456-2000
  4) IS: 4247-1993

  APPROVED MAKE OF MATERIALS

1. STRUCTURAL/REINF. STEEL	: SAIL / TATA / JINDAL or any equivalent make
2. PPC EQUIV. TO OPC 43	: ACC / BIRLA / JAYPEE or any equivalent make
3. ENAMEL PAINTS	: JOHNSON & NICHOLSON / BERGER/ ICI / ASIAN PAINT / NEROLAC or any equivalent make
4. GI & MS PIPES	: SURYA/ PRAKASH/ JINDAL-HISSAR/ TATA or any equivalent make

Approval of BHEL Engineer is to be obtained before procurement of materials. The make of material mentioned if not available in the market or is not suiting the site conditions or the make of any material is not mentioned in the above list equivalent make may be used after the approval from BHEL Engineer.

3 Submission of Design Calculations, Drawings and documents by Contractor:

3.1 The design calculations will be submitted prior to submission of construction drawings.

3.2 Structure and foundation design

- The design calculations for all the structures and foundations will be furnished. The design calculations will include static design calculations for all structures and foundations, dynamic analysis for all important structures and foundation subjected to impact, vibrations etc. induced by equipment and other external forces.
- The data sheet showing specifications of materials, design standards followed, load data assumed including the seismic loading, vibration considerations, deflection, etc. will be furnished. The loading combinations and other design assumptions made in design are to be furnished.
- Measures required for the safety of the buildings and foundations.
- Design and construction/reconditioning of structures, facilities etc. will take into account requirement for operation and maintenance of all equipment and its users.
- This being a renovation/modernization project, while designing and preparing new facilities the Contractor will take into account the structures, foundations, drains, sewers etc of the existing units and modify them, if found necessary, to match the new ones.

3.3 Design Calculations, Drawings and documents

The design calculations/scheme drawing will be submitted by the Contractor for approval of the Purchaser/Consultant prior to submission of construction drawings. The following aspects will be considered with regard to design calculations.

- The Contractor will undertake investigation of field problems by critical visual examination and additional field test non-destructive as required to be ascertained:
  - Defects associated with concrete like erosion, cracks, cavities, pitting, corrosion, spelling and peeling of and deterioration of reinforcement etc.
  - Leakage of water through the structures
  - Condition of components
  - Condition of external surfaces
  - Condition of internal surfaces
- The Contractor will submit graphic records of observation of field problems. Along with this the Contractor will submit report/drawing showing scheme for rehabilitation/reconstruction of distressed concrete structure/inserted parts.
- The Contractor will prepare detailed working drawings considering overall foundation layout for the equipment, buildings services etc., space requirement and clearances as necessary. The Contractor will submit a comprehensive and complete unit wise classified list of drawings.
- The Contractor will submit for approval/information, general arrangement and detailed working drawings for all concrete, reinforced concrete and other civil works.
- The Contractor will submit As-built drawings incorporating all site modifications after completion of construction work.
- If the Contractor intends to carry out any part of the work through subcontractor then prior approval of the subcontracting agencies will be taken from the Purchaser/Consultant

3.4 Quality Control

The Contractor will carry out all checks and tests as directed by the Purchaser / Consultant and submit the results thereof. Acceptance of works will be subjected to achieving required quality as laid down in code of Bureau of Indian Standards.

3.5 Technical Rule

This Technical Rule is meant for civil engineering works included in the scope of work in the package. It includes loading standards, permissible stresses, functional requirement, quality standard, architectural guidelines, norms etc to be adopted as a basis for preparation of design and drawings by the Contractor.

The design prepared by the Contractor will not only provide for the requirement indicated in this technical rule but also consider the overall process requirement, service conditions and provisions to be made for future expansion. The design will be compatible with the operating conditions in the plant and the atmospheric conditions prevalent at location of project site. Standardization and unification will be carried out to the maximum extent possible. Purchaser reserves the right of selecting a particular make of materials and components. The Contractor will supply materials / components of the particular make, if so required.

3.6 Standards

- The design criteria for civil engineering work will be in accordance with this Technical Rule. Detailed instructions on such aspects as are not indicated herein will be as per the latest standards, codes and recommendations of the Bureau of Indian Standards (BIS) specifications/Indian road Congress and specifications published by Ministry of Surface and Transport (MOST). In the absence of suitable BIS specification and codes of practices, other recognized international standards and codes such as of International Standards Organization (ISO), British Standards and codes, Deutsche Industries Norm (DIN), American concrete Institute (ACI) may be used, with prior approval of the Purchaser.
- In case of anything mentioned in this Technical Rule is at variance with BIS or other standards mentioned herein, the provisions of this Technical Rule will prevail.

3.7 Design Parameter

A. General

In addition to the minimum requirements outlined herein, the Contractor will design and construct the buildings, structure, foundations and other civil items as required for all equipments and systems considering all aspects of operational requirements and maintenance of these equipments and facilities. General provision, materials, workmanship, dimensional tolerances, safety requirements for construction works etc. will be in accordance

B. Load Condition

- All foundations and concrete structures will be designed to resist full operating dead and live loads, with appropriate combination of wind and seismic forces and with due allowance for impact, vibration etc as secondary effects of live loads, temperature variation etc. While designing structures and foundations either the effect of seismic forces or wind loads, whichever produces the worst effect, will be considered along with usual load conditions.
- Apart from the operating loads indicated by the equipment manufacturers, the design of buildings and structures will be based on dead and imposed loads calculated according to IS: 875, subject to minimum imposed loads indicated below.
- The live loads listed hereunder are minimum loads for the areas involved. Special use areas will be investigated and loading revised upward as necessary. Additional loading due to electrical cables, ventilation and air conditioning, piping etc. will be considered as per technological requirements.

  All buildings (except as noted separately):

Roofs	:150 kg/m2
Platform and stair	:500 kg/m2
On ladders	:120 kg at centre of rung
Removable covers	:1500 kg/m2
Generator lay down area	:2000 kg/m2
Control Room	:1000 kg/m2

- Design wind pressure and forces will be as per the provisions of IS: 875. Stresses induced due to dynamic effect of wind will be considered in design as per relevant IS codes.
- Seismic forces will be considered according to the provisions of IS: 1893.

- Members subjected to temperature variations will be designed to withstand the stresses arising out of such temperature variations.
- Design of structures will provide for temporary loads, which may be lifted during erection and maintenance of plant and equipment. Consideration will be given in the design of structures to the contributing loads from piping and cabling including provisions for piping anchors and dead endings of electrical conductors.
- In case of moving loads, full load under worst operating condition together with minimum 25% vertical impact factor will be considered for vehicles and machinery travelling on tracks (rails). Horizontal forces along and transverse to the rails as per equipment manufacturers data and recommendations will be considered in design of the track supporting structures and foundations.
- The design of buildings and structures will take into account the loadings due to future extension of units as well as due to and installation of additional equipment, in future in the units.

C. Permissible Stresses

Allowable stresses for all reinforced concrete structures will be as per IS: 456 and for pre-stressed concrete structure as per IS:1343

D. Foundations

- Foundations for structures and equipment will be proportioned to resist the worst condition of loadings and will be generally designed as per the provisions of IS:1904.
- Generally foundation for buildings & equipment will not be structurally connected to ground floor slab. The top level of the stem for building column foundations will be so provided that no part of the steel column base assembly protrudes over finished floor level. The column base assemblies will be encased with concrete up to floor level.
- Foundation of equipment subjected to dynamic loading will be isolated from adjoining floors/foundations to prevent propagation of vibration to adjoining structures.
- Supporting structures and foundation for equipment which may cause vibration will be designed for the dynamic effect of equipment together with the direct loads. The dynamic loads and other relevant data required for analyzing the dynamic effect will be taken as per manufacturers' data and recommendations.
- Structures and foundations supporting vibrating equipment will be proportioned to avoid resonant frequencies. The dynamic analysis will be done as per the stipulations as recommended by respective IS codes as well as the stipulations recommended by equipment manufacturer.

E. Concrete and Reinforced Concrete for Structures and Foundations

General

- Concrete work will secure a dense, homogeneous, smooth mass including required finishes, possessing required strength and resistance to weathering and abrasion for the structures and foundations.
- Design of all reinforced concrete structures will be as per the IS: 456 and of pre-stressed concrete structures as per IS: 1343. The structural safety of all foundations on soil will, in general, be based on IS: 1904. The design of water retaining structures will be according to IS: 3370.
- For calculation purpose "Working Stress Design" or "Limit State Design" methods may be adopted, but design will be consistent throughout.
- Unless otherwise specified, minimum grades of concrete to be used will be as follows:

  Blinding concrete :M 7.5
  Plain cement concrete :M10 & M15
  All reinforced concrete :M30

- Grouting below machine/equipment bases and pockets will be of non-shrinking grout of adequate thickness and strength. Grouting below bases of building structural members will be with concrete of minimum grade M35.

List of Relevant I.S. Codes

IS: 269-1989: Specification for 33 grade ordinary Portland cement.
IS: 383-1970: Specification for coarse and fine aggregates from natural sources for concrete.
IS: 432 (PART-1)-1982: Specification for mild steel and medium tensile steel bars and hard drawn steel wire for concrete reinforcement-hard drawn steel wire.
IS: 432 (PART-2)-1982: Specification for mild steel and medium tensile steel bars and hard drawn steel wire for concrete reinforcement-hard drawn steel wire.
IS: 455-1989: Specification for Portland slag cement.
IS: 456-2000: Code of practice for plain and reinforced concrete.
IS: 458-1988: Specification for precast concrete pipes (with or without reinforcement).
IS: 651-1992: Specification for salt glazed stone ware pipes and fittings.
IS: 771-1963: Specification for glazed earth ware sanitary appliance (line water closets, urinals wash basins, sink etc.)
IS: 782-1978: Specification for caulking lead.
IS: 783-1985: Code of practice for laying of concrete pipes.
IS: 814-1991: Covered electrodes for manual metal are welding of carbon and carbon manganese steel.
IS: 816-1969: Code of practice for use of metal arc welding for general construction in mild steel.
IS: 875(PART-1)-1987: Code of practice for design loads (other than earthquake) for buildings and structures - dead loads.
IS: 875(PART-2)-1987: Code of practice for design loads (other than earthquake) for buildings and structures - imposed loads.
IS: 875(PART-3) –1987: Code of practice for design loads (other than earthquake) for buildings and structures - wind loads.
IS: 875(PART-5)-1987: Code of practice for design loads (other than earthquake) for Buildings and structures - special loads and load combinations
IS: 1038 -1983: Specification for steel doors, windows and ventilators.
IS: 1080 -1986: Code of practice for design and construction of willow foundations on soil (other than raft, ring and shell).
IS: 1609 -1991: Code of practice for laying damp proofing treatment using bitumen felts
IS: 1742 -1983: Code of practice for building drainage
IS: 1786 -1985: Specification for high strength deformed steel bars and wires for concrete reinforcement.
IS: 1893 -2002: Criteria for earthquake resistant design of structures.
IS: 1904 -1986: Code of practice for design and construction of foundations in soil: General requirement
IS: 1905 -1987: Code of practice for structural use of unreinforced masonry
IS: 2062 -1992: Structural steel (fusion welding quality)
IS: 2751-1979: Welding of mild steel plain and deformed bars for reinforced concrete construction
IS: 2950(PART-1)1981: Code of practice for design and construction of raft foundations -design
IS: 2974(PART-1) 1982: Code of practice for design and construction of machine foundation - foundation for reciprocating type machines.
IS: 2974(PART-2) 1980: Code of practice for design and construction of machine foundations - foundations for impact type machine (Hammer foundations).
IS: 2974(PART-3) 1982: Code of practice for design and construction of machine foundations - foundations for rotary type machines (medium and high frequency).
IS: 2974(PART-4) 1979: Code of practice for design and construction of machine foundations - foundations for rotary type machine of low frequency.
IS: 2974(PART-5) 1987: Code of practice for design and construction of machine foundations - foundations for impact type machines other than hammers (forging and stamping press, pig breakers, drop crusher and jolter).
IS: 3006-1979: Specification for chemically resistant glazed stone ware pipes and fittings.
IS: 3067-1988: Code of practice for general design details and preparatory work for damp proofing and water proofing of buildings.

IS: 3114-1985: Code of practice for laying of cast iron pipes.
IS: 33'70(PART-1) 1965: Code of practice for concrete structures for the storage of liquids -general requirements.
IS: 3370(PART-2) 1965: Code of practice for concrete structures for the storage of liquids - reinforced concrete structures.
IS: 3370(PART-4) 1967: Code of practice for concrete structures for the storage of liquids - design tables.
IS: 3614(PART-1) 1966: Specification for fire check doors - plate, metal covered and rolling type.
IS: 3764-1992: Excavation work - code of safety.
IS: 3414-1968: Code of practice for design and installation of joints in buildings.
IS: 4127-1983: Code of practice for laying of glazed stone ware pipes
IS: 4326-1976: Code of practice for earthquake resistant design and construction of buildings.
IS: 6494-1988: Code of practice for water proofing of underground water reservoirs & swimming pools.
IS: 7452-1990: Hot rolled steel sections for doors, window sand ventilators
IS: 1239-1968: Specification for mild steel tubes, tubular and other wrought steel fitting (Part -I Mild Steel Tubes).
IS: 1580-1991: Bituminous compounds for water proofing and caulking purposes.
IS: 13311(Part-I)-1992: Non-destructive testing of concrete

SECTION-II: Architectural Finishing Works of Power House:

1.SCOPE OF WORK

Interior decoration of the existing power plant at Balimela of PURCHASER which includes application of appropriate fixtures and finishing items in floor, wall, ceiling, doors and windows and submission of drawings and BOQ for following use areas.

- Machine Hall & Service bay
- Control room,
- Conference Room
- Acid/Battery Room
- Battery charger Room
- Office ,Corridor ,Lobby
- Staircase including adjoining areas
- The Entrance of Power house building
- Exterior wall of power house building
- Toilet(Male and Female)

The work will be done as per actual and the payment will be governed by the BOQ furnished in price schedule.

2.SCHEDULE OF FINISHES:

A. MACHINE HALL & SERVICE BAY

i. Flooring: The flooring for this area will be 20mm thick gang saw cut mirror polished, premoulded Granite tiles/slabs of required size(>0.5 sq.m) shade, colour and texture laid over 20mm thick base of cement mortar(1 Cement: 4 Coarse sand) with joints treated with white cement, mixed with pigments, epoxy touch-ups including rubbing, curing, moulding and polishing or complete as per direction of Engg. in charge. Chequered plate to be raised to matching with new floor level for which P.C.C should be laid below the support of all chequered plates to maintain an uniform level throughout the floor. Fixing of tile flooring with cement based high polymer modified quick set adhesive (water based). When tile flooring is to be laid over the existing flooring without dismantling old flooring it can be laid with adhesive. The old flooring will be thoroughly cleaned and checked for undulations , if any will be rectified with cement mortar 1:3 (1 cement: 3 coarse sand). Old cement concrete surface will be hacked and cleaned off to have proper bond with the old surface. High polymer modified quick set tile adhesive (conforming to IS 15477) will be thoroughly mixed with water and a paste of zero slump will be prepared so that it can be

used with in 1.5 to 2 hours. It will be spread over an area not more than one sqm at one time. Average thickness of adhesive will be 3 mm

ii. **Skirting / dado:** Minimum 150mm skirting matching with floor finish will be provided in all areas unless specified otherwise elsewhere.

iii. **Paneling of wall:** 4mm thick aluminium composite panel AL-45 of Aludecor or equivalent make(model-AD 09 & AD 75 with foil thickness of minimum 0.50 mm for wall cladding in sizes as prescribed in the drawings, the base frame will be made up of 25×50 mm aluminium section of approved make in required grid so as to provide proper support to the maximum size of ACP sheet, all the horizontal and vertical joints of the sheets to be sealed with weather silicon(dow corning) to make the entire system air and water tight as per direction of EIC.

iv. **Paneling of Column:** All interior column, beam and few portion of wall as per drawing/sketch (attached herewith) will be cladded with PVdF surface coating of 4mm thick (ACP) aluminium composite panel metallic colour (aluminium thickness will be 0.5mm) of approved brand and shade around the columns / dead walls at all hights.

v. **Painting on wall panel:** All interior wall panels will be coated with approved shade of water based low VOC led free Acrylic emulsion paint over plaster of paris / wall putty of 1st quality. A minimum of two finishing coats of paint over a primer will be provided.

vi. **Painting of Chequered plate, railing:** All structural beams at ceiling of machine hall will be painted with two coats of polyurethane of approved shade and brand (Recommended DFT: 30-40µ per coat Corresponding WFT: 67-90µ per coat) over a coat of approved primer all complete as per drawing, before applying the new coat of paint scraping of old paint, removing grease, dust suspended particle etc. will be ensured.

vii. **Louvers:** Replacing the existing louvers and Providing and fixing aluminum louvers of approved brand including fixing 50x5mm glass in slits complete in all respect as per manufacturer specification and direction of engineer

viii. **False ceiling:** Providing and fixing in position false ceiling with LUXALON 84 R/C ceiling system comprising of 84 mm wide x 16mm deep perforated panels roll of approved colour formed of 0.5mm thick Aluminium alloy stove enamelled on both sides fixed on panel carriers 62 mm wide x 29mm deep out of 0.95mm thick enamelled Aluminium satin black with cutouts to hold panels in a module of 100mm (16 mm gap between panels) at maximum 1.3 M c/c carriers to be suspended from roof by 4mm dia galvanised steel wire hangers with special height adjustment clips made of spring steel at maximum 1.3 M c/c hangers fixed to roof by "J" hook and Nylon inserts with provision of openings for fixing light fittings, air conditioning grills etc. complete with all bye works as per drawing and manufac-turer's specification.

B. CONTROL ROOM

i. **Flooring:** 2mm thick antistatic PVC Roll of approved shed and brand as per IS 3462 and laid as per IS-5318 over existing concrete floor after removing the existing PVC mat.

ii. **Wall paneling:** 59.5mm Thick Dry Wall Partitions with 9.5mm USG Fiberock boards fixing one side with 50mm floor Channel & 48mm Stud, joint finishing with USG All Purpose jointing Compound & laminate 1.8mm minimum) finish upto 2.1 mtr. From floor.

iii. **Painting on wall panel:** All interior wall panels will be coated with approved shade of water based low VOC led free Acrylic emulsion paint over plaster of paris / wall putty of 1st quality. A minimum of two finishing coats of paint over a primer will be provided.

iv. **False ceiling:** Providing and fixing in position false ceiling with LUXALON 84 R/C ceiling system comprising of 84 mm wide x 16mm deep perforated panels roll of approved colour formed of 0.5mm thick Aluminium alloy stove enamelled on both sides fixed on panel carriers 62 mm wide x 29mm deep out of 0.95mm thick enamelled Aluminium satin black with cutouts to hold panels in a module of 100mm (16 mm gap between panels) at maximum 1.3 M c/c carriers to be suspended from roof by 4mm dia galvanised steel wire hangers with special height adjustment clips made of spring steel at maximum 1.3 M c/c hangers fixed to roof by "J" hook and Nylon inserts with provision of openings for fixing light

fittings, air conditioning grills etc. complete with all bye works as per drawing and manufac-turer's specification.

C. CONFERENCE HALL

i. **Flooring:** Providing and laying 600x600x9.5mm first quality full body/double charged Vitrified tiles with water absorption's less than .08% and conforming to IS : 15622 of approved shade and brand will be used Fixing of tile flooring with cement based high polymer modified quick set adhesive (water based) When tile flooring is to be laid over the existing flooring without dismantling old flooring it can be laid with adhesive. The old flooring will be thoroughly cleaned and checked for undulations , if any will be rectified with cement mortar 1:3 (1 cement: 3 coarse sand). Old cement concrete surface will be hacked and cleaned off to have proper bond with the old surface. High polymer modified quick set tile adhesive (conforming to IS 15477) will be thoroughly mixed with water and a paste of zero slump will be prepared so that it can be used with in 1.5 to 2 hours. It will be spread over an area not more than one sqm at one time. Average thickness of adhesive will be 3 mm.

ii. **Skirting / dado:** Minimum 150mm skirting matching with floor finish will be provided in all areas unless specified other wise elsewhere.

iii. **Wall paneling:** 4mm thick aluminium composite panel AL-45 of Aludecor or equivalent make(model-AD 09 & AD 75 with foil thickness of minimum 0.50 mm for wall cladding in sizes as prescribed in the drawings, the base frame will be made up of 25×50 mm aluminium section of approved make in required grid so as to provide proper support to the maximum size of ACP sheet, all the horizontal and vertical joints of the sheets to be sealed with weather silicon(dow corning) to make the entire system air and water tight as per direction of EIC.

iv. **Painting on wall panel:** All interior wall panels will be coated with approved shade of water based low VOC led free Acrylic emulsion paint over plaster of paris / wall putty of 1st quality. A minimum of two finishing coats of paint over a primer will be provided.

v. **False ceiling:** Supplying and Fixing of USG Suspended ceiling systems components. This includes Sheetrock Brand ST 55 Perimeter Channel (0.55mm thick having one flange of 21mm and another flange of 28mm and a web of 25mm) screw fixed to brickwall / partition with the help of approved screws at 600mm centers. Then suspending Sheetrock Brand ST 55 Main Channel (38mm x 14mm x 0.9mm thick with two flanges of 14mm each) from the soffit at 1220mm centers with Sheetrock Brand ST 55 Angle Profile (25x10mm x 0.55mm thick) fixed to RCC Slab with Sheetrock Brand ST 55 Soffit Cleat and M6 Fasteners @ 600mm Centers respectively. Sheetrock Brand ST 55 Furring Channel (having knurled web of 48mm and two flanges of 24mm each with lips of 8.9mm) are then fixed to the Main channel with the help of connecting clip (2.5mm Dia) and in perpendicular direction to the intermediate channel at 457mm centers. 6.6mm thick USG Fiberock Panel is screw fixed with 25mm long Drywall screws at 230mm centers. The screw fixing of Gypsum Panels to the metal framing at the periphery, openings and cut edges should be at 150mm centers. All the Gypsum Panels must be staggered. All joints to be taped & finished with 50mm wide Sheetrock Brand Paper Tape & Sheetrock Brand All Purpose Joint Compound Confirming to ASTM C475.

D. ACID/BATTERY ROOM

i. **Flooring:** Acid / alkali resistant tiles 300x300x14 mm thick, jointed with acid / alkali resistant cement mortar. Bedding will comprise of potassium silicate mortar conforming to IS:4832 (Part-1) and resin based mortar like epoxy for jointing.

ii. **Dado:** 10 mm thick acid and/or alkali resistant tiles of approved make and colour using 12mm thick acid and/or alkali resistant mortar bedding (1:4) and joints filled with acid/or and alkali resistant cement as per IS:4457.Complete as per direction of engineer-in-charge.

iii. **Painting:** All interior walls & Ceiling will be coated with approved shade of Acid resistant paint

E. BATTERY CHARGER ROOM

i. **Flooring:** Acid / alkali resistant tiles 300x300x14 mm thick, jointed with acid / alkali resistant cement mortar. Bedding will comprise of potassium silicate mortar conforming to IS:4832 (Part-1) and resin based mortar like epoxy for jointing.

ii. **Dado:** 10 mm thick acid and/or alkali resistant tiles of approved make and colour using 12mm thick acid and/or alkali resistant mortar bedding (1:4) and joints filled with acid/or and alkali resistant cement as per IS:4457.Complete as per direction of engineer-in-charge.

iii. **Painting:** All interior walls & Ceiling will be coated with approved shade of Acid resistant paint

F. STAIR CASES

i. **Tread:** 18mm (minimum) thick white marble flooring with 75mm wide black granite strip with groove & bull nosing in steps & all landings.
Riser - 18mm (minimum) thick black granite in skirting & riser1.6

ii. **Hand rail &Railing:** Providing and fixing stainless steel (SS Grade 304) 1000 mm height of knock down fixing system railing made of 38 mm dia stainless steel Handrail (Wall Thickness 1.5mm), 40mm x 40mm SS Square Baluster @ 900mm (maximum) c/c with complete fixtures, 16mm dia x 3 Nos. SS Horizontal Member.(Existing Brick Wall Railing to be demolished before fixing SS Railing).

G. OFFICE, CORRIDOR, LOBBY

i. **Flooring**

Providing and laying 600x600x9.5mm first quality full body/double charged Vitrified tiles with water absorption's less than .08% and conforming to IS : 15622 of approved shade and brand will be used
Fixing of tile flooring with cement based high polymer modified quick set adhesive (water based)
When tile flooring is to be laid over the existing flooring without dismantling old flooring it can be laid with adhesive. The old flooring will be thoroughly cleaned and checked for undulations , if any will be rectified with cement mortar 1:3 (1 cement: 3 coarse sand). Old cement concrete surface will be hacked and cleaned off to have proper bond with the old surface. High polymer modified quick set tile adhesive (conforming to IS 15477) will be thoroughly mixed with water and a paste of zero slump will be prepared so that it can be used with in 1.5 to 2 hours. It will be spread over an area not more than one sqm at one time. Average thickness of adhesive will be 3 mm

ii. **Skirting / dado**

Minimum 150mm skirting matching with floor finish will be provided in all areas unless specified other wise elsewhere.

iii. **Painting**

All interior walls will be coated with approved shade of water based low VOC led free Acrylic emulsion paint over plaster of paris / wall putty of 1st quality. A minimum of two finishing coats of paint over a primer will be provided.

iv. **False ceiling**

Armstrong Aluminium plank system with plain-finish consisting of 300 mm wide planks of lengths upto 3000mm.Planks made out of pre-coated aluminium of 0.7mm thickness with bevelled edge in white colour(Global white) with Light Reflectance>86% .The panel ends will be raised up to 29mm to create a smart hairline end joint .The panels about each other with a narrow 'V' groove to facilitate the removal of the individual panel without damaging the edge of the panel.
Installation : To comprise of 3000 mm long "carrier bars" manufactured and supplied by Armstrong to be spaced at 1200mm maximum centres securely anchored to the soffit by 6mm/8mm rods.The last hanger at the end of each carrier bar should not be greater than 600mm from the adjacent wall.tiles should be clipped on to the special locking arrangement provided in the carrier bar from below.Perimeter trims to be Armstrong wall angles of white colour secured to the walls at 450mm maximum centres

H. DOOR, WINDOWS & PARTITION

Glazed anodized aluminum (minimum 15 micron thickness) door, widow, partition will be used (as per schedule of enclosed section no.)
Aluminium sections used for fixed/openable windows, ventilators, partitions, frame work & doors etc. will be suitable for use to meet Architectural designs to relevant works and will be subject to approval of the Engineer-in-Charge for technical, structural, functional and visual considerations.

I. ENTRANCE AND EXTERIOR WALL OF POWER HOUSE BUILDING

Exterior surface will be provided with combination of heritage finish (Granular) and Exterior acrylic emulsion paint /texure paint of approved brand and shade. 20% of the external façade of the power house building will be cladded with ACP (Aluminium Composite Pannel) for decoration. Approval of overall composition of façade treatment of all sides of the building will be taken before execution.
Rolling shutter and Grill door at entrance of the power house will be painted with synthetic enamel having low VOC content of approved brand and shade.

J. STRUCTURAL GLAZING BY REPLACING GLASS BRICKS Providing and fixing fully unitized system structural glazing in fixed panels specially designed based on rain screen and pressure equalized drainage system and drawings approved by the architects using powder coated 50 micron thickness using pure polyester powder of NERO COAT / BERGER make extruded aluminium sections. The split mullions & transom will be fixed to RCC Beams / columns with adequately designed M.S. brackets/insert plates etc. Providing and fixing 6 mm thick toughened classic Dark Blue heat reflective glass manufactured by Saint Gobain France and fixing glass with structural silicon of DOW Coning / GE / WACKER make. Sealing the glazing system with specially designed extruded rubber gaskets EPDM make to prevent water penetration as per BIS or BS Standards, all complete as per manufacturer's specification. Glass will be fixed on sub frame of section No. 14454 (19.05 x 19.05 x 1.63) using structural sealent at horizontal position & giving sufficient time to gain proper strength of structural sealent before fixing to the main frame. Gasket between main frame (22713 – 101.6x57x2.00) & sub frame will be filled up by weather sealent to take care of seismic effect, SS clip (mechanical system) will be provided to hold the glass in addition to structural sealent.
Main frame – 22713 (101.6x57x2.00)
Sub frame – 14454 (19.05x19.05x1.67
Equal leg angles – (12.7 x 12.7 x 3.18)
All section no. is of Jindal make or approved equivalent make

K. TOILET AND DRINKING WATER AREA

i. Flooring

The Toilet and Drinking water area will have size of 600x600x9.5mm first quality full body/double charged Vitrified tiles with water absorption's less than .08% and conforming to IS : 15622 of approved shade and brand will be used
Entrance Steps will be of 20 mm thick granite flooring with bull nosing of ruby red shade and riser will be 18 mm thick black granite.

ii. Dadoing:

Toilet and drinking water area will have dadoing upto 2100 mm with ceramic tiles of approved shade and size 200 mm x 300 mm.

iii. Water Supply and Sanitary Fixtures:

All Sanitary fixtures will be of approved make from Hindware / Parryware / jaquar / Neyser. Two number of each 1000 litre PVC water tank will be provided at the terrace for supply of water .

iv. Doors, Windows and Ventilators:

PVC panel door (laminated) with PVC door frame of approved shade and brand). For window Glazed anodized aluminum (minimum 15 micron thickness) door, widow, will be used (as per schedule of enclosed section no.)

v. Painting on wall and ceiling

All interior wall and ceiling will be coated with approved shade of water based low VOC led free Acrylic emulsion paint over plaster of paris / wall putty of 1st quality. A minimum of two finishing coats of paint over a primer will be provided.

L. TECHNICAL SPECIFICATIONS OF FURNITURE IN OFFICE, CONFERENCE HALL & CONTROL ROOM

i. Workstation

L-Shaped workstation 1500x1500 overall worktop size. (Four person module with 1200 high cross partition in between)

1.1 Partitions (Tile based) attached with work station

The double skin partition system will consist of powder coated metallic frames, interchangeable panels of marker / writing white panels, / powder coated metallic tiles, plain /frosted glass minimum 5mm thick, powder coated aluminum capping and curvilinear trimmings, heavy duty connectors etc. complete. The entire system will be modular based, free standing but rigid, without any toxic material, and flexible to accommodate changes. Partition system will be hollow type with concealed wire way ducts for cable management of power, communication and LAN. Metal Tile Sheets will be of minimum 0.8mm thickness with stiffener as per IS: 513-1994 or other approved IS.

Main frame work of a partitions will be double walled, 1200, unless otherwise specified, with facility to extend in all direction. These should be firmly secured to work station /ground, with no crippling or chasing of Floors.

The frame work and partition system including tiles will be of sound structural design to support mounted storages, work surfaces and supplementary components. Such hanging slots will be concealed and provided with safety catches to prevent unintended pull fall out. The partitions will be designed to support work surfaces on either or both faces of the modules. Partition will be assembled with proper fittings to form basic skeleton structure on to which panels are slide in /snap tiles finished in 50 micron (minimum) powder coating. **Overall thickness of partition system will be minimum 50 mm**.

i) All partition main frameworks will have following minimum components & dimension:

a) Vertical members/mainframe

CRCA mild steel sections with 50 micron powder coated / Extruded anodized / powder coated aluminium sections & thickness varying from 1.2mm to 2.1mm.

b) Bottom Horizontal members

CRCA mild steel (Graded)

'C' channel

c) Top Horizontal members

1.2mm thick M.S. tube / composite section made out of 0.8mm thick CRCA in parts welded together having enough stability.

d) Intermediate members.

Minimum two numbers horizontal members will be provided at intermediate excepting top and bottom with additional member above/below worktop will be provided for raceways. All partition will have continuous raceway at the bottom of all partition.

e) Leveler bracket and leveler

Leveler bracket will be 2mm thick CRCA with M4 nut to be weld for connecting vertical channel with M8 nut to be weld for better stability along with M8 leveler and will have minimum 20mm adjustment.

f) Cover section assembly

Cover sections (0.8mm thick CRCA) should be fixed with 2mm bracket / sliding arrangement for the panels.

g) End post

End post will be of minimum 1.5mm thick CRCA of minimum 50 micron powder coated with cap provided at the end or in between to provide strength to the free standing partition of height 1200/1500 mm.

h) Vertical & Horizontal Trim with cap

Vertical & Horizontal Trim will be of 1.2mm thick (minimum) aluminium curvilinear sections.

Staggered height junction will be of same profile of vertical & horizontal trim and the profile at junction will match with the top profile of the trim. Universal cap / end cap and junctions will be of die cast

i) Raceway

Raceway- There will be raceway (and not mounting plates) at 2 different levels (one continuous raceway at skirting level & 2nd part raceway of 750 mm long below worktop), for each modular workstation. Each raceway will be 750mm long and 100 to 150mm high. Total length of raceway per workstation will be minimum 4500 mm.(for L- shaped)

j) Tile size

100mm to 150mm high skirting & There will be 2 module tiles above skirting (externally). No. of internal tiles to match with the technical requirements.

1.2 Worktops: (Post form)

i) The worktop will be of post form finished at the front.

ii) All the work surfaces will be of minimum 25mm thick pre-laminated exterior grade (PF) particle board finished with 0.6mm (minimum) post formed laminate (approved make) on top & 0.6mm balancing laminate (approved brand) on bottom as per IS:12823:1990 or other approved IS of approved colour & shade. All the edges of the board will be sealed. All the work surfaces will be with capability of having panel – hung system, will be sturdy and rigid against vibration and capable of supporting heavy electronic equipment. Where ever required vertical/horizontal supports will be provided. The clear depth & length of the table will be 750/600 & 1500/750 respectively. Worktop will be fixed at 700-750 mm (approx.) above floor finish level.

iii) Big size cantilever brackets of approximate size 430mm for 600mm (depth) worktop end brackets/angle brackets / cantilever bracket assembly will be of minimum 2mm thick CRCA and support the work surfaces. They should be capable of being assembled on either side of partition. Small bracket will be as per manufacturer detail.

Work surfaces will be provided with two openings of 80mm Ø (cable outlet two pieces, round with swiveling section in cover) for cables as per requirements.

1.3 Gable Ends. (Pre laminated particle board)

Both side 25mm thick (minimum) pre laminated partition board (both side laminate of approved makes, colour & shade) with PVC edge strip (all sides) upto bottom of table top with proper leveler. The bottom lipping in the board should be of metal for fixing leveler. It will have rectangular shape.

1.4 Mobile Drawer Unit with Castors (minimum size 435x450 mm depth)

All metal (including bottim & back parts) Mobile Drawer Unit of min. size 435 (W) x 450 (D) x 700mm (H) with castors comprises of 2 (two) nos. small drawers and 1 (one) no. big drawer unit made of powder coated minimum 0.8mm thick CRCA with antirust treatment with heavy duty telescopic channel (ball bearing slides) & the carrying capacity of the channels will be 40 kg/pair and upper drawer will have two compartments. Wheel should have minimum 35mm diameter with a load bearing capacity of 25 kg/per castor. Pedestal should have central locking system. All drawer should have separate recess handle / flush type handle / built in pulling system.

1.5 Keyboard Tray

Keyboard tray including sliding mouse tray will be minimum 550mm wide made of minimum 1.2mm thick CRCA mild steel body with anti-rust treatment. This will be finished with powder coating (minimum 40-50 micron). The key board tray will be fixed below table top with drawer runner (25 kg/pair) for easy sliding.

1.6 CPU Trolley

CPU Trolley will be made of powder coated (minimum 40-50 micron) CRCA mild steel (minimum 1.2mm thickness) with anti-rust treatment supported on castor. Adjustment should be such that the trolley width can be adjusted to hold the CPU width varying from 90mm to 180mm (approx).

2. Storage units

2.1 Lateral filing cabinet

i) Lateral filing cabinet, two drawer unit of approx size { (750 (W) x 450(D)x750(H)} with ball bearing slides full extensions of capacities 40 Kg per pair with recess handle / flush type handle / built in pulling system with central locking system (made out of zinc die-cast/alu. Bar, nickel plated). It will be made of CRCA sheet (minimum 0.8mm thick) with powder coating (minimum 40-50 micron) with top covered with approved board matching with worktop with edges sealed with PVC lipping. Shutters made of CRCA (minimum 0.8mm thick)/ both side pre-laminated particle board 25mm thick.

ii) Lateral filing cabinet three drawer unit approx size 750(W) x 450(D)x1050(H) with ball bearing slides full extension of capacities 40 kg/pair with handle/pull out arrangement with central locking systems (Made out of zinc die – cast / Alu. bar, nickel plated). It will be made of CRCA sheet (minimum 0.8mm thick) with powder coating (minimum 40-50 micron) with top covered with approved board matching with worktop

with edges sealed with PVC lipping. Shutters made out of CRCA (minimum 0.8mm thick)/both side pre-laminated particle board 25mm thick.

2.2 Hinge door unit

Hinge door unit (Full height) approx size 900(W) x450(D)x1980(H)}with two leaves shutters & 5 (five), shelves inside. Shutters, made of CRCA/ both sides 25mm thick prelaminated particle board with espagnolette lock (Finish- zinc alloy, nickel plated). It will be made of CRCA sheet (minimum 0.8mm thickness) with powder coating (minimum 40-50 micron) with all front facia covered with CRCA (0.8mm minimum thick)/ Pre-Lam particle board matching with worktop and top covered with approved board matching with worktop with edges sealed with PVC lipping it will have minimum 60 Kg per shelf load bearing capacity.

1. All locks will be of Hafele / hettich make.
2. Leveling bolt & matching nut will be welded with the bottom horizontal members for proper gripping (dia of bolt will be minimum 8mm).

3. Magnetic buttons:

Magnetic button will be of approved quality shade & 40mm approx. diameter. Minimum 4 nos. per work station/executive table will be provided.

4. Conference Table

Supplying conference table of size minimum 6750mm (L) app. 1350 mm (W) app. made of both side pre-laminated particle board (minimum 25mm thick) laminated with 0.8mm laminate of formica / merino / century make and supported on modesty panel made from pre – lam board (minimum 18mm thick) / Steel Leg (minimum 60mm dia meter). Table will have wire management system and facility to extend in future.

A. Executive Tables:

Self supported executive desk (1650x750x750) with worktop made out of pre-lam particle board(minimum 25 mm thk.) with post formed edge on both sides, side return (1350x400x750 mm) made out of pre-lam particle board with post form edge on front side matching with the workstation top. & Mobile pedestal (400x550x585) with 3 drawer unit, it comprises of two nos. small drawers and one big drawer made of powder coated minimum 0.8mm thick CRCA with antirust treatment with heavy duty (40 kg) telescopic channel for two small drawers & bottom big drawer. Keyboard tray as per specification will be provided in the side return. Castor will have minimum 25 kg load bearing capacity. Metal perforated Leg Guard (CRCA sheet) should be provided. Modesty will be of minimum 18mm thk. prelaminated particle board. All exposed edges will be covered with lipping.

5. General

5.1 Castors

a). Load bearing capacity 50 kg/caster for chairs.

b). Load bearing capacity 25 kg/caster all other units

5.2 Office organization (Cable Outlet)

1.Cable outlet - two piece, round with swiveling section in cover & drilling 80 mm dia of plastic (catalogue No. 428.96 304)

5.3 Hinges.

1. Metal concealed Hinges for silent fold system (Opening angle 105 degree min.)
2. Nos. of hinges per shutter will be 2 nos. for 900 height, 3 nos for 1050 height, 4 nos. for 1980 height.

5.4 Drawer Runners

Ball bearing slides full extension, side mounted features of load bearing capacity of 40 kg/pair.

5.5 Locks

1. Espagnolattee locks with accessories should be provided in all shutters of the storage unit.
2. Syms 3000 central locking system for all pedestal.

5.6 CRCA Finish

All CRCA Sections will have powder coating (minimum 50 micron) as per IS 13871:1993.

5.7 Cut Out on Tiles for electrical & LAN points

Cut-out sizes for Electrical, LAN and Telephone Point will be provided by Mecon after placement of order.
Note: All accessories / hardware fittings mentioned above are of M/s Hafele / Hettich make as mention in list of approved make.

6. List of approved make (furniture):

Sl. No.	Items	Name of Manufacturer
a)	Aluminium extrusions	INDAL/HINDALCO/JINDAL
b)	Locks//hardwares/castors/ Drawer runners/cable outlet	M/s Hafele / M/s Hettich
c)	Screw	M/S Nettle / G.K.W
d)	Glazing	M/S Modi / M/S Saint Gobain /M/s Pilkington
e)	Prelaminated Board / Prelaminated particle board	M/S Mangalam Timber product / M/S Merino / M/s Century
f)	Laminate	M/S Formica / M/s.Merino / M/s Century /
g)	Furnishing Fabric	Praveen kumar / Royal Handloom
h)	CRCA	Tata / Jindal/ SAIL

Note: All dimensions shown above are approximate.

7. Chairs

Chairs will be of:

7.1 (Workstation/Discussion/visitor):

Medium back revolving type with approximate minimum size of seat 47cm (W) x 48cm (D) and back – 47.5cm(W)x48cm(H) Armrest will be of hard PP & directly to be fixed with the bottom face of the seat (without any joint). Chair will have synchro mechanism with upright position locking and tilt tension adjustment & height adjustment by hydraulic gas lift mechanism. Foam will have minimum density of 45 Kg/m3 and hardness 20. Each castor will have minimum 50 Kg load bearing capacity. Minimum Nos. of castor will be 5 (five).

7.2 Senior Executives:

High back Revolving type approximate minimum size of seat 50.0 cm (W) X 49.5 cm (D) and back size 48 cm(W) x 51cm (H). Chair will have synchro mechanism with upright position locking and tilt tension adjustment & height adjustment by hydraulic gas lift mechanism. Back rest will be in mesh fabric. Foam will have minimum density of 45 Kg/m3 and hardness 20. Each castor will have minimum 50 Kg load bearing capacity. Armrest will be provided made out of hard PP. Minimum Nos. of castor will be 5 (five).

7.3 GENERAL

a). Fabric will be as per IS: 12467 (Part-1) & (Part-2) 2006 in black color.
b). Seat and backrest cover - made out of ABS
c). Armrest will be of hard PP.
d). For seat of all chair base material will be 9 mm thick ply, for back of C2, C3 & C4 base material will be SS and back for C1 will be 9 mm thick ply.
e). Base of chair- Nylon material.

7.4. Lounge chair (for waiting area)

Lounge chair will have back (separate back for 2 seater & 3 seater) system standing on beam with side frame assemblies. Frame work will be of powder coated MS Pipe of dia 38.1mm x 2mm thick. Foam will have minimum density of 45 Kg/m3 and hardness 20. All member will be powder coated (minimum 50 micron) / SS with adjustable levelers below. It will have approximate size given below:
(i) S2: " "Double seater - 113 cm (W) x 70 cm (D) x 78.5 cm (H) Seat height (43.5 cm)
(ii) S3 " " Triple seater - 164 cm (W) x 70 cm (D) x 78.5 cm (H)Seat height (43.5 cm.
Fabric will be as per IS: 12467 (Part-1) & (Part-2) 2006 in black color.

iii) Centre table

Rectangular center table of size 1000 (W) x 650 (D) x 450 (H) with 12mm thick toughened glass top & 8mm thick toughened glass shelf below table top & 50 x 50 square polished teak wood leg / SS leg system. The supporting system for both the glass will be either polished teak wood framework / SS framework.

Note:

All dimensions shown above are approximate.

Minimum two sets of tools and tackles for maintaining chairs to be supplied.

7.4.1. List of approved make:

Sl. No.	**Items**	**Name of Manufacturer**
a)	Aluminium extrusions	INDAL/HINDALCO/JINDAL
b)	Hardwares/castors/	M/s Hafele / M/s Hettich
c)	Screw	M/S Nettle / G.K.W
d)	Glazing	M/S Modi / M/S Saint Gobain
e)	Furnishing Fabric	Praveen kumar / Royal Handloom
f)	Powder Coating	Epoxy Finish
g)	CRCA	Tata / Jindal/ SAIL

STANDARD ALUMINIUM SECTION NO.

	Sl. No.	Description	Aluminium Section No. (Hindalco Alupuram)	Size	Weight Kg/mtr.
I.	DOORS				
	A.	Normal Door			
	1.	Door Vertical Plain	9239	85x44.5x2	1.365
	2.	Door Vertical	9241	-do-	1.412
	3.	Door Bottom (for upto 1 mtr. Shutter Width)	9208	101.1x44.5x3.1	2.379
	4.	Door Bottom (for more than 1 mtr. Shutter Width)	9212	180x44.5x3.18	3.438
	5.	Door Top	9208	101.1x44.5x3.1	2.379
	6.	Lock Rail	9232	150x44.45x3.2	3.290
	7.	Glazing Clip	4660	19.7x17.8x1.3	0.167
	B.	Twin Style Door			
	1.	Top/Bottom Rail (for 12mm glass thickness)	9211	90x45x3	3.727
	2.	Top/Bottom Rail (more than 12mm glass thickness)	9206	90x45x3.0	3.506
	C.	Frame	8422	120x80x3	3.143
II	WINDOWS				
	A.	Casement Window – 40mm Series			
	1.	Z Shutter	4132	40x28x2.5	0.585
	2.	Hollow Z Shutter	9148	41.50x29x1.5	0.636
	3.	Mullion	9149	63x40x1.5	0.933
	4.	H Shutter/alternative of Sl. No. 2	4133	40x41x2.5	0.638
	5.	Crimping Angle	2081	50x50x4.9	1.177
	6.	Double glazing clip	4134	25x8x1.2	0.132
	7.	Single glazing clip	4135	24x25x1.2	0.166
	B.	Sliding Window			
	1.	2 Track Bottom	4095	61.98x29.70	0.875
	2.	2 Track Side & Top	4096	61.98x29.70	0.778
	3.	3 Track Bottom	4097	92.36x29.70	1.233
	4.	3 Track Side & Top	4098	92.36x29.70	1.067
	5.	4 Track Bottom	4121	123.02x29.70	1.500
	6.	4 Track Side & Top	4120	123.02x29.70	1.293
	7.	Shutter Vertical	9777	39x20x1.5	0.493
	8.	Shutter Interlock	9778	39x20x1.5	0.612
	9.	Shutter Top & Bottom	4148	41x20x1.5	0.472
III.	PARTITIONS				
	A.	Partition (Height more than 1.5 mtr.)			
	1.	Single Partition (Single Glazing)	9205	101.5x44.45x3	2.34
	2.	Double Partition (Single Glazing)	9204	101.5x44.45x3	2.420
	3.	Single Partition (Double Glazing)	9229	101.5x44.45x2.5	2.03
	4.	Double Partition (Double Glazing)	9228	101.5x44.45x2.5	2.00
	B.	Partition (Height upto 1.5 mtr.)			
	1.	Single Partition (Single Glzaing)	9210	63.5x38.1x2.5	1.376
	2.	Double Partition (Double Glzaing)	9207	63.5x38.1x2.5	1.443
	3.	Glazing Clip	4660	19.7x17.8x1.3	0.167

FACILITIES ALREADY INSTALLED FOR THE PROPOSED UNIT:

I. The equipment and piping shall be erected in conformity with the provisions of standards/ specifications and as may be directed by BHEL. The method of welding (Arc, gas, TIG, MIG/MAG or other method) may be indicated in the detailed drawing/ schedules. BHEL engineer will have option of changing the method of welding as per site requirements.

II. On the discretion of BHEL site engineer, which is depending upon the site requirement, some of the material may be directly unloaded in the powerhouse/work site with EOT Carnes or Own crane or suitable alternative own arrangement of contractor. Contractor shall keep record of the same. For such works contractor shall be paid under material-handling work of packages.

III. EOT cranes shall be provided free of hire charges and on sharing basis with OHPC. The contractor will have to provide additional qualified operator for operating the EOT cranes round the clock if required or as per requirement.

IV. Penstock, MIV/IDV, Scroll case, Stay vane, Draft tube, Power House, EOT Crane (2 Nos each of capacity 125/20/5 Ton), Compressed air system (compressors, air receivers), Turbine & transformer oil tanks, Draft tube gate and its hoist and Tailrace are constructed/installed and to be utilized for the proposed Units 1 to 6.

V. Construction drawings and documents shall be provided at site to the contractor for erection of work. The Contractor shall be provided with construction power at 400V, 3-phase for the purpose of the erection/construction under the Contract only at single one point and is chargeable. The Contractor shall make his own arrangements to lay and maintain necessary supply lines for temporary power from a single point. The Contractor shall make his own further distribution arrangement. All temporary wiring must comply with Indian Electricity Rules and Act and will be subject to the customer's inspection and approval before connection to supply and later. Non-availability of power from the customer shall not be an excuse for delay in completion of erection/construction.

VI. On the discretion of BHEL site engineer**, Construction power to other BHEL contractors/vendors shall be provided by contractor on chargeable basis. The charge towards electricity consumption by other contractors shall be decided by BHEL site in-charge.** However electricity bill raised by power supplier is to be paid by contractor. The bill may include fixed charges, minimum consumption charges, taxes, duties etc.

VII. Display of danger board signs in Hindi, Odia and English languages near switches is to be ensured by the Contractor. The Contractor will supply and install all distribution cables, wires and switches, etc. of rated capacity for the work starting from the source of power at his own cost. He will employ Electricians having valid Electrical Licence for carrying out the installations as well as for the maintenance works.

VIII. Bidder shall also install DG set of suitable capacity for backup power in case of power failure as per site requirement for construction power.

IX. Installation, maintenance and operation of 01 No electrically operated MOT Crane of at least 05 T capacity in closed storage shed. The crane shall remain the property of vendor and will have to be dismantled and taken back after completion of work. Approx. span of rail is 10 M, however tenderer to verify the span before sending suitable MOT crane to site.

X. Heaviest consignment to be handled is approx. 40T/or may be higher. The contractor shall deploy of the suitable capacity crane on his own as and when required to complete the work (within the quoted rates). No crane shall be provided by BHEL in storage yard for any purpose.

XI. Dismantling of stator (removal of winding bar segregation of copper, capping and dismantling of stator segments) shall be done in erection pit only. Generator/Transformer/cable etc will be dismantled by segregating copper & iron, aluminium by contractor. Copper materials properly recorded with OHPC and to be stored in PH space provided by BHEL/OHPC and iron materials within 5Km of power house (storage space provided by BHEL/ OHPC).

XII. There is only one rotor erection pit in power house. The ways and means of cutting and dismantling of other rotors (while the assembly of one rotor in rotor erection pit is underway) within transportable limit of power house shall be responsibility of the Contractor. Necessary procedure for the same shall be submitted by the Contractor to owner for information/acceptance.

XIII. Due to tight erection schedule, parallel erection of two stator is envisaged simultaneously. Erection of one stator shall be done in service bay and one stator erection shall be done in pit, contractor to envisage this accordingly.

XIV. In the workshop of OHPC there are Russian equipments/machine like drilling machine, lathe etc. Contractor shall deploy qualified operator as and when required within quoted price.

XV. **Development of furnishing and its maintenance:** Furnishing and maintenance of residential flats & guest houses at site including mess facilities at site and Open storage area, closed storage shed, office premises including Office furniture, equipments etc shall be done by contractor within quoted price. Also providing internet connection, computers & accessories with latest software at site within quoted price (**facilities to be provided as per List at annexure 2**). All the items as per annexure 2 shall be exclusively for BHEL use. The items shall be taken back by the contractor after completion of project in the used condition. Running maintenance (including replacement if required) of above items shall be done by contractor free of cost till completion of project (schedule contract period including extended period). No extra/additional payment shall be made to contractor for arranging the above facility for BHEL at site.

XVI. Chain pulley blocks, jacks, pull lift machines, D-shackles and general T&P shall be arranged by the sub-contractor at his own cost with due test certificates. **Existing old Rotor of all six units having single shaft forging provided with six ribs upon which are shrunk forged discs. Forming thus a rotor body. Induction heating machine required for dismantling of discs is to be arranged by contractor or any suitable arrangement required for dismantling is to be arranged/adopted.**

XVII. Details of Major equipment along with weights & Dimensions, supplied by BHEL & its vendor under this scope are given in (Volume-IA, Part-I, Chapter-IV). However changes on account of change in design may occur, for which no compensation will be payable and contractor shall complete the entire work as detailed in the tender specifications within finally accepted rates/ prices. As per instructions of BHEL site engineer and or due to space constraint at service bay/power house /work site/stores, some of the assemblies, devices like the Stator/rotor lifting devices, hydraulic test device, other T&Ps may require multiple handling and multiple stacking for shifting from power house/work site to BHEL stores and stores to power house /work site. This shall be responsibility of contractor and for this no additional payments shall be made to contractor.

XVIII. The welding electrodes required for site welding/renovation of major components of turbine like Draft Tube, Turbine casing, spiral casing, CW system of turbine, Inlet /outlet pipes of MIV/IDV, some high pressure piping and any other special consumables **which are supplied by manufacturing units** along with plant material shall be issued to contractor for subject work free of cost. Contractor shall maintain proper records for all those consumables and submit the signed copy of consumption certificate (along with respective RA bills) from the respective package Incharge nominated by Engineer Incharge. **However general purpose electrodes for systems like piping of generator transformer/generator and its auxiliaries bus ducts and other auxiliary pipelines etc. Electrodes /filler wires shall be the responsibilities of contractor. The quantities of these electrodes (i.e. general purpose electrodes and aluminum wire/electrode for bus duct) supplied by contractor are to be deposited in BHEL stores prior to start of the work for keeping records and shall be issued by BHEL as and when required.**

XIX. Field efficiency test of (Turbine & Generator) shall be done on all the six units.

XX. **COMMENCEMENT OF GUARNTEE PERIOD:-**The Guarantee period shall commence only after completion & taking over certificate by Customer OHPC of the entire work of this tender. The BHEL engineer shall certify to the contractor the date on which the work is completed & Taking over and the date thereof for commencement of Guarantee Period .The duration of guarantee period shall be as per GCC.

XXI. **PAINTING: -** All the plant equipment's /items shall be painted with required coat of red oxide primer & required coat of synthetic enamel paint, color as per drawings and site requirement. Paint shall be supplied by BHEL supplying units. The quantity to be supplied by manufacturing units is fixed. Contractor has to follow the painting procedure strictly, any deficiency in quantity of paints due to wrong procedure shall be borne by the contractor.

XXII. The contractor shall have to deploy adequate experienced/qualified engineers and supervisors for material handing work, dismantling work and erection, commissioning, pre-commissioning, testing/checking work,

trial run and attending pending points of the units, minimum man-months deployment required shall not be less than the following:-

Sl No	Type of Manpower	Quantity (Nos)	Minimum Man-months
1	Engineer (Degree holders)	02	84
2	Supervisor (Diploma holders)	04	168
3	Welding Supervisor / NDT level-II (Qualified)	01	25
4	Safety supervisor (Qualified)	01	42

The above figures for deployment of engineers and supervisors for material handing work and erection, commissioning, pre-commissioning, testing/checking works are tentative only and **if need for any additional manpower over and above the mentioned figures are required as per site requirement, the same shall be arranged by the contractor at no extra cost to BHEL.** If the contractor fails to deploy the minimum man-months of each above category manpower at appropriate time at Balimela HEP site as per site requirement then deduction shall be made from his bills at the rate of Rs. 50,000/- per man month for Engineer (at Sr No 1) and Rs. 25,000/- per man month for supervisors (at Sr No 2,3,4). If any of the above category is not utilized fully, it shall be converted in to other category keeping in view the rates at the discretion of BHEL.
Utilization report of all above man-months shall be maintained and submitted the signed copy of utilization report certificate (along with respective RA bill) from the respective package Incharge nominated by Engineer Incharge.

XXIII. The contractor under this contract shall also provide services of skilled/semiskilled/unskilled persons for total contract period free of cost exclusively for use by BHEL. This manpower will be required for following services:

- Skilled workers for office, colony, stores.
- Semi-Skilled workers for office, colony, stores.
- Un-Skilled workers for office, colony, stores.

Persons so deployed shall have to work in extended hours whenever required. Workmen provided as per the above provisions shall be fully trained and experienced in the nature of work for which they are deployed.
In case contractor fails to provide above-mentioned manpower 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. During extended contract period, contractor shall continue to provide the above categories of workers for BHEL use. Utilization report of all above man-months shall be maintained and submitted the signed copy of utilization report certificate by the contractor (along with respective RA bill) from the respective package Incharge nominated by Engineer Incharge.

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

3. Time Schedule

MOBILIZATION, TIME SCHEDULE, CONTRACT PERIOD AND GRACE PERIOD

3.1 INITIAL MOBILIZATION:

After receipt of LOA, Contractor shall discuss with Project Manager / Construction Manager/Engineer Incharge regarding initial mobilization. Contractor shall mobilize necessary resources (considering the immediate requirement of the site and agreed by Engineer Incharge) within 2 weeks of issue of letter of award or as per the directive of Project Manager / Construction Manager. Such resources shall be progressively augmented to match the schedule of milestones and commissioning.

3.2 MOBILIZATION FOR DISMANTLING, ERECTION, TESTING AND COMMISSIONING ETC.

The activities for Dismantling, erection, testing etc shall be started as per directions of Construction Manager of BHEL. Contractor shall mobilize further resources as per requirement to commence the work of erection, testing etc as per scope of work, and progressively augment the resources to match schedule of the project.

3.3 COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE

Start of Dismantling/erection work/material handling work activity at site shall be considered as "start of contract period". Site mobilization will not be considered as start of contract period. The contractor has to subsequently augment his resources in such a manner that following major milestones of erection & commissioning are achieved on specified schedules:

SN	MAJOR MILESTONE	START/ COMPLETION
1	Site Mobilization	2 weeks from Award of LOA or as decided by BHEL.
2	Start of contract period (Zero date)	Start of Dismantling/Erection work/Material handling work activity at site as decided by Project Manager of BHEL.
3	Completion of Dismantling & refurbishment of Unit 1&2.	End of 6th Month from zero date.
4	Completion of Erection, testing, commissioning of Unit 1 & 2.	End of 18th Month.
5	Completion of Dismantling & refurbishment of Unit 3 & 4.	End of 20th Month.
6	Completion of Erection, testing, commissioning of Unit 3 & 4.	End of 32th Month.
7	Completion of Dismantling & refurbishment of Unit 5 & 6.	End of 34th Month.
8	Completion of Erection, testing, commissioning of Unit 5 & 6.	End of 46th Month.
9	Completion of all facilities at site including completion of punch point and site closing.	End of 50th Month.

All dates in above schedule are from start of contract period (zero date) and just for an idea to Tenderer. Detail schedule shall be prepared by successful tenderer after discussion with BHEL.

3.4 CONTRACT PERIOD

The contract period for completion of entire work under scope shall be **50 (Fifty) MONTHS** from the "**START OF CONTRACT PERIOD**" as specified earlier.

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

3.5 CONSEQUENCE OF DELAY

In case of delay in completion is attributable to the contractor, BHEL may impose LD on the contractor as per GCC.

4 Tentative Package wise Weight Schedule

Tentative weight schedule/ Details have been given below

Sr. No.	Description	QTY (Nos.)	Total Package wise tentative Weights (MT)
1	Francis Turbine and Accessories	06	540
2	Governing System & Accessories	06	60
3	Turbine MIV & Accessories (BF Valve)	06	150
5	Generator & Accessories	06	2000
6	Static Excitation and DVR	06	
7	11 KV Bus-duct including CT PTs etc	06	120
8	23.4 MVA or 24.45 MVA Generator step up transformers with oil	06	1250
9	Station Transformers, DTT, ET	06	120
10	220V and 48V DC System	01 Lot	80
11	Control & Monitoring system (SCADA System)	01 Lot	120
12	Protection system	01 Lot	10
13	Power and Control cables including cable trays and accessories	01 Lot	250
14	415 V AC Switchgear system, UAT, SST	01 Lot	20
15	Silent DG sets	02	20
16	Illumination System	01 Lot	40
17	Cooling Water system	01 Lot	45
18	Drainage and Dewatering water system	01 Lot	55
19	HVAC System	01 Lot	30
20	Grounding System	01 Lot	40
21	HP & LP Compressed air system	01 Lot	25
22	Fire Fighting system	01 Lot	120
23	Oil filtration system	01 Lot	15
24	220 KV XLPE Cables	01 Lot	450
25	220 KV Outdoor switchyard	01 lot	
26	Elevators	01 Lot	20
27	Electrical workshop equipment	01 Lot	5
28	Mechanical workshop equipment	01 Lot	30
29	Spares tools & Devices and mandatory spares for all above package.	01 Lot	100

Note:- The above weights of items are tentative only and is liable for variation. These are given for only a general idea to vendor. Payment will be made on the lump sum /unit rate/items-wise accepted by BHEL. No claim of subcontractor shall be entertained in case of mismatch of above weights and actual supplied from MUs.

5. Rate Schedule/BOQ

BALIMELA HEP (6X60 MW) DISMANTLING, ETC & Material handling work:

5.1 Contractor shall fully understand equipment description and scope of work before quoting. The scope of work and responsibility of the contractor as mentioned under these specifications shall be covered within the quoted rates.

5.2 The tenderer shall quote the rates as per the rate schedule only. No cutting/ erasing / over writing shall be done.

RATE SCHEDULE CUM BOQ

Sl. No	Description of Works	Lump sum Price ("A") in Rupees (In Figures and word) are to be quoted.
1	**Lumpsum price (A) for the total work as per Tender Specification for "DISMANTLING, ERECTION, TESTING COMMISSIONING, HANDING OVER AND MATERIAL HANDLING WORK OF ENTIRE WORK OF 6x60MW BALIMELA HEP, Distt MALKANGIRI, ODISHA**."	

	ITEM NO	DESCRIPTION OF WORK	Rate in Rupees or Lumpsum (In figures and words)
PART 1 HTG (60% A)	1	LUMPSUM PRICE FOR DISMANTLING, ERECTION, TESTING, COMMISSIONING AND HANDING OVER THE ENTIRE WORK OF 6X60 MW BALIMELA HEP. REFER CLAUSE 2 (CHAPTER-II, VOL-IA, PART-I) APPROX. 4500 MT	**A1= (78 % of '60% A')**
	2	LUMPSUM PRICE FOR MATERIAL HANDLING OF DISMANTLED ITEMS AND HANDING OVER TO CUSTOMER IN THE SCRAP YARD. (CHAPTER-II, VOL-IA, PART-I, SCOPE OF WORK) APPROX. 4800 MT	**A2= (7 % of '60% A')**
	3	RATE IN RS./MT FOR ENTIRE OF WORK AS DEFINED IN THIS TENDER SPECIFICATION IN RESPECT OF RECEIPT, UNLOADING, ITS VERIFICATION PROPER STORAGE PRESERVATION OF PLANT MATERIALS AT PROJECT STORE/POWER HOUSE /WORK SITE AND TRANSPORTATION TO POWER HOUSE/WORK SITE FROM STORE & VICE VERSA AND UNLOADING /HANDED OVER FOR ERECTION. REFER:-CHAPTER-II-(SCOPE OF WORK) OF THIS TENDER (TOTAL APPROX.:- 5500MT)	**15% of '60% A' / 5500**
PART 2 CIVIL (40% A)	4	CIVIL WORKS OF UNITS 1 TO 6 CHAPTER-II-(AS PER SCOPE OF WORK) OF THIS TENDER (C1)	**C1=(25% of '40% A')**
	5	INTERIOR DECORATION OF POWER HOUSE CHAPTER-II-(AS PER SCOPE OF WORK) OF THIS TENDER (C2)	**C2= (75% of '40% A')**

NOTES ON RATE SCHEDULE:

1. Evaluation of bids shall be done on total price ('A') against this Rate Schedule.

2. The rates of different items at Sr No 1 &2 shall be worked out & awarded as per Annexure 'A' & 'B'.

3. The rates of different items at Sr No 4 & 5 shall be worked out & awarded as per Annexure 'C1' & 'C2'.

4. Approximate BOQ is prepared for complete CIVIL WORKS for Power house of UNITS 1 TO 6. Details of BOQ is attached as Annexure C1.

5. BOQ for architectural works for Power house of UNITS 1 TO 6. Detail of BOQ is attached as Annexure C2.

6. In case any activity though specifically not covered in above BOQ/price schedule but the same is covered under scope of work as per contractual specification etc, no extra claim on this account shall be entertained.

7. Annexure 2 regarding Development of furnishing and its maintenance at residential flats & guest houses at site including mess facilities at site and Open storage area, closed storage shed, Site office premises including Office furniture, equipments etc.

8. In case of any mismatch in Rate and amount on Price discrepancy, the same will be dealt as per clause No. 1.4 of GCC.

6. Terms of Payment

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

6.2 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.

6.3 Shortage / damage reports to be submitted on BHEL standard materials management forms. No payment shall be released till the contractor submits these reports and are verified by the Engineer.

6.4 PRICE VARIATION COMPENSATION- Clause no 2.17 of GCC, is not applicable, **the contract is a firm price contract during the entire period of contract execution as well as extension if any due to delay attributable to either party.**

6.5 RETENTION AMOUNT AND PAYMENTS:- Retention amount shall be withheld from each RA bill as per provision of clause 2.22 and 2.23 of GCC regarding retention amount and payments

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

6.6.1 Interest bearing recoverable advance: Not Applicable (clause No. 2.13 of GCC).

6.6.2 PROGRESSIVE PAYMENT SHALL BE RELEASED ON PRORATA BASIS

PART 1 ITEM 1 OF THE RATE SCHEDULE

100 % of contract rate of item No. 1 of rate schedule shall be payable as detailed **in Annexure -A (**enclosed)

NOTE: Further break-up and/or minor changes in the Annexure A referred above, if required depending upon the site conditions, can be done at site entirely at the discretion of BHEL site.

PART 1 ITEM 2 OF THE RATE SCHEDULE

100 % of contract rate of item No. 2 of rate schedule shall be payable as detailed **in Annexure -B (**enclosed)

NOTE: Further break-up and/or minor changes in the Annexure B referred above, if required depending upon the site conditions, can be done at site entirely at the discretion of BHEL site.

PART 1 ITEM 3 OF THE RATE SCHEDULE

i. 15 % of the rate shall be payable on prorate basis after the materials are safely unloaded by using their (vendor) Cranes, shifted to stores and updating in store material register / store stocks registers as per BHEL practices such as GR/LWB/loading advice/box packing slip subject to furnishing of following information along with the bills as per above clause.

- Proof of claim lodged with Railways/Transporters in respect of shortage/open delivery.
- Material Management forms duly filled/Records generated in stocks (Stock registers and computers) and certified by BHEL Engineer.

ii. **25% of** the rate shall be payable on prorata basis after verification, stacking /re-stacking safekeeping, in line with documents and records as per BHEL standards is ensured. Opening of cases/ repacking, wherever necessary (with contractors own T&P and labour), updation of verification records, filling other reports & submission of information as per Material management forms by contractor immediately. Verification of materials are to be completed within two weeks of receipt of packages at site from BHEL MU's/ BHEL Vendor works failure of which 20% out of 25% shall be forfeited as certified by BHEL Engineer. Required Performa would be supplied by site.

iii. **10%** of the rate shall be payable on pro-rata basis for preservation till these are loaded on truck/trailer for transportation to Power house/work site and erection completed/done.

iv. **15**% of the rate shall be payable on prorate basis after the materials are safely loaded on truck/trailer by using their own cranes for transportation to Power house/work site/valve house area.

v. **20%** of the rate shall be payable on pro-rata basis on completion of transportation of the items to Power house/Work site and vice versa.

vi. **15%** of the rate shall be payable on prorate basis after the materials are safely unloaded at power house /work site by using EOT cranes/ their own Cranes and handed over to erection agency.

Note: - If non availability of EOT Cranes at power house, the contractor shall use his own crane or make alternative arrangement which is acceptable to BHEL site engineer for material handling work.

PART 2 ITEM 4 & 5 OF THE RATE SCHEDULE

- **Payment terms as per standard terms and conditions as per civil package.**
- The 'Engineer' will certify regarding the actual work executed in the measurement books and bills, which shall be accepted by the contractor in measurement book.
- The Contractor shall be paid monthly running bill as per chapter – X of SCC and Clause Nos. 2.22 & 2.23 of GCC. The format for billing shall be approved by BHEL before raising invoices.
- The contractor on certification of the BHEL Engineer at site is entitled for payments of his running bills which shall be subject to any deduction/retention specifically under clauses 2.22 of GCC and 10.0 of SCC.

7.0	**TAXES & DUTIES**
7.1	**Goods & Service Tax (GST)**
	GST is likely to be implemented in near future (possibly w.e.f 01.07.2017). With the implementation of GST, taxes as applicable under GST shall be payable extra by BHEL. This shall be restricted to the direct transaction between BHEL and its Contractor only. **As the execution of work is likely to fall within GST regime, the contractor may quote their price net of Input credit benefits available to them under GST regime after taking note of the applicable provision of tax rates, rules, regulation under GST regime. The contractor has to ensure compliance of all the rules, regulations under GST laws so that benefit of inputs are not denied to BHEL by respective authorities.** **Any default due to non compliance of GST provisions by Contractor and affecting interest of BHEL shall be to contractor's account.** **Wherever the GST laws permit more than one option or methodology for discharging the liability of tax/levy/duty, BHEL will have the right to adopt the appropriate one considering the amount of tax liability on BHEL/Client as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the Contractor for discharging the obligation of BHEL in respect of the tax liability to the Contractor under GST**. **However in case of any deferment in GST implementation due to any reason, the provisions regarding Taxes Duties in the transition period shall be applicable as under.**
7.2	**Taxes Duties (Applicable in pre GST Regime)**
	The contractor shall pay all (save the specific exclusions as enumerated in this contract) taxes, fees, license charges, deposits, duties, tools, royalty, commissions or other charges which may be levied on the input goods & services consumed and output goods & services delivered in course of his operations in executing the contract. In case BHEL is forced to pay any of such taxes, BHEL shall have the right to recover the same from his bills or otherwise as deemed fit. However, provisions regarding **Service Tax & Value Added Tax (VAT)** on output service shall be as per following clauses.
7.2.1	**Service Tax & Swachh Bharat Cess (SBC) & Krishi Kalyaan Cess (KKC)**
7.2.1.1	Service Tax, Swachh Bharat Cess (SBC), Krishi Kalyan Cess (KKC) on output Services are excluded from contractor's scope; therefore contractor's price/rates shall be exclusive of Service Tax, Swachh Bharat Cess and Krishi kalyan Cess as applicable.

7.2.1.2	Contractor shall obtain prior written consent of BHEL before billing the amount towards such taxes. Where the Service Tax Act permit more than one option or methodology for discharging the liability of tax/levy/duty, BHEL will have the right to adopt the appropriate one considering the amount of tax liability on BHEL/Client as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the Contractor for discharging the obligation of BHEL in respect of the tax liability to the Contractor. Contractor shall submit to BHEL documentary evidence of Service Tax registration certificate specifying name of services covered under this contract.
7.2.1.3	**For the purpose of claiming any Service Tax and SBC & KKC from BHEL, the following procedure shall be adopted:**
7.2.1.3.1	Contractor shall submit serially numbered Service Tax,SBC & KKC Invoices signed by him or a person authorized by him in respect of taxable service provided, and shall contain the following, namely:
7.2.1.3.2	The name, address and registration number of the contractor
7.2.1.3.3	The name and address of the party receiving taxable service (BHEL)
7.2.1.3.4	Description, classification and value of taxable service provided and
7.2.1.3.5	The Service Tax, Swachh Bharat Cess (SBC) and Krishi Kalyaan Cess (KKC) payable thereon.
7.2.1.3.6	The service invoice for output services provided should show service tax and the SBC& KKC amount separately
7.2.1.3.7	All the five conditions shall be fulfilled in the invoice for payment of Service Tax and SBC& KKC by BHEL. Where more than one nature of Service as per Service Tax act is involved in the execution of contract, the invoice mentioned above shall contain the breakup of values for each nature of Service.
7.2.1.3.8	Name and address of the Contractor should be same in the service tax invoice and monthly bill as it is in the service tax registration certificate. Any change in the name and address should be supported by documentary evidence duly certified by the authorized signatory.
7.2.1.3.9	Purpose of above requirements, inter-alia, is to enable availment of Cenvat credit by BHEL. As per recent amendments, Time restrictions for taking Cenvat credit is one year from date of invoice. Hence subcontractor must submit its invoice within 30 days from the date of completion of service. Wherever Cenvat credit could not be availed by BHEL due to delay in submission of invoices or for any other reasons attributable to contractors, Liability towards loss of such Cenvat credit shall be passed on to sub-contractors.
7.2.1.3.10	The documentary evidence of deposition of service tax and SBC& KKC is to be submitted at the earliest opportunity.
7.2.1.3.11	The payment or service tax and SBC& KKC as per clause no 7.2.1 is restricted to the direct transactions between BHEL & its sub-contractor only.
7.2.2	**Value Added Tax (VAT)**
	As regards Value Added Tax (VAT) on transfer of property in goods involved in works, the price quoted by the contractor shall be exclusive of same. In case

	contractor opts for composition, it will be with the prior express consent of BHEL. The VAT rules permit more than one option or methodology for discharging the liability of tax/levy/duty and BHEL will have the right to adopt the appropriate one considering the amount of tax liability to BHEL/Client as well as procedural simplicity with regard to assessment of liability. The option chosen by BHEL shall be binding on the contractor for discharging the obligation of BHEL in respect of tax liability to the contractor. BHEL also reserves the right to demand Tax Invoice under the relevant VAT ACT from the contractor. Where such taxes are required to be paid by the contractor subject to above, this will be reimbursed on production of proof of payment made to the authorities by the contractor. The contractor has to take all necessary steps to minimise tax on input goods by purchasing the materials from registered dealers of the concerned state only.
7.2.3	**Modalities of Tax Incidence on BHEL**
	Wherever the relevant tax laws permit more than one option or methodology for discharging the liability of tax/levy/duty, BHEL will have the right to adopt the appropriate one considering the amount of tax liability on BHEL/Client as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the Contractor for discharging the obligation of BHEL in respect of the tax liability to the Contractor.
7.2.4	**New Taxes/Levies (applicable for pre GST period)**
7.2.4.1	In case the Government imposes any new levy/tax on the output service/ goods/work after award of the contract, the same shall be reimbursed by BHEL at actual. The reimbursement under this clause is restricted to the direct transaction between BHEL and its subcontractor only.
7.2.4.2	In case any new tax/levy/duty etc. becomes applicable after the date of Bidder's offer, the Bidder/Contractor must convey its impact on his price duly substantiated by documentary evidence in support of the same before opening of Price Bid. Claim for any such impact after opening the Price Bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.
7.2.4.3	The Vendor has to ensure compliance of all laws and taxes so that benefit of inputs are not denied to BHEL by respective authorities.
7.2.4.4	Payment shall be released against RAB provided proper invoices in conformity with the relevant provisions of new Act/Rules have been issued by sub-contractor/vendor. Later on if it is noticed that input Tax Credit is not available to BHEL due to reasons attributable to sub-contractor /vendor, the same shall be recovered from next bill.
7.3	**BUILDING & OTHER CONSTRUCTION WORKERS (REGULATION OF EMPLOYMENT AND CONDITIONS OF SERVICE) ACT, 1996 (BOCW A AND RULES OF 1998 READ WITH BUILDING & OTHER CONSTRUCTION WORKERS CESS Act, 1996 & CESS RULES, 1998.**
	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:-

7.3.1	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.
7.3.2	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.
7.3.3	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.
7.3.4	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.
7.3.5	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.
7.3.6	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.
7.3.7	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.

8. Facilities Matrix in the scope of contractor/BHEL:

BHEL/OHPC shall provide limited open space for site office and store free of rental charge. It is the responsibility of the contractor to construct temporary sheds for his own use and to dismantle and clear the site after completion of work or as and when required, as a part of his scope of work as per the instructions of BHEL Engineer.

BHEL/OHPC shall provide space for labour colony. Charges for the same if any shall be decided in consultation with OHPC/BHEL. Contractor shall have to build his own colony/ quarters for his workmen/ staff OR can take houses on rental basis in nearby places. Contractor shall be responsible for providing all necessary facilities to staff and workmen like construction of residential accommodation with electricity & water inside the rooms, proper sanitation, transport, medical facilities etc. at his own cost as required under various labour laws and statutory rules and regulations. Electricity & water connection are to be obtained from the statutory body for labour colony & residential purpose. Running charges are to be born-by contractor.

Contractor has to arrange their own DG sets, 1 no. of 125 kVA (rating is only indicative, however bidder has to examine the capacity as per requirement) for Power House area for execution of complete scope of work including construction power for power house, switchyard, other work sites, stores and BHEL office etc within the awarded rates.

The contractor shall have to arrange the water for construction purpose by himself for powerhouse within the awarded rates. Any further distribution will also be the responsibility of the Contractor as a part of his work.

Provision of distribution lines for electric power from the central points/DG sets to the required places of use (like power house & other construction sites, switchyard, BHEL office, stores etc) 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.
On the discretion of BHEL site engineer**, Construction power to other BHEL contractors/vendors shall be provided by contractor on chargeable basis. The charge towards electricity consumption by other contractors shall be decided by BHEL site in-charge.** However electricity bill raised by power supplier is to be paid by contractor. The bill may include fixed charges, minimum consumption charges, taxes, duties etc.

No compensation for idle labour or extension of time for completion of work will be given to contractor unless provided for elsewhere in the tender.

Adequate lighting arrangement such as flood lights, hand lamps and area lighting shall be arranged by the contractor at the site of his work areas within finally accepted rates.

On completion of work **or** as and when required by BHEL, all the temporary buildings, structures, pipe lines, cables etc. shall be dismantled and levelled and debris shall be removed as per instruction of BHEL by the contractor at his cost. In the event of his failure to do so, the Engineer will get it done and expenses incurred shall be recovered from the contractor along with prevailing overheads. The decision of BHEL Engineer in this regard shall be final.

PART I: ESTABLISHMENT/FACILITY

Sl.No	Description	Scope / to be taken care by		Remarks
		BHEL/ OHPC	Bidder	
1.1.0	**ESTABLISHMENT**			
1.1.1	**FOR CONSTRUCTION PURPOSE:**			
A	Open space for office	Yes		Free of rental charge
B	Open space for storage	Yes		Free of rental charge
C	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
D	Bidder's all office equipments, office / store / canteen consumables		Yes	
E	Canteen facilities for the bidder's staff, supervisors and engineers etc		Yes	
F	Firefighting equipments like buckets, extinguishers etc		Yes	
G	Fencing of storage area, office, canteen etc of the bidder		Yes	
1.1.2	**FOR LIVING PURPOSES OF THE BIDDER**			
A	Open space	Yes		Charges for the same if any shall be decided in consultation with OHPC/BHEL
B	Living accommodation		Yes	
1.2.0	**ELECTRICITY**			
1.2.1	Electricity For construction purposes		Yes	Chargeable
1.2.1.1	Single point source at (i) Power house area (ii) Switchyard area (iii) Store area		Yes	1) Power supply at 400V, 3 Phase, 50HZ at single suitable point shall be arranged By BHEL/customer. However electricity bill raised by power supplier is to be paid by bidder. The bill may include fixed charges, minimum consumption charges, taxes, duties etc. 2) Bidder shall also install his 125 KVA (rating is only indicative, however bidder has to examine the capacity as per requirement) silent type DG set for construction power and for backup power as per site requirement.

Sl.No	Description	Scope / to be taken care by		Remarks
		BHEL/ OHPC	Bidder	
1.2.1.2	Further distribution for the work to be done which include supply of materials and execution		Yes	
1.2.1.3	Running and its maintenance		Yes	
1.2.1.4	Payment of electricity consumption		Yes	As per bill of power supply agency up to completion of project.
1.2.1.5	Maintenance of lighting, distribution boards of power at suitable working areas		Yes	
1.2.1.6	Providing of the consumables such as sockets, switches, MCCB, bulbs etc.		Yes	
1.2.2	Electricity for the office, stores, canteen, labor colony etc of the bidder which include:		Yes	
1.2.2.1	Distribution from single point including supply of materials and service		Yes	
1.2.2.2	Supply, installation and connection of material of energy meter including operation and maintenance		Yes	
1.2.2.3	Duties and deposits including statutory clearances for the above		Yes	
1.2.2.4	Living facilities for office use including charges		Yes	
1.2.2.5	Demobilization of the facilities after completion of works		Yes	
1.2.3	POWER for the office, stores, etc of the bidder & BHEL Stores		Yes	
1.2.3.1	Responsibilities of obtaining connection		Yes	
1.2.3.2	Charges for obtaining connection		Yes	
1.2.3.3	Payment of electricity consumption		Yes	
1.2.3.4	Distribution from single point including supply of materials and service		Yes	

Sl.No	Description	Scope / to be taken care by		Remarks
		BHEL/ OHPC	Bidder	
1.2.3.5	Demobilization of the facilities after completion of works		Yes	
1.3.0	**WATER SUPPLY**			
1.3.1	For construction purposes:			
1.3.1.1	Making the water available at single point		Yes	
1.3.1.2	Further distribution as per the requirement of work including supply of materials and execution		Yes	
1.3.2	Water supply for bidder's office, stores, canteen etc		Yes	
1.3.2.1	Making the water available at single point		Yes	
1.3.2.2	Further distribution as per the requirement of work including supply of materials and execution		Yes	
1.4.0	**LIGHTING/ ILLUMINATION**			
1.4.1	For construction work (supply of all the necessary materials) 1.At office storage area 2.At the preassembly area 3.At the construction site /area		Yes	
1.4.2	For construction work (execution of the lighting work/ arrangements) 1.At office storage area 2.At the preassembly area 3.At the construction site /area		Yes	
1.4.3	Providing the necessary consumables like bulbs, switches, etc during the course of construction		Yes	
1.4.4	Lighting for the living purposes of the bidder at the colony / quarters		Yes	
1.5.0	**COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER**			

Sl.No	Description	Scope / to be taken care by		Remarks
		BHEL/ OHPC	Bidder	
1.5.1	Telephone, fax, internet, intranet, e-mail etc		Yes	
1.6.0	**COMPRESSED AIR SUPPLY**			
1.6.1	Supply of Compressor and all other equipments required for compressor and compressed air system including pipes, valves, storage systems etc		Yes	
1.6.2	Installation of the above system and operation and maintenance of the same.		Yes	
1.6.3	Supply of the all the consumables for the above system during the contract period		Yes	

PART II ERECTION FACILITIES

Sl.No	Description	Scope / to be taken care by		Remarks
		BHEL/ OHPC	Bidder	
2.1.0	Engineering works for E&M construction	Yes		
	Engineering works for Civil work		Yes	In consultation with BHEL
2.1.1	Providing the erection drawings for all the equipments covered under this scope	Yes		
2.1.2	Drawings for construction methods	Yes	Yes	In consultation with BHEL
2.1.3	As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes	Yes	Yes	As Built drawing to be prepared by BHEL. Bidder to help BHEL in making as built drawings
2.1.4	Shipping lists etc for reference and planning the activities	Yes		
2.1.5	Preparation of site erection schedules and other input requirements	Yes	Yes	Bidder to prepare in consultation with BHEL

Sl.No	Description	Scope / to be taken care by		Remarks
		BHEL/ OHPC	Bidder	
2.1.6	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments	Yes	Yes	To be jointly done on regular basis
2.1.7	Weekly erection schedules based on Sl No 2.1.5		Yes	
2.1.8	Daily erection / work plan based on Sl No 2.1.7		Yes	
2.1.9	Periodic visit of the senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two months.		Yes	
2.1.10	Preparation of preassembly bay		Yes	

A	**TOOL & PLANTS (T&Ps)- INDICATIVE LIST OF T & Ps**	
Sl. No.	**EQUIPMENT**	
1	General purpose Hand tools	As per requirement
2	Drilling Machines1/4", 1/2", 3/4", 1" & 1.5”	As per requirement
3	Welding Machines-	06 Nos -As per requirement
4	Gas cutting set	As per requirement
5	Trucks 50T	01No -As per requirement
6	Trucks 20T	01No -As per requirement
7	Lorries /Trailer of adequate capacity	01No -As per requirement
8	Hydra -14 T	01No -As per requirement
9	Hydraulic Crane 55 Ton	01 No – As per requirement
10	Torque Wrenches up to 2000 NM.	As per requirement
11	Fork lift – 3T -01 No	As per requirement
12	Impact Wrench (Pneumatic) up to 2400 NM-	As per requirement
13	Chain pulley block of various capacities (2T, 5T, 10T,20T), Pull lift	As per requirement
14	Turn Buckle (2T, 5T, 10T etc)	As per requirement
15	Hydraulic / Mechanical Jacks of various capacities (5-10-20-100T)-	As per requirement
16	Air Arc Gouging Arrangement	As per requirement
17	Hydraulic pump (hand operated).	As per requirement
18	125 KVA DG set (rating is only indicative, however bidder has to examine the capacity as per requirement)	01 No As per requirement
19	MIG Welding machine set	As per requirement
20	Concrete Mixer M/C Of Suitable Capacity	As per requirement
21	Concrete Vibrators	As per requirement
22	JCB, Excavator, Dozer, Jack Hammer With Compressor, Vibro Rollrers (8-12 Mt)	As per requirement
23	Trucks/lorries/tractors/dumpers	As per requirement
24	Water tanker	As per requirement
25	Dewatering pump	As per requirement
26	Winches	As per requirement
27	Concrete mixer m/c of suitable capacity	As per requirement
28	Precision tools (IMT) TENTATIVE QUANTITY- As per requirement. 1.0.02 accuracy block level / Dumpy level with accessories / Theodolite work station 2.Inside micrometer / Outside micrometer-0-25, 25/50, 50-75, 75-100, 100-150 3.Vernier calipers 150, 300 / Telescopic gauge / Slip gauge / Feeler gauges 4.Dial gauge with magnetic stand	
NOTES	1. The above list is only indicative and these T&Ps may not be required for entire contract period but contractor will ensure that these T & Ps are provided as per need. Contractor will assess actual quantity and period of requirement based on his experience. **Contractor has to mobilize / maintain adequate numbers of T& P for meeting the work schedule and intermediate milestones as notified by BHEL Engineer.** 2. Other terms and conditions regarding T&Ps / MMEs please also refer clause for T&Ps & MMEs in SCC. 3. All the tools and plants required for this scope of work are to be arranged by the contractor within the quoted rates. The list is suggestive in nature. Any additional T&Ps required to be arranged by the contractor. 4. If work gets delayed due to non-availability of T&Ps, BHEL reserves the right to get the work done at the risk and cost of contractor without prejudice to rights of BHEL as in GCC.	

B	**MONITORING AND MEASURING EQUIPMENTS (MMEs)- INDICATIVE LIST OF MMEs TO BE PROVIDED BY CONTRACTOR AS PER REQUIRMENT AT SITE**
SL NO	**EQUIPMENT**
1	General purpose Hand tools-
2	Digital/Analog Multi-meter AC & DC-
3	Megger 0-1000-2000-5000V
4	Primary current injection kit
5	Tong Testers DC 30/60/300 A
6	Digital Multimeter 4&half digit
7	Phase sequence indicator 110-450V
8	Frequency meter 0-100 HZ (0-110-230-415 V)
9	Single phase variac 0-220 V, 8A
10	Three phase variac 0-415,15A
11	Digital micro Ohm meter
12	A.C. H.V. Test Kit
13	Dead weight Tester for calibration of pressure gauge.
14	Precision Thermometer
15	Sound level meter 150 db.
16	Digital Handhold Temperature meter
17	Digital Recorder
18	Total station
19	Auto level
20	Measuring tape
21	Plumb bobs
22	Compression strength testing equipment
23	Construction material test equipment
24	Concrete cube mould (150mm x 150mm x 150mm)
25	Concrete slump cone
26	Coarse aggregate sieves & sand sieves
27	Sieve shaker
Notes:	The above list is only indicative and these MMEs may not be required for entire contract period but contractor will ensure that these T & Ps are provided as per need. Contractor will assess actual quantity and period of requirement based on his experience Other terms and conditions regarding T&Ps / MMEs please also refer clause for T&P& MMEs in SCC. All the MMEs required for this scope of work are to be arranged by the contractor within the quoted rates. The list is suggestive in nature. Any additional MMEs required to be arranged by the contractor. If work gets delayed due to non-availability of MMEs, BHEL reserves the right to get the work done at the risk and cost of contractor without prejudice to rights of BHEL as in GCC.

LIST OF T&P BEING PROVIDED BY BHEL FOR USE OF CONTRACTOR FREE OF HIRE CHARGES ON SHARING BASIS

S.NO.	EQUIPMENT	CAPACITY	QTY
1.	EOT CRANE (Power House)	125/20/5 MT	02

NOTE: The above mentioned suitable capacity crane without slings & lifting tackles will be provided by BHEL on sharing basis. The operation and maintenance of cranes shall be the responsibility of contractor. The fuel/power shall be also given by contractor.

1. EOT cranes will be provided by BHEL free of hire charges & on sharing basis for subject work with exclusions as advised. Routine maintenance shall be taken care by the contractor under this scope of work. However, contractor will not be entitled for any compensation due to non-availability of EOT crane.
2. The contractor will have to provide qualified operator adequate in numbers for operating the mobile and EOT cranes round the clock if required or as per requirement.
3. All other terms & conditions shall be as per SCC clause no. 4.2.1 & 4.2.2.

UNPRICED RATE SCHEDULE

Scope of Work: - DISMANTLING, ERECTION, TESTING COMMISSIONING, HANDING OVER AND MATERIAL HANDLING WORK OF ENTIRE WORK OF 6x60MW BALIMELA HEP AT Distt MALKANGIRI, ODISHA.

Sl. No	Description of Works	Lump sum Price ("A") in Rupees (In Figures and word) are to be quoted.
1	Lumpsum price (A) for the total work as per Tender Specification for "DISMANTLING, ERECTION, TESTING COMMISSIONING, HANDING OVER AND MATERIAL HANDLING WORK OF ENTIRE WORK OF 6x60MW BALIMELA HEP, Distt MALKANGIRI, ODISHA."	

NOTE: - The rates of different items for the entire scope shall be worked out & awarded as per Annexure '1'.

ANNEXURE '1'

	ITEM NO	DESCRIPTION OF WORK	Rate in Rupees (In figures and words)
PART 1 HTG (60% A)	**1**	LUMPSUM PRICE FOR DISMANTLING, ERECTION, TESTING, COMMISSIONING AND HANDING OVER THE ENTIRE WORK OF 6X60 MW BALIMELA HEP. REFER CLAUSE 2 (CHAPTER-II, VOL-IA, PART-I) APPROX. 4500 MT	**A1= (78 % of '60% A')**
	2	LUMPSUM PRICE FOR MATERIAL HANDLING OF DISMANTLED ITEMS AND HANDING OVER TO CUSTOMER IN THE SCRAP YARD. (CHAPTER-II, VOL-IA, PART-I, SCOPE OF WORK) APPROX. 4800 MT	**A2= (7 % of '60% A')**
	3	RATE IN RS./MT FOR ENTIRE OF WORK AS DEFINED IN THIS TENDER SPECIFICATION IN RESPECT OF RECEIPT, UNLOADING, ITS VERIFICATION PROPER STORAGE PRESERVATION OF PLANT MATERIALS AT PROJECT STORE/POWER HOUSE /WORK SITE AND TRANSPORTATION TO POWER HOUSE/WORK SITE FROM STORE & VICE VERSA AND UNLOADING /HANDED OVER FOR ERECTION. REFER:-CHAPTER-II-(SCOPE OF WORK) OF THIS TENDER (TOTAL APPROX.:- 5500MT)	**15% of '60% A' / 5500**
PART 2 CIVIL (40% A)	**4**	CIVIL WORKS OF UNITS 1 TO 6 CHAPTER-II-(AS PER SCOPE OF WORK) OF THIS TENDER (C1)	**C1 = (25% of '40% A')**
	5	INTERIOR DECORATION OF POWER HOUSE CHAPTER-II-(AS PER SCOPE OF WORK) OF THIS TENDER (C2)	**C2= (75% of '40% A')**

Note-:

1. Evaluation of bids shall be done on total price ('A') against this Rate Schedule.

2. The rates of different items at Sr No 1 &2 shall be worked out & awarded as per Annexure 'A' & 'B'.

3. The rates of different items at Sr No 4 & 5 shall be worked out & awarded as per Annexure 'C1' & 'C2'.

4. Approximate BOQ is prepared for complete CIVIL WORKS for Power house of UNITS 1 TO 6. Details of BOQ is attached as Annexure C1.

5. BOQ for architectural works for Power house of UNITS 1 TO 6. Detail of BOQ is attached as Annexure C2.

6. In case any activity though specifically not covered in above BOQ/price schedule but the same is covered under scope of work as per contractual specification etc, no extra claim on this account shall be entertained.

7. Annexure 2 regarding Development of furnishing and its maintenance at residential flats & guest houses at site including mess facilities at site and Open storage area, closed storage shed, Site office premises including Office furniture, equipments etc.

8. In case of any mismatch in Rate and amount on Price discrepancy, the same will be dealt as per clause No. 1.4 of GCC.

Annexure C1

S. NO	Description	UNIT	QTY	FACTOR (F)	RATE (Rs.) = FACTOR (F)*C1/ 100000 (Rounded off to two places after decimal)	AMOUNT (Rs) = (Rate X Qty)
Civil Works						
1	DISMANTLING OF RCC	Cum	225	11.3836	-	-
2	DISMANTLING OF PCC	Cum	15	8.0643	-	-
3	DISMANTLING OF BRICK WORK	Cum	15	5.1237	-	-
4	CEMENT CONCRETE M —25 EXCLUDING REINFORCEMENT	Cum	300	28.5102	-	-
5	PCC-M10	Cum	15	14.9925	-	-
6	PRESSURE GROUTING (WITH CEMENT & EPOXY GROUT)	Cum	75	262.5714	-	-
7	REPAIR OF CONCRETE SURFACE	Sqm	2250	1.3277	-	-
8	SHOTCRETING	Cum	75	24.6385	-	-
9	SUPPLYING REINFORCEMENT	MT	22.5	225.2038	-	-
10	PLASTER WITH CEMENT MORTAR	Sqm	6000	1.2431	-	-
11	WHITE/COLOR WASHING INSIDE & OUTSIDE SURFACE	Sqm	12000	0.0713	-	-
12	2 COATS OF CEMENT BASED EPOXY	Sqm	10500	1.5416	-	-
13	SUPPLY & ERECTION OF BOLTS TS	MT	10.5	382.4535	-	-
14	CONSTRUCTION OF NEW CONTROL ROOM(WOOD AND GLASS)	Sqm	180	111.3856	-	-
15	REPAIR WORK OF EXPANSION JOINTS	RM	180	3.2124	-	-
16	NON SHRINK GROUTING	Cum	90	108.0440	-	-
SUB TOTAL- CIVIL WORKS(RS)						-

Note -: C1 = (25% of '40% A') Where 'A = Total Lumpsum Value Quoted'

Annexure C2

Item No.	Description	Unit	Qty	FACTOR(F)	RATE (Rs.) = FACTOR (F) * C2 / 100000 (Rounded off to two places after decimal)	Total Price in Rs. = (Rate X Qty)
SECTION - FINISHING (FN)						
FN-1	12 MM CEMENT PLASTER OF MIX 1:6 (1 CEMENT :6 FINE SAND)	sqm	750	0.2225	-	-
FN-2	6 MM CEMENT PLASTER OF MIX 1:3 (1 CEMENT 3 FINE SAND)	sqm	750	0.2006	-	-
FN-3	FINISHING WALLS WITH ACRYLIC SMOOTH EXTERIOR PAINT OF REQUIRED SHADE : NEW WORK (TWO OR MORE COAT APPLIED @ 1.67 LTR/10 SQM OVER AND INCLUDING PRIMING COAT OF EXTERIOR PRIMER APPLIED @ 2.20 KG/ 10 SQM).	sqm	8250	0.1340	-	-
FN-4	PROVIDING AND APPLYING OF PAINTING ON INTERNAL PLASTERED SURFACES WITH TWO COATS OF ACRYLIC EMULSION - ECO FRIENDLY PAINT WITH LOW VOLATILE ORGANIC COMPOUNDS (NOT EXCEEDING 50 G/L) OF APPROVED SHADE & NAKE, OVER ONE COAT OF APPROVED CEMENT PRIMER CONSISTING OF VOLATILE ORGANIC COMPOUNDS LESS THAN 50G/L, INCLUDING PREPARING THE SURFACES BY APPLYING BIRLA WHITE WALL CARE PUTTY (FINE FINISH) OR APPROVED EQUIVALENT MAKE 1.5MM HICK, SURFACE PREPARATION, CLEANING AND ALL BYE WORKS, FILLING HAIR CRACKS WITH PUTTY I APPROVED FILLER WHEREVER 'REQUIRED, SCAFFOLDING & CLEANING, COST OF ALL MATERIALS, LABOUR ETC. AT ALL HEIGHTS AND LIFTS, ALL AS PER DRAWING, SPECIFICATIONS AND AS DIRECTED BY ENGINEER INCHARGE ETC. COMPLETE.	sqm	600	0.2015	-	-
FN-5	PAINTING WITH SYNTHETIC ENAMEL HAVING VOC (VOLATILE ORGANIC COMPOUND) CONTENT LESS THAN 150 GRAMS/LITRE PAINT OF APPROVED BRAND AND MANUFACTURE, INCLUDING APPLYING ADDITIONAL COATS WHREVER REQUIRED TO ACHIEVE EVEN SHADE AND COLOUR.					
	TWO COATS.	sqm	300	0.1066	-	-
FN-6	APPLYING PRIMING COATS WITH PRIMER OF APPROVED AND MANUFACTURE, HAVING LOW VOC(VOLATILE ORGANIC COMPOUND) CONTENT					
	(A) WITH READY MIXED ZINC CHROMATE ON STEEL/IRON WORKS HAVING VOC CONTENT LESS THAN 250 GRAMS /LITRE	sqm	300	0.0402	-	-
	(B) WITH WATER THINNABLE CEMENT PRIMER ON WALL SURFACE HAVING VOC CONTENT LESS THAN 50 GRAMS / LITRE	sqm	300	0.0534	-	-
FN-7	EPOXY PAINTING OVER CONCRETE/PLASTERED SURFACE OF APPROVED BRAND AND MANUFACTURE, INCLUDING APPLYING ADDITIONAL COATS WHEREVER REQUIRED TO ACHIEVE EVEN SHADE AND COLOUR : TWO COATS.	sqm	450	0.1804	-	-
FN-8	PROVIDING AND APPLYING SPECTRUM / HERITAGE OR APPROVED EQUIVALENT GRANULAR WALL TEXTURED FINISH - ECO FRIENDLY PAINT WITH LOW VOLATILE ORGANIC COMPOUNDS (NOT EXCEEDING 50 G/L) OF APPROVED PATTERN AND SHADE OVER INTERNAL /EXTERNAL WALL SURFACE AT ALL LEVELS AND HEIGHTS INCLUDING ALL BYE WORKS ETC., COMPLETE AS PER SPECIFICATION AND INSTRUCTIONS OF THE ENGINEER INCHARGE.	sqm	5250	0.3758	-	-
FN-9	PROVIDING AND APPLYING ACID RESISTANT PAINT OF APPROVED EQUIVALENT MAKE AS PER IS AND DIRECTION OF THE THE ENGINEER INCHARGE.	sqm	450	0.5013	-	-
SUBTOTAL(FINISHING)-FN						-
SECTION -FLOORING (FL)						
FL-1	PROVIDING AND FIXING 1ST QUALITY CERAMIC GLAZED WALL TILES CONFORMING TO IS: 15622 (THICKNESS TO BE SPECIFIED BY THE MANUFACTURER) OF APPROVED MAKE IN ALL COLOURS EXCEPT BURGUNDY,BOTTLE GREEN, BLACK OF ANY SIZE AS APPROVED BY ENGINEER-IN-CHARGE, IN SKIRTING, RISERS OF STEPS AND DADO OVER 12 MM THICK BED OF CEMENT MORTAR 1:3 (1 CEMENT :3 COARSE SAND) AND JOINTING WITH GREY CEMENT SLURRY @ 3.3KG PER SQM INCLUDING POINTING IN WHITE CEMENT MIXED WITH PIGMENT OF MATCHING SHADE COMPLETE.	sqm	82.5	1.4696	-	-
FL-2	52 MM THICK CEMENT CONCRETE FLOORING WITH CONCRETE HARDENER TOPPING BELOW ALL CHEQUERED PLATE, UNDER LAYER 40 MM THICK CEMENT CONCRETE 1:2:4 (1 CEMENT : 2 COARSE SAND : 4 GRADED STONE AGGREGATE 20 MM NOMINAL SIZE) AND TOP LAYER 12 MM THICK CEMENT HARDENER CONSISTING OF MIX 1:2 (1 CEMENT HARDENER MIX : 2 GRADED STONE AGGREGATE 6 MM NOMINAL SIZE) BY VOLUME, .HARDENING COMPOUND MIXED @ 2 LITRE PER 50KG OF CEMENT OR AS PER MANUFACTURERS SPECIFICATIONS. THIS INCLUDES COST OF CEMENT SLURRY, BUT EXCLUDING THE COST OF NOSING OF STEPS ETC. COMPLETE.	sqm	150	0.6402	-	-

Item No.	Description	Unit	Qty	FACTOR(F)	RATE (Rs.) = FACTOR (F) * C2 / 100000 (Rounded off to two places after decimal)	Total Price in Rs. = (Rate X Qty)
FL-3	PROVIDING AND LAYING FULL BODY/DOUBLE CHARGE VITRIFIED FLOOR TILES IN DIFFERENT SIZES (THICKNESS TO BE SPECIFIED BY THE MANUFACTURER) WITH WATER ABSORPTION'S LESS THAN 0.08% AND CONFORMING TO IS: 15622 OF APPROVED MAKE IN ALL COLOURS AND SHADES, LAID ON 20MM THICK CEMENT MORTAR 1:4 (1 CEMENT : 4 COARSE SAND) INCLUDING GROUTING THE JOINTS WITH WHITE CEMENT AND MATCHING PIGMENTS ETC., COMPLETE.						
	SIZE OF TILE 600X600 MM	sqm	600	2.0994	-	-
FL-4	PROVIDING AND FIXING ACID AND/OR ALKALI RESISTANT TILES IN FLOOR & SKIRTING/DADO AS PER TS VOL-III SEC.B CLAUSE- D AND E.	sqm	135	3.1625	-	-
FL-5	2MM THICK ANTISTATIC PVC ROLL OF APPROVED SHED AND BRAND AS PER IS 3462 AND LAID AS PER IS-5318 OVER EXISTING CONCRETE FLOOR AFTER REMOVING THE EXISTING PVC MAT.	sqm	225	0.4095	-	-
FL-6	PROVIDING AND FIXING 20MM THICK GANG SAW CUT MIRROR POLISHED, PRE MOULDED GRANITE TILES/SLABS FOR FLOOR AND SKIRTING OF REQUIRED SIZE(>0.5 SQ.M) SHADE, COLOUR AND TEXTURE / (BLACK GRANITE FOR RISER & 75 MM WIDE BLACK GRANITE STRIP WITH GROOVE & BULL NOSING IN FLOOR OF STEPS & ALL LANDINGS)) LAID OVER 20MM THICK BASE OF CEMENT MORTAR (1 CEMENT: 4 COARSE SAND) WITH JOINTS TREATED WITH WHITE CEMENT, MIXED WITH PIGMENTS, EPOXY TOUCH-UPS INCLUDING RUBBING, CURING, MOULDING AND POLISHING OR COMPLETE AS PER DIRECTION OF ENGG. IN CHARGE. (CHEQUERED PLATE TO BE RAISED TO MATCHING WITH NEW FLOOR LEVEL FOR WHICH P.C.C SHOULD BE LAID BELOW THE SUPPORT OF ALL CHEQUERED PLATES TO MAINTAIN AN UNIFORM LEVEL THROUGHOUT THE FLOOR).						
a	GRANITE OF ANY COLOUR AND SHADE AREA OF SLAB OVER 0.50 SQM.	sqm	3900	5.8179	-	-
b	EXTRA FOR PROVIDING EDGE MOULDING TO18MM THICK MARBLE STONE COUNTERS,VANITIESETC. INCLUDING MACHINE POLISHING TO EDGE TO GIVE HIGH GLOSS FINISH ETC. COMPLETE AS PER DESIGN APPROVED BY ENGINEER- IN-CHARGE GRANITE WORK IN STEPS AND KITCHEN PLAT FORM	mtr	525	0.3433	-	-
c	EXTRA FOR FIXING MARBLE/GRANITE STONE OVER AND ABOVE CORRESPONDING BASIC ITEM, IN FACIA AND DROPS OF WIDTH UPTO150MM WITH EPOXY RESIN BASED ADHESIVE INCLUDING CLEANING ETC. COMPLETE	mtr	525	0.3684	-	-
d	EXTRA FOR PROVIDING OPENING OF REQUIRED SIZE AND SHAPE FOR WASH BASIN/KITCHEN SINK IN KITCHEN PLATFORM, VANITY COUNTERS AND SIMILAR LOCATIONS IN MARBLE/GRANITE/STONE WORK INCLUDING NECESSARY HOLES FOR PILLAR TAPS ETC. INCLUDING RUBBING AND POLISHING OF CUT EDGES ETC. COMPLETE.	mtr (each)	6	0.5756	-	-
FL-7	MARBLE STONE FLOORING WITH 18MM THICK MARBLE STONE IN RISERS (SAMPLE OF MARBLE SHALL BE APPROVED BY ENGINEER-IN-CHARGE) OVER 20MM (AVERAGE) THICK BASE OF CEMENT MORTAR 1:4 (1 CEMENT : 4 COARSE SAND) LAID AND JOINTED WITH GREY CEMENT SLURRY INCLUDING RUBBING AND POLISHING COMPLETE WITH:					
	MAKRANA WHITE SECOND QUALITY	sqm	525	5.0035	-	-
	EXTRA FOR MARBLE STONE FLOORING IN TREADS OF STEPS AND RISERS USING SINGLE LENGTH UP TO 2.00 METRE.	sqm	525	0.4769	-	-
SUBTOTAL(FLOORING)-FL						**-**
SECTION - WOOD AND PVC WORK (WW)						
WW-1	PROVIDING AND FIXING PRESSED STEEL DOOR FRAMES CONFORMING TO IS: 4351 MANUFACTURED FROM COMMERCIAL MILD STEEL SHEET OF 1.60 MM THICKNESS INCLUDING HINGES, JAMB, LOCK JAMB, BEAD AND IF REQUIRED ANGLE THRESHOLD OF MILD STEEL ANGLE OF SECTION 50X25MM, OR BASE TIES OF 1.60 MM PRESSED MILD STEEL WELDED OR RIGIDLY FIXED TOGETHER BY MECHANICAL MEANS, INCLUDING M.S. PRESSED BUTT HINGES, 2.5MM THICK WITH MORTAR GUARDS, LOCK STRIKE-PLATE AND SHOCK ABSORBERS AS SPECIFIED AND APPLYING A COAT OF APPROVED STEEL PRIMER AFTER PRE- TREATMENT OF THE SURFACE AS DIRECTED BY ENGINEER- IN-CHARGE:						
	PROFILE B					
	FIXING WITH ADJUSTABLE LUGS WITH SPLIT END TAIL TO EACH JAMB	RM	90	0.5624	-	-

Item No.	Description	Unit	Qty	FACTOR(F)	RATE (Rs.) = FACTOR (F) * C2 / 100000 (Rounded off to two places after decimal)	Total Price in Rs. = (Rate X Qty)
WW-2	PROVIDING AND FIXING FACTORY MADE P.V.C. DOOR FRAME OF APPROVED MAKE OF SIZE 50X47MM WITH A WALL THICKNESS OF 5MM,MADE OUT OF EXTRUDED 5MM RIGID PVC FOAM SHEET MITRED AT CORNERS AND JOINED WITH 2 NOS. OF 150MM LONG BRACKETS OF 15X15MM M.S. SQUARE TUBE, THE VERTICAL DOOR PROFILES TO BE REINFORCED WITH 19X19MM M.S. SQUARE TUBE OF 19 GAUGE, EPDM RUBBER GASKET WEATHER SEAL TO BE PROVIDED THROUGH OUT THE FRAME. THE DOOR FRAME TO BE FIXED TO THE WALL USING M.S. SCREWS OF 65/100MM SIZE COMPLETE AS PER MANUFACTURERS SPECIFICATION AND DIRECTED BY ENGINEER.	metre	37.5	0.9106	-	-
WW-3	PROVIDING AND FIXING 30MM THICK FACTORY MADE PVC RIGID FOAM PANELLED DOOR SHUTTERS OF APPROVED MAKE MADE FROM M.S., TUBE OF 19X19MM. 19 GAUGE FOR STYLES AND 15X15MM FOR TOP AND BOTTOM RAILS,COVERED WITH HEAT MOULDED PRELAMINATED PVC "C" CHANNEL OF 5MM THICK SHEET AND 30X50MM WIDE TO FORM STYLES AND 5MM THICK AND 75MM WIDE PRELAMINATED PVC SHEETS FOR TOP RAIL, LOCKRAIL AND BOTTOM RAIL ON EITHER SIDE AND 5MM THICK, 20MM WIDE CROSS PVC SHEET AS GAP INSERT FOR TOP RAIL AND BOTTOM RAIL PANELLING OF 5MM THICK PVC SHEET PRELAMINATED ON BOTH SIDES FITTED IN THE M.S. FRAME WELDED/SEALED TO THE STYLES AND RAILS WITH 5X30MM PRELAMINATED PVC SHEET BEADING ON EITHER SIDE AND JOINED TOGETHER WITH SOLVENT CEMENT ADHESIVE ETC., COMPLETE AS PER MANUFACTURERS SPECIFICATION AND DIRECTED BY ENGINEER.					
	30 MM THICK PLAIN PVC DOOR SHUTTERS.	sqm	6	4.0940	-	-
WW-4	PROVIDING AND FIXING ISI MARKED FLUSH DOOR SHUTTERS CONFORMING TO IS: 2202 (PART-I) DECORATIVE TYPE, CORE OF BLOCK BOARD CONSTRUCTION WITH FRAME OF 1ST CLASS HARD WOOD AND WELL MATCHED TEAK 3 PLY VENEERING WITH VERTICAL GRAINS OR CROSS BANDS AND FACE VENEERS ON BOTH FACES OF SHUTTERS.					
	35 MM THICK INCLUDING ISI MARKED STAINLESS STEEL BUTT HINGES WITH NECESSARY SCREWS.	sqm	37.5	3.8808	-	-
WW-5	PROVIDING AND FIXING IS: 12817 MARKED STAINLES STEEL BUTT HINGES WITH STAINLESS STEEL SCREWS ETC. COMPLETE:					
	100X58X1.9 MM	each	9	0.1326	-	-
WW-6	PROVIDING AND FIXING ALUMINIUM SLIDING DOOR BOLTS ANODIZED (ANODIC COATING NOT LESS THAN GRADE AC10 AS PER IS:1868) TRANSPARENT OR DYED TO REQUIRED COLOUR OR SHADE WITH NUTS AND SCREWS ETC.COMPLETE.					
	300 X 16MM	each	8	0.3419	-	-
	250X16 MM	each	18	0.2814	-	-
WW-7	PROVIDING AND FIXING ALUMINIUM TOWER BOLTS ANODISED (ANODIC COATING NOT LESS THAN GRADE AC10 AS PER IS:1868) TRANSPARENT OR DYED TO REQUIRED COLOUR OR SHADE WITH NECESSARY SCREWS					
	A) 250 X 10 MM	each	15	0.1418	-	-
	B) 150 X 10 MM	each	15	0.0973	-	-
WW-8	PROVIDING AND FIXING ALUMINIUM HANDLES ANODISED (ANODIC COATING NOT LESS THAN GRADE AC10 AS PER IS:1868)TRANSPARENT OR DYED TO REQUIRED COLOUR OR SHADE WITH NECESSARY SCREWS ETC. COMPLETE.					
	A) 125 MM	each	39	0.1039	-	-
WW-9	PROVIDING AND FIXING ALUMINIUM HANGING FLOOR DOOR STOPPER ANODISED (ANODIC COATING NOT LESS THAN GRADE AC 10 AS PER IS: 1868) TRANSPARENT OR DYED TO REQUIRED COLOUR AND SHADE WITH NECESSARY SCREWS ETC., COMPLETE					
	A) SINGLE RUBBER STOPPER	each	20	0.0558	-	-
WW-10	PROVIDING AND FIXING ALUMINIUM PULL BOLT LOCK ANODISED ISI MARKED (ANODIC COATING NOT LESS THAN GRADE AC 10 AS PER IS:1868) TRANSPARENT OR DYED TO REQUIRED COLOUR OR SHADE WITH NECESSARY SCREWS ETC. COMPLETE	each	3	0.1144	-	-
WW-11	PROVIDING AND FIXING ALUMINIUM DIE CAST BODY TUBULAR UNIVERSAL HYDRAULIC DOOR CLOSER (HAVING BRAND LOGO WITH ISI, IS :3564, EMBOSSED ON THE BODY, DOOR WEIGHT UPTO 36 KG TO 80 KG AND DOOR WIDTH FROM 701 M TO 1000 MM) WITH DOUBLE SPEED ADJUSTMENT WITH NECESSARY ACCESSORIES AND SCREWS ETC. COMPLETE	each	6	1.5539	-	-

Item No.	Description	Unit	Qty	FACTOR(F)	RATE (Rs.) = FACTOR (F) * C2 / 100000 (Rounded off to two places after decimal)	Total Price in Rs. = (Rate X Qty)
WW-12	PROVIDING AND FIXING BRIGHT FINISHED BRASS 100 MM MORTICE LATCH AND LOCK ISI MARKED WITH SIX LEVERS AND A PAIR OF ANODISED (ANODIC COATING NOT LESS THAN GRADE AC 10 AS PER IS : 1868) ALUMINIUM LEVER HANDLES WITH NECESSARY SCREWS ETC. COMPLETE (BEST MAKE OF APPROVED QUALITY).	Each	17	1.2142	-	-
WW-13	PROVIDING VISION PANEL IN DOOR SHUTTERS INCLUDING MAKING THE OPENING, PROVIDING NECESSARY TEAK WOOD FRAME WORK AND FIXING 6MM CLEAR FLOAT GLASS WITH TEAK WOOD BEADING ALL ROUND ON BOTH FACES ETC. COMPLETE AS PER THE SPECIFICATIONS AND DIRECTION OF THE ENGINEER IN CHARGE	sqm	90	6.0912	-	-
WW-14	PROVIDING AND FIXING CURTAIN RODS OF 1.25MM THICK CHROMIUM PLATED BRASS PLATE, WITH TWO CHROMIUM PLATED BRASS BRACKETS FIXED WITH C.P. BRASS SCREWS AND WOODEN PLUGS, ETC., WHEREVER NECESSARY COMPLETE:					
	20MM DIA	RM	75	0.5077	-	-
	25 MM DIA	RM	75	0.6979	-	-
SUBTOTAL (WOODWORKS)-WW						**-**
SECTION - STEEL WORK (ST)						
ST-1	PROVIDING AND FIXING STAINLESS STEEL (SS GRADE 304) 1000 MM HEIGHT OF KNOCK DOWN FIXING SYSTEM RAILING MADE OF 38 MM DIA STAINLESS STEEL HANDRAIL (WALL THICKNESS 1.5MM), 40MM X 40MM SS SQUARE BALUSTER @ 900MM (MAXIMUM) C/C WITH COMPLETE FIXTURES, 16MM DIA X 3 NOS. SS HORIZONTAL MEMBER. (EXISTING BRICK WALL RAILING TO BE DEMOLISHED BEFORE FIXING SS RAILING).	RM	225	9.1302	-	-
SUBTOTAL(STEELWORKS)-ST						**-**
SECTION - SANITARY & WATER SUPPLY (SW)						
SW-1	PROVIDING AND FIXING STAINLESS STEEL A ISI 304 (18/8) KITCHEN SINK AS PER IS 13983 WITH CL. BRACKETS AND STAINLESS STEEL PLUG 40 MM INCLUDING PAINTING OF FITTINGS AND BRACKETS, CUTTING AND MAKING GOOD THE WALLS WHEREVER REQUIRED:					
	KITCHEN SINK WITHOUT DRAIN BOARD					
	610X510 MM BOWL DEPTH 200MM.	Each	1	4.6901	-	-
SW-2	PROVIDING AND FIXING P.V.C. WASTE PIPE FOR SINK OR WASH BASIN INCLUDING P.V.C. WASTE FITTINGS COMPLETE.					
	SEMI RIGID PIPE					
	32 MM DIA	Each	2	0.1143	-	-
	40 MM DIA	Each	2	0.1230	-	-
SW-3	PROVIDING AND FIXING 600X450 MM BEVELED EDGE 6 MM. THICK MIRROR OF SUPERIOR GLASS (OF APPROVED QUALITY) COMPLETE WITH 6 MM THICK HARD BOARD GROUND FIXED TO WOODEN CLEATS WITH C.P. BRASS SCREWS AND WASHERS COMPLETE.	Each	1	1.1821	-	-
SW-4	PROVIDING AND FIXING 600XL2OX5MM GLASS SHELF WITH EDGES ROUND OFF, SUPPORTED ON ANODISED ALUMINIUM ANGLE FRAME WITH C.P. BRASS BRACKETS AND GUARD RAIL COMPLETE FIXED WITH 40 MM BNG SCREWS, RAWL PLUGS ETC., COMPLETE. .	Each	1	0.8097	-	-
SW-5	PROVIDING AND FIXING SOIL, WASTE AND VENT PIPES:					
	100 MM DIA.					
	SAND CAST IRON S&S PIPE AS PER IS: 1729.	Metre	30	1.2790	-	-
	75 MM DIAMETER:					
	SAND CAST IRON S&S PIPE AS PER PS: 1729.	Metre	30	1.0558	-	-
SW-6	PROVIDING AND FILLING THE JOINTS WITH SPUN YARN, CEMENT SLURRY AND CEMENT MORTAR 1:2 (1 CEMENT : 2 FINE SAND) IN S.C.L./ CI. PIPES:					
	75 MM DIA PIPE	Each	10	0.0978	-	-
	100 MM DIA PIPE	Each	10	0.1152	-	-
SW-7	PROVIDING AND FIXING BEND OF REQUIRED DEGREE WITH ACCESS DOOR, INSERTION RUBBER WASHER 3 MM THICK, BOLTS AND NUTS COMPLETE.					
	100 MM					
	SAND CAST IRON S&S AS PER PS - 1729	Each	4	0.5085	-	-
	75 MM DIA					
	SAND CAST IRON S&S AS PER IS - 1729	Each	4	0.4051	-	-
SW-8	PROVIDING AND FIXING PLAIN BEND OF REQUIRED DEGREE.					
	100 MM					
	SAND CAST IRON S&S AS PER IS - 1729	Each	4	0.6469	-	-
	75 MM					
	SAND CAST IRON S&S AS PER IS -1729	Each	4	0.3272	-	-

Item No.	Description	Unit	Qty	FACTOR(F)	RATE (Rs.) = FACTOR (F) * C2 / 100000 (Rounded off to two places after decimal)	Total Price in Rs. = (Rate X Qty)
SW-9	PROVIDING AND FIXING SINGLE EQUAL PLAIN JUNCTION OF REQUIRED DEGREE WITH ACCESS DOOR, INSERTION RUBBER WASHER 3 MM THICK, BOLTS AND NUTS COMPLETE.					
	100XL00XL00 MM					
	SAND CAST IRON S&S AS PER IS - 1729	Each	3	0.7230	-	-
	75X75X75 MM					
	SAND CAST IRON S&S AS PER IS - 1729	Each	3	0.5400	-	-
SW-10	PROVIDING AND FIXING SINGLE EQUAL PLAIN JUNCTION OF REQUIRED DEGREE:					
	L00XL00XL00 MM					
	SAND CAST IRON S&S AS PER IS - 1729 .	Each	3	0.8199	-	-
	75X75X75MM					
	SAND CAST IRON S&S AS PER IS - 1729	Each	3	0.4915	-	-
SW-11	PROVIDING AND FIXING SINGLE UNEQUAL JUNCTION OF REQUIRED DEGREE WITH ACCESS DOOR, INSERTION RUBBER WASHER 3 MM THICK, BOLTS AND NUTS COMPLETE:					
	L00XL00X75 MM					
	SAND CAST IRON S&S AS PER IS - 1729	Each	2	1.0239	-	-
SW-12	PROVIDING AND FIXING SINGLE UNEQUAL PLAIN JUNCTION OF REQUIRED DEGREE:					
	100X100X75 MM					
	SAND CAST IRON S&S AS PER IS - 1729	Each	2	0.9928	-	-
SW-13	PROVIDING AND FIXING TERMINAL GUARD:					
	100MM					
	SAND CAST IRON S&S AS PER IS - 1729	Each	2	0.3702	-	-
	75MM					
	SAND CAST IRON S&S AS PER IS - 1729	Each	2	0.2944	-	-
SW-14	PROVIDING AND FIXING COLLAR:					
	100 MM					
	SAND CAST IRON S&S AS PER IS - 1729	Each	2	0.2889	-	-
	75MM					
	SAND CAST IRON S&S AS PER IS - 1729	Each	2	0.2286	-	-
SW-15	PROVIDING LEAD CAULKED JOINTS TO SAND CAST IRON/CENTRIFUGALLY CAST (SPUN) IRON PIPES AND FITTINGS OF DIAMETER:					
	100 MM	Each	30	0.3629	-	-
	75 MM	Each	15	0.3057	-	-
SW-16	PROVIDING AND FIXING M.S. STAYS AND CLAMPS FOR SAND CAST IRON / CENTRIFUGALLY CAST (SPUN) IRON PIPES OF DIAMETER:					
	100MM	Each	6	0.1021	-	-
	75 MM	Each	4	0.0851	-	-
SW-17	PROVIDING AND FIXING TRAP OF SELF CLEANSING DESIGN WITH SCREWED DOWN OR HINGED GRATING WITH OR WITHOUT VENT ARM COMPLETE, INCLUDING COST OF CUTTING AND MAKING GOOD THE WALLS AND FLOORS:					
	100 MM INLET AND 100 MM OUTLET					
	SAND CAST IRON S&S AS PER IS- 1729	Each	3	1.1862	-	-
	100 MM INLET AND 75 MM OUTLET					
	SAND CAST IRON S&S AS PER IS- 1729	Each	2	1.0877	-	-
SW-18	CUTTING CHASES IN BRICK MASONRY WALLS FOR FOLLOWING DIAMETER SAND CAST IRON! CENTRIFUGALLY CAST (SPUN) IRON PIPES AND MAKING GOOD THE SAME WITH CEMENT CONCRETE 1:3:6 (1 CEMENT: 3 COARSE SAND :6 GRADED STONE AGGREGATE 12.5 MM NOMINAL SIZE) INCLUDING NECESSARY PLASTER AND POINTING IN CEMENT MORTAR 1:4 (1 CEMENT: 4 COARSE SAND):					
	100 MM DIA.	Metre	2	0.4943	-	-
	75 MM DIA.	Metre	1	0.3538	-	-
SW-19	PAINTING SAND CAST IRON / CENTRIFUGALLY CAST (SPUN) IRON SOIL, WASTE VENT PIPES AND FITTINGS WITH TWO COATS OF SYNTHETIC ENAMEL PAINT OF ANY COLOUR '' SUCH AS CHOCOLATE GREY, OR BUFF ETC. OVER A COAT OF PRIMER (OF APPROVED QUALITY) FOR NEW WORK:					
	100 MM DIAMETER PIPE	Metre	30	0.0575	-	-
	75 MM DIAMETER PIPE	Metre	30	0.0439	-	-
SW-20	PROVIDING AND FIXING G.I. PIPES COMPLETE WITH G.I.FITTINGS AND CLAMPS, I/C CUTTING AND MAKING GOOD THE WALLS ETC. INTERNAL WORK –EXPOSED ON WALL.					
	25 MM DIA. NOMINAL BORE	Metre	20	0.4529	-	-
	32 MM DIA. NOMINAL BORE	Metre	20	0.5110	-	-
	40 MM DIA. NOMINAL BORE	Metre	10	0.6338	-	-

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SW-21	PROVIDING AND FIXING G.I. PIPES COMPLETE WITH G.I. FITTINGS AND CLAMPS I/C MAKING GOOD THE WALLS ETC. CONCEALED PIPE INCLUDING PAINTING WITH ANTI CORROSIVE BITUMASTIC PAINT, CUTTING CHASES AND MAKING GOOD THE WALL					
	15 MM DIA NOMINAL BORE	Metre	10	0.4557	-	-
	20 MM DIA NOMINAL BORE	Metre	20	0.4971	-	-
SW-22	PROVIDING AND FIXING G.I. PIPES COMPLETE WITH G.I.FITTINGS AND CLAMPS, INCLUDING TRENCHING AND REFILLING ETC. EXTERNAL WORK					
	32 MM DIA. NOMINAL BORE	Metre	20	0.4185	-	-
SW-23	MAKING CONNECTION OF G.I. DISTRIBUTION BRANCH WITH G.I. MAIN OF FOLLOWING SIZES BY PROVIDING AND FIXING TEE, INCLUDING CUTTING AND THREADING THE PIPE ETC. COMPLETE :					
	25 TO 40 MM NOMINAL BORE	Each	2	0.5476	-	-
SW-24	PROVIDING AND FIXING GUN METAL GATE VALVE WITH C.I. WHEEL OF APPROVED QUALITY (SCREWED END) :					
	25 MM NOMINAL BORE	Each	2	0.6385	-	-
	32 MM NOMINAL BORE.	Each	2	0.7467	-	-
	40 MM NOMINAL BORE	Each	2	0.8718	-	-
SW-25	PROVIDING AND FIXING UPLASTICISED PVC CONNECTION PIPE WITH BRASS UNIONS :					
	45 CM LENGTH					
	15 MM NOMINAL BORE	Each	4	0.1021	-	-
SW-26	PAINTING G.I. PIPES AND FITTINGS WITH SYNTHETIC ENAMEL WHITE PAINT WITH TWO COATS OVER A READY MIXED PRIMING COAT, BOTH OF APPROVED QUALITY FOR NEW WORK :					
	25MM DIAMETER PIPE	Metre	20	0.0223	-	-
	32 MM DIAMETER PIPE.	Metre	40	0.0264	-	-
	40 MM DIAMETER PIPE.	Metre	10	0.0313	-	-
SW-27	PROVIDING AND FIXING G.I. UNION IN G.I. PIPE INCLUDING CUTTING AND THREADING THE PIPE AND MAKING LONG SCREWS ETC. COMPLETE (NEW WORK)					
	25 MM NOMINAL BORE	Each	2	0.2979	-	-
	32 MM NOMINAL	Each	2	0.3585	-	-
SW-28	PROVIDING AND PLACING ON TERRACE (AT ALL FLOOR LEVELS) POLYETHYLENE WATER STORAGE TANK ISI : 12701 MARKED WITH COVER AND SUITABLE LOCKING ARRANGEMENT AND MAKING NECESSARY HOLES FOR INLET, OUTLET AND OVERFLOW PIPES BUT WITHOUT FITTINGS AND THE BASE SUPPORT FOR TANK.	per litre	2000	0.0108	-	-
SW-29	PROVIDING PUSH-ON-JOINTS TO CENTRIFUGALLY (SPUN) CAST IRON PIPES OR DUCTILE IRON PIPES INCLUDING TESTING OF JOINTS AND INCLUDING THE COST OF RUBBER GASKETS ;					
	100 MM. DIA. DUCTILE IRON CLASS K-7 PIPES	Joints	10	0.0921	-	-
SW-30	PROVIDING AND LAYING S&S CENTRIFUGALLY CAST (SPUN)/DUCTILE IRON PIPES CONFORMING TI IS: 8329:					
	100 MM. DIA. DUCTILE IRON CLASS K-7 PIPES	Metre	40	1.3758	-	-
SW-31	PROVIDING, LAYING AND JOINTING GLAZED STONEWARE PIPES CLASS SP-1 WITH STIFF MIXTURE OF CEMENT MORTAR IN THE PROPORTION OF 1:1 (1 CEMENT : 1 FINE SAND) INCLUDING TESTING OF JOINTS ETC. COMPLETE :					
	100 MM DIAMETER	Metre	6	0.3075	-	-
SW-32	PROVIDING AND LAYING CEMENT CONCRETE 1:5:10 (1 CEMENT : 5 COARSE SAND : 10 GRADED STONE AGGREGATE 40 MM NOMINAL SIZE) UP TO HAUNCHES OF S.W. PIPES INCLUDING BED CONCRETE AS PER STANDARD DESIGN :					
	100 MM DIAMETER S.W. PIPE	Metre	6	0.8823	-	-
SW-33	PROVIDING AND FIXING SQUARE-MOUTH S.W. GULLY TRAP CLASS SP-1 COMPLETE WITH C.I. GRATING BRICK MASONRY CHAMBER WITH WATER TIGHT C.I. COVER WITH FRAME OF 300 X300 MM SIZE (INSIDE) THE WEIGHT OF COVER TO BE NOT LESS THAN 4.50 KG AND FRAME TO BE NOT LESS THAN 2.70 KG AS PER STANDARD DESIGN :					
	150 X 100 MM SIZE P TYPE.					
	WITH COMMON BURNT CLAY F.P.S. (NON MODULAR) BRICKS OF CLASS DESIGNATION 7.5	Each	2	2.3739	-	-
SW-34	PROVIDING AND FIXING 15MM CP BRASS QUARTER TURN BIB COCK STRAIGHT LINE ,FOAM FLOW WITH FLOW RATE < 2 LITRE PER MINUITE OF JAQUAR (CAT. NO-FLR-5047N) OR SIMILAR APPROVED EQUIVALENT MAKE, ALL BYE-WORKS COMPLETE AS PER SPECIFICATION AND DIRECTION OF THE ENGINEER.	Each	1	8.6686	-	-

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SW-35	PROVIDING, FIXING, JOINTING AND TESTING IN POSITION THE FOLLOWING UPVC PIPES CLASS 3 (6KG/SQ CM) CONFORMING TO IS: 4985 FOR SEWAGE CUT TO REQUIRED LENGTHS INCLUDING ALL NECESSARY FITTINGS AND SPECIALS SUCH AS BENDS, JUNCTIONS, OFFSETS, MAKING PROPER CONNECTIONS. INCLUDING PROVIDING PCC THRUST BLOCK AT 2 MTR. CENTRE TO CENTRE. PIPE TO BE LAID BELOW GROUND LEVEL IN TRENCHES UPTO REQUIRED DEPTH INCLUDING EXCAVATION IN ALL KIND OF SOIL, DEWATERING, REFILLING, WATERING, RAMMING & REMOVING THE SURPLUS EXCAVATED MATERIAL AND MAKING GOOD THE SAME COMPLETE AS REQUIRED. COST SHALL INCLUDE MAKING CONNECTION WITH MAIN SEWER MANHOLE INCLUDING ALL ASSOCIATED CIVIL WORKS.					
	I) 100 DIA PIPES	RM.	30	0.4705	-	-
SW-36	PROVIDING AND FIXING VITREOUS CHINA WHITE GLAZED ORISSA PATTERN SQUATING PAN INDIAN TYPE WATER CLOSET (IWC) OF SUPERIOR QUALITY, SIZE 580 X 440MM WITH INTEGRAL FOOTRESTS SUITABLE FOR SINKING INTO FLOOR, MANUFACTURED BY HINDWARE., (CODE NO. 20042) OR APPROVED EQUIVALENT MAKE OF NEAREST SIZE WITH "P" OR "S" TRAP (CODE NO. 21003/24003) OR SIMILAR APPROVED EQUIVALENT MAKE, WITH OR WITHOUT VENT HORN, WITH 3 AND 6 LITRES FLUSHING CAPACITY LOW LEVEL PVC DUAL FLUSH CISTERN OF HINDWARE (CAT. NO- 507678),/ SIMILAR APPROVED EQUIVALENT MAKE, PVC FLUSH PIPE 32/40MM DIA AND 15 MM UNPLASTICISED PVC CONNECTION PIPE OF SUPERIOR QUALITY WITH C P BRASS COUPLING AT BOTH END, 15MM CP BRASS QUARTER TURN ANGULAR STOP COCK OF JAQUAR (CAT. NO FLR-5053N) OR SIMILAR APPROVED EQUIVALENT MAKE, COMPLETE WITH ALL BYE-WORKS AS PER SPECIFICATION & INSTRUCTION OF THE ENGINEER.	Each	2	5.0517	-	-
SW-37	PROVIDING AND FIXING WHITE GLAZED VITREOUS CHINA FLAT BACK, FRONT LIPPED STANDING URINAL SIZE 59 X 39 X 37.5 CM OF HINDWARE (CAT. NO.60002) ,/ NEAREST SIZE OF PARRYWARE OR SIMILAR APPROVED EQUIVALENT, WITH CONCEALED CI WALL HANGERS , 32 MM DIA PVC WASTE PIPE & C.P DOME SHAPED PERFORATED WASTE WITH UNION OF SUPERIOR QUALITY WITH CP BRASS COUPLING UPTO FLOOR WITH ALL BYE-WORKS AS PER SPECIFICATION AND DIRECTION OF THE ENGINEER.	Each	2	9.8137	-	-
SW-39	SUPPLY, FITTING AND FIXING WHITE GLAZED VITREOUS CHINA WASH BASIN OF HINDWARE (DELTA-CAT. NO- 10010) SIZE 55CM X 40CM /PARRY WARE OF NEAREST SIZE OR SIMILAR APPROVED EQUIVALENT MAKE, WITH PROVISION OF HAVING SINGLE OR DOUBLE HOLES, 32 MM. DIA. PVC WASTE PIPE (SUPERIOR QUALITY) ABOUT 750 MM. LONG FIXED WITH 32 MM CP BRASS WASTE COUPLING OF JAQUAR (CAT. NO-709) OR SIMILAR APPROVED EQUIVALENT, 15 MM CP BRASS QUARTER TURN PILLAR COCK, FOAM FLOW WITH FLOW RATE < 2 LITRE PER MINUITE , OF JAQUAR (FLORENTINE – CAT. N0- 5011N) / MARC (OYSTER-CAT.NO-MOY-1010) OR SIMILAR APPROVED EQUIVALENT MAKE , 15 MM UNPLASTICISED PVC CONNECTION PIPE OF SUPERIOR QUALITY WITH C P BRASS COUPLING AT BOTH END, PAINTED METALLIC BRACKETS AND 15 MM. C P BRASS QUARTER TURN ANGULAR STOP COCK WITH WALL FLANGE OF JAQUAR (FLORENTINE-CAT. NO-FLR-5053N) / MARC (OYESTER- CAT. NO-MOY-1060) /SIMILAR APPROVED EQUIVALENT MAKE, COMPLETE WITH ALL BYE-WORKS AS PER SPECIFICATION AND INSTRUCTION OF THE ENGINEER.	Each	3	3.1683	-	-
SW-41	PROVIDING AND FIXING MINIMUM 6.00MM THICK POLISHED GLASS MIRROR, OF SIZE-1500X600 (APPROX.), BEVELLED EDGE , OF APPROVED MAKE FIXED TO WALL WITH 6 MM. THICK MARINE PLYWOOD SHEET BACKING WITH NECESSARY BEADING, FIXING ARRANGEMENT ALL COMPLETE AT ALL LEAD AND LIFTS AS PER DRAWINGS, SPECIFICATIONS AND INSTRUCTION OF THE ENGINEER INCHARGE.	Sqm.	2	3.9405	-	-
SW-43	PROVIDING AND FIXING CP BRASS QUARTER TURN ANGULAR STOP COCK WITH ADJUSTABLE WALL FLANGE OF JAQUAR (CONT.-CAT. NO-FLR-5053N) OR SIMILAR APPROVED EQUIVALENT MAKE WITH ALL BYE-WORKS COMPLETE AS PER SPECIFICATION AND DIRECTION OF THE ENGINEER.	Each	1	0.9228	-	-

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SW-44	PROVIDING AND FIXING C.P BRASS TILTING TYPE LIQUID SOAP CONTAINER OF SUPIERIOR APPROVED QUALITY FIXED WITH CP BRASS SCREWS WITH ALL BYE-WORKS COMPLETE AS PER SPECIFICATION AND DIRECTION OF THE ENGINEER.	Each	2	0.3407	-	-
SW-45	PROVIDING AND FIXING 600 MM LONG SINGLE TOWEL RAIL WITH BRACKETS OF JAQUAR (CONT.-CAT. NO-1111N) / SIMILAR APPROVED EQUIVALENT MAKE FIXED ON WOODEN PLUGS WITH CP BRASS SCREWS WITH ALL BYE-WORKS COMPLETE AS PER SPECIFICATIONS AND DIRECTION OF THE ENGINEER.	Each	2	0.8063	-	-
SW-46	PROVIDING AND FIXING CP BRASS ROBE HOOK OF JAQUAR (CONT.-CAT. NO-1191) / SIMILAR APPROVED EQUIVALENT MAKE FIXED WITH CP BRASS SCREWS WITH ALL BYE-WORKS COMPLETE AS PER SPECIFICATIONS AND DIRECTION OF THE ENGINEER.	Each	2	0.8063	-	-
SUBTOTAL(SANITORY WORKS)-SW						-
SECTION - ALUMINIUM WORK (AL)						
Al-1	PROVIDING AND FIXING ANODISED ALUMINIUM WORK FOR DOORS, WINDOWS, VENTILATORS AND PARTITIONS WITH EXTRUDED BUILT UP STANDARD TUBULAR SECTIONS AND OTHER SECTIONS OF APPROVED MAKE CONFORMING TO IS: 733 AND IS:1285, FIXING WITH DASH FASTENER OF REQUIRED DIA AND SIZE, INCLUDING NECESSARY FILLING UP THE GAPS AT JUNCTION, I.E. AT TOP, BOTTOM AND SIDES WITH REQUIRED EPDM RUBBER NEOPRENE GASKET ETC.. ALUMINIUM SECTIONS SHALL BE SMOOTH, RUST FREE, STRAIGHT, METRED AND JOINTED MECHANICALLY WHEREVER REQUIRED INCLUDING CLEAT ANGLE, ALUMINIUM SNAP BEADING FOR GLAZING/PANELLING , CP BRASS / STAINLESS STEEL SCREWS, ALL COMPLETE AS PER ARCHITECTURAL DRAWING AND THE DIRECTIONS OF THE ENGINEER-IN-CHARGE.(GLAZING ,PANELLING AND DASH FASTENERS TO BE PAID FOR SEPARETELY)						
	(A) FOR FIXED PORTION ANODISED ALUMINIUM(ANODIZED TRANSPARENT OR DYED TO REQUIRED SHADE ACCORDING TO IS 1868, MIMIMUM ANODIC COATING OF GRADE AC 15)	kg	1162.5	0.5189	-	-
	(B)FOR SHUTTERS OF DOORS, WINDOWS AND VENTILATORS INCLUDING PROVIDING AND FIXING HINGES/ PIVOTS AND MAKING PROVISION FOR FIXING OF FITTINGS WHEREVER REQUIRED INCLUDING THE COST OF EPDM RUBBER/ NEOPRENE GASKET REQUIRED (FITTINGS SHALL BE PAID SEPARATELY). ANODISED ALUMINIUM(ANODIZED TRANSPARENT OR DYED TO REQUIRED SHADE ACCORDING TO IS 1868, MIMIMUM ANODIC COATING OF GRADE AC 15)	kg	1548	0.6044	-	-
Al-2	PROVIDING AND FIXING RECESS TYPE LOCKING ARRANGEMENT IN SLIDING ALUMINIUM WINDOW WITH ALL BYE-WORKS COMPLETE IN ALL RESPECT AS PER MANUFACTURER SPECIFICATION AND DIRECTION OF ENGINEER.	Each	128	0.9113	-	-
Al-3	PROVIDING AND FIXING ROLLER OF APPROVED MAKE AND SIZE IN SLIDING ALU WINDOW COMPLETED IN ALL RESPECT AS PER MANUFACTURER SPECIFICATION AND DIRECTION OF ENGINEER-IN CHARGE.	Each	729	0.1150	-	-
Al-4	PROVIDING & FIXING GLASS PANES GLAZING CLIPS IN ALUMINIUM DOORS, WINDOWS, CLERESTORY WINDOWS ALL COMPLETE					
	(A) WITH 4.0 MM THICK GLASS PANES.	sqm.	1627.5	5.1921	-	-
Al-5	PROVIDING AND FIXING CARBON STEEL GALVANIZED (MINIMUM COATING 5 MICRON) DASH FASTENER OF 10 MM DIA DOUBLE THREADED 6.8 GRADE (YIELD STRENGTH 480 N/SQ.MM), COUNTER SUNK HEAD, COMPRISING OF 10 MM DIA POLYAMIDE PA 6 GRADE SLEEVE, INCLUDING DRILLING OF HOLES IN FRAME, CONCRETE/MASONARY, ETC. AS PER DIRECTION OF ENGINEER-IN-CHARGE.	Each	150	0.1456	-	-
	(A) 10X140 MM					
Al-6	PROVIDING & FIXING COLUMNS/WALL CLADDING WITH PVDF SURFACE COATING OF 4MM THICK ALUMINIUM COMPOSITE PANEL METALLIC COLOUR (ALUMINIUM THICKNESS SHALL BE 0.5MM) (MAKE REYNOBOND – FRANCE, ALUCOBOND, GERMANY OR APPROVED EQUIVALENT MAKE) AROUND THE COLUMNS / DEAD WALLS AT ALL HIGHTS. THE RATE SHALL INCLUDE ALL NECESSARY FRAME WORK, TOOLS AND PLANTS, SCAFFOLDING, TECHNICAL PERSONNEL & AS PER TECHNICAL SPECIFICATIONS COMPLETE AS PER THE DIRECTION OF THE ENGINEER-IN-CHARGE.	sqm.	1200	5.6212	-	-

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AI-7	4MM THICK ALUMINIUM COMPOSITE PANEL AL-45 OF ALUDECOR OR EQUIVALENT MAKE(MODEL-AD 09 & AD 75 WITH FOIL THICKNESS OF MINIMUM 0.50 MM FOR WALL CLADDING IN SIZES AS PRESCRIBED IN THE DRAWINGS, THE BASE FRAME SHALL BE MADE UP OF 25×50 MM ALUMINIUM SECTION OF APPROVED MAKE IN REQUIRED GRID SO AS TO PROVIDE PROPER SUPPORT TO THE MAXIMUM SIZE OF ACP SHEET, ALL THE HORIZONTAL AND VERTICAL JOINTS OF THE SHEETS TO BE SEALED WITH WEATHER SILICON(DOW CORNING) TO MAKE THE ENTIRE SYSTEM AIR AND WATER TIGHT AS PER DIRECTION OF EIC.	sqm	4500	3.8059	-	-
SUBTOTAL(ALUMINIUM WORKS)-AL						**-**
SECTION- FALSE CEILING (FC)						
FC-1	SUPPLYING AND FIXING OF USG SUSPENDED CEILING SYSTEMS COMPONENTS. THIS INCLUDES SHEETROCK BRAND ST 55 PERIMETER CHANNEL (0.55MM THICK HAVING ONE FLANGE OF 21MM AND ANOTHER FLANGE OF 28MM AND A WEB OF 25MM) SCREW FIXED TO BRICKWALL / PARTITION WITH THE HELP OF APPROVED SCREWS AT 600MM CENTERS. THEN SUSPENDING SHEETROCK BRAND ST 55 MAIN CHANNEL (38MM X 14MM X 0.9MM THICK WITH TWO FLANGES OF 14MM EACH) FROM THE SOFFIT AT 1220MM CENTERS WITH SHEETROCK BRAND ST 55 ANGLE PROFILE (25X10MM X 0.55MM THICK) FIXED TO RCC SLAB WITH SHEETROCK BRAND ST 55 SOFFIT CLEAT AND M6 FASTENERS @ 600MM CENTERS RESPECTIVELY. SHEETROCK BRAND ST 55 FURRING CHANNEL (HAVING KNURLED WEB OF 48MM AND TWO FLANGES OF 24MM EACH WITH LIPS OF 8.9MM) ARE THEN FIXED TO THE MAIN CHANNEL WITH THE HELP OF CONNECTING CLIP (2.5MM DIA) AND IN PERPENDICULAR DIRECTION TO THE INTERMEDIATE CHANNEL AT 457MM CENTERS. 6.6MM THICK USG FIBEROCK PANEL IS SCREW FIXED WITH 25MM LONG DRYWALL SCREWS AT 230MM CENTERS. THE SCREW FIXING OF GYPSUM PANELS TO THE METAL FRAMING AT THE PERIPHERY, OPENINGS AND CUT EDGES SHOULD BE AT 150MM CENTERS. ALL THE GYPSUM PANELS MUST BE STAGGERED.	sqm	120	2.4555	-	-
FC-2	PROVIDING AND FIXING IN POSITION FALSE CEILING WITH LUXALON 84 R/C CEILING SYSTEM COMPRISING OF 84 MM WIDE X 16MM DEEP PERFORATED PANELS ROLL OF APPROVED COLOUR FORMED OF 0.5MM THICK ALUMINIUM ALLOY STOVE ENAMELLED ON BOTH SIDES FIXED ON PANEL CARRIERS 62 MM WIDE X 29MM DEEP OUT OF 0.95MM THICK ENAMELLED ALUMINIUM SATIN BLACK WITH CUTOUTS TO HOLD PANELS IN A MODULE OF 100MM (16 MM GAP BETWEEN PANELS) AT MAXIMUM 1.3 M C/C CARRIERS TO BE SUSPENDED FROM ROOF BY 4MM DIA GALVANISED STEEL WIRE HANGERS WITH SPECIAL HEIGHT ADJUSTMENT CLIPS MADE OF SPRING STEEL AT MAXIMUM 1.3 M C/C HANGERS FIXED TO ROOF BY "J" HOOK AND NYLON INSERTS WITH PROVISION OF OPENINGS FOR FIXING LIGHT FITTINGS, AIR CONDITIONING GRILLS ETC. COMPLETE WITH ALL BYE WORKS AS PER DRAWING AND MANUFAC-TURER'S SPECIFICATION.	sqm.	3750	0.9680	-	-
FC-3	ARMSTRONG ALUMINIUM PLANK SYSTEM WITH PLAIN- FINISH CONSISTING OF 300 MM WIDE PLANKS OF LENGTHS UPTO 3000MM.PLANKS MADE OUT OF PRE-COATED ALUMINIUM OF 0.7MM THICKNESS IN CORRIDOR WITH BEVELLED EDGE IN WHITE COLOUR(GLOBAL WHITE) WITH LIGHT REFLECTANCE>86% .THE PANEL ENDS WILL BE RAISED UP TO 29MM TO CREATE A SMART HAIRLINE END JOINT .THE PANELS ABOUT EACH OTHER WITH A NARROW 'V' GROOVE TO FACILITATE THE REMOVAL OF THE INDIVIDUAL PANEL WITHOUT DAMAGING THE EDGE OF THE PANEL.	sqm.	585	2.4917	-	-
SUBTOTAL(FALSE CEILING WORKS)-FC						**-**
SECTION- STRUCTURAL GLAZING (SG)						

Item No.	Description	Unit	Qty	FACTOR(F)	RATE (Rs.) = FACTOR (F) * C2 / 100000 (Rounded off to two places after decimal)	Total Price in Rs. = (Rate X Qty)
SG	PROVIDING AND FIXING FULLY UNITIZED SYSTEM STRUCTURAL GLAZING IN FIXED PANELS SPECIALLY DESIGNED BASED ON RAIN SCREEN AND PRESSURE EQUALIZED DRAINAGE SYSTEM AND DRAWINGS APPROVED BY THE ARCHITECTS USING POWDER COATED 50 MICRON THICKNESS USING PURE POLYESTER POWDER OF NERO COAT / BERGER MAKE EXTRUDED ALUMINIUM SECTIONS. THE SPLIT MULLIONS & TRANSOM SHALL BE FIXED TO RCC BEAMS / COLUMNS WITH ADEQUATELY DESIGNED M.S. BRACKETS/INSERT PLATES ETC. PROVIDING AND FIXING 6MM THICK TOUGHENED CLASSIC DARK BLUE HEAT REFLECTIVE GLASS MANUFACTURED BY SAINT GOBAIN FRANCE AND FIXING GLASS WITH STRUCTURAL SILICON OF DOW CONING / GE / WACKER MAKE. SEALING THE GLAZING SYSTEM WITH SPECIALLY DESIGNED EXTRUDED RUBBER GASKETS EPDM MAKE TO PREVENT WATER PENETRATION AS PER BIS OR BS STANDARDS, ALL COMPLETE AS PER MANUFACTURER'S SPECIFICATION. GLASS SHALL BE FIXED ON SUB FRAME OF SECTION NO.14454 (19.05 X 19.05 X 1.63) USING STRUCTURAL SEALENT AT HORIZONTAL POSITION & GIVING SUFFICIENT TIME TO GAIN PROPER STRENGTH OF STRUCTURAL SEALENT BEFORE FIXING TO THE MAIN FRAME. GASKET BETWEEN MAIN FRAME (22713 – 101.6X57X2.00) & SUB FRAME WILL BE FILLED UP BY WEATHER SEALENT TO TAKE CARE OF SEISMIC EFFECT, SS CLIP (MECHANICAL SYSTEM) WILL BE PROVIDED TO HOLD THE GLASS IN ADDITION TO STRUCTURAL SEALENT. MAIN FRAME – 22713 (101.6X57X2.00) SUB FRAME – 14454 (19.05X19.05X1.67 EQUAL LEG ANGLES – (12.7 X 12.7 X 3.18) ALL SECTION NO. IS OF JINDAL MAKE OR APPROVED EQUIVALENT MAKE	sqm.	1275	7.3687	-	-
SUBTOTAL(STRUCTURAL GLAZING)						-
MODULAR FURNITURE WORK FPR OFFICE, CONFERENCE HALL, CONTROL ROOM (FR) FIXED						
FR.1	SUPPLYING, FIXING IN POSITION WORKSTATION L- SHAPED (1500 X 1500) POST FORM WORKTOP MODULE COMPRISING OF 1200MM HIGH PARTITION WITH GABLE ENDS, MOBILE DRAWER UNIT WITH CASTORS, KEY BOARD TRAY, CPU TROLLEY AS PER SPECIFICATION, RELEVANT I.S. CODE, APPROVED DRAWING, COMPLETE IN ALL RESPECT & DIRECTION OF ENGINEER-IN-CHARGE TYPE : FOUR PERSONS MODULE INCLUDING FOUR CHAIR	No.	4	311.4967	-	-
FR.2	SUPPLYING, FIXING IN POSITION EXECUTIVE TABLE OF SIZE 1650 X 750MM WITH SIDE RETURN OF SIZE 1350 X 400MM WITH POST FORM EDGE ON BOTH SIDE OF THE FRONT TABLE AND ONE SIDE OF THE SIDE RETURN WITH MOBILE PEDESTAL, METAL PERFORATED LEG GUARD AS PER SPECIFICATION, RELEVANT I.S. CODE, APPROVED DRAWING, COMPLETE IN ALL RESPECT & DIRECTION OF ENGINEER-IN-CHARGE.INCLUDING CHAIR TYPE : ONE PERSON NORMAL SET	No.	14	114.7372	-	-
FR.3	SUPPLYING, FIXING IN POSITION CONFERENCE TABLE OF SIZE 5400 X 1350 MM OF BOTH SIDE PRE-LAMINATED 25MM THICK (MINIMUM) PARTICLE BOARD WITH PVC EDGE LIPPING WITH CONCEALED WIRE MANAGEMENT SYSTEM AS PER SPECIFICATION, RELEVANT I.S. CODE, APPROVED DRAWING, COMPLETE IN ALL RESPECT & DIRECTION OF ENGINEER-IN-CHARGE INCLUDIGN 16 NOS CHAIR TYPE : SET	No.	1	314.7247	-	-
FR.4	SUPPLYING, FIXING IN POSITION STORAGE UNITS AS PER SPECIFICATION, RELEVANT I.S. CODE, APPROVED DRAWING, COMPLETE IN ALL RESPECT & DIRECTION OF ENGINEER-IN-CHARGE					
a	SPECIFICATION AS PER FR.4 AND SIZE SHALL BE (750X450X750MM) TYPE : LATERAL FILING CABINET	No.	16	24.1892	-	-
b	SPECIFICATION AS PER FR.4 AND SIZE SHALL BE (750X450X1050MM) TYPE : LATERAL FILING CABINET	No.	16	25.6260	-	-
c	SPECIFICATION AS PER FR.4 AND SIZE SHALL BE (900X450X1980MM) TYPE : HINGED DOOR UNIT	No.	16	27.0271	-	-
FR.6	**CHAIR**					
FR.6.1	SUPPLYING & PROVIDING CHAIR AS PER SPECIFICATION & APPROVED SHADE BY ENGINEER-IN-CHARGE.					
a	SPECIFICATION : AS PER FR.6.1 TYPE : WORK STATION/VISITOR/CONFERENCE CODE: C1	No.	50	7.5727	-	-

Item No.	Description	Unit	Qty	FACTOR(F)	RATE (Rs.) = FACTOR (F) * C2 / 100000 (Rounded off to two places after decimal)	Total Price in Rs. = (Rate X Qty)
b	SPECIFICATION : AS PER FR.6.1 TYPE : IN-CHARGE/ENCLOSURE CODE: C2	No.	8	11.1819	-	-
FR.6.2	LOUNGE CHAIR SHALL HAVE BACK SYSTEM STANDING ON BEAM WITH SIDE FRAME ASSEMBLIES.FRAME WORK SHALL BE OF POWDER COATED MS PIPE OF DIA 38.1MMX2MM THICK.FOAM SHALL HAVE MINIMUM DENSITY OF 45KG/M3 AND HARDNESS 20.ALL MEMBER SHOULD BE POWDER COATED(MINIMUM 50MICRON)WITH ADJUSTABLE LEVELERS BELOW.IT SHALL HAVE APPROXIMATE SIZE					
a	SPECIFICATION : AS PER FR.6.2 TYPE : 3 SEATER CODE: L-43 WIDTH-1164.0 DEPTH-70.0 HEIGHT-78.5 SEAT HEIGHT-43.5 UNSPECIFIED TOL-+-.5	No.	1	30.8030	-	-
b	SPECIFICATION : AS PER FR.6.2 TYPE : 2 SEATER CODE: L-42 WIDTH-113.0 DEPTH-70.0 HEIGHT-78.5 SEAT HEIGHT-43.5 UNSPECIFIED TOL-+-.5	No.	2	19.8877	-	-
FR.3	SUPPLYING & PROVIDING CENTRE TABLE OF GODREJ ALICE OR SIMILAR EQUIVALENT AS PER SPECIFICATION & APPROVED SHADE BY ENGINEER-IN-CHARGE. TYPE : 1000(L)X650(D)X450(H) CODE : TC1	No.	2	16.8562	-	-
SUBTOTAL-FR						**-**
SECTION - MISCELANEOUS (MS)						
MS-1	DEMOLISHING CEMENT CONCRETE MANUALLY/BY MECHANICAL MEANS INCLUDING DISPOSAL OF UN SERVICEABLE MATERIAL WITHIN 50 METERS LEAD AS PER DIRECTION OF ENGINEER-IN-CHARGE.					
	NOMINAL CONCRETE 1:3:6OR RICHER MIX(I/CEQUIVALENT DESIGN MIX)	cum	795	1.3292	-	-
MS-2	DEMOLISHING R.C.C WORK MANUALLY/BY MECHANICAL MEANS INCLUDING STACKING OF STEEL BARS AND	cum	22.5	1.9390	-	-
	DISPOSAL OF UN SERVICEABLE MATERIAL WITHIN 50METRES LEAD AS PER DIRECTIONS OF ENGINEER-IN-CHARGE					
MS-3	EXTRA FOR CUTTING REINFORCEMENT BARS MANUALLY/BY MECHANICAL MEANS IN R.C.C.OR R.B.WORKS(PAYMENT SHALL BE MADE ON THE CROSS SECTIONAL AREA OF R.C.C.OR R.B.WORK) AS PER DIRECTION OF ENGINEER-IN- CHARGE.	sqm	12	0.6707	-	-
MS-4	DEMOLISHING BRICK WORK MANUALLY/BY MECHANICAL MEANS INCLUDING STACKING OF SERVICEABLE MATERIAL AND DISPOSAL OF UNSERVICEABLE MATERIAL WITHIN50METRES LEAD AS PER DIRECTION OF ENGINEER- IN-CHARGE:					
	IN CEMENT MORTAR	cum	75	1.7327	-	-
MS-5	DISMANTLING STEELWORK MANUALLY/BY MECHANICAL MEANS IN BUILT UP SECTIONS WITHOUT DISMERMBERING AND STACKING WITHIN 50METRES LEAD AS PER DIRECTION OF ENGINEER-IN-CHARGE.	kg	1500	0.0032	-	-
MS-6	DISMANTLING G.I PIPES(EXTERNAL WORK) INCLUDING EXCAVATION AND REFILLING TRENCHES AFTER TAKING OUT THE PIPES, MANUALLY/BY MECHANICAL MEANS INCLUDING STACKING OF PIPES WITHIN 50 METERS LEAD AS PER DIRECTION OF ENGINEER-IN-CHARGE.					
	15 MM TO 40 MM NOMINAL BORE	mtr	45	0.0861	-	-
	ABOVE 40 MM NOMINAL BORE	mtr	75	0.0972	-	-
MS-7	DISMANTLING OLD PLASTER OF SKIRTING RAKING OUT JOINTS AND CLEANING THE SURFACE FOR PLASTER INCLUDING DISPOSAL OF RUBBISH TO THE DUMPING GROUND WITHIN 50 METERS LEAD.	mtr	27675	0.0299	-	-
MS-8	DISMANTLING ALUMINIUM/GYPSUMPARTITIONS, DOORS, WINDOWS, FIXED GLAZING FOR FALSE CEILINGIN CLUDING DISPOSAL OF UNSERVICEABLE SURPLUS MATERIAL AND STACKING OF SERVICEABL EMATERIAL WITHIN50METERS LEAD AS DRECTEDBY ENGINEER-IN-CHARGE.	sqm	1200	0.0325	-	-
MS-9	59.5MM THICK DRY WALL PARTITIONS WITH 9.5MM USG FIBEROCK BOARDS FIXING ONE SIDE WITH 50MM FLOOR CHANNEL & 48MM STUD, JOINT FINISHING WITH USG ALL PURPOSE JOINTING COMPOUND & LAMINATE 1.8MM MINIMUM) FINISH UPTO 2.1 MTR. FROM FLOOR.	sqm.	4500	1.9738	-	-
SUBTOTAL(MISCELLANEOUS)-MS						**-**
TOTAL = TOTAL IN RUPEES for (FINISHING (FN) + FLOORING (FL) + WOOD & PVC WORK (WW) + STEEL WORK (ST) + SANITARY & WATER SUPPLY (SW) +ALUMINIUM WORKS (AL) + FALSE CEILING (FC) + STRUCTURAL GLAZING (SG) + FURNITURE WORK (FR) + MISCELLANEOUS (MS) =						**-**

Note -: C2 = (75% of '40% A')
Where 'A = Total Lumpsum Value Quoted'

ANNEXURE-A

BILLING BREAK UP FOR SUB-CONTRACTOR FOR DISMANTLING, RENOVATION & INSTALLATION WORK OF 6x60 MW BALIMELA HEP

Sl. No.		UNIT NO. I	II	III	IV	V	VI	COMMON	TOTAL % = (F1)	Total in Rs. = (A1xF1)/100
	EXISTING FACILITY FOR DISMANTLING									
1	Turbine and associated equipment including Turbine shaft, cone, runner, guide bearing, shaft seal, Guide vane, discharge ring etc of all six units.	0.30	0.30	0.30	0.30	0.30	0.30		1.80	-
2	Governing System including PMG, Oil pressure system, Governor panels etc. of all six units.	0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
3	Generator and associated equipment including stator, rotor, generator shaft, Thrust bearing, guide bearings, Generator Air Coolers of all six units.	0.60	0.60	0.60	0.60	0.60	0.60		3.60	-
4	Excitation System including Pilot Exciter, Main Exciter, Slip rings, Excitation panels etc. of all six units.	0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
5	Cooling water system (common as well as unit specific) including, pump- motor sets, pipe, valves, filters, etc. for all six units.	0.20	0.20	0.20	0.20	0.20	0.20	0.20	1.40	-
6	Dewatering & drainage system including pipes, valves, and pump-motor sets etc. Common for all six units.							0.20	0.20	-
7	Fire protection system (fire hydrant, HVWS etc) including pipes, valves, pump-motor sets etc. common for all six units.							0.10	0.10	-
8	04 nos. vacuum pump-motor sets including pipelines, valves etc. common for all six units.							0.10	0.10	-
9	Air conditioning unit including duct, damper, louver etc. and Ventilation duct.							0.20	0.20	-
10	Drinking water system including piping, valves, pump-motor sets, filter etc.							0.10	0.10	-
11	2 nos. HP compressors & 1 no. LP old compressor including compressed air piping, valves etc. common for all the six units.							0.10	0.10	-
12	Generator Transformer, 11 KV Reactor and associated facilities of all six units.	0.40	0.40	0.40	0.40	0.40	0.40		2.40	-
13	Unit Auxiliary transformer, SST & SAT and other associated facilities of all six units.	0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
14	11 KV switchboards, Unit Auxiliary board panels, Control panels, Protection panels etc. of all six units.	0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
15	Bus ducts, Power, Control and other cables within battery limit of all six units.	0.30	0.30	0.30	0.30	0.30	0.30		1.80	-
16	HT, LT, Control and instrumentation cables, Illumination system of all six units and also of common auxiliary systems.	0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
17	Miscellaneous items used in all the six Units.	0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
								TOTAL (X1) =	**19.00**	

Sl. No	**EXISTING FACILITY FOR RENOVATION/ REFURBISHMENT**	UNIT NO. I	II	III	IV	V	VI	COMMON	TOTAL % = (F1)	Total in Rs. = (A1xF1)/100
1	Penstock and associated facilities	0.50	0.50	0.50	0.50	0.50	0.50		3.00	-
2	Spiral Case and associated facilities Stay vanes, Stay rings	0.50	0.50	0.50	0.50	0.50	0.50		3.00	-
3	Draft tube and associated facilities etc	0.25	0.25	0.25	0.25	0.25	0.25		1.50	-
4	Draft tube gate, Gantry crane etc	0.25	0.25	0.25	0.25	0.25	0.25		1.50	-
5	Generator transformer & auxiliaries etc	0.50	0.50	0.50	0.50	0.50	0.50		3.00	-
6	Shut-off Rotary Valve (MIV) & Auxiliaries	0.50	0.50	0.50	0.50	0.50	0.50		3.00	-
7	Butterfly Valve (Penstock Valve) & auxiliaries	0.50	0.50	0.50	0.50	0.50	0.50		3.00	-
								TOTAL (X2) =	**18.00**	

SL No.	**PACKAGE FOR INSTALLATION**	UNIT NO. I (%)	II (%)	III (%)	IV (%)	V (%)	VI (%)	COMMON	TOTAL % = (F1)	Total in Rs. = (A1xF1)/100
1	**TURBINE AND ACCESSORIES**									
1.1	Runner and shaft assembly and lowering in pit.	0.25	0.25	0.25	0.25	0.25	0.25		1.50	-
1.2	Guide apparatus trial and final assembly.	0.30	0.30	0.30	0.30	0.30	0.30		1.80	-
1.3	MIV, inlet pipe,outlet pipe,accessories, servomotors assy & testing etc .	0.30	0.30	0.30	0.30	0.30	0.30		1.80	-
1.4	Turbine Guide bearing including pad scraping.	0.30	0.30	0.30	0.30	0.30	0.30		1.80	-

Sl. No.			UNIT NO. I	II	III	IV	V	VI	COMMON	TOTAL % = (F1)	Total in Rs. = (A1xF1)/100
1.5	Installation of Shaft sealing.		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
1.6	Installation of OPU, pressure accumulator of Governor & MIV.		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
1.7	OPU adjustment, Dry stroking and time adjustment of Guide Apparatus.		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
1.8	Air, Water & Oil Pipe line for Turbine and MIV.		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
1.9	BFV, inlet pipe,outlet pipe,accessories, servomotors assy & testing etc .		0.30	0.30	0.30	0.30	0.30	0.30		1.80	-
1.10	Instrumentation and box up for readiness for spinning.		0.50	0.50	0.50	0.50	0.50	0.50		3.00	-
1.11	Pre commissioning checks.		0.35	0.35	0.35	0.35	0.35	0.35		2.10	-
									TOTAL (X3) =	18.60	

SL No.	PACKAGE FOR INSTALLATION		UNIT NO. I (%)	II (%)	III (%)	IV (%)	V (%)	VI (%)	COMMON	TOTAL % = (F1)	Total in Rs. = (A1xF1)/100
2	GENERATOR AND ACCESSORIES										
2.1	Stator assembly, joint winding, HV etc.		0.25	0.25	0.25	0.25	0.25	0.25		1.50	-
2.2	Stator shifting to pit and its Centering, levelling etc.		0.25	0.25	0.25	0.25	0.25	0.25		1.50	-
2.3	Rotor rim building in service bay.		0.25	0.25	0.25	0.25	0.25	0.25		1.50	-
2.4	Mounting of Rotor Poles, HV test etc.		0.25	0.25	0.25	0.25	0.25	0.25		1.50	-
2.5	Bottom bracket assembly in service bay.		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
2.6	Lowering of bottom bracket in pit.		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
2.7	Blue matching of bearing pads and thrust bearing components.		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
2.8	Assembly/Installation of Brake & Jack system, Brake dust collector, HS lubrication system.		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
2.9	Lowering of Rotor in Pit.		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
2.10	Assembly of Top bracket arms & Centre piece in service bay.		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
2.11	Assembly of thrust bearing in top bracket		0.10	0.10	0.10	0.10	0.10	0.10		0.60	-
2.12	Lowering of Top bracket in Pit.		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
2.13	Assembly of thrust collar in Generator shaft		0.10	0.10	0.10	0.10	0.10	0.10		0.60	-
2.14	Installation of stator air coolers and its associated pipings.		0.15	0.15	0.15	0.15	0.15	0.15		0.90	-
2.15	Fire protection system of generator.		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
2.16	Generator instrumentation, gauge panel including calibration.		0.10	0.10	0.10	0.10	0.10	0.10		0.60	-
2.17	Complete Unit Axis Alignment.		0.25	0.25	0.25	0.25	0.25	0.25		1.50	-
2.18	Extension shaft, slip ring, brush gear, CCL, carbon dust collector etc.		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
2.19	Box up of bearings, oil filling in bearings, installation of air baffles, guide etc.		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
2.20	Pre commissioning checks		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
									TOTAL (X4) =	23.40	

SL No.	PACKAGE FOR INSTALLATION		UNIT NO. I (%)	II (%)	III (%)	IV (%)	V (%)	VI (%)	COMMON	TOTAL % = (F1)	Total in Rs. = (A1xF1)/100
3	Excitation sys with AVR, Ex Trans, Accessories etc.		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
4	Bus duct isolated phase type, terminal cubicles etc.		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
5	Generator step up transformer Single phase with associated equipments.		0.50	0.50	0.50	0.50	0.50	0.50		3.00	-
6	Control & Monitoring sys incl computers, VDU's, printers, (incl Alarm & annunc.,sync panels, instruments, relays, automatic energy metering system etc. in all respect.		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
7	Protection system for Generator ,Transformers etc.with wiring & cubicles.		0.10	0.10	0.10	0.10	0.10	0.10		0.60	-
8	Switchgear with all Accessories.		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
9	Power, Control & Instrumentation cabling, cable trays, support structures.		0.20	0.20	0.20	0.20	0.20	0.20	0.10	1.30	-
10	Unit Auxiliary transformer, Station Service transformer & Station transformer		0.20	0.20	0.20	0.20	0.20	0.20	0.20	1.40	-
11	DC system, battery banks, chargers, racks, electrolyte, main & sub dist boards.								0.55	0.55	-

Sl. No.			UNIT NO.						COMMON	TOTAL % = (F1)	Total in Rs. = (A1xF1)/100
			I	II	III	IV	V	VI			
12	Oil handling system.								0.20	0.20	-
13	Drainage water pumps and piping etc for PH								0.20	0.20	-
14	Dewatering system pumps and piping etc								0.20	0.20	-
15	Installation of pumps,strainers etc for cooling water system		0.10	0.10	0.10	0.10	0.10	0.10		0.60	-
16	Laying of pipelines ,valves ,flow meters etc for cooling Water System .		0.10	0.10	0.10	0.10	0.10	0.10		0.60	-
17	HP & LP comp air system with compressors, accessories, piping etc		0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.70	-
18	Equipment Earthing etc.		0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.70	-
19	Installation of pipelines ,pumps ,valves etc for Fire Fighting System		0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.70	-
20	Painting of equipment		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.35	-
21	Spining and bearing run of unit		0.25	0.25	0.25	0.25	0.25	0.25		1.50	-
22	Synchronising including commissioning tests prior to synchronising		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
23	Load throw off tests and unit inspection		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
24	Field Efficiencny test for Turbine & Generator.		0.20	0.20	0.20	0.20	0.20	0.20		1.20	-
									TOTAL (X5) =	**21.00**	
GRAND TOTAL FOR DISMANTLING, RENOVATION & INSTALLATION WORK OF 6x60 MW BALIMELA HEP = (X1 +X2 +X3+X4+X5)										**100.00**	

Note -: **A1 = (78 % of '60% A')Where 'A = Total Lumpsum Value Quoted'**

ANNEXURE-B

BILLING BREAK UP FOR SUB-CONTRACTOR FOR MATERIAL HANDLING OF DISMANTLED ITEMS AND HANDING OVER TO CUSTOMER IN THE SCRAP YARD WORK OF 6x60 MW BALIMELA HEP

Sl. No.	PACKAGES TO BE TRANSPORTED FROM POWER HOUSE TO OHPC STORE/SCRAP YARD	UNIT NO.						COMMON	TOTAL % = (F2)	Total in Rs. = (A2XF2)/100
		I	II	III	IV	V	VI			
1	Turbine and associated equipment including Turbine shaft, cone, runner, guide bearing, shaft seal, Guide vane, discharge ring etc of all six units.	2.50	2.50	2.50	2.50	2.50	2.50		15.00	-
2	Governing System including PMG, Oil pressure system, Governor panels etc. of all six units.	1.00	1.00	1.00	1.00	1.00	1.00		6.00	-
3	Generator and associated equipment including stator, rotor, generator shaft, Thrust bearing, guide bearings, Generator Air Coolers of all six units.	3.00	3.00	3.00	3.00	3.00	3.00		18.00	-
4	Excitation System including Pilot Exciter, Main Exciter, Slip rings, Excitation panels etc. of all six units.	1.00	1.00	1.00	1.00	1.00	1.00		6.00	-
5	Cooling water system (common as well as unit specific) including, pump- motor sets, pipe, valves, filters, etc. for all six units.							1.00	1.00	-
6	Dewatering & drainage system including pipes, valves, and pump-motor sets etc. Common for all six units.							1.00	1.00	-
7	Fire protection system (fire hydrant, HVWS etc) including pipes, valves, pump-motor sets etc. common for all six units.							1.00	1.00	-
8	04 nos. vacuum pump-motor sets including pipelines, valves etc. common for all six units.							1.00	1.00	-
9	Air conditioning unit including duct, damper, louver etc. and Ventilation duct.							1.00	1.00	-
10	Drinking water system including piping, valves, pump-motor sets, filter etc.							1.00	1.00	-
11	2 nos. HP compressors & 1 no. LP old compressor including compressed air piping, valves etc. common for all the six units.							1.00	1.00	-
12	Generator Transformer, 11 KV Reactor and associated facilities of all six units.	2.00	2.00	2.00	2.00	2.00	2.00		12.00	-
13	Unit Auxiliary transformer, SAT & SST and other associated facilities of all six units.	1.50	1.50	1.50	1.50	1.50	1.50		9.00	-
14	11 KV switchboards, Unit Auxiliary board panels, Control panels, Protection panels etc. of all six units.	1.00	1.00	1.00	1.00	1.00	1.00		6.00	-
15	Bus ducts, Power, Control and other cables, Illumination within battery limit of all six units.	1.50	1.50	1.50	1.50	1.50	1.50		9.00	-
16	HT, LT, Control and instrumentation cables of all six units and also of common auxiliary systems.	1.00	1.00	1.00	1.00	1.00	1.00		6.00	-
17	Miscellaneous items used in all the six Units.	1.00	1.00	1.00	1.00	1.00	1.00		6.00	-
	TOTAL								**100.00**	

Note -: A2 = (7 % of '60% A')Where 'A = Total Lumpsum Value Quoted'

Annex 2

S.No.	BRIEF DESCRIPTION OF WORK	UNIT	QTY.
1	**POWER HOUSE OFFICE**		
1 (a)	TABLE - EXECUTIVE APPROX 5' X 2'8"	Nos.	1
1 (b)	TABLE - EXECUTIVE APPROX 4'6" X 2'6"	Nos.	5
1 (c)	CHAIRS - SWIVEL HIGH BACK	Nos.	1
1 (d)	CHAIRS - SWIVEL NORMAL BACK	Nos.	5
1 (e)	CHAIRS- VISITORS & CONF ROOM	Nos.	15
1 (f)	TABLE- CONF ROOM APPROX 6' X 4'	Nos.	1
1 (g)	SIDE RACKS	Nos.	8
1 (h)	ALMIRAH WITH LOCKERS - BIG	Nos.	4
1 (i)	REFRIGERATOR 220-250 LTR.	Nos.	1
1 (j)	DRINKING WATER COOLER CONNECTED WITH (RO+UV+TDS) - CAP. 50 LTR.	Nos.	1
1 (k)	PHOTOCOPIER MACHINE FOR A3 & A4 SIZE	Nos.	1
1 (l)	CEILING FANS APPROX. 1200 MM INCL INSTALLATION	Set	3
1 (m)	COMPUTER DESKTOP - WITH WEBCAM	Set	6
1 (n)	LASER PRINTER - COLOUR	Nos.	1
1 (o)	LASER PRINTER - BLACK & WHITE	Nos.	1
1 (p)	SCANNER	Nos.	2
1 (q)	CROCKERY, CUTLERY, GAS STOVE WITH COOKING GAS CONNECTION/ INDUCTION HEATER, EMERGENCY LIGHT	Lot	1
1 (r)	FIRST AID KIT (COMPLETE TO BE UPDATED PERIODICALLY)	Set	1
1 (s)	SPLIT AC 1.5 TON IN CONFRENCE ROOM	No	1
1 (t)	SPLIT AC 1.0 TON IN OFFICE ROOM	Nos.	3
1 (u)	BORDBAND CONNECTION WITH HIGH SPEED (16 MBPS) INTERNET FACILITY (WI-FI ROUTER), UNLIMITED DATA. RUNNING MONTHLY CHARGE IS TO BE BORNE BY CONTRACTOR	set	1
1 (v)	ELECTRICAL LIGHTING (LED) AS PER REQUIREMENT, IN EVERY ROOMS AND COMMON SPACE, CALLINB BELL SYSTEM	lot	1
2	**STORE OFFICE**		
2 (a)	TABLE - EXECUTIVE APPROX 4'6" X 2'6"	Nos.	3
2 (b)	CHAIRS - SWIVEL NORMAL BACK	Nos.	3
2 (c)	CHAIRS- VISITORS	Nos.	6
2 (d)	SIDE RACKS	Nos.	3
2 (e)	ALMIRAH WITH LOCKERS - BIG	Nos.	2
2 (f)	DRINKING WATER COOLER CONNECTED WITH (RO+UV+TDS) - CAP. 50 LTR.	Nos.	1
2 (g)	DESERT AIR COOLER	Nos.	2
2 (h)	CEILING FANS APPROX 1200 MM INCL INSTALLATION	Set	2
2 (i)	COMPUTER DESKTOP - WITH WEBCAM	Set	2
2 (j)	LASER PRINTER - BLACK & WHITE	Nos.	1
2 (k)	SCANNER	Nos.	1
2 (l)	CROCKERY, CUTLERY, GAS STOVE WITH COOKING GAS CONNECTION/ INDUCTION HEATER, EMERGENCY LIGHT	Lot	1
2 (m)	FIRST AID KIT (COMPLETE TO BE UPDATED PERIODICALLY)	Set	1
2 (n)	BORDBAND CONNECTION WITH HIGH SPEED (16 MBPS) INTERNET FACILITY (WI-FI ROUTER), UNLIMITED DATA. RUNNING MONTHLY CHARGE IS TO BE BORNE BY CONTRACTOR	Set	1
2 (o)	AREA LIGHTING HIGH MAST INCLUDING FIXING. RUNNING EXPENDITURE IS TO BE BORNE BY CONTRACTOR	No	1
3	**4R (4BR) QTRS FURNISHING OF RESIDENTIAL CAMP: PROVIDING FOLLOWING**		
3 (a)	DOUBLE BED BOX TYPE WITH COIR FOAM MATTRESS IN BED ROOM WITH BED SHEETS, PILLOWS AND PILLOW COVERS, WALL TO WALL CURTAINS. 2 SETS OF (2 BED SHEET AND 2 PILLOW COVER TWICE IN A YEAR)	Set	4
3 (b)	DESERT AIR COOLER	no.	4
3 (c)	STEEL ALMIRAH FULL SIZE- ONE IN EACH ROOM	no.	4
3 (d)	STUDY TABLES 3'X2' WITH 2 CHAIRS IN EACH BED ROOM	set	4
3 (e)	DRESSING TABLE – ONE EACH IN EACH BED ROOM	no.	4
3 (f)	SET OF 2 BLANKETS IN EACH ROOM	set	4
3 (g)	ELECTRIC IRON - 1 IN EACH ROOM	no.	4
3 (h)	EMERGENCY LIGHT -ONE IN EACH ROOM	no.	4
3 (i)	SET OF 2 BUCKETS WITH 2 MUGS IN EACH QUARTER	no.	4
3 (j)	ELECTRIC KETTLE - ONE IN EACH ROOM	no.	4
3 (k)	HEATERS/BLOWERS - ONE IN EACH QUARTER	no.	4
3 (l)	ELECTRICAL LIGHTING (LED) AS PER REQUIREMENT, IN EVERY ROOMS AND COMMON SPACE	lot	1
3 (m)	EXHAUST FAN	Nos.	4
3 (n)	CEILING FANS APPROX. 1200 MM INCL INSTALLATION	Set	5
4	**PROVIDING MESS FACILITY IN ONE OF THE QUARTERS ALLOTTED FOR APP 10-12 PERSONS WITH ITEMS LISTED BELOW**		
4 (a)	PROVIDING 6’ X 3’ EIGHT SEAT SUN MICA TOP DINING TABLE WITH 8 CUSHIONED SEAT DINING CHAIRS.	Set	1

S.No.	BRIEF DESCRIPTION OF WORK	UNIT	QTY.
4 (b)	CROCKERY, CUTLERY, COOKING UTENSILS, GAS STOVE WITH COOKING GAS CONNECTION FOR 10-12 PERSONS ALONG WITH ELECTRIC KETTLE, EMERGENCY LIGHT	Lot	1
4 (c)	MICROWAVE OVEN	no.	1
4 (d)	DESERT AIR COOLER	no.	2
4 (e)	HEATERS/ BLOWERS	no.	2
4 (f)	HEAVY DUTY MIXTURE GRINDER	no.	1
4 (g)	5 SEAT SOFA SET WITH 4' X 1 ¾' CENTRE TABLE- IN DINING/ DRAWING AREA	no.	1
4 (h)	REFRIGERATOR 220-250 LTR.– ONE IN DINING/ DRAWING ROOM	no.	1
4 (i)	40" COLOUR TV LED WITH DISH ANTENNA WITH RECHARGEABLE DTH CONNECTION– ONE IN DINING/DRAWING ROOM. RUNNING MONTHLY CHARGE IS TO BE BORNE BY CONTRACTOR	no.	1
4 (j)	WASHING MACHINE AUTOMATIC (6.5 KG CAPACITY) - ONE FOR WHOLE QUARTER	no.	1
4 (k)	BORDBAND CONNECTION WITH HIGH SPEED (16 MBPS) INTERNET FACILITY (WI-FI ROUTER), UNLIMITED DATA. RUNNING MONTHLY CHARGE IS TO BE BORNE BY CONTRACTOR	Set	1
4 (l)	(RO+UV+TDS) FOR DRINKING WATER - CAP. 14 LTR.	Nos.	1
4 (m)	ELECTRICAL LIGHTING (LED) AS PER REQUIREMENT, IN EVERY ROOMS AND COMMON SPACE	lot	1
4 (n)	5 KVA DG SET FOR BACKUP POWER IN CASE OF POWER FAILURE INCLUDING ITS RUNNING EXPENDITURE	Nos.	1
5	**2RB (2BR) QTRS FURNISHING OF RESIDENTIAL CAMP: PROVIDING FOLLOWING**		
5 (a)	DOUBLE BED BOX TYPE WITH COIR FOAM MATTRESS IN BED ROOM WITH BED SHEETS, PILLOWS AND PILLOW COVERS, WALL TO WALL CURTAINS. 2 SETS OF (2 BED SHEET AND 2 PILLOW COVER TWICE IN A YEAR)	Set	4
5 (b)	DESERT AIR COOLER ONE IN EACH ROOM	no.	4
5 (c)	STEEL ALMIRAH FULL SIZE- ONE IN EACH ROOM	no.	4
5 (d)	STUDY TABLES 3'X2' WITH 2 CHAIRS IN EACH BED ROOM	set	4
5 (e)	DRESSING TABLE – ONE IN EACH BED ROOM	no.	4
5 (f)	SET OF 2 BLANKETS IN EACH ROOM	set	4
5 (g)	ELECTRIC IRON - 1 IN EACH ROOM	no.	4
5 (h)	EMERGENCY LIGHT -ONE IN EACH ROOM	no.	4
5 (i)	SET OF 3 BUCKETS WITH 3 MUGS IN EACH QUARTER	set	2
5 (j)	ELECTRIC KETTLE -ONE IN EACH ROOM	no.	4
5 (k)	HEATERS/ BLOWERS - ONE IN EACH QUARTER	no.	4
5 (l)	(RO+UV+TDS) FOR DRINKING WATER - CAP. 14 LTR.	Nos.	2
5 (m)	ELECTRICAL LIGHTING (LED) AS PER REQUIREMENT, IN EVERY ROOMS AND COMMON SPACE	lot	1
5 (n)	CEILING FANS APPROX. 1200 MM INCL INSTALLATION	Set	4
5 (o)	EXHAUST	Nos.	2
6	**17, 18 (2BR) ERECTOR'S HOSTEL FURNISHING OF RESIDENTIAL CAMP: PROVIDING FOLLOWING**		
6 (a)	DOUBLE BED BOX TYPE WITH COIR FOAM MATTRESS IN BED ROOM WITH BED SHEETS, PILLOWS AND PILLOW COVERS, WALL TO WALL CURTAINS. 2 SETS OF (2 BED SHEET AND 2 PILLOW COVER TWICE IN A YEAR)	Set	2
6 (b)	4 SEAT SOFA SET WITH 4' X 1 ¾' CENTRE TABLE - IN DINING/DRAWING AREA IN EACH QUARTERS.	no.	2
6 (c)	REFRIGERATOR 165 LTR.– ONE IN DINING/DRAWING ROOM IN EACH QUARTERS	no.	2
6 (d)	32 " COLOUR TV LED WITH DISH ANTENNA WITH RECHARGEABLE DTH CONNECTION– ONE IN DINING/DRAWING ROOM. RUNNING MONTHLY CHARGE IS TO BE BORNE BY CONTRACTOR	no.	2
6 (e)	STEEL ALMIRAH FULL SIZE- ONE IN EACH QUARTERS.	no.	2
6 (f)	STUDY TABLES 3'X2' WITH 2 CHAIRS IN EACH QUARTERS.	set	2
6 (g)	DRESSING TABLE – ONE EACH IN EACH QUARTERS.	no.	2
6 (h)	SET OF 2 BLANKETS IN EACH QUARTERS.	set	2
6 (i)	ELECTRIC IRON - 1 IN EACH QUARTERS.	no.	2
6 (j)	EMERGENCY LIGHT -ONE IN EACH QUARTERS.	no.	2
6 (k)	SET OF 2 BUCKETS WITH 2 MUGS IN EACH QUARTER	no.	2
6 (l)	ELECTRIC KETTLE -ONE IN EACH QUARTERS.	no.	2
6 (m)	HEATERS/ BLOWERS - ONE IN EACH QUARTER	no.	2
6 (n)	SPLIT AC 1 TON - ONE IN EACH QUARTERS.	no.	2
6 (o)	GEYSER 15 LTR - ONE IN EACH QUARTERS.	no.	2
6 (p)	EXHAUST	Nos.	2
6 (q)	CEILING FANS APPROX. 1200 MM INCL INSTALLATION	Set	4

NOTE:

1. ALL ABOVE ITEMS SHALL BE EXCLUSIVELY FOR BHEL USE.

2. ALL ABOVE ITEMS SHALL BE ON RETURNBALE BASIS AS IS WHERE IS BASIS (BY CONTRACTOR) AFTER COMPLETION OF PROJECT IN THE USED CONDTION.

3. RUNNING MAINTENANCE OF ABOVE ITEMS SHALL BE DONE BY CONTRACTOR FREE OF COST TILL COMPLETION OF PROJECT (INCLUDING TIME EXTENSION IF ANY).

Rev 00
6th JULY
2010

VOLUME- IA (PART-II): TECHNICAL CONDITIONS OF CONTRACT (TCC)

NAME OF WORK:

DISMANTLING OF OLD TG SET INCLUDING AUXILIARIES; RENOVATE AND REUSE THE FIXED/EMBEDDED COMPONENTS; COLLECTION OF ALL INFORMATION/ DIMENSION, TAKING MEASUREMENTS AS REQUIRED, ASSESSING/ MEASURMENT THE CONDITION AND STRENGTH OF VARIOUS CIVIL FOUNDATIONS AND RESTRENGTHEN (IF REQUIRED) AND REUSE THE FOUNDATIONS, UNLOADING AT STORE, LOADING, TRANSPORTATION, STORING & PRESERVATION AT SITE, LOADING & UNLOADING OF DISMANTLED MATERIAL FROM SITE TO DUMPING YARD, COMPLETE ERECTION OF ALL THE COMPONENTS TESTING, COMMISSIONING AND HANDING OVER OPERATING PLANT TO OHPC (CUSTOMER) UNIT 1 TO 6 ALOGNWITH CIVIL, ARCHITECTURAL (INTERIOR DECORATION OF POWER HOUSE), MECHANICAL, ELECTRICAL, CONTROL & INSTRUMENTATION WORKS AS REQUIRED INCLUDING DEMONSTRATION OF PERFORMANCE GUARANTEES AT (6X60MW) BALIMELA HEP, DISTT-MALKANGIRI, ODISHA.

BHARAT HEAVY ELECTRICALS LIMITED

VOLUME – I A (PART – II): TECHNICAL SPECIFICATIONS

1. GENERAL

BHEL has been awarded the work of Dismantling, Design, Manufacture, Supply, installation, erection, testing & commissioning of **6X60 MW BALIMELA HYDRO ELECTRIC POWER PROJECT.** The scope of work under the contract shall include Dismantling, renovation & repairs including capital repairs, transportation, material handling, loading, unloading storage & preservation, erection, testing, commissioning & Performance Guarantee Tests under Renovation & Modernization with New TG of the Units 1 to 6 and its associated facilities of Balimela hydroelectric project.

1.1 SCOPE OF WORK

- **A.** Receiving and Unloading of consignments from the Trucks/Trailers arriving from BHEL manufacturing units and its suppliers/vendors.
- **B.** Proper Stacking and Preservations of all the material.
- **C.** Keeping records and status of all materials as per BHEL practices. Verification of all the material received by contractor. Prepare shortages/damaged reports, if any.
- **D.** Transportation of materials from site stores to the powerhouse service bay or the pre assembly area as per site requirement and the instructions of site engineer.
- **E.** Construction of temporary shelters on some of the special items as per the instruction of the site engineer.
- **F.** Unloading and stacking of certain items in the service bay / work area with the help of EOT cranes / loading arrangement as per the instruction of BHEL engineer.
- **G.** Proper Housekeeping and safe working.
- **H.** Handing over of all the spares to customer at their stores.
- **I.** Handling and Transportation of scrap from power house to OHPC Ltd stores / scrap yard as per the instructions of BHEL engineer.
- **J.** Re-conciliation of materials with BHEL and OHPC Ltd.
- **K.** Dismantling, Erection, Testing, Commissioning and handing over as per BHEL drawing, contract specifications and as per the instructions of the BHEL engineer.

The materials will be supplied from our manufacturing units located all over the country as well as our vendors located both inland and overseas. The scope of work under this tender consists of taking delivery of the materials from transporters, unloading, shifting to their designated locations, verification & stacking etc. The delivery of these materials will mostly be inside the project campus by road transport. However, delivery of some items may also have to be taken from Godowns of transporters.

The contractor has to handle whatever actual materials are dispatched for the project irrespective of any variations and payments shall be released for the actual gross tonnage handled for material handling purposes.

Though most of the material is being planned to be made available at site well in time for erection requiring proper handling, verification and storage. However certain items may be delayed, requiring direct delivery at site for erection. In such cases contractor has to unload the

material directly in powerhouse/ work place and verification to be carried out. Contractor for subject work will be eligible for payment as per the rate schedule. Besides above BHEL at its discretion may get the material handling/ unloading done at any location in the premises of powerhouse, store depending upon availability of space in powerhouse/ stores.

1.2 Tenderer may note that as the place of work is inside the POWER PROJECT and the premises is being manned by Security/Safety Force of OHPC, all necessary system related to entry of men, vehicle & material, safety & security systems, work permit system etc. as applicable will have to be followed by the contractor

NOT APPLICABLE

3.1 The scope of work mainly involves receipt, unloading from road carriers (Trucks/Trailers etc) of total materials for six units of 60 MW of BHEL (like Hydro-turbines, valves, generators, transformers, bus-duct, piping, auxiliaries equipment, C&I, BOP and other miscellaneous materials/ equipment) at site or bringing from road carrier godown to site stores/ storage yards and shifting from place of unloading to actual storage area (stores developed by BHEL), proper storing, stacking/ restacking of materials/ equipment (in closed store sheds/ open storage yards/ project site), verification of components including opening of cases, re-packing/ stacking and preservation of the same after verification including liasioning with carrier for waiver/ reduction of demurrage, watch and ward, to provide firefighting equipment including fire extinguishers in closed and open storage yard wherever required. Also transportation of material to erection site as and when required. The contractor is to use equipments (supplied by BHEL or arranged by contractor) like suitable cranes/ trucks/ tractor-trailers and other material handling equipment including all necessary small/ major T&P required for the same for the above work.

The contractor shall maintain record of material such as receipts, issue, return, in Day – Book, ledgers, stock registers and computers, issue gate passes, record of shortages & MDR etc as per BHEL procedures and instructions. The contractor shall also assist BHEL for all correspondence regarding the insurance including preparation of claims.

3.2 Approx. weight to be handled for six units as indicated in **Volume -IA, Part- I, Chapter – IV** is of the order of 5500 MT (Approx.). But the contractor has to handle whatever actual materials are dispatched for the project irrespective of variations in weight and sizes.
Volume-IA, Part- I, Chapter-IV gives the general idea for tender's information about the weights and dimensions of some major components/ equipment. The weights and dimensions shown are approximate and are liable to vary. No increase in quoted/ accepted rates/ prices should be allowed due to change in weights and dimensions of the equipment/ materials.

3.3 The contractor shall deploy adequate number of supervisors, storekeepers, riggers, carpenter, fitters and other skilled and unskilled workers as per requirement having adequate experience of jobs of similar nature till completion of work.

3.4 Contractor shall provide all necessary preservatives, paints, thinners, rust preventives, grease, lubricants etc. for preservation of components. All tools and tackles and other consumables required for the contractor at his own cost shall also provide preservation of components including supervision. Preservation of components also includes applying preservatives, paints, rust preventives, greasing of threaded portions, repainting of work order Nos. / DU nos. /component codes etc. After preservation wherever necessary, components will be stacked properly as per original stacking for which no additional payment shall be made.

3.5 It shall be the responsibility of the contractor to keep in touch with Engineer at site and find out arrival of road consignments. The Contractor shall collect all the lorry waybills from BHEL site office either personally or through an authorized representative. The customer or his authorized representative shall, for the purpose, visit the said office every day and collect available LWB, PWB etc. While collecting the LWB, PWB contractor or his authorized representative will sign the register maintained for the purpose indicating the date and time of collection. The contractor shall keep in touch with carriers and arrange to effect delivery of consignments immediately on their receipts. Delay may cause deterioration of goods apart from attracting demurrage charges. Contractor shall also maintain a

register indicating date of LWB, PWB date of collection of the materials from road transport agencies/ lorries and date of stacking them at storage yard of BHEL.

3.6 The contractor is required to find out and follow up regularly with carriers regarding arrival of consignments even prior to the receipt of GR, if any, and take delivery of the same on 'INDEMNITY BOND'. Indemnity bonds would be executed by BHEL when the Contractor furnishes intimation regarding arrival of consignment.

3.7 It is possible that in certain cases, LWBs, PWB may not be received in time but BHEL may receive Photostat copies of the same, it is, therefore, the responsibility of contractor to collect such Photostat copies while furnishing indemnity bond from BHEL authorities at site.

3.8 Payment of all demurrages/ warfages that results due to contractor's faults would be the responsibility of contractor and to his account. If BHEL have to make payment of demurrage/ warfage together with freight, the amount so paid as demurrage/ wharfage for the reasons stated above shall be paid by the contractor forthwith or would be recovered from bills of the contractor.

3.9 In any case contractor will pursue with concerned Carrier authorities at all level (local/ HQ etc) for waiver/ reduction to the minimum of such demurrage /wharfage charges. Whenever such demurrages/ wharfages become payable due to reasons not attributable to contractor, contractor will immediately bring it to the notice of BHEL with specific request to bear such charges. The decision of the Engineer in such case will be final and binding on the contractor.

3.10 The contractor has to ensure the unloading and removal of materials from unloading place within the permitted time and ensure to keep the area free and avoid jamming. Any loss to BHEL on this account shall be recovered from the contractor.

3.11 Any discrepancy/ shortage/ damage found in the consignment after taking delivery from the carriers after giving clear receipt would be the responsibility of the contractor and the amount liable to be lost by BHEL on such accounts is recoverable from the contractor.

3.12 In case of apparent damages/ shortages in consignments/ packing noticed by the contractor, such cases shall be brought to the notice of BHEL and cleared only with their consent/ approval. The contractor shall provide all the necessary assistance to BHEL for lodging the insurance claim and all correspondence with the insurer, surveyor and transport agency. The contractor shall also help in maintaining all the records in connection of insurance claims.

3.13 It would be responsibility of the contractor to examine the packages, consignments etc. on arrival and bring to the notice of carriers and BHEL authorities regarding loss/ damages, if any, observed in the consignments proposed to be taken delivery of.
Before taking delivery, particularly of consignments in 'smalls' the weight of the package shall be checked with the invoiced weight of the packages and any discrepancy shall be reported immediately to BHEL/ carriers. In all case of loss/ damages the contractor will take open delivery from the carriers and forward such open delivery certificates (ODC) to the engineer within 15 days of receipt of such consignment. All expenses connected there with shall be to the account of contractor. BHEL reserves right to claim losses, if any, accrued to BHEL in the event of contractor non-compliance to above.

In case of short delivery and non-delivery, immediate notice of loss shall be filed with the carrier at places of dispatch and destination as also at any intermediate stations, if it is different one, under intimation to BHEL authorities at site.
Unloading from lorries, transportation, unloading at storage area/ work site of heavy sophisticated equipment like stator, panels etc. shall be done in the presence of and as per the directions of BHEL representative, including stacking and re-stacking, if necessity arises.
Certain packages are likely to be received by BHEL by passenger bus. The relevant waybills will also be handed over to the contractor for clearing the from the Bus station. It is the responsibility of the contractor to clear the same at the bus station, transport and hand over to BHEL authorities at site under the scope of the contract. All the tender provisions indicated in the tender shall be applicable in this case also.
Since the trucks/ trailers are expected to arrive during any time of the day/ night, the contractor shall have his workmen round the clock at site as well as other places as required to unload the materials.

Consignments coming on Sundays and Holidays are also required to be handled by the contractor promptly. It will be the responsibility of the contractor to contact the site engineer /his authorized representative of BHEL at their residence, if required, and obtain instructions to make suitable arrangements. In the event unloading from the carrier is delayed by the contractor, the detention charges, if any, will be contractors account.

Under the scope of this contract, it shall be the responsibility of the contractor to provide all necessary facilities to open the packages in the presence of the engineer, verifying the contents of the packages, repackaging where ever and whenever necessary, properly stacking them as may be directed by the engineer so as to facilitate proper handling, periodical verification of material, receipt position, stock taking etc. for this, the contractor shall have experienced person at site who can maintain the records of dispatch/ receipt/ stacking/ verification/ shortages/ damage/ missing items etc. The verification of materials shall be carried out within 15 days and report shall be submitted as a documentary proof.

All material shall be stored 6 inches above ground level by use of concrete or wooden sleepers. Number of concrete/wooden sleepers required for this purpose is to be arranged by contractor within the quoted rates. No material shall be left to remain on ground at any time. Material shall not be stacked in low-lying areas where it is likely flooded during rains. Wooden sleepers/ concrete block and tarpaulins for this purpose, wherever deemed necessary be arranged by the contractor. These items shall be stacked/ stored properly at the location(s) specified by BHEL when not in use.

The material/ equipment requiring indoor storage will be handed and stacked inside the storage shed (provided by BHEL) by the contractor using material handling equipment like Hydra crane, Fork lift etc. For checking/ verification of the components with packing slips/ LWB/ PWB etc. The contractor shall provide sufficient experience persons and other facilities as and when required by the engineer.

Stacking/restacking of the material shall be done as per the instruction and to the satisfaction of engineer (stacking and restacking may be done multiple times on the instruction of engineer Incharge at no extra cost). The materials shall be so stacked that the same should facilitate easy handling. In the event of any improper stacking BHEL may ask the contractor to restack the material properly or failing which BHEL may get the job done by another agency at the risk and cost of the contractor.

The contractor shall execute the work in the most substantial and workman like manner. The stores shall be handled with care and diligence. Any loss to BHEL due to contractor's lapse /negligence shall have to be made good by the contractor.

In case contractor is not able to unload, transport, stack the material at a pre-determined area, as per direction of the engineer for any reason whatsoever (including non-availability of crane, tractor, trailer and other T&P etc.) BHEL shall be at liberty to get the work done by engaging other agency/ equipment / T&P etc at the risk and cost of the contractor.

It shall be responsibility of the contractor to keep the storage areas (closed/ open) in neat and tidy conditions. Any vegetation like grass, bushes, sarkandas etc. shall be cut in open storage area and removed as per requirement and instruction of BHEL engineer within the contractual value. All surplus/ unusable packing materials shall be removed and deposited at location(s) specified by BHEL within the project premises (including weighment of the same within the project premises if required).

Normally the consignments from BHEL manufacturing units/ their sub-suppliers are sent on freight paid basis. In case any consignment is received at any place or freight to pay basis, it will be the responsibility of the contractor to pay the freight and take delivery of such consignments. The amount of freight paid by the contractor at any point of time in such cases will be limited to Rs.5000/-. However, the freight paid by the contractor will be reimbursed by BHEL within a week's time on production of relevant receipt. In case of freight amounts exceed Rs.5000/- contractor may request BHEL well in time to issue cheque/ Draft for such additional amounts in favour of carriers towards freight charges. Receipt of payment and proof of taking delivery of consignment shall be submitted to BHEL by the contractor. Delay in issuance of cheque/ drafts as above shall not in any case be taken as a cause of delay in taking delivery of consignment resulting in wharfage / demurrage leviable by carriers.

In case some materials are required to be dispatched from Site to Manufacturing Units, other sites or any other place, the contractor may be asked by the engineer to get the same packed, transport it to the nearest railway station, carriers godown and get the same booked. The rates for this work shall be mutually decided at site and shall be payable extra to contractor. In case of material required to be booked as freight paid the freight for the consignment limited to Rs. 3000/- shall be paid by the contractor. However it shall be reimbursed by BHEL on submission of receipt within a weeks' time. The funds for freight charges exceeding Rs. 3000/- shall be arranged by BHEL. Required packing material (accepted to BHEL Engineer) shall be arranged by contractor within the quoted price. For any exigencies during execution of the contract, the contractor shall have to depute his personnel for collection/ delivery of any material meant for site from/ to outstation if desired and instructed by the Engineer without any financial implication to BHEL.

4.0 MATERIAL HANDLING AND STORAGE & TRANSPORTATION TO POWERHOUSE

4.1 Contractor shall plan in consultation with BHEL engineer, plant/ material to be received/ delivered in powerhouse as per erection progress/ schedules and fill in the requisite formats in standard forms.

4.2. As the storage & erection work can be spread in different areas/ locations of the project, contractor has to arrange sufficient numbers of watch & ward personals to avoid any pilferage of material. In case any equipment/ material is lost/ damaged while in the custody of the contractor, the cost of repair/ replacement if any to bring back the equipment in original order shall be deducted from the contractor's bill. BHEL's decision in this regard shall be final and binding on the contractor.

4.3 All electrical panels, control gear, motors and such other devices shall be dried by heating before they are installed and energized. Exposed parts those required special protection such as bearings, slip rings, commentator's and other fragile items shall be protected against moisture ingress and corrosion during storage and are periodically inspected.

4.4 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 is installed.

4.5 Contractor shall also ensure that lifting heavy equipment such as generator rotor, stator, Main inlet valve, shafts etc. shall be done strictly in accordance with drawing given for the purpose and using of lifting tackles supplied for the purpose. Wherever required rubber/ leather pads shall be given between the slings and the machined parts to avoid any damages, scratches to the machined surface. Contractor shall cover bearing journals with grease and cloth as per direction of engineer to avoid damages to the surface.

4.6 After Dismantling some of the items may be kept & preserved for future reference/use/dimension. The same may also be in the scope of contractor within quoted price. The list of such items shall be provided by BHEL at site.

4.7 As per the erection requirement contractor shall deliver material to powerhouse/ work site. The maximum care has to be taken during that time of loading the material at storage area, transportation and unloading at powerhouse. No untoward damage should occur to the material at that time. Any loss of item/ damages shall be to the contractors account.

5.0 PRESERVATION OF COMPONENTS

Preservation of all material received at store/site shall be in the scope of contractor. After Dismantling some of the items may be kept & preserved for future reference/use/taking for dimension. The same may also be in the scope of contractor within quoted price. The list of such items shall be provided by BHEL at site.

For further details regarding preservation refer to Chapter 6 of SCC clause no 6.2.

6.0 CLEANING OF EQUIPMENT

The contractor shall thoroughly clean all the components before installation of the components whose surfaces are coated with protective coating and sent to site are to be thoroughly cleaned by suitable mechanical/ chemical means as per the approved procedure.

Contractor shall ensure that the items identified by BHEL shall be cleaned with kerosene/ petrol/ CRC before assembly and erection of the equipment. For cleaning purposes he shall use only soft cotton cloth. Contractor shall never use cotton waste for cleaning any equipment. The electrical equipment before erection shall be cleaned with dry air/ vacuum cleaner.

The contractor shall clean inside of all pipes and fittings from dirt, sand and loose scales, mechanically/ chemically and by air blowing before being erected. All pipe lines be thoroughly blown/ flushed. If necessary certain pipelines may have to be cleaned by acid pickling/ chemical cleaning. The procedure for the same shall be provided by BHEL. All chemicals and inhibitors shall be arranged by the contractor with in the contract. Disposal of chemical has to be carried out by the contractor at his own cost.

7.0 Erection

7.1 All works such as cleaning, checking, levelling, blue matching, aligning, assembling, temporary erection for alignment / dismantling of certain equipment for checking, cleaning, surface preparation, fabrication at site, cutting, grinding, straightening, chamfering, filing, chipping, drilling, reaming, dowelling, scrapping, machining, surface grinding, shaping, fitting up welding, tube expansion etc. as may be applicable in such erection works are to be treated as incidental to erection and necessary to complete the work satisfactorily & shall be carried out by the contractor as part of the work.

7.2 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 within the finally accepted rates.

7.3 No members of the 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.

7.4 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 & removed from work site.

7.5 Corrections like straightening of ladders, tube support plates adjustment/ removal of ovulates in pipes and opening or closing the fabricated bends of piping to suit the layout shall be considered part of the work and the contractor is required to carry out such work within finally accepted price/ rate as per instructions of Engineer.

7.6 The contractor shall fabricate pipes, special bends, etc. threading and welding as required and carry out the chemical cleaning of fabricated piping.

7.7 The servicing and realignment of skid-mounted equipment if required or if directed by BHEL shall be carried out by the contractor at no extra cost to BHEL.

7.8 The contractor shall completely erect & test all the piping systems, covered in the specification including sampling lines up to and including sample coolers, hangers & supports, valves & accessories in accordance with the drawings furnished. This includes all necessary bolting, welding, pre-heating, stress relieving, testing, cleaning & painting. System shall be demonstrated in condition to operate continuously in a manner acceptable to the Engineer. Welding shall be used throughout for joining pipes except where flanged screwed or other type joints are specified or shown on the drawings. All piping shall be erected true to the lines & elevation as indicated in the drawings.

7.9 Pipes sent in standard length shall be cut to suit the site conditions and the layouts. Tubes or pipes wherever deemed to be convenient will be sent in running lengths. Bends shall be prepared and/or fabricated at site.

7.10 The contractor shall ensure lowering of pipes in position with adequate precautions as to avoid any damage to either material or men. Only the anchoring points earmarked for the purpose of lowering the pipes are to be used.

7.11 Certain adjustments in length may be necessary while erecting pipelines. The contractor should remove the extra lengths/ add extra lengths to suit the final layout after preparing edges a fresh by adopting specified heat treatment procedures, at no extra cost.

7.12 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.

7.13 The contractor shall be responsible for any modifications of shop fabricated pipes prior to installation to accommodate minor site alteration in pipe which may include cutting/re welding of flanges/pipes for change of angles of bend or length adjustment at no extra cost.

7.14 All vents and drains for piping equipment covered in the scope whether shown in the drawings or not shall terminate in atmosphere and to pit as directed by BHEL.

7.15 Wherever piping erected by the contractor is connected to equipment/ piping erected by the other agencies the joint at the connecting point shall be the responsibility of the contractor of this specification.

7.16 Normally the valves will have prepared edges for welding. But, if it becomes necessary, the contractor will prepare new edges or recondition the edges by grinding or chamfering to match the corresponding tubes and pipes within quoted price. All fittings like `T' pieces, weld neck flanges, reducers etc., shall be suitably matched with pipes for welding. The valves will have to be checked, cleaned or overhauled in full or in part before erection after chemical cleaning and during commissioning.

7.17 The contractor shall be responsible for correct orientation of all valves so that seats, stems & hand wheels will be in desired location. It is the responsibility of the contractor to obtain the information regarding orientation of valves not fully located on drawings before the same are installed.

7.18 Suspension for piping, etc., will be supplied in running lengths, which shall be cut to suitable sizes and adjusted as required.

7.19 The adjustment of all supports erected for maintaining the proper slopes of piping wherever required is also included in the scope of the contractor.

7.20 No temporary supports should be welded on the piping. In case of absolute necessity prior approval should be taken from BHEL Engineer. In such cases heat treatment if required, shall be carried out by the contractor as part of subject work.

7.21 All supports and anchors shall be installed as per drawing to obtain safe and reliable and complete pipe installation as per instructions of Engineer. Any additional support as called for by Engineer shall have to be fabricated and provided by the contractor. The raw materials required for fabricating such supports shall be arranged by BHEL.

7.22 Contractor shall install piping in such a way that no excessive or destructive expansion forces exist under any condition.

7.23 The contractor shall carry out the tightening of the field bolts on the equipment and piping covered under this specification by using either the calibrated torque wrench method or the turn of part method. The methods used, the tools and the equipment deployed shall be subject to the approval of Engineer. All the torque wrenches shall be calibrated at the start of each days work and at least once during the day. The bolting work shall be carried out by the competent technicians.

7.24 The contractor shall ensure that all supporting elements, anchors & restraint have been installed and adjusted in accordance with the drawings / sketches & other written instructions of the Engineer.

7.25 Layout of small bore piping as required shall be done as per site requirement. Necessary sketch for routing these lines should be got approved from BHEL by the contractor. There is a possibility of slight change in routing the above pipe lines even after completion of erection or from aesthetic point of view which should be carried out at no extra cost.

7.26 All the valves, including motorised valves, flap valves, etc. shall be serviced and lubricated to the satisfaction of Engineer before erecting the same and during pre-commissioning also. Welding or jointing of extension spindle for valves to suit the site conditions and operational facility shall be part of erection work within the quoted rates.

7.27 Additional platforms and ladders of permanent nature incidental to the job for approaching different equipment/ valves as per site requirement, which may not be indicated in drawings, shall be fabricated and installed by the contractor. The materials required will be supplied by BHEL free of cost. Erection and welding of necessary instrumentation tapping points, valves to be provided on equipment, auxiliaries and pipe lines covered within the scope of this specification, will also be the responsibility of the contractor and will be done as per the instructions of BHEL Engineer at no extra cost.

7.28 All the items will be supplied in pieces/ loose and are to be assembled bolted and welded at site. Contractor has to work as per the drawings and instruction issued at site for erection and testing purposes. Weights for handling and erection are indicative only. **No claim will be entertained on account of variations in weights or change from conventional design e.g from bolted to welded connections and vice versa, increase in number of pieces etc. The bidders should take care of this point while quoting lump sum price for subject works for handling and erection works.** It may be possible that during routing /laying of pipelines, cable trays, HVAC ducts etc may foul with each other, the contractor has to re-route (Minor) the above as per the decision of BHEL without any financial implication to BHEL**.**

7.29 In view of the tight erection schedule, limited area in service bay and rotor assembly being in critical path, whatever pre-erection preparatory works can be carried out in BHEL store area shall have to be planned accordingly. In particular, the cleaning, de-burring, de-greasing and segregation of rim punching by weight shall definitely be planned and carried out in store area.
Since the subsequent units shall have to be erected/ commissioned in schedule time the contractor shall have to complete the rotor assembly in the service bay by working round the clock in this area. Moreover, two-shift working shall have to be adopted by the contractor to meet the erection schedule.

8.0 WELDING, HEAT TREATMENT, RADIOGRAPHY AND OTHER NON-DESTRUCTIVE TESTING

8.1 The equipment and piping shall be erected in conformity with the provisions of standard/ specification and as may be directed by BHEL The method of welding (arc, gas, TIG, MIG or other method) may be indicated in the detailed drawings/ schedules. BHEL Engineer will have the option of changing the method of welding as per site requirements.

8.2 Welding being a special process, all-welding shall be carried out by skilled and experienced welders holding valid certificates as per requirements of ISO 9002. The certificate shall be checked by BHEL before allowing the welders to be engaged on welding. BHEL at its own discretion may ask any or all welders to under go welder Qualification Test as per Standard Procedure in accordance with requirements of ISO 9002 and as per welding manual of BHEL**. The deployment of qualified welder and subsequent site testing of requisite numbers of welders shall be one of the prerequisite of contractor's site mobilization completion.**

8.3 All welders including tack welder, structural and pipe welder shall be tested as per ASME section IX and approved by BHEL Engineer before they are actually engaged on work though they may possess the certificate. BHEL reserves the right to reject any welder if the welder's performance is not found to be satisfactory. The contractor in Performa given by BHEL Engineer shall maintain the records of qualification of welders. All the welders qualified for the work will be issued an identity card by BHEL Engineer and welder will keep the same with him at work place.

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

8.5 Faulty welds caused by the poor workmanship shall be cut and re-welded at the **contractor's expenses including cost of materials**. The Engineer prior to any repair being made shall approve the procedure for the repair of defective welds. Radiography or any other NDT on completed field welds shall be conducted as per drawings or instructions of BHEL engineer.

8.6 The contractor shall carry out the root run welding of all piping, valves, instrumentation, tapping points etc. by TIG/ SMAW / MIG welding process. The contractor shall have to carry out full TIG welding of butt weld joints of tubes /pipes of lesser thickness if required. During the root runs of stainless steel joints, the contractor shall before and during welding have to purge the pipes with inert gas in case of stainless steel. All arrangements required for the above shall be the responsibility of the contractor at no additional cost.

8.7 All charges for testing of contractor's welders including consumables for welding / destructive and non destructive tests conducted by BHEL at site or at laboratory shall have to be borne by the contractor only. The test coupons raw material will be supplied by BHEL free of cost.

8.8 The regulators used on welding machines shall be calibrated before putting these into use for work. Periodic calibration for the same shall also be arranged by the Contractor at his cost.

8.9 Only **BHEL/OHPC approved electrodes and filler wire** will be used. All electrodes shall be baked and dried in the electric electrode-drying oven to the required temperature for the period specified by the Engineer before these are used in erection work. All welders shall have electrodes drying portable oven at the work spot. The electrodes brought to the site will have valid manufacturing test certificate. The test certificate will have co-relation with the lot No. /batch No given on electrode packets. No electrodes will be allowed to 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. Periodical calibration for the same shall also be arranged by the contractor within the finally accepted rates.

8.10 All butt / fillet welds shall be subject to dye penetration test as per drawing and document requirement and have to be carried out as per the instructions of the engineer within the quoted / finally accepted rates for this contract .

8.11 The contractor shall maintain a record in the form as prescribed by BHEL of all operations carried out on each weld and maintain a record indicating the number of welds, the names of welders who welded the same, date and time of start and completion, preheat temperature, radiographic results, rejection if any, percentage of rejection etc. and submit copies of the same to the BHEL Engineer as required. Interpretation of the BHEL Engineer regarding acceptability or other wise of the welds shall be final. All site welding joints shall be subject to acceptance by BHEL Engineer

8.12 All welds shall be painted with anticorrosive red oxide paint once radiography and stress reliving works are over. Necessary consumables and scaffolding etc. including paints shall be provided by contractor at his own cost.

8.13 The contractor shall carry out the edge preparation of weld joints at site in accordance with the details acceptable to BHEL. Wherever possible machining or automatic flame cutting will be allowed only wherever edge preparation otherwise is impractical. All slag's / burrs shall be removed from cuts and all the hand cuts shall be ground smooth to the satisfaction of engineer.

8.14 **Pre-heating, radiography and other NDT tests, post heating and stress relieving after welding of tubes, pipes, including attachment welding wherever necessary, are part of erection work and shall be carried out by the contractor in accordance with the instructions of Engineer. All equipment and consumables essential for carrying out the above process shall be arranged by contractor at his cost.**

8.15 Contractor shall arrange all necessary stress relieving equipment with automatic recording devices. Also the contractor shall have to arrange for labour, heating elements, thermocouples, etc. insulating materials like asbestos cloth, ceramic beads, asbestos ropes etc. required for heat treatment/ stress relieving operations. Temperature shall be measured by thermocouple and recorded on a continuous printing type recorder. All the recorded graphs for heat treatment works shall be the property of BHEL. The contractor has to provide thermal chalks, temperature recorders, thermocouple attachment units, graphs sheets, etc. for checking within the finally accepted rates. All stress relieving equipment will be used after due calibration and submission of test certificate to BHEL. Periodic calibration from Govt. approved / accredited Test Houses traceable to National / International standards will also be arranged by the contractor for such equipment at his cost. The contractor shall obtain the signature of BHEL

Engineer or his representative on the chart of the recorder after setting up the weld joints for heat treatment operation prior to the starting..

8.16 **The contractor shall also be equipped for carrying out other NDT like Radiography, DP, MPI, UT etc. as required (if required) as per welding schedule/ drawings within the finally accepted price/ rates on all equipment welding in Stay ring, Spiral, spiral inlet pipe, MIV(BFV), MIV inlet pipe, and also in piping and other areas as applicable Necessary help including surface preparation and scaffolding required for conducting all the shall be rendered by contractor at his own cost.**

8.17 The technical particulars, specification and other general details for NDT work shall be in accordance with ASME, ISO or as specified by Drawings and Manuals of BHEL / CUSTOMER.

8.18 Low speed high contrast, fine grain films (D-7 or equivalent) in 10cm. width only be used for weld joint radiography. Film density shall be between 2.0 to 4.0.

8.19 Iridium – 192 / any other approved shall be used by contractor for radiography work. The geometric un-sharpness shall not exceed 0.05 mm. Taking adequate safety precautions shall be the responsibility of the contractor while carrying out radiography. Necessary safe guards required for radiography (including personnel from BARC) shall be arranged by contractor at his own cost.

8.20 All radiographs shall be free from mechanical, chemical or process marks, to the extent they should not confuse the radiographic image and defect finding. Penetrameter as per ASME or ISO must be used for each exposure.

8.21 Lead numbers and letters are to be used (generally 6mm size) for identification of radiographs. Contract no., joint identification, source used, welder's identification and SFD are to be noted down on paper cover of radiograph.

8.22 Lead intensifying screens for front and back of the film should be used as per the above referred ASME specification.

8.23 The joint is to be marked with permanent mark A, B, C, etc. to identify the segments. For this a low stress stamp shall be used to stamp the pipe on the downstream side of the weld.

8.24 For multiple exposure, an overlap of about 25 mm of film should be provided.

8.25 Radiography personnel with sufficient experience and certified by M/s BARC as Radiographer for conducting radiographic tests in accordance with safety rules laid down by Division of Radiological protection only have to be deployed . These personnel should also be registered with BARC for film badge service.

8.26 All arrangements for carrying out radiography work including dark room with air conditioner/ blower and other accessories shall be provided by contractor within the space allotted for office at his cost. As an alternative the contractor may deploy an agency having all above facilities and who are duly approved / accredited by BARC and/or other Regulatory authorities. Detailed particulars of such agencies will be submitted and got approved by BHEL Engineer before the actual deployment of agency for radiography work.

8.27 The contractor shall have a dark room fully equipped with radiography equipment, film (unexposed), chemicals and any other dark room accessories such as Airconditioner/ Blower etc. There should be adequate number of radiography personnel with sufficient experience and certified by M/s BARC as Radiographer for conducting radiographic tests in accordance with safety rules laid down by Division of Radiological protection. These personnel should also be registered with BARC for film badge service.

8.28 Contractor shall note that 100% radiography will be done at the initial stages on all the welding joints as specified in the drawings. Subsequently radiographic inspection will be done on the basis of quality of welding. However minimum percentage of joints to be radiographed shall not be less than the requirement of BHEL welding schedule. The percentage may be increased depending upon the quality of joints and at the discretion of BHEL. Radiography on LP piping joints is not envisaged. However other NDT test as called for in the FQP including LPI, MPI and HT will have to be carried out.

8.29 All the Radiographs shall be properly preserved and shall become the property of BHEL.

8.30 Since radioisotopes are being used, all precautions and safety rules as prescribed by BHEL/BARC/ Customer shall be strictly followed. BARC certificate/permission letter to be provided before taking up the work.

8.31 Radiography of joints shall be so planned that it does not interfere with the ongoing erection works keeping in mind the safety of the persons due to radiation exposure. The testing of the welding joints shall also be planned in a way that it is carried out at the earliest possible so as to assess the soundness of the weld joints and performance of HP welders. If the performance of welder is unsatisfactory, he shall be replaced immediately.

8.32 Wherever radiographs are not accepted, on account of bad shot, joints shall be re-radio graphed and re-shots submitted for evaluation. Radiographs shall be taken on joints after carrying out repairs. However, if the defect persists after first repair, as per radiograph, carrying out radiography shall be repeated till the joint is made acceptable. In case the joint is not repairable, the same shall be cut, re-welded and re-radio graphed at contractor's cost.

8.33 If the contractor does not carry out radiography work due to non-availability of source / film / chemical / operator etc., BHEL will get the work done departmentally or through some other agency at the risk and cost of the contractor.

8.34 Heat treatment and radiography may be required to be carried out at any time (day and night) to ensure the continuity of the progress. The contractor shall make all necessary arrangements including labour, supervisors/ Engineer required for the work as per directions of BHEL. The contractor shall assist BHEL Engineer in preparing complete field welding schedule/procedure for all the field welding activities to be carried out in respect of piping and equipment erected by him involving high pressure welding at least 30 days prior to the scheduled start of erection work at site. Such schedules shall be strictly adhered to by the contractor. Existing old Rotor rim in the unit is heat shrink fitted. **Induction heating machine required for dismantling of Rotor is to be arranged by contractor or any suitable arrangement required for dismantling is to be arranged/adopted.**

8.35 The contractor shall assist BHEL Engineer in preparing complete field welding schedule/procedure for all the field welding activities to be carried out in respect of piping and equipment erected by him involving high pressure welding at least 30 days prior to the scheduled start of erection work at site. Such schedules shall be strictly adhered to by the contractor.

9.0 TESTING, PRE-COMMISSIONING, COMMISSIONING AND POST-COMMISSIONING.

9.1 On completion of erection of equipment, the contractor shall get the equipment checked up by the OHPC/BHEL, and their deputed supervisors, specialists concerned with the particular item of work. The testing of various equipment will be carried under the supervision of BHEL/ OHPC with the assistance of the Contractor in the manner decided by and in the presence of the owner and other authorized supervisors concerned, and to their entire satisfaction. On completion of these preliminary checks by the equipment supplier, the contractor shall make the equipment ready for conducting the test. The contractor shall rectify all defects found during the checking / testing as directed by the BHEL/ Consortium partner /Owner to ensure satisfactory operation of the equipment.

9.2 The contractor shall carry out the required tests as instructed by BHEL using contractor's own consumables, labour and scaffoldings.

9.3 All the tests shall be repeated till all the equipment satisfy the requirement / obligation of BHEL at various stages. Contractor shall also carry out repair of all the welded joints (site and suppliers) failed during testing.

9.4 The scope of testing activities cover installation of all necessary temporary piping, supports, valves, blanking, pumps, tanks etc. and other accessories with access platforms valves, pressure gauges, electric cables, switches, cutting of some of existing valve, placing of rubber wedges in the valves etc., required for hydro test, chemical cleaning, or for any other tests as the case may be and will carry out above activities under this scope of work as per instructions of BHEL. The scope also covers the off site disposal of effluents.

9.5 For testing of spiral casing, the necessary test pump and bulk heads shall be supplied by BHEL. Any other item which may be required additionally shall be arranged by contractor. The necessary blanks, pressure gauge, valve etc for testing of piping system including hardware shall be arranged by the contractor within his scope of work.

9.6 It shall be the responsibility of the contractor to provide various categories of workers in sufficient numbers along with Supervisors including necessary consumables, T&Ps, IMTEs etc., and any other assistance required during testing of equipment and attending any problem in the equipment erected by the contractor till handing over. Association of BHEL's/ Client's staff during above period will not absolve contractor from above responsibilities.

9.7 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 contractor's finally accepted rates/ price shall be inclusive of all these factors also.

9.8 In case, any rework is required because of contractor's faulty erection which is noticed during testing, the same has to be rectified by the contractor at his cost. If any equipment/ part is required to be inspected during testing, the contractor will dismantle /open up the equipment / part and reassemble / redo the work without any extra claim.

9.9 During testing, 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 shall also include all such work.

9.10 The contractor shall make all necessary arrangements including making of temporary closures on piping/ equipment for carrying out the hydro test on all piping equipment covered in the specification at no additional cost.

9.11 In case any defect is noticed during tests 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 same shall be done as per Engineer's instructions including repair, rectification and replacement work by the contractor at his cost. The parts to be replaced shall be provided by BHEL.

9.12 The contractor shall carry out cleaning and servicing of valves prior to testing of the equipment under his scope. A system for recording of such servicing operations shall be developed and maintained in a manner acceptable to BHEL Engineer to ensure that no valves are left un-serviced. Wherever necessary as required by BHEL Engineer, the contractor shall arrange to lap / grind valve seats.

9.13 Cleaning & servicing of all the filters/ strainers, toppings of oils coming in the system shall be done by the contractor within the accepted price.

9.14 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 extra cost.

10.0 FINISH PAINTING

Primer painting wherever peeled off or damaged or if required is to be carried out after thoroughly cleaning of all dirt, rust, scales, grease, oils and other foreign materials by wire brushing, scrapping, any other method as per requirement of BHEL and the same being inspected and approved by the engineer before painting. Bare surfaces / unpainted surfaces shall be provided with two coats of suitable primer. The gas cut stubs / weld seams would require to be cleaned / ground before painting. After applying the primer paints all the equipment / items shall be finished with two coats of enamel paint or any other paint as issued by BHEL. The exterior surface may have to be cement / coal tar painted as directed by BHEL

As the equipment/ items are to be spray painted, the contractor shall make arrangements of the required equipment for spray painting. Spray painting at the job/ site shall be permitted only items approved by the owner / Engineer.

While the primers and paints will be issued by BHEL as free issue item, all tools and other consumables including scaffolding materials required for finish painting shall be supplied by contractor within their quoted rate.

All the plant equipment's /items shall be painted with required coat of red oxide primer & required coat of synthetic enamel paint, color as per drawings and site requirement. Paint shall be supplied by BHEL supplying units. The quantity to be supplied by manufacturing units is fixed. Contractor has to follow the painting procedure strictly, any deficiency in quantity of paints due to wrong procedure shall be borne by the contractor.