Rev 02
17th Sept
2020

NOTICE INVITING TENDER

(Document No PS:MSX:NIT)

TENDER NO.: BHEL/NR/SCT/NEPAL/RAHUGHAT HEP/HTG&MM/1263

NAME OF WORK: MATERIAL HANDLING, AND ERECTION, TESTING AND COMMISSIONING OF E&M PACKAGE FOR 2X20 MW RAHUGHAT HEP, NEPAL

Bharat Heavy Electricals Limited



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NOTICE INVITING E-TENDER (NIT)

NOTE: BIDDER MAY DOWNLOAD FROM WEB SITES

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To

Dear Sir/Madam

Sub : NOTICE INVITING E-TENDER

Sealed offers in two part bid system (National competitive bidding (NCB)) are invited from reputed & experienced bidders (meeting PRE QUALIFICATION CRITERIA as mentioned in Annexure-1) for the subject job by the undersigned on the behalf of BHARAT HEAVY ELECTRICALS LIMITED as per the tender document. Following points relevant to the tender may please be noted and complied with.

1.0 **Salient Features of NIT**

SL NO	ISSUE	DESCRIPTION	
i	**TENDER NUMBER**	**BHEL/NR/SCT/NEPAL/RAHUGHAT HEP/HTG &MM/1263**	
ii	**BROAD SCOPE OF JOB**	**MATERIAL HANDLING, AND ERECTION, TESTING AND COMMISSIONING OF E & M PACKAGE FOR 2X 20 MW RAHUGHAT HEP, NEPAL.**	
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*	
e	Volume-II	*Price Schedule (Absolute value).*	*Applicable*
iv	**ISSUE OF TENDER DOCUMENTS**	**Tender documents will be available for downloading from BHEL eProcurement portal (*https://eprocurebhel.co.in)* till due date of submission.** Brief information of the tenders shall also be available at BHEL website (**www.bhel.com**)	*Applicable*
v	**DUE DATE & TIME OF OFFER SUBMISSION**	***Date : 23/05/2022, Time : 10:00 hrs*** ***Place : on https://eprocurebhel.co.in***	*Applicable*
vi	**OPENING OF TENDER**	***Date : 23/05/2022, Time : 15:30 hrs*** *Notes:* *(1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day.*	*Applicable*

		(2) Bidder may depute representative to witness the opening of tender. For e-Tender, Bidder may witness the opening of tender through e-Procurement portal only.	
vii	**EMD AMOUNT**	*Nil*	*Not Applicable*
viii	**COST OF TENDER**	*Free*	
ix	**LAST DATE FOR SEEKING CLARIFICATION**	**Five days before bid submission due date**. Along with soft version also, addressing to undersigned & to others as per contact address given below; **1)** Name: **G.V. RAJA SEKHAR** Designation: Sr. MANAGER Deptt: SCT Address: BHEL-PSNR, PLOT NO. 25, SECTOR – 16A, NOIDA - 201301 Phone: (Landline) 0120-2416232 Email : gvr@bhel.in 2) Name: **ADITTI GUPTA** Designation: Dy. Manager Deptt: SCT Address: BHEL-PSNR, PLOT NO. 25, SECTOR – 16A, NOIDA - 201301 Phone: (Landline) 0120 - 2416511 Email : aditi@bhel.in	*Applicable*
x	**SCHEDULE OF PRE BID DISCUSSION (PBD)**		*Not applicable.*
xi	**INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)**	*Please refer clause no. 15.*	*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), BHEL eProcurement portal (***https://eprocurebhel.co.in***) **and not in the newspapers**. Bidders to keep themselves updated with all such information.	

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

3.0 **Not Used.**

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

~~For Electronic Fund Transfer the details are as below -:~~

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

~~**b) Bank Particulars**~~

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

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

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

Documents Comprising the e-Tender

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

a. Technical Tender (UN priced Tender)

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

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

b. Price Bid:

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

DO NOT'S

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

Digital Signing of e-Tender

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

The Requirement:

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

The contact details of the service provider are given below:

For any technical related queries please call at 24 x 7 Help Desk Number

0120-4001 002, 0120-4001 005 & 0120-6277 787

International bidders are requested to prefix 91 as country code

Email Support - Technical - support-eproc@nic.in

Note: For any Issues or Clarifications relating to the published tenders, bidders are requested to contact the respective Tender Inviting Authority

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

The contact details of the DSC Certifying Authority as given below:

Sl. No.	Name	Website Link
1	**GNFC**	www.ncodesolutions.com
2	**e-Mudhra**	http://www.e-Mudhra.com
3	**Safescrypt**	www.safescrypt.com

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

6.0 Not used.

7.0 Deviation with respect to tender clauses and additional clauses/suggestions in Techno-commercial bid / Price bid shall NOT be considered by BHEL. Bidders are requested to positively comply with the same.

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

9.0 **Assessment of Capacity of Bidders:**

Bidder's capacity for executing the job under tender shall be assessed '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 I))

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

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

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

b) Number of Months 'T_1' for which 'Monthly Performance Evaluation' as per relevant formats, should have been done in the 'Period of Assessment' for the corresponding similar package P_1. Similarly T_2 for package P_2, T3 for package P_3, etc. for the tendered scope. Now calculate cumulative total months '$\mathbf{T_T}$' for total similar Packages '$\mathbf{P_T}$' for all Regions (i.e. $\mathbf{T_T} = T_1 + T_2 + T_3 + T_4 + \ldots T_N$)

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

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

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

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

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

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

Sl. No.	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
1	Similar Packages for all Regions → (under execution/ executed during period of assessment)	P_1	P_2	P_3	P_4	P_5	…	P_N	Total No. of similar packages for all Regions = **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)	$S_{1\text{-}1}$, $S_{1\text{-}2}$, $S_{1\text{-}3}$, $S_{1\text{-}4}$, … $S_{1\text{-}T1}$	$S_{2\text{-}1}$, $S_{2\text{-}2}$, $S_{2\text{-}3}$, $S_{2\text{-}4}$, … $S_{2\text{-}T2}$	$S_{3\text{-}1}$, $S_{3\text{-}2}$, $S_{3\text{-}3}$, $S_{3\text{-}4}$, … $S_{3\text{-}T3}$	$S_{4\text{-}1}$, $S_{4\text{-}2}$, $S_{4\text{-}3}$, $S_{4\text{-}4}$, … $S_{4\text{-}T4}$	$S_{5\text{-}1}$, $S_{5\text{-}2}$, $S_{5\text{-}3}$, $S_{5\text{-}4}$, … $S_{5\text{-}T5}$	.. … … … …	$S_{N\text{-}1}$, $S_{N\text{-}2}$, $S_{N\text{-}3}$, $S_{N\text{-}4}$, … $S_{N\text{-}TN}$	--------
4	Sum of Monthly Performance scores of the corresponding Package for the corresponding period (as in row-3)	S_1	S_2	S_3	S_4	S_5	…	S_N	Sum (Σ) of columns (iii) to (ix) = **S_T**

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

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

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

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

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

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

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

III. '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)

In addition to above, in case contractor fails to score more than 5 (five) marks in the scaled down scores of HSEPES for "more than 2 months in a period of 6 months preceding and including the cut-off month in any single package", the contractor shall be considered disqualified for ongoing tender(s) of BHEL. Qualification of bidder for further tendering process shall be subject to qualifying this condition in addition to qualifying requirements mentioned in PQR. Bidders who did not qualify this condition shall not be considered under the provisions of clause 9 IV (iv) of NIT.

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

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

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

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

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

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

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

iv). Consequent upon applying the criteria of 'Assessment of Capacity of Bidders' detailed above on all the bidders qualified against Technical and Financial Qualification criteria, if the number of qualified bidders reduces to less than minimum no. of bidders required for conducting RA as per extant RA Guidelines, then for further processing of the Tender, BHEL at its discretion reserves the right to also consider the bidders who are "not qualified" as per criteria of 'Assessment of Capacity of Bidders' and for this, procedure described in following three options shall be followed:

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

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

v). 'Under execution' shall mean works in progress as per the following:
a. Up to execution of 90% of anticipated Contract Value in case of Civil, MM, Structural and Turbo Blower Packages

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

c. Up to Synchronization in all Balance Packages

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

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

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

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

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

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

ix). Performance evaluation as specified above in this clause is applicable to Prime bidder and Consortium partner (or Technical tie up partner) for their respective scope of work.

10.0 Since the job shall be executed at site**,** bidders must visit site/ work area and study the job content, facilities available, availability of materials, prevailing site conditions including law & order situation, applicable wage structure, wage rules, etc. before quoting for this tender. They may also consult this office before submitting their offers, for any clarifications regarding scope of work, facilities available at sites or on terms and conditions.

11.0 For any clarification on the tender document, the bidder may seek the same in writing or through e-mail and/or through e-procurement portal, as per specified format, within the scheduled date for seeking clarification, from the office of the undersigned. BHEL shall not be responsible for receipt of queries after due date of seeking clarification due to postal delay or any other delays. Any clarification / query received after last date for seeking clarification may not be normally entertained by BHEL and no time extension will be given.

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

13.0 In the event of any conflict between requirement of any clause of this specification/ documents/drawings/data sheets etc. or requirements of different codes/standards specified, the same to be brought to the knowledge of BHEL in writing for clarification before due date of seeking clarification (whichever is applicable), otherwise, interpretation by BHEL shall prevail. Any typing error/missing pages/ other clerical errors in the tender documents, noticed must be pointed out before pre-bid meeting/submission of offer, else BHEL's interpretation shall prevail.

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

15.0 Bidders shall submit Integrity Pact Agreement (Duly signed by authorized signatory who signs in the offer), **if applicable**, along with techno-commercial bid. This pact shall be considered as a preliminary qualification for

further participation. **The names and other details of Independent External Monitor (IEM) for the subject tender is as given at Clause no. 1, Salient Features of NIT, Sl. no. (xi) above.**

"Integrity Pact (IP)"

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

Sl. No.	IEM	Email
1.	Shri Arun Chandra Verma, IPS (Retd.)	acverma1@gmail.com
2.	Shri Virendra Bahadur Singh, IPS (Retd.)	vbsinghips@gmail.com

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

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

Note:

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

16.0 The Bidder has to satisfy the Pre-Qualifying Requirements stipulated for this Tender in order to be qualified. The Price Bids of only those bidders will be opened who will be qualified for the subject job on the basis of satisfying the Pre-Qualification Criteria specified in this NIT as per Annexure-I (as applicable), past performance etc. and date of opening of price bids shall be intimated to only such bidders. BHEL reserves the right not to consider offers of parties under HOLD.

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

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

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

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

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

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

23.0 Consortium Bidding (or Technical Tie up): Not Applicable

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

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

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

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

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

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

28.1.1 **Commitment by BHEL:**

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

28.1.2 **Commitment by Bidder/ Supplier/ Contractor:**

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

(ii) The bidder/ supplier/ contractor will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to relevant guidelines issued from time to time by Govt. of India/ BHEL.

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

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

29.0 Not Applicable

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

31.0 **PREFERENCE TO MAKE IN INDIA:**

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

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

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

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

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

IV. The *beneficial owner* for the purpose of (III) above will be as under:
   1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.
      Explanation
      a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent of shares or capital or profits of the company.
      b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements.
   2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership.
   3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person has ownership of or entitlement to more than fifteen percent of the property or capital or profits of the such association or body of individuals.
   4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
   5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.

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

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

Note:

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

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

32.0 **Not used**

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

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

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

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

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

35.0 **Not used**

36.0 Order of Precedence:

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

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

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

for BHARAT HEAVY ELECTRICALS LTD
(SCT)

Enclosure:

(i) Annexure-1: Pre Qualifying Requirements.
(ii) Annexure-2: Check List.
(iii) Annexure-3: Not Used
(iv) Annexure-4: Reverse Auction Process Compliance Form
(v) Annexure-5: Authorization of representative who will participate in the online Reverse Auction Process
(vi) Annexure-6: RA Price Confirmation and Breakup
(vii) Annexure-7: Integrity Pact
(viii) Annexure-8: Undertaking as per C4 of Annexure-1 i.e. PQR
(ix) Annexure-9: Declaration reg. Related Firms & their areas of Activities
(x) Annexure-10: Declaration reg. minimum local content in line with revised public procurement
(xi) Annexure-11: Declaration by the Contractor
(xii) Other Tender documents as per this NIT.

ANNEXURE - 1

PRE QUALIFYING REQUIREMENTS

JOB	**MATERIAL HANDLING, AND ERECTION, TESTING AND COMMISSIONING OF E & M PACKAGE FOR 2X 20 MW RAHUGHAT HEP, NEPAL.**
TENDER NO	**BHEL/NR/SCT/NEPAL/RAHUGHAT HEP/HTG & MM/1263**

SL. NO.	NAME AND DESCRIPTION OF PRE-QUALIFICATION CRITERIA	BIDDER'S CLAIM IN RESPECT OF FULFILLING THE PQR CRITERIA
A	Submission of Integrity Pact duly signed	**Applicable**
B **B-1**	**TECHNICAL:** Bidder shall have undertaken erection, testing and commissioning of Hydro turbine generators of minimum two units of any one type or from combination (Pelton/Francis/ Kaplan) of capacity 20 MW and above in last 7 years.	**Applicable**
C **C-1**	**FINANCIAL:** **TURNOVER:** Bidders must have achieved an average annual financial turnover (Audited) of **INR 2.13 Crore or more** over last three Financial Years (FY) i.e. (2018-2019, 2019-2020, 2020- 2021).	**Applicable**
C-2	**NET WORTH**: Net worth (only in case of companies) of the bidder should be positive. ***Note:*** *Net worth shall be calculated based on the latest Audited Accounts, as furnished for 'C-1' above.* *Net worth = Paid up share capital + Reserves.*	**Applicable**
C-3	**PROFIT:** Bidder must have earned profit in any one of the three financial years as applicable in the last three financial years defined in 'C-1' above based on latest Audited Accounts ***Note:*** *PROFIT shall be PBT earned during any one year of last three financial years as in 'C-1' above.*	**Applicable**
C-4	Bidder must not be under Bankruptcy Code Proceedings (IBC) as on date by NCLT/ other related local authority or under liquidation/BIFR, which will render him ineligible for participation in this tender, and shall submit undertaking to this effect.	**Applicable**
C-5	Bidder to submit undertaking for non-Blacklisting from Government agencies.	**Applicable**
D	Assessment of Capacity of bidder to execute the work as per clause 9.0 of NIT	**Applicable – By BHEL**
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.*	**Applicable – By BHEL**
F	Price Bid Opening ***Note:*** *Price Bids of only those bidders shall be opened who stand qualified after compliance of criteria A to E*	**By BHEL**

Explanatory Notes for PQR:

1. Bidder to submit Audited Balance Sheet and Profit and Loss Account for the three years as indicated against C-1 above along with all annexures.

2. In case of audited financial statements have not been submitted for all three years as indicated above, then the applicable audited statements submitted by bidders against the requisite three years, will be averaged for three years.

3. If Financial Statements are not required to be audited statutorily, then instead of audited financial statements, financial statements are required to be certified by Charted Accountant.

4. In case Balance Sheet and Profit & loss account statement submitted by the bidder is not in INR, then the exchange rate (TT selling rate of SBI) shall be considered as on schedule date of technical bid opening.

5. 'UNDERTAKEN' means the bidder should have achieved the criteria specified in the Technical criteria B-1 i.e. achievement of milestone as "SUCCESSFUL SYNCHRONIZATION" of hydro turbine generator.

6. Certification for achievement of milestone as "SUCCESSFUL SYNCHRONIZATION" of hydro turbine generator from the respective customer who has issued work order for Erection, Testing & Commissioning of Hydro, Turbine & Generator.

7. Completion date for achievement of the technical criteria should be in the last 7 years ending on the 'latest date of Bid Submission' of Tender irrespective of date of the start of work. Completion date shall be reckoned from the "FY quarter of bid submission.

8. The bidder should have achieved the technical criteria even if the contract has not been completed or closed.

9. Bidders shall submit relevant documents, meeting above requirements at B & C.

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

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

ANNEXURE - 2

CHECK LIST

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

1	**Name of the Tenderer**	
2	**Address of the Tenderer**	
3	**Type of the Firm/ Company**	
(i)	In case of Individual Tenderer	His / her full name, address and place & nature of business shall be furnished along with the offer.
(ii)	In case of Partnership Firm	The names of all the partners and their addresses, A copy of the partnership deed/instrument of partnership dully certified by the Notary Public shall be furnished along with the offer..
(iii)	In case of Companies	a) Date and place of registration including date of commencement certificate in case of Public Companies (certified copies of Memorandum and articles of Association are also to be furnished). b) Nature of business carried on by the Company and the provisions of the Memorandum relating thereof.
4.a	**Details of Contact person for this Tender**	Name : Mr/ Ms Designation: Telephone No: Mobile No: Email ID:
4.b	**Details of alternate Contact person for this Tender**	Name : Mr/ Ms Designation: Telephone No: Mobile No: Email ID:
5	**EMD DETAILS**	Not Applicable
6	**Validity of Offer**	TO BE VALID FOR **SIX MONTHS** FROM DUE DATE

	DESCRIPTION	**APPLICABILITY (BY BHEL)**	**ENCLOSED BY BIDDER**
7	Whether all pages of the Tender documents including annexures, appendices etc are read and understood	Applicable	YES / NO
8	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
9	Audited Balance Sheet and profit & Loss Account for the last three years	Applicable	YES / NO
10	Copy of PAN Card	Applicable	YES / NO
11	Copy of GST registration	Applicable	YES / NO

SL. NO.	DESCRIPTION	APPLICABILITY (BY BHEL)	ENCLOSED BY BIDDER
12	Organization Chart of the tenderer's organization, including the names, addresses and contact information of the Directors/Partners shall be furnished along with the offer.	Applicable	YES / NO
13	Integrity Pact (Annexure – 7 of NIT)	Applicable	YES / NO
14	Annexures – 5, 8, 9, 10 & 11 of NIT	Applicable	YES / NO
15	Offer forwarding letter / tender submission letter ***[Form No. F-01 (Rev 00)]***	Applicable	YES / NO
16	Declaration by Authorised Signatory ***[Form No: F-02 (Rev 00)]***	Applicable	YES / NO
17	Declaration by Authorised Signatory regarding Authenticity of submitted documents ***[Form No: F-02A (Rev 00)]***	Applicable	YES / NO
18	No Deviation Certificate ***[Form No: F-03 (Rev 00)]***	Applicable	YES / NO
19	Declaration confirming knowledge about Site Conditions ***[Form No: F-04 (Rev 00)]***	Applicable	YES / NO
20	Declaration for relation in BHEL ***[Form No: F-05 (Rev 00)]***	Applicable	YES / NO
21	Non-Disclosure Certificate ***[Form No: F-06 (Rev 00)]***	Applicable	YES / NO
22	Bank Account Details for E-Payment ***[Form No: F-07 (Rev 00)]***	Applicable	YES / NO
23	Format for seeking clarification ***[Form No: F-08 (Rev 00)]***	Applicable	YES / NO
24	Capacity Evaluation of Bidder for current Tender ***[Form No: F-09 (Rev 00)]***	Applicable	YES / NO
25	Power of Attorney for Submission of Tender/Signing Contract Agreement ***[Form No: F-25 (Rev 00)]***	Applicable	YES / NO
26	Analysis of Unit rates ***[Form No: F-26 (Rev 00)]***	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

NOT USED

ANNEXURE - 4

Reverse Auction Process Compliance Form

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

To

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

Sub: Agreement to the Process related Terms and Conditions

Dear Sir,

This has reference to the Terms & Conditions for the Reverse Auction mentioned in the RFQ document for {Items} against BHEL enquiry/ RFQ no.{…….} dt. {…….}
This letter is to confirm that:

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

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

With regards

Signature with company seal

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

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

ANNEXURE – 5

Tender No. **BHEL/NR/SCT/NEPAL/RAHUGHAT HEP/HTG & MM/1263**

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

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

ANNEXURE – 6

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

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

CC: M/s BHEL
{Unit-
Address-}
Sub: **Final price quoted during Reverse Auction and price breakup**

Dear Sir,

We confirm that we have quoted.

NPR {_____in value & in words_____} for item(s) covered under tender enquiry No. {...} dt.{…}

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

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

The price break-up is as given below.

========
Total - NPR **in value & in words**
========

Yours sincerely,

For _____

Name:
Company:
Date:
Seal:

ANNEXURE – 7

INTEGRITY PACT

Integrity Pact format attached separately

ANNEXURE – 8

UNDERTAKING

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

To,

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

Dear Sir/Madam,

Sub: DECLARATION REGARDING INSOLVENCY/ LIQUIDATION/ BANKRUPTCY PROCEEDINGS

Ref: NIT/Tender Specification No: **BHEL/NR/SCT/NEPAL/RAHUGHAT HEP/HTG & MM/1263**

I/We, _____

declare that, I/We am/are not under Bankruptcy Code Proceedings (IBC) as on date by NCLT/ other related local authority or under liquidation/BIFR, which will render us ineligible for participation in this tender.

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

Place:
Date:

ANNEXURE - 9

DECLARATION

Date: _____

To: _____
Address: BHEL,_____
_____
_____
_____
Email: _____

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

Dear Sir/ Madam,

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

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

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

Regards,

(_____)

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

Annexure-10

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

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

To,

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

Dear Sir,

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

Ref : 1) NIT/Tender Specification No: **BHEL/NR/SCT/NEPAL/RAHUGHAT HEP/HTG & MM/1263**
2) All other pertinent issues till date

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

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

1. _____ 2. _____

3. _____ 4. _____

…
…
…

Thanking you,
Yours faithfully,

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

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

Note:

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

ANNEXURE-11

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

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

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

Dear Sir,

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

Ref : 1) NIT/Tender Specification No: **BHEL/NR/SCT/NEPAL/RAHUGHAT HEP/HTG & MM/1263**
2) All other pertinent issues till date

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries. I certify that _____ (**SPECIFY THE NAME OF THE ORGANIZATION HERE**), is not from such a country/ has been registered with the Competent Authority (*attach valid registration by the Competent Authority, i.e., the Registration Committee constituted by the Dept. for Promotion of Industry and Internal Trade (DPIIT*); and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority. (*attach relevant valid registration, if applicable*)

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

Thanking you,
Yours faithfully,

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

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

Annexure-~~I~~

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 TENDER NO. BHEL/NR/SCT/NEPAL/RAHUGHAT/HEP/HTG&MM/1263 - MATERIAL HANDLING, AND ERECTION, TESTING AND COMMISSIONING OF E&M PACKAGE FOR 2X20MW RAHUGHAT HEP,NEPAL (hereinafter referred to as "Contract"). The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

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

Section 1- Commitments of the Principal

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

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

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

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

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

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

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

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(ADITTI GUPTA)
Dy. Manager/SCT
BHEL-PSNR, NOIDA

2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he/ she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

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

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

2.1.4 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

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

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

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

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

Section 4 - Compensation for Damages

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

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

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Section 5 - Previous Transgression

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

5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason or action can be taken as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

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

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

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

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

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

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

Section 8 -Independent External Monitor(s)

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

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

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

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

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

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

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

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

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

8.10 If the IEMs have reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code / Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the IEMs may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

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

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

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

Section 9 - Pact Duration

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

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

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Section 10 - Other Provisions

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

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

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

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

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

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

Aditti
(ADITTI GUPTA)
By: Manager/SCP

For & On behalf of the Principal
(Office Seal)

BHARAT HEAVY ELECTRICALS LTD. NOIDA (PS-NR)

Place NOIDA
Date 11/05/2022

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

Witness:_____
(Name & Address) _____
_____

Witness:_____
(Name & Address) _____
_____

TECHNICAL CONDITIONS OF CONTRACT (TCC) PART-I

(Document No PS:MSX:TCC)

BHARAT HEAVY ELECTRICALS LIMITED

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1. Project Information

1.1 Introduction

Raghuganga Hydropower Limited (RGHPL), the "Employer", a Company promoted by Nepal Electricity Authority (NEA) has placed an order on Bharat Heavy Electricals Limited (BHEL), a company incorporated under the laws of India and having its registered office at BHEL House, Siri Fort, New Delhi 110049, India for execution of Electro Mechanical Works of Rahughat HEP, Nepal. The scope of Electro Mechanical Works comprising Design, Engineering, Manufacturing, Supply, Transportation to site, Material handling at site, erection, testing, commissioning and handing over of Electro Mechanical components.

The scope under this work will include Material Handling, Erection, Testing & Commissioning for Electro Mechanical Works excluding switchyard for 2x20 MW Rahughat HEP, Nepal

The major components of the Project lie on the left bank of Rahughat Khola. Rahughat is one of the major tributaries of Kaligandaki River that flows from west to east to meet Kaligandaki River at Galeshwor.

The design discharge will be diverted at the headworks in a 6.27 km headrace tunnel to generate 40 MW of power in the powerhouse located on the right bank of the Kaligandaki River at Galeshwor.

A surface powerhouse has been proposed to accommodate 2 nos vertical axis Pelton type Turbines to generate 40MW (2x20MW) installed capacity. The powerhouse complex as envisaged comprises of a machine hall, service bay auxiliary building and an open switchyard with following dimension.

The headworks of Rahughat Hydroelectric Project is located about 1.2 km upstream from the existing suspension bridge that connects the Piple VDC and Jhi VDC. The proposed headrace tunnel runs along left bank of Rahughat Khola through Mauwaphat and Piple villages. The surge shaft is located at Piple village and the surface powerhouse lies about 300 m upstream from the confluence of Rahughat Khola and Kaligandaki River on the Beni-Jomsom Highway.

The Project envisages to generate 40MW(2X20) of power by diverting 16.67 cumecs of water through the Head Race Tunnel and Pressure shaft to a surface Power house located at right bank of Kaligandaki River.

Approach Roads/Bridges: The road up to Beni is metallic and beyond Beni up to Power House site is graveled (WBM). The following Roads / Bridges have to be constructed/ maintained for the project.

- Ghumanetal to Barrage site connecting access roads to Surge Shaft and Adit-2 about 12km.
- Re-alignment of Beni – Jomsom Sadak at power house complex about 300m.
- Permanent Steel truss bridge across Rahughat Khola at Jhi about 1.2 Km downstream

of Barrage site.

- One semi permanent steel Bailey bridge at Downstream Coffer Dam has been proposed to cross the river as approach to adit-1 and power intake.

1.2 Transportation:

The project is 1060 Km from nearest Indian Port Kolkata and 360 Km from Raxaul (India)/ Birgunj (Nepal) via Narayanghat, Pokhara and Beni. The nearest railhead (broad-gauge) is Raxaul and nearest International Airport is Kathmandu which is about 300Km from the project site.

1.3 Other Important Information:

The Bidder is advised to visit and examine the Site of works and its surroundings and obtain for itself/himself/herself, on his own responsibility, all information that may be necessary for preparing the bid and entering into a Contract for execution of the Works. All costs for and associated with site visits shall be borne by the bidder.

The bidder shall assess and satisfy himself as to the adequacy of the local conditions such as approach roads to the Site, adequacy of existing culverts/bridges/roads for the expected traffic, water and power supply, accommodation required during the Contract, geological and climatic conditions, availability of labour, materials, details of taxes, royalties duties and levies as applicable and locally applicable laws and regulations governing engagement of labour for employment and deployment at site and any other information required.

The costs of visiting the Site shall be at the Bidder's own expense. The BHEL shall not entertain any request for clarifications from the Bidders, regarding such local conditions. The Bidder and any of his personnel or agents will be granted permission by the Owner to enter upon his premises and lands for the purpose of such inspection, but only upon the express condition that the Bidder, his personnel or agents, will release and indemnify the Owner and his personnel and agents from and against all liability in respect thereof and will be responsible for personal injury (whether fatal or otherwise), loss of or damage to property and any other loss, damage, costs and expenses however caused, which, but for the exercise of such permission would not have arisen.

It must be understood and agreed that such factors have properly been investigated and considered while submitting the proposals. No claim for financial adjustment to the Contract awarded under these above specifications and documents will be entertained by the Owner. Neither any change in the time schedule of the Contract nor any financial adjustments arising thereof shall be permitted by the Owner, which are based on the lack of such clear information or its effect on the cost of the Works, to the Bidder.

Contact Person for site visit-
1.) Sh Pankaj Kumar, Manager
Contact No: +91-9999661743
+977-9862931645

2. Scope of Works

2.1 Material Handling:

Material handling at site under this scope includes unloading of all the incoming materials from truck/ trailer/ carriers supplied by BHEL units/their vendors, preliminary verification of materials at the time of unloading from road transport vehicle and reporting immediately the discrepancies like damages and shortages noticed, providing necessary assistance for insurance claim settlement process, detailed material verification with reference to packing list and loading advice slip after unpacking of boxes/crates (wherever is applicable), record keeping (maintain stock register, DB register, material issue register etc. both in hard copy and soft copy), repacking, where called for and preparation of receipt inspection reports, proper storage (stacking & storing as per instructions) of materials in open/ closed storage yards/semi-closed sheds, during storage, re-handling and restacking of materials as and when called for by BHEL, preservation of the materials in accordance with BHEL preservation manual and/or as per BHEL instructions, on receipt of demand for material from erection site, loading of material on truck/ trailer/ carriers, transporting the same to powerhouse/ erection place/other work site including BFV House, surge shaft, Switchyard, dam etc.

This also includes handling of excess/redundant/ scrap materials returned to stores by BHEL construction & Erection Contractor(s), handling and loading of outgoing materials those are to be sent to other destinations, construction of temporary shelters on some of the special items as per the instruction of the BHEL Engineer and handing over of spares & surplus material to BHEL/Customer, material reconciliation after completion of Erection and Commissioning of the project. Material handling of following E&M components is in the scope of this this tender, which are to be supplied from BHEL's Manufacturing Units located all over the country in India as well as its vendor located in India and overseas.

Total plant materials/equipment's involved for material handling work under this tender will be approx. 2162 MT. However, total weight of the material to be handled is tentative and may vary during detail design and 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.

The plant material shall be unloaded/loaded at power house & valve house with E.O.T cranes and shall be unloaded/loaded at BHEL stores/work site by contractor's Hydra/Mobile cranes. The E.O.T cranes shall be provided by BHEL/customer on free of cost for material handling work at power house. In case of non-availability of EOT crane in PH/Valve house for any reason, Mobile crane/Hydra required for material handling in Powerhouse/ work site shall be arranged by contractor within the quoted rates. If some of the consignments of Plant materials are already received at BHEL stores, then these materials are also to be verified, re-stacked, preserved, record keeping & loaded from store and transported to power house /work site and handed over to erection agency.

Tentative 2400 sqm open storage area and 600 sqm covered shed (1 no) shall be provided by BHEL free of cost for storage of material within 7-8km (approx.) from power house.

Some of the incoming consignments from MUs approx.100 MT may be required to be directly unloaded in the Powerhouse/valve house/other erection site, the contractor shall have to unload directly in Powerhouse/erection site on instructions of BHEL engineer. Some materials may be required to be dispatched back from Site to Manufacturing Units, other sites or any other place, the contractor may be asked by the BHEL engineer to get the same packed, loading on to the truck for further dispatch.

E&M Components for Material handling:

1. Two (2) vertical shaft Pelton type hydraulic turbines (375 rpm) and with rated continuous output at rated Head along with accessories.
2. Two (2) Governors and pressure oil supply systems.
3. Two (2) Main Inlet Valves (Spherical type) and accessories for turbine.
4. Two (2) sets of Cooling Water Supply System.
5. Compressed Air Supply System.
6. One (1) set each of Overhead EOT Crane for Powerhouse and valve chamber.
7. Oil handling & Purifying Equipment.
8. Mechanical and Electrical Workshop Equipment.
9. Air Conditioning & Ventilation System.
10. Fire Fighting System for the powerhouse and other areas of the including deluge system for protection of GSU transformers installed in switchyard.
11. Elevator.
12. One (1) no. Emergency closing valve of Butterfly type and accessories at valve chamber.
13. Two (2) alternating current generators each of 20 MW with their accessories including CO2 fire protection system.
14. Two (2) 11/220 kV outdoor Generator Step up (GSU) Transformer each of 26 MVA, with their accessories.
15. One (1) 11/11 kV, 1000 kVA isolation dry type distribution transformer and its accessories.
16. Two (2) 11/0.4 kV, 500 kVA dry type station service transformers and their accessories.
17. Two (2) 11/0.4 kV, 100 kVA pole mounted oil type distribution transformers and accessories one each for head works & valve chamber.
18. Emergency diesel generator sets of rating 400 kVA/ 100 kVA at Powerhouse/Headwork respectively.
19. 11 kV overhead lines/poles etc. from switchyard to head-works valve chamber.
20. Switchgear equipment for outdoor 220kV switchyard with single rigid bus bars/ACSR connectors all complete with galvanised steel support structures for equipment/Bus post insulators/Post Insulators and gantry for Outgoing feeders.
21. Control, automation and protection equipment for generating units, 11/220kV GSU transformers, 11/11 kV isolation/distribution transformers, 11/0.4 kV station service transformers, 220 kV Bus Bars, LILO of one circuit of 220 kV D/C transmission line, 11 kV line to head-works/valve chamber etc. all complete with accessories including computerized control system/SCADA at powerhouse, SCADA upgradation/adaptation at

LDC Kathmandu for Control/monitoring through RTUs/OPGW at Power House Control Room/ LDC. .

22. Switchgear equipment for indoor 11 kV system Generator circuit cubicle and local supply cubicle etc. all complete with accessories including termination of XLPE cables/segregated phase bus duct with GCE and of XLPE cables on one end with 11 kV switchboard for local supply and on other end with 11 kV pole of line from switchyard to headworks/valve chamber and to 11 kV pole near switchyard for termination on 11 kV line to camp by Employer.
23. Station Auxiliary system with 400 V AC Mains &Sub-Distribution Boards at Power House & Switchyard, Head Works, and Valve Chamber etc. including 11 kV overhead line from switchyard to head works with tap-off at valve chamber (& termination on 11 kV pole, near switchyard, of 11 kV line to camp by Employer) along with 110 V/ 48 V DC system with UPS, inverter/ converter at Power House & Switch yard, 110 V/ 48 V DC system at Head Works, 48 V DC system at Valve Chamber and Camp.
24. Power (AC & DC), control, instrumentation and communication cables /cable racks/cable trays for complete powerhouse complex spread over various areas all complete with accessories/terminals etc.
25. Optical fiber communication equipment (RTUs, MUX etc. and communication interface) at Control room for exchange of data/tele-metry/tele control/tele protection signals for tripping of circuit breakers at Dana/Kushama substations/RGHEP switchyard as well as and SCADA adaptation at LDC, Kathmandu all complete with their accessories for control and monitoring from LDC.
26. Illumination system and small power outlets complete for powerhouse, switchyard, valve chamber, surge shaft, head-works, other project areas including approach roads for all project areas, access tunnels etc.
27. Earthing system and lightening protection system complete for equipment/mechanical components/ferrous structures at powerhouse, switchyard, valve chamber, surge shaft, head works area etc.
28. Optical Fiber (OF), accessories and terminal equipment/panels at powerhouse, switchyard, valve chamber and camp for communication of data/telemetery/tele- control for SCADA systems at Control Room and LDC, Kathmandu.
29. Security and surveillances system
30. Miscellaneous items of Generator, Turbine & Axillaries.
31. Spare items

2.2 Erection, Testing & Commissioning (ETC):

Pre-erection assembly, erection, testing (including hydraulic testing, NDT, electrical testing, stage & final HV including dry out, Tan Delta of generator stator etc. of relevant equipments at various stages during erection), pre-commissioning and commissioning including trial run, handing over to RGHEP (Customer), of equipments/systems of the following E&M components for 2x20 MW Rahughat HEP of vertical Pelton type Hydro Turbines, hydro generators, auxiliaries and all other associated equipment.

Total materials are to be erected are approximately 1537 MT.

1. Two (2) vertical shaft Pelton type hydraulic turbines (375 rpm) along with accessories.
2. Two (2) Governors and pressure oil supply systems.
3. Two (2) Main Inlet Valves (Spherical type) and accessories for turbine.
4. Two (2) sets of Cooling Water Supply System.
5. Compressed Air Supply System.
6. One (1) set each of Overhead EOT Crane for Powerhouse and valve chamber.
7. Oil handling & Purifying Equipment.
8. Mechanical and Electrical Workshop Equipment.
9. Air Conditioning & Ventilation System excluding switchyard.
10. Fire Fighting System for the powerhouse and other areas of the including deluge system for protection of GSU transformers excluding switchyard.
11. One (1) no. Emergency closing valve of Butterfly type and accessories at valve chamber.
12. Two (2) alternating current generators each of 20 MW with their accessories including CO2 fire protection system.
13. Two (2) 11/220 kV outdoor Generator Step UP (GSU) Transformer each of 26 MVA, with their accessories.
14. One (1) 11/11 kV, 1000 kVA isolation dry type distribution transformer and its accessories.
15. Two (2) 11/0.4 kV, 500 kVA dry type station service transformers and their accessories.
16. Two (2) 11/0.4 kV, 100 kVA pole mounted oil type distribution transformers and accessories one each for head works & valve chamber.
17. Control, automation and protection equipment for generating units, 11/220kV GSU transformers, 11/11 kV isolation/distribution transformers, 11/0.4 kV station service transformers, excitation transformer.
18. Switchgear equipment for indoor 11 kV system Generator circuit cubicle and local supply cubicle etc. all complete with accessories including termination of XLPE cables/segregated phase bus duct with GCE and of XLPE cables on one end with 11 kV switchboard for local supply and on other end with 11 kV pole of line from switchyard to headworks/valve chamber and to 11 kV pole near switchyard for termination on 11 kV line to camp by Employer.
19. Station Auxiliary system with 400 V AC Mains & Sub-Distribution Boards at Power House & Switchyard, Head Works, and Valve Chamber etc. including 11 kV overhead line from switchyard to head works with tap-off at valve chamber (& termination on 11 kV pole, near switchyard, of 11 kV line to camp by customer) along with 110 V/ 48 V DC system with UPS, inverter/ converter at Power House & Switch yard, 110 V/ 48 V DC system at Head Works, 48 V DC system at Valve Chamber and Camp.

20. Power (AC & DC), control, instrumentation and communication cables /cable racks/cable trays for complete powerhouse complex spread over various areas, valve house, Dam area all complete with accessories/terminals etc.
21. Optical fiber communication equipment (RTUs, MUX etc. and communication interface) at Control room for exchange of data/tele-metry/tele control/tele protection signals for tripping of circuit breakers at Dana/Kushama substations/RGHEP switchyard as well as and SCADA adaptation at LDC, Kathmandu all complete with their accessories for control and monitoring from LDC.
22. Illumination system and small power outlets complete for powerhouse, valve chamber, surge shaft, head-works, other project areas including approach roads for all project areas, access tunnels etc.
23. Earthing system complete for equipment/mechanical components/ferrous structures at powerhouse, valve chamber, surge shaft, head works area etc.
24. Optical Fiber (OF), accessories and terminal equipment/panels at powerhouse, valve chamber and camp for communication of data/telemetery/tele- control for SCADA systems at Control Room and LDC, Kathmandu.
25. Miscellaneous items of Generator, Turbine & Axillaries.

BRIEF DESCRIPTION OF E&M PACKAGES FOR E/T/C

I. TURBINE

Two vertical shaft Pelton type turbines with 6 jets of identical size. Each turbine shall be complete with runner, distributor, power nozzles and needles, jet deflectors, needle and deflector servomotors and regulating mechanism, brake jet assembly, shaft, guide bearing, turbine housing, rails, trolley for runner removal, and other accessories, equipment, devices, piping, instruments, cabling and wiring and terminal cubicle. Embedded parts mainly consists of following:

Contractor has to arrange its own mobile crane for erection of Pipes and embedments in first stage, Pipes and embedments in second stage, Arrangement of central frame work, Installation of lower pit liner, Embedded tubes for field efficiency test, Embedments for MIV and BFV if EOT crane is not available at site.

1. Lower Pit Liner:

Lower pit liner shall be supplied in 3 segments with inner dia of 5550mm when assembled and height of 3950mm. Anchor hook, anchor lug, patch plate, rung ladder, foundation plate, anchor hook, turn buckle, radial stay, anchor iron, steel flat etc. to be installed/erected as per drawing. All three segments of lower pit liner shall be assembled in pit and joints to be welded as per drawing, welding electrodes shall be provided by BHEL free of cost. However, NDT as per drawing is to be carried by contractor along with its arrangement.

2. Central Frame Work:

The Central Frame Work is supplied in grid section which shall be bolted together at site. These grid sections are supported on set of ISMB RS beam. It shall be provided to permit access to nozzle and runner for general inspection purposes. An opening shall be provided in turbine housing for shifting runner/nozzles along with trolley. Trolley for the transportation

of runner shall be provided. Necessary track (rails) and the support structure etc. shall be erected.

3. **Pipes and embedments in first stage :**
   The embedded pipelines (Carbon Steel and SS) for two units have been foreseen in primary concreting which mainly comprise penstock drain, distributor drain, brake jet valve piping, runner aeration, CW inlet to heat exchanger, CW return from heat exchanger, CW strainer backwash, trench drain pipe, decompression drain, field efficiency piping, pipe for interconnecting CW line, leakage water drain line etc. All welding shall be checked as per drawings. Pipes shall in general be supplied in straight lengths and to be bent at site as per requirement. For medium and large size pipes, regular bends will not be supplied and therefore bends shall have to be fabricated at site by contractor within the quoted rates. The pipes are to be laid and welded at site as per drawing. The pipe routing can be suitably modified at site. All welds are to be tested as per drawing requirements.

4. **Embedded tubes for field efficiency test**
   The embedded tubes for field efficiency test and pressure measurement of turbine for both the units have been foreseen. Major portion of this piping will be embedded in first stage concreting, rest is exposed piping as per drawing requirements.

5. **Upper turbine Housing**
   Turbine housing consisting of cylindrical portions, supplied in pieces to be assembled & welded together at site. A flange is provided for supporting the turbine guide bearing. Steel aeration pipes are provided in the top cover for the aeration of turbine. Cutouts are provided for fitting of distributor flanges. Brake jet pipes shall be fitted in the housing as per drawing. Inner lower turbine housing is to be assembled with inner upper turbine housing.

6. **Installation of Distributor**
   It shall be of fabricated constructions with branch outlets for six nozzles. It shall be supplied in about five segments to site alongwith make up pieces. Thickness of sections varies from 28 mm to 20 mm appx.

   Edge preparation has to be done at site. The welding of distributor to be NDT as per drawing requirement. These joints are to be Stress relieved as per drawings after welding at site. The distributor assembly after welding shall be hydraulically tested as per drawing requirements. The test cone shall be installed at distributor inlet end for pressure testing. The distributor piping shall be kept pressurized during the process of concreting or the upper side of the distributor casing shall be provided with a compressible wrapping in order to minimize cracking of the concrete cover above the spiral. The wrapping shall cover at least the upper half of the spiral casing, for appropriate length upstream of the connection flange.

   The brake jet assembly shall be used to restrain the movement of the rotating part of the turbine and generator after the unit has been taken-off the line. The water for the braking nozzle shall be taken from the spherical valve body upstream of the service seal/upper-half of the penstock inlet/extension pipe.

7. **Pipes and embedments in second stage**
   For various functions for all units embedded pipelines have been provided. Necessary cutting in pit liner etc. wherever required for the embedded pipelines, acid pickling etc. shall have to be done at site. Pipes shall in general be supplied in straight lengths and to be bent at site as per requirement. For medium and large size pipes, regular bends may not be supplied and therefore bends shall have to be fabricated at site within the quoted rates. The pipes are to be laid and welded at site as per drawing. All welds are to be tested as per drawing requirements.

8. **Nozzle Servomotor and Deflector Servomotor assembly**
   There are six internal nozzle servomotor and one common deflector servomotor assembly for all nozzles. Each set consists of Nozzle Inlet/Spider, Nozzle tip and nozzle tip liner (SS), jet deflector, needle and needle stem, nozzle servomotor, deflector servomotor etc. Before erection, complete nozzle and deflector assembly are to be tested in S/bay.

   Deflector operating mechanism shall consist of servomotor connecting rod, lever, inter connecting links etc.

   Oil headers for nozzle servomotor assembly and deflector servomotor assembly consists of supplying oil for opening and closing of nozzle servomotors are provided.

9. **Runner & shaft assembly**
   The Pelton type runner assembly having 20 buckets with OD 2268 mm appx and height 550 mm is weighting approximately 5 tones. The turbine shaft nominal dia appx 420 mm with flanges at both ends is bolted to runner at turbine end with fitted sleeve and studs. Upper flange of turbine shaft is bolted with fitted bolt to generator shaft bottom flange. Total length of shaft is approx. 3000 mm and approx. weight is 4 tons.

10. **Turbine guide bearing**
    Turbine Guide bearing shall be of self-oil lubricating shell type with cooling arrangement. The bearing shall be located above the turbine runner.

    The bearing shall permit sufficient vertical movement of the runner and shaft to allow for adjustment of the generator thrust bearing.

11. **Turbine sealing**
    Conventional shaft sealing arrangement is not provided in Pelton turbine. For shaft sealing serrations is provided in bottom cone of turbine housing.

12. **Hoist Equipment**
    In order to minimize idle time of the turbines due to repair or replacement of parts, special facilities may shall be provided by BHEL for lifting and transport of parts, the same shall be erected.

13. **Feedback mechanism**
    It comprises of wire rope mechanism and LVDT to transmit signal of the movement of nozzle servomotor & Deflector servomotor (opening/closing) to the hydro mechanical cabinet (HMC) of governor or servo valve type system shall be provided.

14. Installation of metering instruments

Pressure, temperature, measuring instruments etc. are installed on this metering panel to measure the pressures of different points like distributor, sealing air & water pressures, servomotor closing & opening pressures etc. The pipelines shall be hydraulically tested to required pressure.

15. Oil, water, air pipelines

Laying and clamping /supporting of oil pipe lines, water pipe lines and compressed air pipe lines are shown indicative in respective drawing which can be decided to suit site condition. Pipes shall in general be supplied in straight lengths and to be bent at site as per requirement. For medium and large size pipes, regular bends may not be supplied and therefore bends shall have to be fabricated at site within the quoted rates .The pipes are to be welded at site as per drawing. All welds are to be tested as per drawing requirements. All pipes are to be hydraulically tested at site after welding. Cleaning of pipe acid pickling to be carried out as per drawing requirement.

16. Dismantling Joint

The dismantling joint of required length shall be provided with a thrust ring, combined with the flange for connection on downstream side of the turbine inlet valve. The other end of the dismantling joint shall be connected to the spiral casing/distributor/MIV through flanged connection. The thrust ring will transmit the hydraulic force of the closed turbine inlet valve.

17. Ventilation

Adequately designed and arranged openings with water deflecting baffles for permanent air admission shall be provided on the runner pit liner and be connected to ventilation pipes embedded in the surrounding concrete.

18. Other Miscellaneous Mechanical assembly

Other miscellaneous mechanical assembly like, hatch covers, headrace measuring device, tailrace measuring device, platform and ladders etc. are envisaged.

SITE TESTS

- Hydrostatic pressure testing of the turbine inlet valve and dismantling joint assemblies, incl. turbine spiral casing/distributor, if possible
- Ultrasonic examination of all site-welds shall be subjected to radiographic examination. Ultrasonically examined welds showing doubtful indications shall be rechecked radiographically.
- Tightness tests on all pressure oil and water piping at a pressure 50% higher than the max. service pressure.
- Functional tests on all turbine equipment
- After or during commissioning of the turbines, each turbine inlet valve has to be tested by cutting off the turbine discharge with the needles and deflectors in fully open position. The turbine inlet valve has to be drip tight after the test. Otherwise the seals have to be adjusted or replaced and the test repeated.
- Start-up and load rejection tests, Runaway tests for 2 minutes, Trial runs at different loads.

II. GOVERNOR

For each turbine a governor for control of speed / frequency and output of the generating units (in isolated mode as well as when connected with the national grid system) and control of main inlet valve shall be installed. The equipment for local manual control shall be arranged in cabinet or cubicle mounted control boards adjacent to the governor cabinet.

Each governor system shall be equipped with all devices and appurtenances necessary to accomplish its duties as specified herein. All valves, piping, panel control cabinets/boards, cabling, safety devices and other provisions as required for a safe and continuous operation of the equipment shall be installed.

The nominal operating pressure of the governor systems shall be 100 bars. Each governor shall be provided with its own and independent pressure oil system. Each governor oil pressure system shall be provided with two (2) identical electrically driven A.C. oil pumps. The pumps shall be of the screw/piston/vane/gear type, and shall be self-priming. The accumulator shall be of the piston type at 100 bar. Each governor oil pressure system shall be provided with an oil sump tank. Oil pressure system shall be common for MIV and governor system.

The governor shall be provided with all interconnecting piping and valves between the various parts of the governor system and including connections between the governor and turbine servomotors, the oil pressure accumulator, Nitrogen banks and sump tank. Separate Hydro mechanical cabinets shall be provided for Nozzle and deflector control. Complete oil is to be flushed in line with pipings to get the required NAS values.

III. MAIN INLET VALVE

Turbine inlet valve of spherical type dia 1250mm comprises of valve body and rotor and servo motor(s) for opening operation and counterweight(s) for closing operation of the valve, control gear for operation, penstocks intake pipe piece (with reducer if necessary), outlet pipe piece (with thrust ring and dismantling joint), and other essential accessories and auxiliaries viz by-pass valves, air valve, piping with valves for water, air, oil etc.

Spherical valve assembly shall be hydro tested at BHEL works and dispatched in assembled condition to site. However, due to transportation limitation if MIV is received in dismantled condition at site, the same shall be assembled at site within the quoted rates. MIV seal test and body test if required shall be done at site.

Following are the major components of the Spherical valve assembly: Valve body (upstream body & downstream body), Valve door (Rotor) & Trunnions, Valve seals (Service seal on downstream body, Maintenance seal on upstream body and door sealing rings on door), Bush housing with self-lubricating bush, Lever on both sides, Servomotor (two nos.), single acting, Counter weights, suspended on lever, Inlet pipe connected to penstock, Outlet pipe with dismantling joint towards distributor end, By-Pass valve, Decompression valve, drainage valves. MIV inlet pipe, taper pipe shall be welded with penstock along with NDT/Stress relieving by the contractor.

For opening of MIV two servomotors are provided which are to be operated by 100 kg/cm2 nitrogen system common for governor system. However, separate OPU to be installed for operation of MIV seals along with all pipelines.

All water pipe lines like drain line of service seal, maintenance seal, MIV drain, pipe line between inlet and outlet pipe for bypass line, MIV drain, distributor drain, pressure line on inlet and outlet pipe, etc.as per drawing are to be installed at site. Oil pipe line for operation of servomotor, bypass valve, decompression valve etc. are to be installed at site. All foundation plates and bolts are to be embedded at site.

MIV DETAILS

Penstock Diameter:	1520 mm reduced to 1250 mm
Outlet Pipe Diameter:	1263.2 mm
Elevation of Valve C.L.:	870.50 m
Rated Flow (unit):	8.335 m³/sec
Maximum Gross Head:	294.50 m
Maximum Net Head:	290.02 m
Servomotor working pressure:	100 bars
Servomotor test pressure:	165 bars
Opening:	By Oil
Closing:	By Dead Weight

SITE TESTS

The following tests, checks, inspections, etc. shall be carried out at site.

- Hydrostatic pressure testing of the turbine inlet valve and dismantling joint assemblies, incl. turbine spiral casing/distributor, if possible
- Ultrasonic examination of all site-welds shall be subjected to radiographic examination.
- Ultrasonically examined welds showing doubtful indications shall be rechecked radiographically.
- Tightness tests on all pressure oil and water piping at a pressure 50% higher than the max. service pressure.
- After or during commissioning of the turbines, each turbine inlet valve has to be tested by cutting off the turbine discharge with the needles and deflectors in fully open position.
- The turbine inlet valve has to be drip tight after the test. Otherwise, the seals have to be adjusted or replaced and the test repeated.

IV. COOLING WATER SYSTEM

The complete cooling water equipment for both generating units shall be supplied as two separate systems as specified hereunder, for each system:

- Heat exchanger.
- All piping with valves to and from the CW supply headers of the generating unit coolers and the heat exchanger including pipe connections with valves for pumps
- All pipings with valves to and from the cooling water supply header outside the generator barrel for coolers and the heat exchangers
- All piping with valves etc. from overhead tank, expansion vessels, closed loop circuits of the two cooling water systems.
- Two circulation pumps for the closed circuit.
- All necessary instrumentation for control, alarms and measuring of pressure, flow and temperature at the various points in the CW supply and discharge piping.
- All necessary anchor plates, bolts and nuts, gaskets, oil, grease, temporary and permanent devices for alignment and anchoring.
- All components, accessories, items and equipment not specifically mentioned above, but necessary for the complete cooling water supply system.

- Two (2) circulation pumps with adjustable speed shall be provided, each one with 100% discharge capacity of the flow required under 10% over load of the generator (with 15% design margin) for the given temperature difference (37°C to 30°C).

Cooling water system caters for cooling of generator Thrust cum guide pads, LGC pads, generator air coolers, OPU oil coolers, Turbine guide bearing coolers etc. Heat exchangers for both the units shall be kept in tailrace channels. Two nos pump motor set per unit shall be installed along with necessary cyclonic separators, expansion vessel, automatic backwash strainers of 250 and 500 microns etc. pipeline from overhead water tank to power house shall be laid by the contractor. In order to compensate for the pressure fluctuation during operation, the closed loop cooling water system for each of the two units shall be provided with a pressurized closed expansion vessel of bladder type or piston type of suitable capacity.

Orifice plate, heat exchanger, pressure gauges, isolating valves, motorized valves, NRV, flow relays, instruments etc. are to be installed at site.
In order to minimize idle time of the cooling water equipment (heat exchanger, pumps, major sized valves etc.) due to repair or replacement of parts, special facilities like hoist may be installed for lifting and transport.

SITE TESTS
Tests shall be carried out as per relevant standards and shall include the following tests and checks after installation of the equipment at site:

- Functional tests on all pumping units
- Functional checks and performance tests on pressure reducing valves
- Overall functional checks on the water supply systems
- Tightness checks on the various piping systems, including the valves for leakage.

V. LP COMPRESSED AIR SYSTEM/EQUIPMENT

The Low-pressure compressed air system is common for the entire powerhouse. The L.P. compressed air system shall supply low-pressure air at nominal pressure of 7 kg / cm2 to station service requirements and generator braking system as given below:

- 1 No. per unit at EL 867.75 M (MIV / Turbine floor)
- 1 No. per unit at EL 872.55 M (Generator floor)
- 1 No. per unit at EL 878.0 M (Machine Hall)
- 2 Nos. in Service Bay at EL 878.0 M
- 2 Nos. in Workshop, EL 882.30 M
- 1 No. in Battery rom, EL 882.30 M
- 1 No. in Switchyard
- 1 No. for outdoor Transformers
- 1 No. per unit for Ejector.

The above locations and points are tentative, as per site requirement and approved drawings, no of points and locations may vary. These connections will terminate at a normally closed isolating valve (234L). Flexible hose with quick release coupling will be supplied for routing the line to the required location. Pressure gauges (273L) with isolating valves (272L) have been provided for pressure monitoring. All piping with valves from the compressed air stations

to all required locations in the powerhouse including generators (with pressure reducing valves, if required), service bay, workshop, MIV / turbine floor etc. instruments shall be mounted over the receiver along with safety valves, gauges etc.

Low-pressure Compressor Motor set comprises of two nos. (one Main and One stand-by) LP compressor. The air from the operating compressor shall pass through an air-cooled after-cooler (204L) and then through an air dryer for dehumidifying air. The Compressor will be air-cooled type, preferably with V-belt drive, heavy-duty, motor-driven, stationary, oil lubricated, and rotary screw type air compressor motor set supplied along with starter cum control panel. The Compressor motor of adequate rating and suitable for 415 volts (±10 %), 3-phase, 50 Hz (± 5%) AC supply shall be part of compressor package.

Air Receiver system comprises of one no. air receiver of capacity 1.5 m^3, Working pressure of receiver = 7 kg/cm^2, Test pressure of Receiver = 15 kg/cm^2.

The low-pressure compressed air system will supply air to the generator braking system in case of an emergency. The system shall also supply compressed air to the ejector and at various station service points. In case the required braking pressure is lower, the same shall be obtained through pressure reducing valve.

SITE TESTS

Tests shall be carried out as per relevant standards and shall include the following tests and checks after installation of the equipment at site:

- Functional (operational) check for the complete equipment/system
- Leak check with brushed soap solution around all connections, manhole, covers, joints, welding, couplings etc.

VI. OVERHEAD E.O.T. CRANES

1. POWERHOUSE CRANE: ONE NO. 70T DG EOT CRANE WITH SPAN 14.7M WITH 10T CAPACITY ELECTRIC HOIST AND TRAVEL LENGTH APPROX. 50M

The Powerhouse Crane of the travelling overhead bridge type shall be supplied for installing, removing and dismantling all equipment /accessories installed in the powerhouse.

- Crane beam elevation — 884.60 MSL
- Main Hook Hoisting speed — 1.0 m/min
- Auxiliary Hook capacity — 10 ton
- Trolley travelling speed — 0-5 m/min
- Crane travelling speed — 0-15 m/min
- Main Hook rated capacity — About 70 tons or Adequate to handle heaviest package +10% margin

Erection of EOT crane is to be done by making own arrangement of winches/mobile crane or any other arrangement by the contractor acceptable to BHEL. After erection of EOT crane load testing of crane is to be done for which dead weight in the form of concrete or steel is to be arranged by contractor. All embedment for DSL, rail etc. shall be embedded by the contractor.

The cranes bridge shall be of solid welded steel construction designed to resist without undue deflections vertical and horizontal stresses. Perfect parallelism of the structure shall be

ensured when any load up to the rated load is applied. Platforms and walkways shall be of either checkered plate or grated. PVC shrouded conductor bus bar type Cu DSL will be with suitable guards and service cage for maintenance of DSL will be provided. Finish/ touch up paint as required shall be done at site by the contractor. Approx. weight of the trolley is 16T and weight of the crane is approx.35T

Power House Cranes shall be controlled for all three motions from the control desk located in the operator's Cabin, pendent push button station and Radio Remote Control (RRC). Crane shall be complete with trolley, tracks, wheels, axles, drive mechanism, hoisting drum brakes, horns, warning lights limit switches etc.

2. VALVE CHAMBER CRANE: ONE NO. 15T EOT CRANE WITH SPAN 5M

The Valve Chamber Crane of the travelling overhead bridge type shall be supplied for installing, removing and dismantling all equipment /accessories installed in the underground valve chamber.

Erection of EOT crane is to be done by making own arrangement of winches/mobile crane or any other arrangement by the contractor acceptable to BHEL. After erection of EOT crane load testing of crane is to be done for which dead weight in the form of concrete or steel is to be arranged by contractor. All embedment for DSL, rail etc. shall be embedded by the contractor.

Platforms and walkways shall be of either checkered plate or grated. PVC shrouded conductor bus bar type Cu DSL will be with suitable guards and service cage for maintenance of DSL will be provided. Finish/ touch up paint as required shall be done at site by the contractor. Crane beam elevation is 1143.70 MSL with travel length of crane 12m.

SPECIFICATIONS FOR POWER HOUSE AND VALVE HOUSE CRANES

Description	**POWER HOUSE CRANE**	**VALVE CHAMBER CRANE**
Capacity	70/10T	15T
Type	Double girder EOT crane	Single girder EOT crane
Number of crane/s	1 no.	1 no.
Main hoist capacity (SWL/ OVERLOAD at 125%)	70 T / 87.5 T	15 T / 18.75 T
Aux. hoist capacity (SWL/ OVERLOAD at 125%)	10T / 12.5 T	NA
Main hoist speed	1.0 m/min	1.0 m/min
Aux. hoist speed	1.0 m/min	NA
Trolley travelling speed	5.0 m/min	5.0 m/min
Crane travelling speed	15.0 m/min	15.0 m/min

SITE TESTS FOR POWER HOUSE AND VALVE HOUSE CRANE

Tests shall be carried out as per relevant standards and shall include the following tests and checks after installation of the equipment at site:

- Functional checks, including limit switches,
- Check of the operating speeds,
- Check of the approach distances,
- Check of the braking distances,
- Check of the bridge and beam deflections.
- Load test (rated load/dynamic over load (125%)
- Check of the protection equipment
- Any other tests as per the relevant standards and as per normal practice of the manufacturer
- Arrangement of load on returnable basis for load testing of EOT shall be in the scope of contractor.
- During load testing of cranes, OEM supervision shall be provided at site free of cost. While routine maintenance of the crane is under the scope of contractor, breakdown maintenance (if any) for two years after load/overload test of cranes shall be in the scope of OEM by deputing expert. Any item, spare, repair of wear and tear of crane equipment's/accessories and special tools & tackles required for breakdown maintenance shall be in OEM scope provided breakdown has not happened due to negligence of the contractor.

VII. OIL HANDLING EQUIPMENT

The powerhouse shall be equipped with oil filtration and an oil handling equipment for the generating equipment as well as transformer. The oil handling system shall be installed as specified hereunder:

- One (1) mobile tyre mounted generating unit oil purifying unit of 1000 to 1200 liters/hr capacity, complete including pump, electric motor, oil filters (coalescer type), centrifuge, vacuum pump, oil heaters, oil-water separator, pipes and valves etc. The system shall have thermostatic control, instruments and control panel etc.
- One (1) Electrostatic type of minimum capacity 25 kW, portable lubrication oil purifying plant for online filtration, complete with oil hoses, hose couplings and other accessories to complete the system
- One (1) portable lubricating oil transfer pump complete including pump, electric motor, oil filters, valves, oil hoses with fittings, electrical controls, instruments etc.
- Two (2) service oil tanks of suitable capacity for lubrication oil
- One (1) regenerative air dryer of suitable capacity,
- One (1) mobile tyre mounted insulating oil transfer pump of suitable capacity complete with electric motor, oil hoses, hose coupling and other accessories etc.,
- One (1) oil tester for transformer oil
- One (1) transfer cart
- Any other items.

SITE TESTS

Tests shall be carried out as per relevant standards and shall include the following tests and checks after installation of the equipment at site:

- functional (operational) check on the entirety of the equipment
- All the piping comprising the oil handling system shall be pressure tested to a hydrostatic test pressure of ten (10) bar for 30 minutes.

VIII. MECHANICAL WORKSHOP EQUIPMENT & ELECTRICAL WORKSHOP EQUIPMENT CONSISTS OF INSTALLATION OF ITEMS AS GIVEN BELOW:

- Universal Lathe
- Bench drilling machine
- Workshop grinder, pedestal type
- Standard workbench
- Portable Universal Drilling Machine
- Portable Heavy Duty Drilling Machine for Steel
- Electric Portable Grinder
- Pneumatic Portable Grinder
- Pneumatic Hammering Spanner
- Pneumatic Ratchet
- Racks with shelves
- Measuring devices
- Testing devices
- Transformer Oil testing devices
- Instrument testing and calibrating devices
- Workshop equipments
- Workbenches, lockers and instruments.
- Hoist equipment.
- Any other items

While erection/installation of all the above items are in the scope of contractor, commissioning support shall be provided by OEM if required.

IX. AIR CONDITIONING AND VENTILATION SYSTEM

The E/T/C of air conditioning and ventilation system as specified hereunder includes but not necessarily limited to:

- Two (2) sets of packaged air conditioners for control room and conference/meeting room.
- Four (4) sets of packaged air conditioners for office rooms.
- Ventilating system in the general area of the Powerhouse.
- Two (2) sets of packaged air conditioners for control room and office room at headwork
- Ventilating system in the valve chamber.
- Fan units, Air Handling Unit, Filters, Ductwork, Grills and diffusers, Dampers, Refrigerant pipe works, Condensate drain works, Control equipment and local control cubicle
- All other necessary associated erection works of the equipment system to operate properly and to be in line with other related systems.

1. Ventilation Systems consists of Centrifugal fans, Axial Fan, Propeller fans, Air Handling Unit, Controls

a) Ventilation system of the Powerhouse

The ventilation system in powerhouse consists of set of Air Handling Unit with set of supply fan, air filter, air ducts, dampers, etc. and sets of exhaust fans. One set of supply fan centrifugal type of capacity 3300 CMH, motor capacity 7.5 kW shall be installed in Powerhouse. Two set of exhaust fan centrifugal type of capacity 12600 CMH, motor capacity 3.7 kW shall be installed in Powerhouse.

b) Ventilation system of the Valve Chamber

A manually controlled axial fan of appropriate capacity with air supply duct feeds air into the inner valve chamber. The fan is manually operated from the access tunnel adit.

c) Ventilation system in other rooms

The ventilation for battery room, store, workshops and lavatory, panty and kitchen are made by propeller fans installed on the walls or embedded in the ceiling and the air intakes of door grills or aluminum louver on the walls.

2. Air-Conditioning System shall be made of package air conditioner consisting of indoor and outdoor units. The indoor units are cooling units and the outdoor units are condensing units. The indoor units shall be floor mounted type and the outdoor units shall be air-cooled type housing condenser coils, fan and compressor, connected with the indoor units with refrigerant piping and control wiring system.

Package air-conditioner

a. **General:** Package air-conditioner shall consist of indoor units, outdoor unit, refrigerant piping, drainage piping, power and control cables, remote controller and other accessories, etc.
b. **Indoor Unit:** The indoor unit shall be of floor mounted type and consisting of Centrifugal fan, Cooling coil of Copper pipe and aluminium fin, Refrigerant controller of Electronic expansion valve and capillary tube, Casing of Galvanized steel sheet and melamine baked paint and Diffuser of Four direction diffusing with automatic swing
c. **Outdoor Unit:** The outdoor unit shall be of floor type and consisting of Compressor of Inverter control compressor, Coil of Copper pipe and aluminum fin, Propeller fan, Refrigerant Controller by Mechanical expansion valve, Casing of Galvanized steel sheet and melamine baked paint.
d. **Refrigerant Pipe:** Copper pipe with heat insulation shall be used for the refrigerant piping.

Air-Conditioning System for Control Room and Meeting Room

Two sets of floor mounted packaged air conditioner of cooling coil capacity 25000kcal/hr and heating capacity of 27000kcal/hr shall be installed.

Indoor unit consists of Fan air volume 5100 CMH , Fan motor power 0.3 kW and Air filter efficiency AFI 85% , Outdoor unit consists of Air volume 11700 CMHx2 , Motor power 0.22kWx2 and Reciprocating/Hermetic type compressor of Power 7.5 kW

Air-conditioning system for office rooms

Four sets floor mounted Packaged air conditioner of Cooling coil capacity 7800 kcal/hr and Heating capacity 8400 kcal/hr shall be installed.

Indoor unit consists of Fan air volume 30 CMM [1800 CMH] , Fan motor power 0.15 kW Air Filter efficiency Afi 85% , Out-door unit consists of Air volume 4800 CFM, Motor power 0.22 kW and Hermetic or scroll type compressor of Power 2.58 kW

Air-conditioning system for control room and office room at headworks

Two sets floor mounted Packaged air conditioner (P.A.C.) of Cooling coil capacity 7800 kcal/hr and Heating capacity 8400 kcal/hr shall be installed.

Indoor unit consists of Fan air volume 30 CMM [1800 CMH] , Fan motor power 0.15 kW Air Filter efficiency AFi 85% , Out-door unit consists of Air volume 4800 CFM and Motor power 0.22 kW and Hermetic or scroll compressor with Power of 2.58 kW

Refrigerant Piping

Joints shall be brazed except that joint on lines 20mm and smaller may be flared. Fittings for flare joints shall be standard forged-brass flare type with short-shank flare units. Fittings for brazed joints shall be wrought-copper or forged-brass sweat fittings. The insulation material shall be fibrous glass, mineral fiber or flexible foamed plastics.

Duct Work

Duct shall be constructed (at site) of galvanized steel sheets conform to the dimensions indicated and shall be straight and smooth on the inside, with joints neatly finished. All edges shall be hammered down to leave a smooth interior duct finish. Ducts shall be so constructed and installed as to be completely free from vibration under all conditions of operation. Joints shall be made substantially air-tight at all joint connections, grills, register, or diffusers. Curved elbows shall have a center line radius of not less than 1.5 times the width or diameter of the duct. Laps at the joints shall be made in the direction of air flow. Transformations shall be made with sides pitched not to exceed a maximum of 20 degrees, and 40 degrees included angle for diverging air flow.

Ducts & stiffeners shall be fabricated and Duct supports shall be not less than two steel hangers spaced one on each side of duct in accordance with the following table:

GI sheet gauge (mm)	Longer Side of Duct in	Bracing	Angle Support in mm	Max. Spacing in cm
26 (0.5)	15 - 40	None	25x25x3	300
24 (0.6)	41 - 75	25x25x3mm girth angle reinforcing spaced on 180cm max. centers	25x25x3	300
22 (0.8)	76 – 150	30x30x3mm girth angle reinforcing spaced on 90cm max. centers	30x30x3	300
20 (1.0)	151 - 225	40x40x3 mm girth angle reinforcing spaced on 90cm max. centers	40x40x3	300
18 (1.2)	226 & over	40x40x5mm girth angle reinforcing spaced on 90cm max. centers.	40x40x5	300

Notes: ducts with longer sides of 500mm and over shall have angle flanged joint, hangers shall be of steel rod (9mm in diameter)

Air Deflectors

Air deflectors shall be provided in all square elbows, duct-mounted supply outlets, take-off of extension collars to supply outlets, and tap-in branch-takeoff connections.

Diffusers, Registers, Grills& Louvers

Diffusers, registers, and grills shall distribute the specified quantity of air evenly over space intended, without causing noticeable drafts, or dead sports anywhere in the conditioned area. Louver blades shall be fabricated from aluminum or steel sheets, and shall be provided with frame of structural shapes. Blades shall be accurately fitted and firmly secured to frames. Edges of louver blades shall be folded or beaded for rigidity and baffled to exclude driving rain. Louver shall be provided with bird screen.

Dampers

All damper frames shall be constructed of No. 16 gauge galvanized sheet metal, and shall have flanges for duct mounting. The blades shall be parallel or opposed, as required, and suitable for the air velocities to be encountered in the system. Manual dampers with locking quadrants, multiple-blade dampers, and splitter dampers shall be installed where necessary for proper control and balancing of air distribution.

Duct Painting

Ducts for exposed surface shall be painted with one coat of primer and two coats of oil paint.

Hoist Equipment

In order to repair or replacement of Air conditioning & Ventilation Equipment parts, special facilities may require to be installed for lifting and transport. Approx. Earth flat 75x10mm -310m, local tray 50/75 mm – 900m to be installed at site

SITE TESTS

Air volumes measurements in ducts and air outlets, Noise rating tests in all air conditioned or ventilated rooms, Temperatures in all air conditioned or ventilated rooms at high and low ambient temperatures ,Humidity in the control room ,The functionality of all equipment

Ductwork

All supply, return and exhaust ducts, plenums, and casings, shall be tested and made substantially airtight at the static pressure indicated for the system before covering with insulation or concealing in masonry. Substantially airtight shall be construed to mean that no air leakage is noticeable through the senses of feeling or hearing at all duct joints. When joints are taped, testing under this paragraph will not be required.

Performance Tests

After cleaning, balancing, and testing is completed, each system shall be tested as a whole to see that all items perform as integral parts of the system and temperatures and conditions are evenly controlled throughout the building. Corrections and adjustments shall be made as necessary to produce the conditions indicated or specified. The capacity tests and general operating tests shall be conducted by a competent experienced engineer.

X. FIRE FIGHTING SYSTEM

The E/T/C of fire-fighting system as specified hereunder includes but not necessarily limited to:

- Complete water fire-fighting system at powerhouse with requisite fault detection/monitoring system, fire alarm panel in the Control room & compatible with computerized control system.
- Complete deluge systems for the two GSU transformers in switchyard
- 2 (two) sets of requisite capacity motor pump set (with suction and delivery pipes, valve etc from bore well to overhead tank at El 950m), complete galvanized steel piping system for water supply from the overhead tank for fire hoses & deluge system for Generator Step Up (GSU) transformers as well as for fire hoses in the power house complete with all the required valves, deluge valves, flanges, blind flanges, drains, air vents, fittings, gaskets, brackets, anchors, bolts, screws, and electrical controls.

- Sufficient numbers of portable CO2 and dry chemical extinguishers at various locations in power house, valve chamber, headwork control building and other necessary project areas.
- 1 (one) wheeled dry chemical extinguisher, 25 kg
- 1 (one) complete charging equipment for dry chemical extinguishers.
- 1 (one) complete charging equipment for CO2 extinguishers.
- The equipment specified under this chapter is to be arranged on the various floors of powerhouse as well as switchgear/control room at head works, valve chamber, camp etc.

BRIEF DESCRIPTION OF FIRE FIGHTING SYSTEM

1. GENERAL

Overhead tank at EL 950m or any other place suiting for head requirement shall be constructed by civil contractor. However, 2 nos. borewell of dia approx. 8 inches shall be installed by the contractor for filling of overhead tank, contractor has to install the necessary piping network for supply and proper drainage for firefighting system. From the source (overhead tank) to the taps, separate pipe headers and risers shall be provided for the fire hoses. From the risers, a branch shall be provided at each floor to each hose cabinet. Overhead tank shall be constructed by civil contractor. The fire hose system shall consist of fire hose cabinets and piping from Fire hose cabinets shall be installed in the powerhouse/switchyard at appropriate locations as required. Required number of sets of flame or smoke protection suits with associated equipment at various locations.

2. DELUGE SYSTEM

Each of the two transformers shall be protected by an automatic stationary water spray system. The water deluge system shall provide complete spray coverage of the surfaces of the transformer and the surrounding area. Sufficient numbers of nozzles for each transformer shall be provided. The water protection system includes the water deluge system and the water to the fire hoses. Spray headers and piping shall be designed for dismantling and re-assembling so that piping will not interfere with the installation/ replacement of the transformers.

3. DELUGE VALVES

Outside each transformer bay the lines shall be equipped with a manually operated maintenance valve of the gate type of appropriate size and automatic deluge valve electrically activated by the heat sensors of appropriate size. The automatic valves shall be equipped with means for manual operation also and shall always be manually closed after deluging has been completed.

4. FIRE DETECTORS

Each transformer fire-fighting system shall have a fire detection system apart from the Fire Alarm System. At each transformer, there shall be installed a double detector loop for deluge release. Each loop shall be provided with combined heat/flame detectors. In addition at least one pressure detector shall be included in each loop. Loss of electrical power shall not result in release of the deluge system. Loss of water pressure shall enable the local control units to initiate a system failure signal to the UCB and control room.

5. FIRE HYDRANT

The fire hydrants shall be of the compression type, the hydrant opens against the water pressure and closes with the pressure. The hydrants shall be complete including a positive drain valve, weather cap, test plug, lubrication points, bronze top stem, nozzle caps with chains, compression type main valve and bronze seat ring, and bronze cap nut.

The drain valves shall operate automatically without springs or plungers, and shall automatically be flushed when the hydrant is open.

The cabinets for powerhouse and switchyard shall be suitable for indoor and outdoor installation respectively, and shall include hose with brass couplings attached, fog nozzles (adjustable and with shut-off provisions and the nozzle shall not be capable of producing a solid straight water stream), two adjustable hydrant wrenches, two common spanners.

6. DRY CHEMICAL EXTINGUISHERS (DCE)

The DCE shall be designed for fighting of fires in solids, oil and electrical equipment (ABC type). Each of the portable units shall be complete with short flexible tube, pistol nozzle, and wall bracket. The wheeled unit, to be used in the power house shall be mounted on a two-wheel trolley complete with approximately 10 m flexible tube/hose and pistol nozzle.

7. CO2 EXITINGUISHERS

The CO2 units shall be designed for fighting of fires in oil and electrical installations (BC type). Such extinguishers shall be housed in power house/control room at head works, valve chamber, camp etc.

Erection Consumables like rawl plugs, screws, check nuts, nuts & bolts, saddles, saddle bars, cable (nylon) ties, washers, cable tags(strips), etc. which are not covered in the supply but required for successful completion of above erection activity shall be considered in the scope of Erection agency.

SITE TESTS

Tests shall be carried out as per relevant standards and shall include the following tests and checks after installation of the equipment at site:

- Functional tests 1 DCE unit and 1 CO2 unit shall be carried out
- Overall functional checks on the fire-fighting systems
- Tightness checks on the various piping systems, including the valves.
- Operation of the water deluge systems with actuation by the automatic detection system, alarm system and manual release. These tests shall be conducted with the system only in dry condition.

XI. EMERGENCY CLOSING VALVE/PENSTOCK VALVE

One 2150 mm diameter emergency closing valve of the butterfly type (EL 1138.5m) with accessories shall be installed as specified hereunder.

- Transportation from stores to valve house, including the necessary loadings and unloading up to the valve chamber site.
- Unloading at site, necessary storage, erection, site tests and commissioning.
- Erection of all the necessary water, air and oil pipelines, drain and guard valves, etc.

- Erection of embedded parts, anchor bolts, sole plates and other necessary items for complete installation.

The limits of erection are; The flange faces between upstream steel lined pressure shaft and butterfly valve housing; The flange faces between dismantling joint and downstream steel lined pressure shaft and The bypass connection flange faces on top of the upstream steel lined pressure shaft.

One No. 2150 mm dia. butterfly valves , suitable for maximum water pressure is required to be installed at underground location located downstream of the surge shaft. The butterfly valves is required primarily for the purpose of isolation of the respective turbine main inlet valves (spherical valves), for inspection and maintenance/replacement of its maintenance seal. The Penstock Valve is of double seal parallel face through flow (lattice door) type Butterfly Valve, designed to open under balanced head condition and to close against unbalanced condition with maximum turbine flow. Normal opening of valve is affected by servomotor oil pressure and normal closing/Emergency closing is affected by dead weight only/oil pressure.

Penstock valve shall be supplied in assembled condition at site. However, due to transportation limitation if it is supplied in dismantled condition, the same is to be assembled at site within the quoted price. Penstock valve consist of valve upper and lower body, door with trunnion, levers, servomotors, inlet pipe, outlet pipe, vacuum breaking valves, air release valves, oil leakage unit, bypass valve, pipeline like interconnection between inlet and outlet pipe, penstock drain upstream and downstream of valve and its routing to drain pit, pressure measurement etc.

Inlet pipe and outlet pipe shall be welded with penstock by the contractor along with necessary NDT and Stress relieving for welding joints. Servomotors for opening/closing of BFV shall be oil operated with 100 kg/cm2 system. OPU system consist of nitrogen bank, piston accumulators etc. maintenance seal shall be water operated with tapping taken from upstream of valve and service seal shall be self operated.

SITE TESTS

The following tests, checks, inspections, etc. shall be carried out at site. If deemed necessary by the Engineer they are to be complemented by additional tests, checks, controls, etc. to verify the design, construction, functioning and behavior of the equipment.

- Hydrostatic pressure testing of the steel lined pressure shaft /emergency closing valve and dismantling pipe assemblies, including steel lined pressure shaft /penstock as specified under Lot-1 Civil and Hydro-mechanical Works.
- Tightness tests on all pressure oil and water piping at a pressure 50% greater than the max. Service pressure.
- After or during commissioning of the turbines, the emergency closing valve has to be tested cutting off the turbine discharge with the needles in fully open position. The emergency closing valve has to be drip tight after the test. Otherwise, the disc seal has to be adjusted or replaced and the test repeated.

XII. ALTERNATING CURRENT GENERATOR, 23.529 MVA

GENERAL

The generator shall be of three (3) phase vertical shaft, hydraulic turbine driven, indoor, air cooled synchronous type, generator with a salient pole revolving field and AC brushless excitation. The cooling system shall be of the self-ventilating and re-circulating type with

water-cooled air coolers.02 nos. Exciter Transformer shall be of three-phase, 50Hz, dry type, self-cooled. Primary side of the excitation transformer shall be connected to 11 kV bus, between 11 kV generator terminal and VCB in 11 kV switchgear cubicle. The secondary side of Power V.T. shall be wired to AVR / control circuit.

The generator described in this specification is of vertical shaft, salient pole, and suspended type construction. The generator has a thrust & guide bearing positioned above the rotor & a guide bearing below the rotor. The thrust bearing is capable of carrying the additional load of turbine runner & shaft and hydraulic thrust. H.S. lubrication system for injection of oil to the thrust bearing pads has been provided for use during starting and stopping. Top and bottom air baffles with air guides to be installed.

BRIEF DESCRIPTION OF GENERATOR

1. WINDINGS

The stator winding will have a Class 'F' BHEL epoxy resin based insulation system. The winding will be of coil type, wound in open slots and will be provided with BHEL'S PROVEN "resiflex" insulation system (Class F). Each coil will consist of a number of insulated copper conductors to minimize eddy current losses. Both ends of each phase will be brought out as insulated bus bar terminals, arranged outside the generator frame.

2. WOUND STATOR

Stator will be partially wound at works and dispatched to site in a two/three number of segments to suit the transport limitations. The winding at the joints of the stator segments will be carried out at site along with all bus ring connectors and jumper connections. NDT of joints shall be carried out at site. Dimension of stator frame A/F are 5050 mm and generator stator bore is 3350mm.

3. ROTOR

The rotor spider will be a fabricated structure. This will be fitted to the shaft with the help of keys & bolts. The rotor rim will be assembled around rotor spider. Slots in the outer periphery of the rim will receive similar shaped projections on the poles.

The poles will be of laminated construction consisting of sheet steel punching, clamped between heavy steel end plates by means of steel studs. The pole core will have number of T Heads to engage with corresponding slots in rotor rim punching. The damper winding bars will be of circular cross section and embedded in pole face. The end of damper bars of the pole will be short circuited together by copper punching. The field coils will be manufactured from rectangular copper strips. The insulation will be class 'F'. All connections between adjacent field coils and between field coils to Brushless exciter will be mechanically strong construction and firmly secured to the rotor.

Cooling fan blades shall be of carbon steel and constructed to preclude vibration. The driving torque shall be transmitted from the rim to the rotor spider/disc through taper keys. The taper keys between the rim and rotor spider arms/discs shall be rigid, be rigidly supported, and in contract over the full axial length of the rim. OD of rotor is approx. 3316mm and weight of rotor with shaft is around 60MT. No of poles to be mounted at site are 16

4. SHAFT AND THRUST BEARING COLLAR

The shaft and thrust collar are forged individually from high quality alloy steel. The shaft has been accurately machined. A forged thrust bearing collar will be shrink fitted on the upper

end of Generator shaft. Shaft is provided with bottom guide bearing collar. Solid coupling flange is provided at lower end of the shaft, for connection to the turbine shaft.

5. THRUST BEARING

The thrust bearing will be of the spring mattress type in which the stationary parts consist of a set of white metal (babbitted) segmental pads supported on mattress of helical springs. The thrust bearing pads will be completely immersed in an oil bath and would be cooled by means of oil cooler units. The bearing will be designed for the axial load which is summation of the weights of all rotating parts of Generator, Turbine and maximum axial hydraulic thrust. During spinning/bearing run, if required bearing gaps setting to be adjusted as per requirement.

6. GUIDE BEARING

The guide bearings will be of the Segmental pivoted pad type consisting of a row of white metal (babbitted) pads arranged in a support ring to bear on a journal surface. A pivot bar will be bolted to the back of each guide pad to enable the pad to rock slightly to take up a suitable position and facilitate formation of the oil film when running. The clearance between the individual pads and the journal will be set by adjusting the shims between the back of the pad and the pivot bar. During spinning/bearing run, if required bearing gaps setting to be adjusted as per requirement.

7. BEARING INSULATION

The bearing above the rotor will be adequately insulated to prevent circulating shaft current from passing through the bearing surface. The insulation will be arranged to break the possible paths of such currents.

8. OIL VAPOUR SEAL FOR OIL VAPOUR

Seals are provided for both the bearing housings to prevent escape of oil vapour to the generator air circuit and its deposition on rotor and stator. It consists of air and oil vapour chambers. The inner diameter is serrated to act as labyrinth to minimize vapour leakage. The oil vapour can escape to an oil tundish through the piping provided for the purpose. For satisfactory performance of the vapour seal, it is essential to maintain the radial shaft clearance.

9. TOP & BOTTOM BRACKET

The top bracket is a steel fabricated construction which accommodates the thrust bearing and upper guide bearing. The bracket is designed to carry the static load plus the weight of turbine and generator rotating parts and maximum axial hydraulic thrust.

The bottom bracket will also be of a fabricated construction which accommodates lower guide bearing. Brakes and jack units will be mounted on the bracket for braking and jacking.

10. HIGH PRESSURE OIL LUBRICATION SYSTEM

A high pressure oil injection system will be provided for the thrust bearing in order to create a positive oil film over the pads at low speeds during starting and stopping of the generator. The components consist of a positive displacement pump with it's A.C. motor, filters, valves etc. mounted on a steel base .One standby D.C. driven pump-motor will also be supplied. The system will be arranged to come into operation automatically during starting/stopping and also when the unit starts creeping

11. BRAKING AND JACKING SYSTEM

The Generator brakes will consist of a number of replaceable shoes, mounted on a vertical piston moving in a cylinder and will operate against a polished circular steel brake track. To apply the brakes, air will be fed into the cylinder from the station compressed air system. Brakes will be automatically applied when the speed of the rotor will reduce to a preset value, and will remain applied continuously so that the unit stops completely. The brakes will be automatically reset after complete stopping of the Generator. Limit switches will be provided for each brake to prevent the machine from starting if any brake is in the raised position. The brakes will be mounted on the bottom bracket. The brakes will also serve as a convenient means for jacking the rotor for maintenance purpose.

12. BRAKE/JACK CONTROL PANEL

Each unit will be provided with a brake/jack control panel serving as a common approach point for braking or jacking of the rotor. Braking of the rotor will be automatically achieved through braking solenoid valve, which will be located in the brake panel. Also this solenoid valve will be provided with manual over ride which can be used whenever required. Jacking of the rotor will be attempted when rotor is stand-still.

13. HYDRAULIC POWER PACK

The motorized hydraulic power pack will be provided for jacking of the rotor during maintenance. The unit will be of portable type. Flexible hoses with swivel nuts for connection between power pack and brake jack control panel will also be provided.

14. BRAKE DUST COLLECTION EQUIPMENT

The brake dust collection equipment will consists of an extraction unit, hoppers around brake assemblies for entrapping the dust and flexible hoses for connecting hoppers to extraction unit.

15. MOISTURE DETECTOR

The instrument will be solid state type with a probe immersed in the bearing oil. The presence of moisture content is sensed through a sensor and a signal will be sent to the indicating unit or a relay through an amplifier. The relay can be set to give an alarm in the event of moisture in bearing oil exceeding preset value.

16. ON LINE VIBRATION MONITORING SYSTEM

A continuous on line vibration monitoring system shall be provided. It shall comprise of

- 2 no. non-contact type proximity probes each for upper guide bearing, lower guide bearing and turbine guide bearing to measure radial vibration in (X-Y direction).
- 3 no. non-contact type proximity probes at the thrust bearing bracket at suitable location 120 degree apart to monitor axial vibration.
- 2 no. contact type velocity probes each for upper, lower & turbine bearing bracket to measure the radial movement of bracket/housing.
- 2 no. contact type velocity probes for turbine head cover to measure structural Vibration.
- 2 no. contact type probes (one for each stator segment) installed at suitable locations 90 degree apart to monitor stator frame vibration.
- 1 no synchronization probe.
- Set of input/output modules, power supply, relay modules etc. shall be provided.

17. CONTINUOUS ONLINE PARTIAL DISCHARGE MONITORING SYSTEM

Partial discharge couplers shall be installed in generator to measure partial discharges in the high voltage stator winding of hydro generator continuously. One no. PD coupler per phase per parallel path so total 6 no. couplers shall be provided for each generator.

18. AIR GAP SYSTEM

An air gap measuring system (AGMS) shall be provided for on line monitoring of the air gap between stator and rotor while the unit is running. The system shall mainly consist of sensors, synchronization probe etc. 8 (eight) capacitive sensors shall be glued over stator core tooth on inner diameter of stator core 4 on drive end side and 4 on non-drive end side).

19. SHAFT CURRENT MONITOR

This will consist of shaft current transformer and relay unit. The shaft current transformer will be of ring shaped sheet steel core, encircling the shaft, which will form the primary winding and carry on evenly spaced torroidal secondary winding. The transformer will have an additional winding on the core enabling testing of the protection by induction.

20. FIRE FIGHTING SYSTEM

An automatic CO2 fire protection system shall be provided complete with initial discharge banks, final discharge bank, control panel, auxiliary, Carbon dioxide shall admit to the generator housing through piping and nozzles to fill the housing.

21. INSTALLATION OF BRUSHLESS EXCITATION SYSTEM CONSISTS OF

Power supply units, supply converter, Processors, Resistors, MMIs, Other electronic modules, I/O Cards, Instrument Transformers, Indicating lamps , Switches, Gauges & Push buttons, Communication/Data card, Blown fuse detector, Field flashing rectifier, Blocking diodes for field, Field breaker components, Closing coil, Tripping coil, Fixed contacts for main poles, Moving contacts for main poles, Arc chute for main plate, Braid, Auxiliary contact blocks, Exciter transformer, Power rectifier module assembly complete, 200% of rotating diode & surge arrester.

XIII. GENERATOR STEP UP TRANSFORMERS (02 Nos)

11/220 kV three phase Generator Step up Transformers located at switchyard at 884 m elevation.

Three phase, oil immersed, self-cooled, outdoor type transformer for stepping up the voltage at Rahughat Power station from 11 kV to 220 kV. Location of transformer is in switchyard, so EOT crane shall not be available for handling of GSU. Contractor has to unload GSU at switchyard by making its own arrangement having approval of BHEL Engineer Incharge. Transformer shall be equipped with Oil conservator with level gauge Dehydrating breather with silica gel Gas relay RTD for oil and winding temperature Contact thermometers for oil and winding temperature Oil cooling radiators Bushing CT on HV & LV On-line monitoring (PDD& DGA), on-line moisture detector, Fire protection. Any other parts as recommended shall be installed at site.

The technical data are as described below:

Description	**11/220 kV**
Rated capacity	26 MVA
Frequency	50 Hz

Type	Outdoor, Oil-immersed
Type of cooling	ONAN
Temperature rise above 40 deg. C ambient temperature	
a) In oil by thermometer	50 degree C
b) In winding by resistance	55 degree C
Number of phases	3(three)
Maximum voltage (line to line)	
a) LV	12 kV
b) HV	245 kV

General
The transformers shall be connected to three-phase 50 Hz system of 220kV & 11kV systems as specified. The GSU transformers shall be installed outdoor in a hot & humid atmosphere at switchyard. These transformers shall be oil immersed.

BRIEF DESCRIPTION OF GSU

1. Insulating oil
The insulation oil shall be new inhibited naphthenic-based mineral oil with anti-oxidant (phenol) additives, and shall have properties such as to avoid formation of copper sulphide under continuous heavy loading conditions even without passivator additives. Oil circulation has to be done at site till required values are not achieved. Oil testing is to be done by contractor from external approved agencies. Transformer cooling system; Cooling system shall be ONAN for oil immersed GSU transformers. Oil preservation system; Oil preservation shall be by means of conservator tank

2. Temperature indicators
One set of winding temperature indicator shall be supplied and fitted locally so as to be readable at a standing height from ground level. Necessary current transformer and heating coil for obtaining thermal images of winding temperatures and a detector element shall be furnished and wired.

3. Buchholz relay (63)
The Buchholz Relay shall be provided with two floats and two pairs of electrically separate contacts - one pair for alarm and the other pair for tripping.

4. Transformer bushings
The bushing shall be located so as to provide minimum electrical clearances between phases and also between phase and ground as per relevant standards. All bushings shall be porcelain type and shall be furnished complete with terminal connectors of adequate capacity.

5. Bushing current transformer
Each GSU transformer shall be provided with one set of three (3) current transformers each on the HV and LV voltage terminals of bushing to be used for transformer differential relaying. The transformer shall be provided with neutral bushing current transformer to be used for earth fault protection in High Voltage side.

6. Cooling Equipment

Each GSU transformer shall be equipped with a sufficient number of radiators or cooling units to operate as a self-cooled unit as specified.

7. Portable Partial Discharge Detector and On-Line Dissolved Gas Analyzer

Since the failure of a Transformer can be catastrophic resulting in oil spills, fires and extensive damage to the adjacent equipment, it is required to install Partial Discharge Detector (PDD). On-Line Dissolved Gas Analyzer (DGA) on each Transformer to monitor the contents of dissolved gases in PPM such as hydrogen, methane, ethylene, ethane, acetylene, carbon monoxide (CO) etc. present in the insulating oil. DGA should also monitor moisture in transformer oil. If this facility is not available in DGA, a separate on-line moisture detector shall be supplied

8. Fire Protection

Requisite firewalls shall be provided for the 11/220 kV generator step up transformers. The fire protection of the GSU transformers shall be deluge type as detailed in Section fire fighting system.

Field tests:

After installation at the site, the transformers shall be subjected to field test as described; contractor has to arrange all testing instruments at site or get it done through external certified laboratory.

The routine checks during erection works shall be as follows for 11/220 kV transformers

- Measurement of winding resistance.
- Measurement of voltage ratio test
- Ratio test
- Polarity and phase relationship test
- High voltage test according to IEC requirements
- Insulation oil test
- Gas and oil tightness test
- Calibration of dial thermometers and gauges
- Operation test of tap changing equipment
- Individual protective relays test by primary & secondary injection
- Temperature gauges, buchholtz relay operation checks
- Insulation resistance measurement
- FRA test
- LV/HV Bushing- Tan Delta

XIV. 11/11 kV , 1000kVA, 50Hz, Isolation Transformer (1 No)

Dry insulated transformers for indoor use, AN cooled, with data as specified below. All transformers shall have built-in temperature sensors for winding temperature supervision.

XV. 11/0.4 kV, 500kVA, Station service transformers (02 Nos)

Dry insulated transformers for indoor use, AN cooled, with data as specified below. All transformers shall have built-in temperature sensors for winding temperature supervision.

Field Tests for Isolation and station transformer

Field tests are subdivided into 2 stages:

a) Preliminary tests during and after erection

- Checking of quality of paint on external surfaces of the cubicles
- Checking of earthing connections
- Checking of correctness of phase sequence
- Checking of correctness of tap changer positions
- Preliminary measurement of insulation resistance
- Preliminary checking of control & protection wiring
- 11/0.4 kV station service transformers and 11/11 kV Isolation distribution transformers ratio check
- Measurement of winding resistance
- High voltage tests according to IEC requirements
- Calibration of dial thermometers
- Check of protective devices

b) Final acceptance tests

- Checking of operation of temperature sensing devices
- Checking of control circuit operation
- Checking of correct operation of tap changer
- Checking of neutral CT wiring
- Checking of phase sequence
- Measurement of insulation resistance
- Measurement of winding resistance at direct current
- Measurement of voltage ratio and check of voltage vector relationship
- Measurement of impedance voltage/short circuit impedance.

The routine checks during erection works shall be as follows: Ratio check, Polarity and phase relation check, Measurement of winding resistance, High voltage tests according to IEC requirements, Calibration of dial thermometers, Check of protective devices, Insulation resistance measurement

XVI. <u>11/0.4 kV, 100kVA station service transformer at Headworks and valve chamber (02 Nos)</u>

Three phase, oil immersed, ONAN (self-cooled), outdoor type distribution transformer one each for head works and valve chamber power supply. Contractor has to shift station transformer from stores to headworks /the contractor shall install valve chamber. Contractor shall install poles alongwith the installation of transformer, and all tests as specified for GSU transformers are to be carried out for these transformers also.

The routine checks during erection works shall be as follows: Ratio check, Polarity and phase relation check, Measurement of winding resistance, High voltage tests according to IEC requirements, Calibration of dial thermometers, Check of protective devices, Insulation resistance measurement.

XVII. <u>11 KV INDOOR SWITCHGEAR</u>

2 nos. of 11kV Generator Circuit Cubicles (GCC) in the powerhouse located in Auxiliary bay floor at EL878.0. Incoming connection from generator to GCC shall by 12 kV segregated phase bus-duct (SPBD) whereas outgoing connection from GCC to outdoor 11/220 kV Generator step up transformers shall be through 12 kV single core multiple XLPE power cables. Lightening

arrestors/voltage transformers/current transformers for instrumentation, protection & synchronization shall be housed in GCC. 11 kV sides of exciter transformer, station supply transformer and Isolation transformer shall be connected to GCC through XLPE cables. The secondary side of isolation transformer shall be connected through 11 kV XLPE cable to 11 kV Local Supply Cubicle which shall also housed requisite CBs/VTs/CTs etc. for control/protection/instrumentation.

XVIII. CONTROL, AUTOMATION & PROTECTION SYSTEM

The scope of work, shall be E/T/C of the following:

Scope of work under this section covers assembly, erection, testing and commissioning, performance & acceptance testing, of Control and Automation/Monitoring System as well as limited control & monitoring from LDC, Kathmandu for the present and complete remote control in future including SCADA adaptation of existing SCADA system at LDC as well as all parts, all items, auxiliaries and accessories.

Detailed scope of work:

a. Local control boards

The Computerized Control and Monitoring System shall contain at least the following Local Control Boards:

- Two (2) sets of Unit Control Board (UCB) with all necessary accessories.
- One (1) set of LCB for Weir / Intake Regulation and Control Board with all necessary accessories.
- One (1) set of LCB for Common Services Board with all necessary accessories.
- One (1) set of LCB for Electrical Power Supply Service Board with all necessary accessories for Generator Circuit Cubicles, 11kV switchgear and feeders (i.e. 11/11 kV Isolating Transformer, 11 kV line Headworks to with tap-offs to BFV & Camp), DG sets, SSTs, and 400V switchgear etc.
- One (1) set of LCB for 220 kV switchyard Control Board for GSU Transformers.
- RTU for communication at Power house, RTU for communication at Valve Chamber, RTU for communication at LDC, Optic Fiber Cables, 230VAC Uninterrupted Power Supply (UPS) System for HMI, High speed communication Panels (SDH, PMUX)

b. Central Control Centre (Control Room at Powerhouse)

Equipment for Control Room shall comprise of the following: Operator Work Stations, Engineering Work Station with dockable arrangements and printers, Mobile Engineering Work Station, Training Simulator, with all necessary accessories, separate workstations and connected to the Central Control Room Network, Video Work Stations for security/surveillance system, projection type Large Video display with controller acting as a video mimic, Router/Gateway with necessary firewall functionality for Data transmission and communication between power house and Load Dispatch Center (LDC) through OPGW associated with 220 kV Transmission Lines to Dana & Kushma, Network printers ,Modular furniture (Desks & chairs) for Engineering Work Station, Operator Work Stations, Security/Surveillance stations, Data Storage System and Training Simulator (Chairs with bending mechanism, sitting height adjustment and ergonomic adjustment etc.)

c. Time synchronization (GPS)

Universal time synchronization system complete with redundant master clocks, at least two (2) nos. of slave clocks, antenna and any other instrumentation/ provisions required for time

synchronization of all the equipment of the control system as well as protection system equipment, with Global Positioning System (GPS), so that each piece of equipment shall be synchronized individually shall be installed.

d. Process control networks

- Fiber optic Control Room Network with all necessary accessories and interfaces.
- Fiber optic Plant Control Network with all necessary accessories and interfaces.

e. Plant LAN

- Fiber optic Plant LAN with redundant server and all necessary accessories and interfaces.
- Suitable number of Wireless LAN hot spots with all necessary accessories including 24 port wireless switches.
- Plant Computers and servers with all necessary accessories and software hooked up with 1Gbps Plant LAN.

f. Link between Powerhouse and Headworks

Redundant single mode ADSS optical fiber link, complete in all respects, between Head works and powerhouse (approx. 10 Km), BFV to PH and Camp to PH through ADSS cable on 11 kV line (with tap-offs at BFV chamber and camp) suitably anchored to poles or laid in trenches and with RTU/terminal equipment / OFC accessories / assembly for telemetry, data transmission, control & tele-protection from Power House and LDC.

g. OPGW Communication

For telemetry, data transmission, tele-protection and control of equipment at headwork, BFV chamber and camp, ADSS optical fiber link shall be utilized. Further, the OPGW link associated with 220 kV Transmission Lines to Dana & Kushma, Kushma to Butwal (under scope of separate Kaligandaki Transmission Corridor Project) and existing transmission lines beyond Butwal to Kathmandu shall be utilized for such data transmission and communication purposes between powerhouse at LDC, Kathmandu.

h. Fiber Optic System for OPGW System

i. ADSS type fiber optic aerial cable

On the 11 kV line supports of the lines from the powerhouse to the headworks with tap- offs at valve chamber and Camp, ADSS (all dielectric self-supporting) cables, optical terminal equipment and associated accessories shall be installed. Such ADSS cables etc. shall also be installed on employer constructed 11 kV line from powerhouse to Camp.

The location of ADSS fiber optic cable on the 11 kV supports etc. shall be determined to minimize the effects of the voltage gradient on the cable. Further, laying of 0.4 kV cables from 11/0.4 kV step down transformers (mounted on tap-off structures at Head works, BFV & camp) to respective LT panels at different locations shall be on 0.4kV poles/trenches as per site conditions. ADSS cables shall thus be laid on these 0.4 kV poles/trenches in such locations.

- **ADSS Optical fiber cable link between Power House and Headwork:**

12 core, single mode, redundant overhead optic fiber cable (ADSS) unitube will be provided between Powerhouse control room and Headwork along the 11 kV Transmission Lines. The approx. length of Cable considered for 2 run is 16 Km.

- **ADSS Optical fiber cable link between Power House and Valve house:**

12 core, single mode, redundant overhead optic fiber cable (ADSS) unitube will be provided

between Powerhouse control room and Valve house along the 11 kV Transmission Lines. The approx. length of Cable considered for 2 run is 2 Km.

- **ADSS Optical fiber cable link between Power House and Camp:**

12 core, single mode, redundant overhead optic fiber cable (ADSS) unitube will be provided between Powerhouse control room and Camp along the 11 kV Transmission Lines. The approx. length of Cable considered for 2 run is 1.6 Km.

Site Tests

Site test shall include at least the following: Visual inspection, Insulation and continuity tests of all secondary wirings, Testing of all circuit loops, Injection of currents at secondary of various CTs to simulate all fault conditions and verifying all trip sequences, Tests to prove correct operation and characteristics of all protection equipment, control sequences, indications and alarm systems, Calibration of all instrumentation, protective relays and control devices, Magnetization characteristics, measurement of secondary winding resistance, ratio and polarity tests of all current transformers, ratio and polarity tests of potential transformers/CVTs, Measurement of lead resistance of all protection current circuits, Operation of all protective gear systems by primary injection, Operation of voltage circuits by primary or secondary injection, Verification of secondary current and potential magnitudes and phase angles under rated and over load conditions of the unit.

PROTECTION SYSTEM

Erection, site testing and commissioning of protection equipments comprising protective relays auxiliary relays, metering, panels complete in all respects including. The protection shall cover the Turbines, Generators, 11/220 kV GSU Transformers, 11kV Isolation Distribution Transformer, 11/0.4kV Station Service Transformers, 11/0.4 kV head works, camp & valve chamber Transformers, Diesel Generating sets, 11kV & 0.4 kV Switch gear etc.

Tests during installation and pre commissioning

At least following tests shall be performed : i)Ratio and polarity of CTs and PTs, ii) Correctness of interconnections between CTs and PTs as well as CT groups and associated relays, iii) Testing, calibration and adjustment of protection relays, iv) Check of functional characteristics of each of the electrical protections, v) Check of tripping sequence, vi) Check of orders issued by each of the protections with respect to the corresponding tripping sequence, vii) The systematic testing of the operation of each chain forming the protection, the associated tripping sub-assembly, the links to the connected systems and all fault simulations by test kit for which the system is to react, viii) The co-ordination of protection and relay setting, ix) Analysis of information consistency and of alarms supplied by protection system.

Commissioning tests

At least following tests shall be performed: i) The systematic testing of the operation of each chain forming the protection, the associated tripping sub-assembly, the links to the connected systems and all fault simulations by creating real fault for which the system is to react, ii) The final co-ordination of protection and final relay setting, iii) The testing of the protection system behavior in the event of failure of one of the connected system to which it is connected, iv) Analysis of information consistency and of alarms supplied by protection system. The finalizing of the setting and the co-ordination of the various protections, v) The systematic testing of the operation of each chain forming the protection, the associated tripping sub-assembly, the links to the connected systems and all fault simulations for which the system is to react, vi) The co-ordination of protection between the unit with network, line and bus bar protection.

XIX. CABLES, CABLE RACKS, CABLE TRAYS & ACCESSORIES

Following cables/ terminations & sealing end/ accessories/ cable racks/ cable trays etc. shall be installed.

- 11kV XLPE Power Cables
- LT Power Cables
- Control Cables and Instrumentation cables
- Cable trays and supports
- Cable accessories like Termination Kits, Cable Lugs, Cable Glands, Button Tape (Strap and Stud) and all other accessories.

- BOPs, like EOT Crane, HVAC System, Illumination System, Fire Fighting System, Switchyard.
- 11kV, single-core, 1000 sq.mm:11kV main circuit from the 11kV generator circuit cubicle to the 26 MVA Generator Step up transformer and shall be used in duplicate for each phase for the two generators.

- 11kV, three-core, 95 sq.mm: 11kV cable from the 11kV generator circuit cubicle to each of the two 500 kVA, 11kV/400 V station service transformers.

- 11kV, three-core, 240 sq.mm: 11kV cable from the 11kV generator circuit cubicle to bushing on primary side of 1000 kVA, 11kV/11kV Isolation transformer. Further, the same size of cable provided from bushing on secondary side of the transformer to 11 kV Local supply cubicle (LSC)

- 11kV, three-core, 95 sq.mm: 11kV cables from LSC in Auxiliary bay to the terminal poles in switchyard for connection to 11kV distribution line to headworks and for termination on another 11 kV line (that shall pass through switchyard to camp - under construction by Employer).

- 1100V, single-core, 500 sq.mm: LT cable from each of the two 500kVA 11/0.4 kV station service transformers (to be used in duplicate for each phase) to the low-tension switchgear board in the powerhouse.

- 1100V, three-core, 70sq.mm: LT cable from 100 kVA, 11/0.4 kV pole-mounted transformer to the main distribution board in headworks control room.

- 1100V, three-core, 70sq.mm: LT cable from 100 kVA, 11/0.4 kV pole-mounted transformer to the main distribution board in valve chamber.

- 1100V, single-core, 300sq.mm: LT cable from 400 kVA DG control panel to low tension switchgear board in auxiliary bay of powerhouse (to be used in duplicate for each phase.

- 1100V, single-core, 70sq.mm: LT cable from 100 kVA DG to low tension switchgear board in headworks control building.

- All AC power cables of requisite rating for 400 V circuit from LT switchgear in the power house to No. 1 Unit MCC, No.2 Unit MCC, Common MCC & Power Distribution Boards.

- All requisite size AC power cable and rating from main distribution board to sub distribution boards at headworks and valve chamber shall be installed.

- All DC power & control cables of requisite rating to different loads fed by 110V DC panel including cables connection to 110 V sub DCDBs & Loads fed.

- All DC power cables between Battery chargers No.1&2 to 110 V DC panel and from 110 V DC Batteries.

- 110V DC cables from 110V DC panel to each of the two 110V/48V DC to DC converter DC power cables connections between 110V/48 V DC to DC converter to DC panels.

- Ladder / perforated type MS trays of width 150, 300, 450 and 600 mm as applicable will be provided for the above cables.

- Any other cable not specified but required for completion of work is included in the scope of contract without price implication.

Control and Instrumentation cables shall be as follows as per BHEL practice:

1. 2.5mm^2 Cu, un-armoured PVC insulated cable will be used for the following
   - All the command signals e.g. Motor On/Off command from UCB to MCP, Breaker On/Off command from UCB/GRP, Solenoid On/Off etc.
   - Field Signals which needs multiplication in UCB/GRP etc. for further use in the circuit e.g. Turbine GB Temp. Very High, Vibration Very High, Pressure Receiver Oil Level Very Low etc.
   - Signals being used for Interlocking in MCP/ UCB/ HMC/ Governor, GRP etc.
   - Feedback/ Status Signal which needs multiplication for further use in the circuit.

2. 0.5mm^2 Cu, Un-armoured PVC insulated, Overall screened cable will be used for:
   - All the feedback/ Status signals which does not need multiplication e.g. Breakers On/Off, Motor On/Off, Local Drive Disturbance etc.
   - All the alarm signals.
   - Field Signals which are not multiplied.

3. 0.5mm^2 Cu, Un-armoured PVC insulated, Individual & Overall screened cable will be used all analog signals (4-20mA) being used for measurement.

4. 1.5mm^2 Cu, Un-armoured PVC insulated, Individual & Overall screened cable will be used Triad cables being used for temperature measurement (RTD signals) from instruments to the Temperature Scanner/UCB/SCADA

5. 4C x 04 mm^2 Cu XLPE cable will be used for CT connections.

6. 4C X 2.5 mm^2 Cu XLPE cable will be used for PT connections.

7. Control Cables shall be selected from 2C, 4C, 7C or 12C X 2.5 Sq. mm sizes.

8. Instrumentation/ Signal cables shall be selected from 2Triad x1.5 Sq.mm, 4Triad x1.5 Sq.mm, 2PX0.5 Sq. mm, 4PX0.5 Sq. mm, 8PX0.5 Sq. mm,12PX0.5 Sq. mm sizes.

METHODOLOGY FOR INSTALLATION

1. Cables in the control room, other areas inside power house and in outdoor area shall be laid on ladder type cable trays. Cabling in the cable spreader room shall be laid on hung support assembly. Hung supports shall be fixed to the roof of cable spreader room/other areas using Anchor fastener bolts.
2. Barrier strip shall be used in cable trays where control/instrumentation cables and AC auxiliary power supply cables run in single tray.
3. Tray supports shall be fabricated at site on the basis of required cable tray tiers.
4. Power and control cables in the cable trench shall be laid in separate tiers. The order of lying of various cables shall be as follows, for cables other than directly buried.

   i. 11kV on top tiers

   ii. 415V AC Power cables.

   iii. Control/ Instrumentation and other service cables in lower tiers.

5. Power and control cables shall be securely fixed to the tray/supports with self-locking type nylon ties.

6. Wherever cables cross roads, drains and rail tracks, these shall be laid in pipes.

7. In each cable run, some extra length shall be kept at a suitable point to enable straight through joints for H.T. cables.

8. For HT cables, if straight through joints are unavoidable, the straight through joints kit shall be used.

9. Blank white plastic sleeves shall be used for ferrules, Same shall be printed at site with black ink by ferrule printing machine, contractor has to arrange sleeves and machine with consumables.

Field Tests

Field/site tests shall be carried out in compliance with the approved QC plan and the IEC Standards. The following tests are the minimum requirement as applicable.

a) Measurement of insulation resistance

b) DC di-electric test

c) Inspection of the completed cable systems;

d) Continuity tests;

e) Voltage test on outer sheath;

f) High voltage withstand test.

g) Any other test

XX. STATION AUXILIARY SUPPLY

This covers the equipment and installation for the 400/230 V low voltage supply system and DC supply system for safe and reliable operation of equipment at power house, headworks Valve chamber etc. tapping connection to valve chamber along with 11 kV terminal poles at valve chamber. 11 kV feeder from local supply cubicle in auxiliary bay shall be connected to 11 kV pole of this line.

Distribution Boards

a) Power House and outside

- One (1) no. of 400 V AC Main Switchboard;
- Two (2) nos. of 400 V unit MCC;
- One (1) no. of 400 V common MCC;
- One (1) Lot AC Sub-Distribution Board for general applications;
- Four (4) nos. Battery Chargers 400 VAC/110 VDC, 180 A DC approximately;
- Two (2) sets of maintenance free sealed type batteries(VRLA) 110 V DC, 700 Ah minimum;
- Two (2) nos. UPS system, 110 V DC /400/230 V AC 50 Hz of suitable capacity as suggested by the bidder.
- One (1) no. 110 V DC Main Switchboard;
- One (1) lot of 110 V DC Sub-Distribution Boards;
- Two (2) sets of 110V/48 V DC to DC Converter

b) Head Works

- One (1) no. of 400 V AC Main Switchboard;
- One (1) lot of 400 V AC Sub-Distribution Boards;
- 110V DC battery / battery charger / 110V to 48V DC to DC converter /110V DC& 48V DC main distribution boards have been envisaged at head works to meet the DC control power requirement at head works, including 48 V DC power requirements for distributed RTU, OLTE, MUX etc. 48V DC power requirement should be ascertained from suppliers of RTU and adaptation works , communication system & SCADA adaptation whereas 110 V DC power requirement for other equipment / gates etc. shall be assumed by the bidder from his experience / established practices.

c) Valve chamber

- One (1) no. of 400 V AC Main Switchboard;
- One (1) lot of 400 V AC Sub-Distribution Boards;
- 48V DC battery / battery charger / 48V DC main distribution board have been envisaged at valve chambers works to meet the DC control power requirements to be ascertained from supplier of emergency closing valves (PTS: Mechanical-Chapter 13), including 48 V DC power requirements for distributed RTU, OLTE, MUX etc. 48V DC power requirement should be ascertained from suppliers of RTU and adaptation works.

d) Camp facility

- 48V DC battery / battery charger / 48V DC main distribution board have been envisaged at camp to meet DC power requirements including 48 V DC power requirements for distributed RTU, OLTE, MUX etc. 48V DC power requirement should

be ascertained from suppliers of RTU and adaptation works, communication system & SCADA adaptation .

The 11 kV overhead line (others scope) from powerhouse to headworks with tap-off at valve chamber shall be provided. At both these locations 11/0.4 kV distribution transformers shall be mounted on poles. LT power requirement at both headworks and valve chamber shall be met through cables/AC main switchboard /Sub-distribution board etc.

General Suitable numbers of galvanized steel pole with insulator set, guy wire, necessary hardware/fittings and accessories shall be supplied and installed for the 11kV distribution line from terminal pole in switchyard of Rahughat power house to the headworks area with tap-off to valve chamber by other contractor of BHEL (TBG). This line gets its power supply through XLPE cables connected on other end to 11kV local supply cubicle (LSC) in auxiliary bay. Further, another 11kV terminal pole shall also be installed in the switchyard. 11kV feeder (XLPE cables) from LSC shall be connected to this 11 kV pole, which shall facilitate further connection to 11kV line to camp. However, supply and stringing of ADSS fiber optic cable on these 11kV poles (for transmission of telemetry/data/communication, control, protection signals etc. to and fro camp/valve chamber/headworks and powerhouse control room/LDC), splicing boxes, terminal equipment and accessories shall also be under the scope of the Contractor. At headworks and at valve house 11/0.4 kV distribution transformers shall be mounted on poles. LT power requirement at both headworks and valve chamber shall be met through cables/AC main switchboard /Sub-distribution board etc. Tapping from 11KV line to BFV and Head works shall be in the scope of contractor.

TEST AT SITE

The routine check during erection works are as follows:

1. For Battery - Voltage measurement on representative cells, Test of capacity, Test of efficiency.

2. For Battery Charger-Construction check, Charging voltage (floating and equalizing), Sequence test, Alarm operation

Additionally test to be done are Visual inspection of the completed installation, Measurement of insulation resistance, Test of control functions and interlocks, Loop check of instrument/control/ alarm circuits, Test of protection relay functions with actual settings.

XXI. GROUNDING SYSTEM & PROTECTION AGAINST LIGHTNING

Riser earthing, its pigtail etc. in the different areas in the entire power plant, valve house, headworks etc. including the interconnections between the earthing systems of different areas, Earthing of machinery equipment & other parts of above ground/above floor main Earthing network is included in this scope. If required, soil resistivity test at head works and dam area shall be done by contractor.

XXII. ILLUMINATION SYSTEM

- Semi underground powerhouse illumination and convenience outlets, Illumination of various Access/Ventilation tunnels, surge shaft, valve chamber etc. Illumination of Surge shaft/Valve Chamber.
- Outdoor post lamps for entrance area of power house/head works/Access and ventilation tunnels etc.;
- Headworks area illumination including intake/de-sander/HRT Intake etc;
- Access roads illumination (provision of street light poles etc.) for at least ½ km to various areas of the project viz., access/ventilation tunnels for valve chamber & surge shaft,

headworks area etc;

- 50 nos. of ceiling fans (or actual as per requirement) shall be provided in powerhouse, control room/switchgear room at headworks & valve chamber etc., where Air Conditioning is not provided.
- The choice of lamps, i.e., incandescent fluorescent, mercury vapour, sodium vapour etc., shall mainly depend on the nature of work & location of installation. Type of lamps/fittings to be used in different areas of the power station.
- Civil works if required shall be done by the contractor within the quoted price.
- Items like saddle, spacer, coupler, junction box, circular box, inspection bend, ball & socket, check nut, adaptor land, epoxy coated saddle spacer set, csk nut bolt, rawl plug, anchor bolt, check nut, screw, aluminum paint, nail clamp, electrical tape, double gland compression gland etc. shall be arranged by the contractor for completion of system.

ELECTRICAL WORK AT HEADWORKS

The works at headworks shall include but not limited to the following:

- Installation of Illumination for 100kVA, 11/0.4 kV transformer station (pole mounted) including MCCB panel, lightning arrestor, HT air break switch and other accessories.
- Installation of lighting distribution board which shall be connected with lighting sub distribution boards at intake, de-sander, HRT intake etc. for general illumination of respective areas as well as specific gates/equipments/component at these sites as per requirements of Lot1: Civil & HM contractor.

ELECTRICAL WORK AT BFV CHAMBER/SURGE SHAFT

The works at butterfly valve chamber and surge shaft shall include but not limited to the following:

- Installation of Illumination for 100 kVA, 11/0.4 kV transformer station (pole mounted) including MCCB panel, lightning arrestor, HT air break switch and other accessories.
- Installation of lighting distribution board getting its supply from AC distribution board at butterfly valve chamber as well as sub-distribution lighting boards (SDLBs) in approach tunnel to butterfly valve chamber. The lighting distribution board shall be installed inside BFV chamber which shall cater to the illumination requirements of BFV, crane and other equipment. The SDLBs installed in the approach tunnel shall be used for general illumination of the tunnel as well as for general illumination of/ and small power requirement at surge shaft including general illumination of outside area at top of surge shaft for which at least two lighting mast shall be installed. The cable/overhead conductor between entrance to BFV chamber and surge shaft can be installed on steel poles.

OUTDOOR EQUIPMENT LIGHTING

- Lighting fixture: Lighting fixture shall be of outdoor, flood type, symmetrical beam spread with built-in ballast.
- Lamp: The lamps shall be of non-colour corrected, high-pressure sodium vapour fixtures, 400 watts, 230 volts and shall have minimum luminous flux of 20,000 lumens with 24,000 hour service life.
- Ballast: The ballast shall be for use with 400 watt lamp, 230 volts, 50 hertz and shall have a 90 percent power factor, 45 decibel sound level.
- Cable: The wiring cable shall be of single core, direct burial and shall be installed

underground or laid in the cable trench except those rising along the steel structure in conduits.

OUTDOOR LIGHTING

- Lighting fixture: The fixture shall be outdoor, post-top, bottom support with built-in ballast.
- Lamp: The lamp shall be of colour-corrected high-pressure mercury fluorescent, 250 watts, 230 volts and shall have minimum luminous flux of 11,000 lumens with 16,000 hour service life.
- Ballast: The ballast shall be for use with 250 watt lamp, 230 volts, 50 hertz .
- Cable: The wiring cable shall be of single core, direct burial and shall be installed underground or laid in cable trench.
- Control panel: The control panel shall be galvanised, outdoor type.

POWERHOUSE LIGHTING

- Normal lighting fixture/boards: All normal electronic fixtures shall be of fluorescent type
- Emergency lighting fixture: The emergency lighting shall be installed in control room/switchgear rooms/service bay/machine hall/near equipment, front & back side of panels in generator & turbine floors/near staircases etc. Connection for emergency lightning shall be taken from lightning boards installed on various floors and at suitable location of the PH.
- Cable and Raceway: All wiring cable shall be of single core and shall be run in conduit.
- Switch and Receptacle: All switches and receptacles shall be flush type and shall be capable to carry a continuous current to the rated capacity.
- Lighting panel: The lighting panels shall be complete with cubicles, bus bar system circuit.
- Convenience outlets. Sufficient number of convenience outlets (wall mounted sockets) of single phase three pin, 16A/32A and three phase five pin, 63A supply shall be provided at appropriate locations of the powerhouse/valve house & headworks control rooms for purification of transformer oil/ repair/maintenance etc.
- Portable socket cubicles: Supplied from a network of sockets distributed throughout the power house.
- Portable Lighting: Heavy duty portable lighting fixtures fitted with fluorescent lamps for maintenance work.

TURBINE /GENERATOR/MACHINE HALL FLOORS

The fixture shall be well set against vibration and shock. The suspension fixtures shall be installed above the overhead travelling crane. In addition to these, four (4) number of metal halide flood light fixtures shall be provided to spot the lights on turbine-generator units.

Appropriate number of fluorescent lighting / metal halide shall also be provided for providing the necessary level of light intensity in front and back of the panels as well as for general lighting.

CONTROL ROOM

The light intensity in the control room shall be variable with appropriate light switches and /or dimmers. Requisite co-ordination and provision of necessary contacts and / or ports for integration of lighting system with plant SCADA system shall be made.

GROUNDING
All electrical equipment shall be effectively grounded.

Other equipments of illumination system for erection

- Lighting Distribution Board – 2200 L x 1200 W x 2200 H
- Street light poles (PS2 and PF2) – 9 M/ 11M- 110nos.
- High mast (30M Height) - 2 nos
- 100mm Dia Hume Pipes (Approx. 500 meters)
- Wire 1x2.5mm2 Cu – 17.5 kms
- Wire 1x4 mm2 Cu – 3.5 kms
- 14 SWG GI wire – 20 kms
- 25x6 mm GI flat– 01 kms
- 50x6 mm GI flat– 01 kms
- GI conduit of sizes from 20mm to 40mm – 20 kms
- Flexible PVC coated conduit – 0.5 kms

Cables for HVAC, illumination system and EOT crane packages to be installed are as given below:

Cable Size	Kms
1CX300 SQMM (XLPE, CU, armoured)	0.5
2CX6 SQMM (XLPE, CU, armoured)	0.5
3CX6 SQMM (XLPE, CU, armoured)	0.5
4CX6 SQMM (XLPE, CU, armoured)	1
3CX16 SQMM (XLPE, CU, armoured)	0.5
4CX16 SQMM (XLPE, CU, armoured)	3
2CX2.5 SQMM (XLPE, CU, armoured)	2
3CX2.5 SQMM (XLPE, CU, armoured)	2
5CX2.5 SQMM (PVC, CU, armoured)	1
12CX2.5 SQMM (PVC, CU, armoured)	2.5
2CX70 SQMM (XLPE, CU, armoured)	0.5
3CX70 SQMM (XLPE, CU, armoured)	0.5
4CX35 SQMM (XLPE, CU, armoured)	3.5

XXIII. COMMUNICATION SYSTEM AND SCADA ADAPTATION

This chapter covers communication equipment for entire plant and its office area including all communication interfacing equipment at headworks (and various other sites of Powerhouse) and Rahughat control room required for telemetering / tele-indication / tele-protection / voice communication / data transfer between process/RTUs, Rahughat control room and Load Dispatch Center (including SCADA Adaptation) situated at Kathmandu.

Communication System The scope of work shall include installation, field-testing and commissioning of communication system with terminal equipment and accessories (Fiber Optic systems/ADSS cable / OLTEs/MUXes as well as communication interfaces) at Headworks and RGHEP Control Room for efficient and trouble-free operation as specified hereunder. ADSS Fibre Optic cable for Headworks / Valve Chamber / Camp shall be installed on 11 kV line poles/cable trenches. Requirement of communication equipments for telemetry, data transmission/acquisition, voice communication, tele-protection, control from LDC etc.

RGHEP to Headworks with tap-offs to valve chamber and camp: ADSS cables on 11 kV line suitably anchored to poles and/or laid in cable trenches / terminal equipment / OFC accessories as well as requisite communication interface at Headworks with SCADA.

XXIV. REMOTE TERMINAL UNIT AND ADAPTATION WORKS

One (1) lot of new RTUs and adaptation works at RGHEP Control room (including distributed RTUs and accessories for communication links between powerhouse & headworks, powerhouse & valve chamber and powerhouse & camp).

The Contractor shall be responsible for the complete installation, wiring, testing, commissioning of the new RTUs, including any required new or parallel connections to NEA's field equipment as described in this Specification, including synchronization with the existing SCADA equipment.

Individual RTUs or distributed RTU at powerhouse / headwork / valve chamber / camp etc. shall be powered by the 48V DC station auxiliary supply system.

XXV. SEGREGATED PHASE BUS DUCT

The scope of works shall cover erection, testing and commissioning, handing over to Employer MV Segregated Phase Bus duct (SPBD) system complete with all accessories for each of the 2 (Two) Nos of 20 MW (plus 10% continuous overload) Generating units as detailed below:

- Segregated phase bus duct assembled between generator terminals and 11 kV Generator Circuit Cubicle complete with seal-off bushings, flexible connectors etc.
- Bus ducts assembly for Generator Neutral side, complete with all the necessary items for neutral formation including flexible connectors.
- CTs in line and neutral side SPBD for relaying and metering scheme.
- Neutral Grounding Cubicles complete with Neutral Grounding transformers, current limiting resistor, Disconnecting switch etc.
- Isolating links in the bus for individual isolation of the GSU Transformer, Exciter Transformer connection and Generator terminal from the SPBD.
- Supporting structures, frames, inserts/plates to be embedded in floors/ceilings/walls, hangers, mounting plates, hardware, expansion joints etc.

Bus duct shall be continuous 3 phase indoor type naturally air cooled type. Material of busbar is copper while material of enclosure shall be aluminium. For brazing/soldering of busbar and its enclosure, consumables such as feeler material, gas etc. is to be arranged by contractor along with its NDT. After completion of bus bar HV test is to be carried out at site for which contractor has to arrange HV kit. Some of the items of bus duct are Bus Enclosures, Bus Conductor, Grounding of Bus Enclosure, Shorting links (If applicable), Bus Support Insulators, Supporting Structures, Seal Off Bushings, Portable Hot Air Blowing Equipment, Space Heater (if required), Wall Frame Assembly, Silica-Gel Breathers, Temperature Indication, Instrument Transformers, Neutral Grounding Transformer Cubicle, Cubicle and Control panel/ Cabinet, Cooling requirement.

2.3 Some more points

2.3.1 Since the present contract is for complete scope of work, In case due to urgency if any erection activity is done by other BHEL Contractor, the value of the same shall be reduced from the contract value.

2.3.2 To give an idea of equipment and project layout, drawings for reference are attached as per **Annexure V.**

2.3.3 Arrangement of suitable capacity of mobile cranes or any other alternative for erection/commissioning of lower pit liner and up to distributor till commissioning of EOT crane shall be in the scope of this contract.

2.3.4 Special welding electrodes for main assemblies like Stay Ring, Top Cover, Pivot Ring, DT Liners, DT Cones, Guide apparatus, major piping works of turbine eg: CW Systems, drainage/dewatering/flood dewatering system etc. shall be provided by BHEL manufacturing units and shall be issued to contractor for subject work free of cost. Contractor shall maintain proper records for all those consumables. Any additional requirements resulting due to reasons namely but not Limited to avoidable wastages, mishandling, poor storage, high rate of rejections due to poor quality of welding or deployment of insufficiently experienced welders etc. shall be arranged by contractor at his own cost within their quoted price for subject work. Feeler wires, inert gas for TIG/MIG welding for pipeline, bus ducts etc shall be in the scope of contractor.

However, In case the electrodes supplied/issued by BHEL are found inadequate/unusable, contractor has to arrange the same from market as per provision SCC 4.1.5 and cost shall be reimbursed on actual basis.

2.3.5 General purpose & structural frame work welding rods shall be arranged by contractor at his own cost.

2.3.6 Electrodes for BOP work like FF system, HVAC, EOT, generator pipe lines, illumination system etc. to be use for pipeline joint welding & structural fabrication shall be arrange by Vendor within the quoted rates.

2.3.7 Insulating materials for stator winding & Rotor assembly shall be provided by BHEL.

2.3.8 First filling of oil for turbine and generator bearings, OPU/ Governing system, and transformers shall be supplied by BHEL. Any undue wastage of oil due to mishandling, poor quality of piping and/or other works resulting into leakages or spillages shall have to be arranged by contractor at his cost or recoverable from him.

2.3.9 NDT: NDT (RT/UT/DPT/MPI) test of all weld joints shall be done in accordance to the drawings. If any permission from the Nepal authority/Local authority is required for conducing Radiography Testing, it is to be taken by the contactor at his own cost. If required, BHEL will assist contractor for getting permission from Nepal Authority.

2.3.10 All the tests including NDT, mentioned in the drawings, scope of work as well as routine tests to be conducted during Erection, Testing & Commissioning, are in the scope of the bidder. Permission from Nepal/local authorities' along with hiring/purchase of the suitable rating test equipment/kit/ external agency (if required) for conductance of these tests is included in the scope of contract within the quoted price.

2.3.11 The equipment and piping shall be erected in conformity with the provision of standard/ specification and as may be directed by BHEL. The method of welding (Arc, gas, TIG 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.

2.3.12 The information provided in above details of work is tentative. There may be chances of some changes during detailed engineering of the systems to suit the site requirement, for which no additional compensation will be payable and contractor shall complete the entire work as detailed in the tender specifications within finally accepted rates/ prices.

2.3.13 Work of E/T/C for Fiber Optical Cable in Powerhouse, PPV house, Dam site etc. shall be in the scope of contractor.

2.3.14 Erection & Equipment GA drawings and documents shall be provided at site to the contractor for erection of work.

2.3.15 Installation of all embedment's incl. foundation/sole plates for Turbine-Generator & their Auxiliaries and BOPs are covered in the scope of this contract.

2.3.16 Erection of 1st stage embedded pipelines, 2nd stage embedded pipelines, oil & water or any other pipelines for all above systems including fabricating/making site bends, cleaning, Acid pickling & preservation, clamping, flushing, hydraulic testing as per drawing requirements and standard practices etc. Pipes shall in general be supplied in straight lengths and to be bent at site as per requirement. For medium and large size pipes, regular bends may not be supplied and therefore bends shall have to be fabricated at site. Pipe routing as shown in the drawing may have to be changed/modified to suit the site condition.

2.3.17 All the pressure vessels/pipes/systems/components, supplied in assembled condition or fabricated/assembled at site, shall be cleaned and tightened and then leakage & pressure tested at 1.5 times of design pressure (unless otherwise specified) in drawing at site before erection/installation. Any minor rectification needed to ensure healthiness for Erection/Testing/Commissioning; same shall be done without any extra cost to BHEL.

2.3.18 The ends of the pipelines shall be kept covered during concreting and/or other civil Works.

2.3.19 Insulation/lagging of the pipelines as per requirements given in the relevant drawings/docs of different systems shall be done at site. Insulation material shall be provided by BHEL.

2.3.20 Painting may also be required on embedded / foundation parts prior to concreting etc. including oil, water, air pipeline and touch-up painting of panels/equipments. Paints for such painting shall be supplied by BHEL.

2.3.21 In order to maintain the time schedule, depending on site condition/ requirement the contractor shall be required to do Stator winding in Generator pit. Necessary temporary platform in generator barrel for winding work etc. shall be arranged by Contractor. The contractor shall carry the work within finally accepted rates/ prices. Special Tools & tackles required for Stator Winding shall be provided by BHEL.

2.3.22 Notwithstanding of the above, and scope of painting mentioned in Chapter X, Part –II of TCC, SCC 6.2.2, final painting of the equipment after commissioning to be done by contractor as per the instructions of BHEL engineer. Paints for final painting shall be supplied by BHEL.

2.3.23 Some of the main tests apart from the routine tests during erection, pre commissioning and commissioning shall include Tan Delta test, HV test, bearing heat run, Over-speed test, SCC, OCC, over-load test, load rejection tests in stages up to 110%, emergency stop tests, turbine & generator output tests, vibration measurement & dynamic balancing etc. on all the units and field efficiency test and type test on one unit. Inspection of the units shall be carried out after load throw-off tests and retightening of wedges, fasteners etc. shall be carried out.

2.3.24 Any other works required to be carried out which have not been explicitly mentioned above but are essentially required to be carried out to complete the individual assemblies and the unit/ units as a whole including pre-commissioning and commissioning.

2.3.25 Details with Weight & Dimension of major equipments supplied by BHEL under this scope are given in TCC. However, changes in design may occur as is usual in such large project, for which no additional compensation will be payable and contractor shall complete the entire work as detailed in the tender specifications within finally accepted rates/ prices.

2.3.26 In view of the tight erection schedule, limited area in service bay and stator/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 may be planned and carried out in store area within the finally agreed price.

2.4 Within the finally agreed price, the contractor under this contract shall provide services of highly skilled, skilled and unskilled persons for a total period of 84 Man-months (MM) exclusively for use by BHEL. This manpower will be required for following services:

a) Highly skilled workers (Qualified computer operators) for office and stores work for 28 man-months,
b) Skilled workers for office, stores, field hostel for 28 man-months
c) Un-Skilled workers for office, stores, field hostel for 28 man-months.

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 later shall have the right to hire such services from other agencies at the risk and cost of the contractor. However, if BHEL does not utilize the man-months as per above provision, fully or partly, recovery

at the rate of the prevailing minimum wages at site for the categories given plus 10% will be made from the final bill of the contractor.

In case of excess man-months of persons required after consumption of 84 man-months, contractor has to provide services of manpower, BHEL will reimburse contractor at the rate of prevailing minimum wage plus 10% for the categories at site.

2.5 Contractor has to deploy within the awarded rates following minimum commissioning engineer and supervisor each for 4 man-months exclusively for working with BHEL commissioning engineers during commissioning.

a) Engineers (Degree Holder) 1 Nos. for total 4 man-months MINIMUM
b) Supervisors (Diploma holders) 1 Nos. for total 4 man-months MINIMUM

If the contractor fails to deploy this minimum man-months (MM), then deduction shall be made from his bills at the rate of NPR 48,000/- per MM for a) and NPR. 32,000/- per MM for b).

2.6 Bidders have to deploy adequate engineers & staff within the awarded rates. Following minimum staff of working experience at Hydro Electric project in the field of powerhouse installation and material handling works shall be provided for as per the plan given by the BHEL site in-charge.

a) Engineers (Degree holders) - 1 nos. or for total 28 man-months
b) Supervisors (Diploma holders) - 1 nos. or for total 28 man-months
c) Welding / NDT Level II inspector - 1 nos. or for total 8 man-months

If the contractor fails to deploy above minimum man-months (MM), then deduction shall be made from his bills at the rate of NPR. 48,000/- per MM for a) above and NPR. 32,000/- per MM for b), c) above.

2.7 Within the finally agreed price, the contractor under this contract shall provide following (Brand new) IT related office equipments progressively as per demand by BHEL Engineer at Site for their use at site till completion of the project. Contractor will also arrange AMC, preferably through local service provider till end of the contract period including extended period, if any :

Sl. No.	Equipment	Quantity
1	Desktop PC with Accessories (Processor Intel I5, RAM 8GB, HDD 500GB TFT 19 7th Generation) Make HP/DELL/LENEVO or equivalent with webcam and speaker	4 sets
2	UPS with Accessories (Prolink 750va UPS or equivalent)	4 sets
3	Printer 3-in-1 (print, ADF, scan, copy) Type Laser, Connectivity: USB 2.0 Wifi Compatibility (32/64 bit) Windows10,8 Page size supported-A4, B5, A5, Legal, Letter, Auto duplex Make Canon/HP or equivalent	1 no.

Note:

The above equipment are the property of the contractor and it shall be required specifically for BHEL use till completion of the project, after which it is to be taken back by the contractor. No separate payment of any type shall be payable for this and should be suitably built up in the bid prices. Consumables like cartridges/papers etc. shall be in the scope of BHEL

3. Facilities in the scope of Contractor/BHEL

Sl. No	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.1	**ESTABLISHMENT**			
3.1.1	**FOR CONSTRUCTION PURPOSE**			
3.1.1.1	Open space for office of BHEL	Yes	No	
3.1.1.2	Open Storage Yard/ Closed Storage shed for storage of E&M Equipment.	Yes	No	Stores area including Open Storage Yard of approx. 2400 sq.m. & tentatively 1 nos. Closed Storage Sheds of approx. 600 sq.m. are planned to be constructed within 7-8 km from Powerhouse.
3.1.1.3	Construction of bidder's office, canteen and storage building including supply of materials and other services	No	Yes	
3.1.1.4	Bidder's all office equipment's, office / store / canteen consumables	No	Yes	
3.1.1.5	Canteen facilities for the bidder's staff, supervisors and engineers etc.	No	Yes	
3.1.1.6	Firefighting equipment's like buckets, extinguishers etc. at PH and stores.	No	Yes	
3.1.1.7	Fencing of storage area, office, canteen etc. of the bidder	No	Yes	
3.1.2	**FOR LIVING PURPOSES OF THE BIDDER**			
3.1.2.1	Open space	No	Yes	
3.1.2.2	Living accommodation	No	Yes	

3.2	**ELECTRICITY**			
3.2.1	**POWER FOR CONSTRUCTION & COMMISSIONING PURPOSE**	No	Yes	The Contractor shall be responsible to provide all step-down transformers, poles, cables and other accessories he will need for supply of power to the construction sites (PH, Valve house, head works, switchyard etc.) at no additional cost to BHEL. Presently electricity supply lines only passing in the vicinity of PH/Switchyard site (11 kV& 33 kV) is extended up to the Powerhouse site from the National Grid of Nepal. However, BHEL will not guarantee availability and reliability of the existing supply system. The Contractor shall keep his own standby supply (diesel generators) in order to ensure non-interrupted construction power as well as to ensure the safety of the works. The locations for installing standby generators arrangement to tap power shall be approved by BHEL/Customer. The Contractor may also arrange construction power from lot 1 Civil & HM Contractor with coordination from employer and engineer. However, the payment for such facilities shall be fixed by mutual agreement between the two Contractors.
3.2.1.1	Payment of electricity consumption	No	Yes	
3.2.1.2	Maintenance of lighting, distribution boards of power at suitable working areas	No	Yes	
3.2.1.3	Providing of the consumables such as sockets, switches, MCCB, bulbs etc.	No	Yes	

3.2.2	**POWER FOR BHEL STORES**			
3.2.2.1	Responsibilities of obtaining connection	No	Yes	Power to be arranged by bidder by getting connection from Nepal authority (NEA), if available or through installation of suitable capacity of DG set by them. BHEL will assist contractor on request, if required.
3.2.2.2	Charges for obtaining connection	No	Yes	
3.2.2.3	Payment of electricity consumption at BHEL Store(s)	No	Yes	Electricity bill raised by power supplier is to be paid by bidder. The bill may include fixed charges, minimum consumption charges, taxes, duties etc.
3.2.2.4	Payment of electricity consumption at BHEL Office in BHEL Store(s)	Yes	No	Energy meter shall be installed by contractor at his own cost for electricity usage by BHEL in office. BHEL shall reimburse the cost of energy/units consumed as per prevailing rates of NEA. However, fixed charges or any other charges shall not be reimbursed by BHEL.
3.2.2.5	Maintenance of lighting, distribution boards of power at suitable working areas	No	Yes	
3.2.2.6	Providing of the consumables such as sockets, switches, MCCB, bulbs etc.	No	Yes	
3.2.3	**POWER FOR BHEL OFFICE**			
3.2.3.1	Responsibility of obtaining connection at BHEL main office including charges for obtaining connection.	No	Yes	Power to be arranged by bidder by getting connection from Nepal authority (NEA). For uninterrupted power if required DG set to be installed by vendor.
3.2.3.2	Payment of electricity consumption/Diesel	Yes	No	Energy meter shall be installed by contractor at his own cost for electricity usage by BHEL in office. BHEL shall reimburse the cost of energy/units consumed as per prevailing rates of NEA. However, fixed charges or any other charges shall not be reimbursed by BHEL.

3.2.3.3	Responsibilities of obtaining connection at BHEL Porta Cabins at POWER HOUSE including charges for obtaining connection and electricity consumption charges.	No	Yes	Power to be arranged by bidder by getting connection from Nepal authority (NEA), if available or through installation of suitable capacity of DG set by them. BHEL shall reimburse the cost of energy/units consumed as per prevailing rates of NEA. However, fixed charges or any other charges shall not be reimbursed by BHEL.
3.2.4	**POWER for the contractor facilities including their office, stores, living accommodation, canteen etc.**	No	Yes	
3.2.5	**POWER FOR OTHER CONTRACTORS OF BHEL**	No	Yes	
3.2.5.1	Payment of electricity consumption	---	---	Contractor on chargeable basis shall provide construction power to other contractor of BHEL at one point.
3.3	**WATER SUPPLY**			
3.3.1	**For construction purposes at PH and other erection sites**			
3.3.1.1	Making the water available at single point	No	Yes	
3.3.1.2	Further distribution to the work sites as per the requirement of work	No	Yes	
3.3.2	**Water supply for the contractor facilities including their office, stores, living accommodation, canteen etc.**			
3.3.2.1	Making the water available at single point	No	Yes	
3.3.2.2	Further distribution as per the requirement of work	No	Yes	
3.3.3	**Water supply for BHEL stores**			
3.3.3.1	Making the water available at single point	No	Yes	
3.3.3.2	Further distribution as per the requirement of work	No	Yes	
3.4	**LIGHTING/ ILLUMINATION AT WORKS SITES**			
3.4.1	Supply and execution of all the necessary materials such as lamps, extension boards, hand lamps, cable etc.): 1. At erection/work site 2. At pre-assembly area	No	Yes	

3.4.2	Lighting for the living purposes of the bidder at the colony / quarters	No	Yes	
3.5	**COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE CONTRACTOR**	No	Yes	
3.6	**COMPRESSED AIR SUPPLY**			
3.6.1	Supply of Compressor and all other equipment's (including pipes, valves, storage systems etc.) required for supply of compressed air at site.	No	Yes	
3.6.2	Installation of the above system, operation, and maintenance of the same.	No	Yes	
3.6.3	Supply of the all the consumables for the above system during the contract period	No	Yes	
3.7	**SECURITY AT BHEL STORES AND WATCH & WARD AT POWERHOUSE.**			
3.7.1	Security at store	No	Yes	One security post at Store with guards/security (hired from security Agency) round the clock 'from & till' material is available at the respective storage location is in scope.
3.7.2	Watch & Ward of the material (erected & under erection) at Powerhouse.	No	Yes	Watch & Ward round-the-clock at Powerhouse, valve house, headworks, other work places is in scope of bidder.

PART II: ERECTION FACILITIES:

Sl. No	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.8	**Engineering works for erection**			
3.8.1	Providing the erection drawings for all the equipment's covered under this scope	Yes	No	**Controlled copy**
3.8.2	Drawings for erection methods	Yes	No	In consultation with BHEL

Sl. No	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.8.3	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	No	Bidder to help BHEL in making as built drawings
3.8.4	Shipping lists etc. for reference and planning the activities	Yes	No	
3.8.5	Preparation of site erection schedules and other input requirements	No	Yes	Bidder to prepare in consultation with BHEL
3.8.6	Weekly erection schedules based on Sl. No 3.8.5	No	Yes	Bidder to prepare in consultation with BHEL
3.8.7	Daily erection / work plan based on Sl. No 3.8.6	No	Yes	Bidder to prepare in consultation with BHEL
3.8.8	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
3.8.9	Visit of the senior official (atleast once in every two months) of the bidder to site to review the progress so that works are completed as per schedule.		Yes	
3.8.10	Preparation of preassembly bay	No	Yes	

Notes:

1. On the discretion of BHEL site Engineer, construction power to BHEL other contractor/vendors shall be provided by contractor on chargeable basis as per 3.2.5 of facility matrix.

2. BHEL will not be responsible for any delay in work and loss or damage to the contractor's equipment because of variation in voltage or frequency or interruptions in power supply.

3. It is the responsibility of the contractor to construct labour colony/temporary sheds for his 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.

4. The bidder shall have to arrange diesel, lubricants & consumables for the DG sets as above within the finally accepted/contract price.

5. Contractor shall lay network of pipelines at his cost to various work spots requiring construction water as above.

6. The said contractor shall also deploy the requisite number of qualified mobile crane operators as per requirement for his scope of work.

7. Provision of distribution lines of electrical power from the central points to the required place with proper distribution boards observing the safety rules laid down by the electrical authorities of the state shall be done by the contractor, supplying all the materials like cables, distribution board, switch boards, TPN, CBS, ELCBS/ MCCBS/ Copper / Brass clamps, copper conductor, change over switches pipes etc. at his own cost. If any failure is caused in supply of the power, 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.

8. The contractor while drawing construction power supply from Distribution Board should strictly adhere to following points.

   a) All electrical installations should be as per Electricity rules.
   b) All distribution Boards installed by the contractor should be constructed with fireproof materials viz. Steel frames, Bakelite sheets etc.
   c) Connection for single phase should be taken from phase and neutral. Nowhere the connection should be taken with earth as neutral.
   d) All electrical connections should be made through connectors, nuts and bolts, switches, plug and sockets. Loose connections or hooking up of wires shall not be permitted.
   e) Contractor have to make their own Earthing arrangement for their equipment / DB Earthing.
   f) All electrical equipment / tools and plants should be properly earthed. DBs to be earthed diagonally opposite at two points.
   g) Contractor should use “MCCB” and “ELCB” either on incoming or outgoing connections to the DBs (if any).
   h) Contractor should ensure that all the CBs / TPNs/ Fuses/ MCCB / ELCB cables etc. should be of adequate rating/ capacity (if any).

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

10. Proper disposal of chemicals/paints etc. to be done by the contractor at his own cost.

11. All floor opening(s)/cut-outs at erection sites should be adequately covered and temporary railings to be installed at the edges of various floors/staircase to avoid accident.

12. If required, additional lighting arrangement such as floodlights, hand lamps and area lighting shall be arranged by the contractor at storage area etc. within finally accepted rates.

13. The Contractor shall be responsible for providing all necessary facilities like residential accommodation, transport, electricity, water, medical facilities etc. at his own cost as

required under various labour laws and statutory rules and regulations framed there under to the personnel employed by him. (As per GoI & GoN).

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

4. T&Ps and MMEs to be deployed by Contractor

Following tentative List of Tools and Plants for Material Handling to be arranged by the contractor at his own cost. It is further to be mentioned here that the list is "Tentative and not exhaustive".

Tools and Plants which are to be carried from India or other country on returnable basis to Nepal, is required to be submitted to IBN and Ministry of Finance (MOF), Nepal through CUSTOMER/WAPCOS for approval. Bidder is to submit details of their T&Ps as per sample format enclosed as **Annexure-III** as part of tender document.

Please note, contractor has to arrange all documents including GR Waiver Certificates from his banker etc. for custom clearance at India/Nepal border entry point. Bidder must be acquainted about this and taken care for time and cost on account of this.

4.1 Tentative List of Tools & Plants for Material Handling

Sl. No.	Item	Qty. (No.)
1	Mobile Crane 55 T	As per requirement
2	Hydra Crane 14 T	As per requirement
3	Trucks 20T/ Trucks 9T	As per requirement
4	Trucks 40T	As per requirement
6	Slings (10, 16, 25, 32, 40, 50 mm)	As per requirement
7	Pulling & Lifting machines 5T (manual/ motorised)	As per requirement
8	Chain Pulley blocks (2T, 5T, 10T)	2 nos. of each lifting capacity
9	D-Shackles & Eye Bolt (2T, 5T, 10T)	4 nos of each load carrying capacity
10	Hydraulic / Mechanical Jacks of various capacities (5-10-20-50)	4 nos of each load carrying capacity
11	Wire Ropes (Dia 16 mm, 20 mm & 25 mm)	As per requirement
12	Fork lift – 3T	As per requirement
13	Manila Ropes / Nylon type lifting belts	10 Nos
14	Turn Buckle (2T, 5T, 10T etc.) & chain shackles	10 Nos
15	Set of Carpenter tools	4 Sets
16	Crow Bar (0.5, 1.0, 1.5 meter)	As per requirement
17	Set of preservatives	As per requirement

18	All general purpose T&P (ropes/hand operated hydraulic testing pump/etc.)	2 Nos each
19	Tarpaulin for covering (3M x 6M)	As per requirement
20	Water Tanker	As per requirement
21	Dewatering Pump	As per requirement
22	Winches	As per requirement
23	Welding Machines	As per requirement

4.2 Indicative List of Tools and Plants for Erection

Sl. No.	Item	Qty. (No.)
1	Double end spanners upto 60mm	4 Sets
2	Ring spanners upto 60mm	4 Sets
3	Hammer 500 gm, 1 Kg, 2Kg, 4 Kg,8 Kg	2 Nos of each type
4	Nylon/ Wooden Hammer/ mallet	4 Nos of each type
5	Box spanner set upto 60 mm	4 Sets
6	Set of Slogging spanner upto 60 mm	2 Sets
7	Torque Wrenches upto 2000 NM	As per requirement
8	Impact Wrench (Pneumatic) upto 2400 NM	As per requirement
9	Chiesel 14mm, 22mm	4 Nos of each type
10	Power slitting machining /Hacksaw 400 mm with blades	As per requirement
11	Electrician Tool Kit	6 Sets
12	Soldering iron (35/ 60/ 125 Watts)	2 Nos (each)
13	Plier 1", 1 1/2"	4 Nos of each type
14	Screw driver set	6 Sets
15	Letter punch A-Z (10mm)	2 Sets
16	Number punch 0-9 (10mm)	2 Sets
17	Chain pulley block 1T, 3Mtr	4 Nos of each lifting capacity
18	Chain pulley block 5T, 3Mtr	4 Nos of each lifting capacity

19	Pull lift 5 T	As per requirement
20	Turn Buckle (2 T, 5 T)	Total 10 Nos
21	Mechanical Jacks (5, 10, 20, 35 T)	4 nos. of each load carrying capacity
22	Hydraulic Jacks (5, 10, 20T)	4 nos. of each load carrying capacity
23	Gas cutting set (Acetylene Cylinder, Oxygen Cylinder cutting set with hose & regulator.	4 Sets
24	Brazing torch set (With oxygen, acetylene cylinder)	4 Sets
25	Compressed air spray painting Unit	2 Nos complete Unit
26	Elco Meter	2 Nos
27	Air hose 16mm dia.	100 m Length
28	Aluminium ladder 4 Mtr length	2 Nos
29	Welding generator (300/ 600 A) with cable & holder	4 nos
30	Air Arc Gouging Arrangement	2 Nos
31	Electrode Oven portable	4 Nos
32	Wire Brush	50 Nos
33	Flat/ round/ triangular/ square/ needle file (assorted)	4 sets of each type
34	Oil stone / oil can	4 nos each
35	Allen key set (MM/ BA/ Inch size - assorted)	4 Sets
36	Crow bar (1.5M, 2.1M)	10 Nos of each length
37	Scissor	2 Nos
38	Leather gloves / Rubber gloves/Cotton gloves	As per requirement
39	Welding Goggles	10 Nos
40	Mobile power boards	10 Nos
41	Set of carpenter tools	4 sets
42	Plumb-with line dori or piano wire	10 sets of each type
43	MIG/ TIG Welding machine with accessories	As per requirement
44	Angle grinder (AG4, AG7, AG9) machine	4 nos of each type
45	Sander (HS7)	4 nos of each type

46	Straight grinder (GQ4, GQ6)	2 nos of each type
47	Flexible shaft grinder (FF2)	2 nos
48	Portable pneumatic drill machine (upto 40 mm)	2 nos
49	Portable electric drill machine (upto 40 mm)	2 nos
50	Firefighting equipment for A,B,C class of fires	10 nos of each class
51	Hydraulic test pump (100 Kg/cm2)with pressure gauge	As per requirement
52	Pipe bending machine for pipe upto 50 mm	2 nos
53	Bench Vice	2 nos
54	Pipe Vice	2 nos
55	Scrapper (Flat/ triangular/ half round)	4 Nos of each type
56	Needle file	4 Sets
57	First Aid Box with medicine	2 Nos
58	Centre punch	4 Sets
59	Hole Punch (assorted size)	2 Sets
60	Portable drilling Machine (Concrete upto 30 mm)	2 Nos
61	Air Compressor with 1 m3 receiver capacity	As per requirement
62	Ultrasonic Testing Equipment with recording facility (For Distributor weld joints and other testing)	1 No (As per requirement)
63	Drilling Machines 1/4", 1/2", 3/4", 1", 1.5”and 2” with tap set	4 Sets
64	Dewatering pump portable type (0.5 HP)	As per requirement
65	Pressure gauges testing & calibration test bed	As per requirement
66	**Precision tools (S No a-d below)** a. 0.02 accuracy block level/Dumpy level with accessories/Theodolite work station. b. Inside micro meter/Outside micro meter of range -0-25, 25/50, 50-75, 75-100, 100-150, upto 700mm c. Vernier calipers range 150, 300 / Telescopic gauge /Slip gauge/Feeler gauges. d. Dial gauge with magnetic stand.	As per requirement

4.3 List of T&P and IMTE for Transformer Erection/ Commissioning

Sl. No.	Item	Qty. (No.)
1	High vacuum insulating oil filter machine	As per requirement
2	Vacuum pump for evacuation of transformer tank	As per requirement
3	Insulation Resistance Tester / Meggar Hand operated 500V / 1000V	As per requirement
4	Insulation Resistance Tester / Meggar Motorised 2500v / 5000v	As per requirement
5	Oil BDV Test Kit 0-100 KV	As per requirement
6	PPM measurement, tan delta & DGA measurement Kit, resistivity kit.	As per requirement
7	Transformer Resistance Test Kit (TTR kit)	1 No

4.4 Indicative List of IMTE`S (Electrical)

Sl. No.	Item	Qty. (No.)
1	Analog multimeter voltage AC/DC 2.5-2500VCurrent, AC /DC-100mA to 10A, Resistance upto 200 Mohm	2 Nos each
2	Clamp-on type Digital AC/DC milliamp meter	2 Nos.
3	Soldering iron (15W, 30W,60W, each) / Soldering Station (50-450 ℃)	1 No.
4	Digital Multimeter 4&half digit	2 Nos
5	Phase sequence indicator (110-450V)	1 Nos
6	Tong tester DC-30/60/300A, AC 50/ 100/ 500/ 1000A	2 Nos each
7	Single phase variac 0-220 V, 8/15A	2 Nos
8	Three phase variac 0-415, 8/15A	2 Nos
9	Hand tachometer(Digital) 0-1500 rpm (Contact & Non-contact type)	1 No. each
10	Digital Handhold Temperature meter	1 Nos
11	Function Generator - Input/ output 220V AC/ 30 V DC, 20 VA	1 Nos
12	A.C. Voltmeter 0-75-150-300-600V	2 Nos
13	D.C. Voltmeter 0-75-150-700-600	2 Nos
14	A.C. Ammeter 0-5-10 Amps.	4 Nos

15	D.C. Ammeter 0-1-2.5-5 Amp.	4 Nos
16	Multi-channel Oscilloscope 20 M HZ	1 No
17	Secondary injection Kit (Omicron CMC356 or higher) with associated peripherals	1 No (As per requirement)
18	Primary Injection Kit- 1000Amp (CT rating would be greater than 10000 A)	1 No (as per requirement)
19	A.C. H.V. Test Kit 0-50/60 KV	1 No
20	Vibration Measurement equipment	As per requirement
21	Partial discharge monitoring	As per requirement
22	U.V. Recorder	As per requirement
23	Stop watch , magnetic compass	2 Nos each
24	Precision Thermometer	2 Nos
25	Sound level meter 150 db.	1 No
26	Null Deflection meter (DC)	1 No
27	Calibrator AC/DC voltage/Current	1 Nos
28	HI-Pot for cable testing > 11kV	As per requirement
29	Temperature measurement system with RTD Measuring stator	1 No Kit
30	Oil Filtration (Lubricating) mounted On Truck/ Along with Prime mover	As per requirement
31	Digital micro/mini Ohm meter (suitable for high inductive loads viz Transformer)	2 Nos
32	Continuity Testers	4 Nos
33	Oil bath with temperature indicators	2 Nos
34	Electronic repair kit with accessories	1 No
35	Power Analyser	As per requirement
37	(DC) Rectiformer	As per requirement
38	Frequency response analyser test kit for SFRA measurements (Megger/FRAX 99)	As per requirement
39	Automatic capacitance & tan delta kit	As per requirement

Note:

1. The above list specifies only major T&P (may not be complete in items or numbers) to be deployed by the contractor. All additional / other tools and plants required for timely and

satisfactory completion of the project/facility shall also be deployed by the contractor within the finally accepted rates/ contract prices.

2. The above items mentioned “as per requirement “are 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/requirement. Contractor will assess actual quantity and period of requirement based on his experience. No recovery will be effected from the contractor, if any of the listed T&P/IMTE mentioned “ as per requirement” is not needed for execution of the work, provided contractor has not utilized BHEL free issued T&P for completing the work.
3. Contractor has to mobilize/maintain adequate numbers of equipment for meeting the work schedule and intermediate milestones as notified by BHEL Engineer. All the tools and plants required for this scope of work are to be arranged by the contractor within the quoted rates during the contract/extended period if any. Any additional T&Ps required for completion of scope is to be arranged by the contractor without any extra cost.
4. Custom Clearance, if any for T&Ps required for execution of the contract, shall be arranged by contractor. However, BHEL shall assist bidder for documentation requirement only to get custom clearance. Custom Duty/BG Charges, if any for custom clearance shall be borne by bidder.
5. 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.
6. Running and operators cost of all T&Ps including Mobile Cranes and material-handling equipments in store shall be in scope of the contractor.
7. The bidder shall have to arrange operator(s), lubricants, consumables, running diesel charges etc. for running the DG sets during scope of works within the finally accepted/contract price.
8. It is the responsibility of contractor to unload the consignments. If the crane deployed by contractor is not suitable to unload the consignments then, it has to be unloaded/handled by sleeper jack or any suitable capacity crane at their own cost. The bidders are required to take note of it while submitting their offer.
9. In View of existing transportation infrastructure in Nepal, the bidder shall have to maintain the buffer stock of all consumables and mandatory spares for repair of T&Ps in sufficient quantity, at site. The contractor has to make provisions of above within the finally agreed price of the contract.
10. In case of any additional T&P as decided by BHEL is required for proper execution of work, contractor will be communicated in writing regarding such requirement by giving 15 days of notice for deployment of the T&P/IMTE etc. The same may also be mutually decided in monthly Form F-14.
11. If the respective work is completed before the schedule deployment period as provided by site, then no recovery/bonus shall be applicable.
12. Other terms and conditions regarding above shall be as per the special condition of the contract clause no. SCC 4.2.1 (T&Ps and MMEs to be provided by the Contractor).
13. Contractor should either set up the field laboratory with facilities required for material & concrete testing, alternatively, all the materials used and proposed to be used for any civil works may be tested in an authorized and accredited laboratory outside and the material test reports shall be furnished to BHEL Engineer before use of material in work.
14. All the tools and tackles/measuring instruments shall be duly tested/calibrated and valid certificate to that effect should be submitted to BHEL site in-charge before the start of work. Measuring Instruments should be re-calibrated as per Latest Standards.

15. If the work related to T & Ps mentioned above is completed then, BHEL can release that T&P during contract period/extended period if any. However, written permission shall be taken by contractor from BHEL construction Manager for releasing the T&P.
16. In case BHEL decides to engage the contractors cranes for any other job then the contractor is bound to operate the cranes with his own operator as per the direction of BHEL engineer.
17. The sleepers are to be taken back by the contractor as is whereas basis. No claim on account of damage /loss shall be payable by BHEL.
18. In case of requirement (given by site), if the T&P is delayed or deployed for shorter period or had abnormal down time and BHEL had to deploy either its own T&P or from outside for completion of work, the recovery shall be done from the contractor. The method of recovery shall be as under:
    I. In case BHEL had to deploy its own T&P, hire charges of T&P applicable for outside agencies as per extant BHEL guidelines for “Hire charges on issue of Capital Tools & Plants” shall be recovered.
    II. In case BHEL had to deploy the T&P from outside, actual hiring cost plus applicable overheads shall be recovered as per GCC.

5. T&Ps and MMEs to be deployed by BHEL on sharing basis

Sl. No.	Equipment	Capacity	Quantity
1.	EOT crane for PH	70/10 T	01
2.	EOT crane for BFV House	15 T	01

Note:

1. Erection of the EOT crane shall be in contractor's scope. The EOT cranes shall be provided free of hire charges and on sharing basis. Routine and regular maintenance shall be in the scope of the contractor for the entire period till handing over of the crane to customer. The said contractor shall also deploy the requisite number of qualified crane operators as per the instructions of BHEL engineer for operation of the crane for his scope of work in connection with Electromechanical works of BHEL. The crane operator may have to work in overtime also depending upon the work conditions for which no extra charge shall be payable to the contractor. The contractor will also provide the EOT crane services (including the operators) to the other contractors working in the powerhouse for civil and mechanical works if required. However, contractor will not be entitled for any compensation due to non-availability of EOT crane.

6. Time Schedule

6.1 Initial Mobilization

After receipt of LOA, contractor shall discuss with Project Manager / Construction manager regarding initial mobilization. Contractor shall mobilize necessary resources within **04 weeks of issue of LETTER OF AWARD** or **as per the directive of BHEL**. Such resources shall be progressively augmented to match the schedule of milestones and commissioning. However, BHEL Engineer will certify the actual date of start of work (ZERO DATE) after adequate mobilization of manpower, material handling equipment and other T&P by the contractor.

6.2 Augmentation of Mobilization

Contractor shall subsequently augment his resources in such a manner that daily activities shall be completed on daily basis and the entire work is completed within the time schedule/contract period. Mobilization of contractor's resources shall be made and augmented from time to time in such a manner that the work in scope is carried out in an uninterrupted manner.

6.3 Commencement of Contract Period and Tentative Schedule

The Contract period shall be considered as 28 (Twenty eight) months from "The Start of Contract Period" (ZERO DATE)

BHEL Engineer will certify the actual date of start of work (zero date) after the following:

a) Adequate mobilization of manpower, T&P, other pre-requisites
b) Furnishing of security deposit by contractor as per Cl. 1.10 of GCC
c) After the contractor gets registered with the local authorities in Nepal, if required.

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:

Sr. No.	MAJOR MILESTONE	Completion in days after commencement Date (zero date)
1	Completion of erection of turbine and all associated equipment ready to start the next civil works stage for Unit No.1	60
2	Completion of erection of turbine and all associated equipment ready to start the next civil works stage for Unit No.2	110
3	Completion of Installation, testing and commissioning of power house Crane	170
4	Completion of stator & rotor along with lower & upper brackets and embedment for Unit No.1 at site	210
5	Completion of stator & rotor along with lower & upper brackets and embedment for Unit No.2 at site	250
6	Completion of Installation of cooling water system, oil pressure system, drainage system, compressed air systems, measurement system for hydraulic parameters etc.	285
7	Completion of installation of GSU transformers and all associated systems and equipment.	340
8	Completion of installation of 11 kV generator circuit cubicles.	535
9	Completion of installation station auxiliary supply system at powerhouse/ head works/ BFV chamber/ camp.	585
10	Completion of installation of control, automation and protection system along with RTUs and communication equipment as well as establishment of data/communication/ protection link between PH control room/ LDC Kathmandu/ headworks/ BFV chamber/ camp/ Dana & Kushma sub-	635

	stations etc.	
11	Completion of installation of generating Unit No.1 along with brushless exciting system and associated equipment/ auxiliaries as well as Boxing up of Generating Unit No.1	660
12	Completion of installation of generating Unit No. 2 along with brushless exciting system and associated equipment as well as Boxing up of Generating Unit No.2	795
13	Completion of Dry testing and Pre commissioning tests on Generating Unit No.1	805
14	Completion of Dry testing and Pre commissioning tests on Generating Unit No.2	815
15	Completion of Spinning/ Commissioning/ Synchronization of Generating Unit No.1	825
16	Completion of Spinning/ Commissioning/ Synchronization of Generating Unit No.2	840
17	Completion of Works to allow the Issue of Taking-Over Certificate by the Engineer	840

The number of days in above schedule are from the start of contract period (zero date). Scheduled duration is 28 months (Twenty-Eight months) from Zero date. Successful tenderer shall prepare detail schedule after discussion with BHEL.

There is provision of penalty in case of slippage of milestones mentioned above as following:-

a. 0.25% of amount for the relevant works (major milestones) as per price schedule for each day of delay.
b. In the event of the contractor completing the whole work within the authorized time for completion, such amount recovered from the contractor for not achieving the individual milestones shall be refunded to the contractor.
c. Delay damage for the whole of the Works shall be 0.05% per day in the currencies and proportions in which the Contract Price is payable.
d. The maximum amount of the delay damages including delay damages for not achieving the individual milestones shall be limited to 10% of the Contract Price.
e. In case of termination of contract due to any reason attributable to contractor before completion of work, the amount already withheld against slippage of milestone shall not be released and be converted into recovery.

6.4 Contract Period

The contract period for completion of entire work under scope shall be 28 (Twenty-Eight) MONTHS from the "START OF CONTRACT PERIOD (ZERO DATE)" as specified above.

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

6.5 Completion of Works

The generating units may be required to operate continuously as a trial run at rated speed and rated output for a period of seventy-two (72) hours. Any interruption during this trial run shall be deemed as a failed test and full repetition shall be performed. After successful completion of this trial run the units shall be required to operate under the

working conditions of the station within the limits of output specified, either continuously or intermittently, as may be more convenient for the Employer, without failure or undue interruption, of any kind, resulting from defect of equipment supplied under the Contract, for a reliability test period of one (1) month.

The scope of work under this contract is deemed to be completed, when so certified by the BHEL Engineer.

(As per scope of work) After commissioning contractor has to provide skilled man power for the following:

- The generating units may be required to operate continuously as a trial run at rated speed and rated output for a period of seventy-two (72) hours
- Reliability test period of one (1) month
- Field acceptance test.

6.6 Guarantee Period

Guarantee period of 24 months (Performance Guarantee for Workmanship) will commence from the date of completion of the respective generating unit as per GCC 2.24.

As per BHEL contract with customer, after commercial operation date (COD), BHEL shall have to operate the plant for 1 (one) year as per requirement & programme of the customer and as per the grid conditions. BHEL shall be responsible for proper operation and maintenance of whole plant during this period. Contractor has to provide assistance to BHEL required for the above purpose.

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7. Tentative Weight Schedule

7.1 Tentative weight of equipment for material handling shall be approx. 2162 MT. Detail package weight and quantity are enclosed as **Annexure- I**

7.2 Tentative Weight & dimension of major components are enclosed as **Annexure- II.**

7.3 Weights mentioned for the above items are tentative and may change during detail design. The contractor shall have execute the actual weight required for completion of the system in the finally agreed rate.

7.4 Number of Panels, size and weight for Control & Monitoring system, excitation system, protection system, starter panels, LTAC system, etc. are likely to change during detail design.

7.5 The payment will be made at the quoted/accepted rates for tonnage actually handled.

8. Rate Schedule & BBU:

8.1 Rate Schedule:

a. Contractor shall fully understand equipment description and Scope of Work including Notes, Inclusion and Exclusion before quoting. The scope of work and responsibility of the contractor as mentioned under these specifications shall be covered within the quoted rates.
b. The bidder has to quote his price keeping in to consideration the facilities and T&Ps as specified in TCC Part-I & II.
c. Bidders shall quote **Prices in NPR** (Nepalese currency) for all the items and bids shall be evaluated accordingly.
d. Since the job shall be executed at site, bidders may 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.
e. The tenderer shall quote Total Price for entire scope of works under this tender in **Part-I: Rate Schedule** only. No cutting/ erasing / over writing shall be done.
f. Evaluation of bids shall be done on Total Price (A) against the above Rate Schedule only.
g. In case of Price discrepancy, the same will be dealt as per clause No. 1.4 of GCC.

PART-I: RATE SCHEDULE	
DESCRIPTION OF WORK	**TOTAL PRICE (A) (in NPR) (In Figures and Words)**
Total Price ('A') for the work as per tender specification for "Material Handling And Erection, Testing & Commissioning Of E&M Package For 2x20 MW Rahughat HEP, Nepal**".**	

Note:

1. Incomplete offer received may not be considered for the subject work.
2. Bidder's quoted price above shall be completed in all respect for the full scope defined in specification and in accordance with all terms & conditions of tender.
3. Contractor shall fully understand the description and specifications of items/work scope mentioned in the TCC.
4. In case of any mis-match in rate and amount on price discrepancy, the same will be dealt as per clause no. 1.4 of GCC.
5. Taxes (VAT) shall be payable extra as per relevant clauses in Technical Conditions of Contract.

The Total price (A) quoted in the Part-I: Rate Schedule shall be broken up and allocated against different items in the Part-II: Rate Schedule below:

PART-II RATE SCHEDULE				
Item No.	**Brief description of work**	**Quantity**	**Unit Rate**	**Total Price in NPR**
1	Lumpsum Price for Erection, Testing & Commissioning packages as per scope (approx. material is 1537.5 MT).	1 Set	Not Applicable	80% of (A)
2	Material handling for entire scope of work as defined in this tender specification in respect of receipt, unloading of material/equipment from Truck/Trailers etc. at project stores, its verification, proper storage, stacking, preservation and transportation of material incl. loading from project stores to Powerhouse or other work sites and unloading by EOT Crane/Mobile Crane and handing over for erection.	2062 MT	$\frac{19.5\% \text{ of A}}{2062 \text{ MT}}$	19.5% of (A)
3.	Material handling for entire scope of work as defined in this tender specification in respect of receipt, unloading of materials/equipments from Truck/Trailers with EOT crane/mobile crane/own arrangement directly at Powerhouse or valve house , its verification, proper storage, stacking and preservation of materials/equipments (for the materials received directly at working site from units)	100 MT	$\frac{0.5\% \text{ of A}}{100 \text{ MT}}$	0.5% of (A)

Note:

1. For Item No. 1 above, Lumpsum price is allocated and it will not be changed in case of quantities variation.
2. However, the quantities indicated against Item No. 2&3 are tentative and are liable to vary depending upon the site requirement. The contractor has to handle/provide services for the actual quantities as per advice of BHEL Engineer. The final contract price shall be adjusted on the basis of quantities actually to be handled at site & payment will also be regulated for the same as per clause GCC 2.14. The contractor confirms that total price quoted above takes care of such variations during execution stage.

8.2 Billing Break Up (BBU)

Billing Break-Up (BBU) for Erection, Testing & Commissioning work (Item No. 1, Part-II: Rate Schedule) of 2x20MW Rahughat HEP:

BILLING BREAK UP 2X20 MW RAHUGHAT HEP, NEPAL					
SL. No.	ACTIVITY	TOTAL (% of E,T&C contract value as in rate schedule Item No.1)			
		U#1	U#2	COMM.	Total
		(%)	(%)	(%)	(%)
A.	**EOT CRANES**				
1	Erection of embedded parts, rails and DSL fixing upto Service Bay for EOT cranes of Powerhouse (70/10MT)			0.25	0.25
2	Erection of EOT crane in Service bay (70/10MT)			1	1
3	Load testing of EOT crane in Service bay (70/10MT)			0.5	0.5
4	Erection of embedded parts, rails and DSL fixing beyond Service Bay up to end (70/10MT)			0.25	0.25
5	Erection of embedded parts, rails and DSL fixing for EOT crane in BFV house (15MT).			0.25	0.25
6	Erection of EOT crane in BFV house (15MT).			0.5	0.5
7	Load testing of EOT crane in BFV house (15MT).			0.25	0.25
B.	**TURBINE AND ITS AUXILIARIES**				
1	Erection of Pipes and Embedments in first stage	0.25	0.25		0.5
2	Installation of Lower Pit liner	0.5	0.5		1
3	Installation of Central frame work	0.25	0.25		0.5
4	Erection of Pipes & Embedment in second stage	0.25	0.25		0.5
5	Completion of Field efficiency embedded tubing/piping.	0.25	0.25		0.5
6	Installation of bearing housing with Turbine housing	0.5	0.5		1
7	Installation of distributor and its welding including NDT and SR	1.5	1.5		3
8	Pressure testing of distributor	0.5	0.5		1
9	Installation of Nozzle assemblies	0.5	0.5		1
10	Assembly of deflector servomotor and link mechanism	0.5	0.5		1
11	Assembly of Guide bearing	0.5	0.5		1
12	Assembly of runner and Shaft	0.5	0.5		1
13	Installation of OPU with N2 bank & Piston Accumulator of Governor & MIV.	0.5	0.5		1
14	Installation of Oil pipelines for Governor etc.	0.25	0.25		0.5
15	Lowering of MIV inlet pipe, reducer and its welding with penstock including NDT and SR	0.5	0.5		1
16	Installation of MIV on its Foundation, assembly of Lever, counter-weight, By-pass valve etc.	0.75	0.75		1.5
17	Installation of MIV outlet pipe with dismantling joints	0.25	0.25		0.5

18	Installation of Oil pipelines for MIV	0.25	0.25		0.5
C.	**GENERATOR AND ITS AUXILIARIES**				
1	Dressing of stator and bottom bracket foundation and installation of its sole plates.	0.25	0.25		0.5
2	Assembly of wound stator segments in service bay/Pit.	0.5	0.5		1
3	Laying of jointing winding bars	0.5	0.5		1
4	Laying of busring connector and Laying of jumper connections	0.5	0.5		1
5	Completion of Brazing & Final HV test of Stator Winding in S/B.	0.5	0.5		1
6	Lowering of Wound Stator assembly in pit	0.5	0.5		1
7	Levelling of rotor rim building stools and placement of spider at S/bay.	0.5	0.5		1
8	Rotor rim building including final pressing	0.5	0.5		1
9	Assembly of rotor poles and its interconnections, CC leads etc. including HV testing.	0.5	0.5		1
10	Lowering of Rotor assembly in pit.	0.5	0.5		1
11	Assembly of Lower (Bottom) bracket & Brake jack assembly in S/bay.	0.25	0.25		0.5
12	Lowering of Lower (Bottom) bracket in pit, its levelling centering etc.	0.25	0.25		0.5
13	Brake jack oil piping, air piping and instrumentation.	0.25	0.25		0.5
14	Assembly of Thrust bearing and Top Guide Bearing.	0.5	0.5		1
15	Testing and installation of Bearing (UGB & LGB) Oil coolers.	0.25	0.25		0.5
16	Assembly of Top (Upper) bracket in service bay, its lowering in position, centering, levelling.	0.75	0.75		1.5
17	Completion of cooling water piping for Generator.	0.5	0.5		1
18	Installation of Generator Fire Fighting system (CO2 system)	0.5	0.5		1
D.	**ELECTRICAL SYSTEMS**				
1	Placement of 26 MVA three phase GSU Transformers on its foundation at switchyard.	1	1		2
2	Installation of LV & HV bushings.	0.25	0.25		0.5
3	Oil filtration & oil filling in GSU transformers, instrumentation and readiness for charging.	0.25	0.25		0.5
4	Installation of Bus Duct incl. CTs, VTs, LAVT, GCC,NG cubicles.	1	1		2
5	Installation of brushless Excitation System and transformer.	0.5	0.5		1
6	Installation of station service Transformers.	0.5	0.5		1
7	Installation of isolation transformer ,station service transformer in headworks and valve house along with tap off from 11kv line.			1.5	1.5
8	Installation of Cable tray for power, control, instrumentations cables in Powerhouse.	1	1	1	3
9	Cable laying for power, control, instrumentations cables in Powerhouse.	1	1	1	3
10	Installation of cable tray at sites other than Powerhouse like BFV, Surge shaft, Dam site etc.			0.5	0.5

11	Laying of cables at sites other than Powerhouse like BFV, Surge shaft, Dam site etc.			0.5	0.5
12	Laying of ADSS Optical fibre cable between Power House and Valve house , Dam & Camp.			2	2
E.	**OTHER COMMON SYSTEMS**				
1	Installation of Penstock protection /Butterfly valve.			1.25	1.25
2	Assembly of Counter-weight and Servomotors of PPV.			0.5	0.5
3	Welding of PPV inlet and outlet pipe with Penstock ferrule.			0.5	0.5
4	Installation of OPU with N2 bank & Piston Accumulator and panels at PPV house.			0.5	0.5
5	Water and Oil pipeline in PPV house.			0.5	0.5
6	Erection of Unit LP compressors ,receivers, dryer etc.			0.75	0.75
7	Erection of Unit LP compressed air system piping.	0.5	0.5		1
8	Erection of service air piping.			1	1
9	Installation of Cooling water system Pump, strainers, heat exchanger etc.	0.75	0.75		1.5
10	Installation of Cooling water system piping & C&I.	1	1		2
11	Installation of DC system (Battery Banks, DCDB/ACDB, Battery chargers, Inverter panels etc.) at Powerhouse.			1	1
12	Installation of DC system (Battery Bank, DCDB/ACDB, Battery chargers, Inverter panels etc.) at PPV house, Dam & Camp site.			0.5	0.5
13	LTAC/ AC Auxiliaries system at PH, head works, valve house.	0.5	0.5	1	2
14	11Kv Switchgear with accessories.			0.5	0.5
15	Installation of Fire detection and fire-fighting system at various floors (Turbine floor, control; room, Generator floor etc.) in Powerhouse.	0.5	0.5	0.5	1.5
16	Installation of Fire detection and fire-fighting system for GSU in switchyard	0.5	0.5		1
17	Installation of Fire detection and fire-fighting system for headworks, BFV house etc.			0.5	0.5
18	Installation of borewell pumps along with its boring.			1.5	1.5
19	Laying of pipe lines from borewell to overhead tank and to power house			1.5	1.5
20	Installation of HVAC system at various floors of Powerhouse.			3	3
21	Installation of HVAC system at PPV house.			0.5	0.5
22	Installation of HVAC system in Headworks.			0.5	0.5
23	Installation of Illumination system at powerhouse.			1	1
24	Illumination of various Access/Ventilation tunnels, surge shaft, valve chamber etc.			1	1
25	Headwork area illumination including intake/de-sander/HRT Intake etc			0.5	0.5
26	Access roads illumination (provision of street light poles etc.) for access/ventilation tunnels for valve chamber & surge shaft, headworks area etc;			1	1

27	Installation and commissioning of Lubricating Oil & Insulation Oil filtration system.			0.5	0.5
28	Installation of SCADA, Control & Monitoring panels in Powerhouse and other sites	0.5	0.5	0.5	1.5
29	Installation of SCADA, Control & Monitoring panels at Dam site, valve house.			0.5	0.5
30	Protection system for Generator and Transformers with wiring & cubicles	0.5	0.5		1
31	Installation of equipment of Mechanical/Electrical Workshop.			0.5	0.5
F.	**UNIT ALIGNMENT & BOXING UP**				
1	Coupling of Generator Top & bottom shaft with Rotor	0.5	0.5		1
2	Coupling of Turbine shaft with Generator shaft.	0.5	0.5		1
3	Rotor levelling and Combined unit axis alignment	0.75	0.75		1.5
4	Boxing-up of Turbine Bearing	0.5	0.5		1
5	Boxing-up of Generator Bearings	1	1		2
6	Boxing-up of Unit	1	1		2
7	Painting of equipment	0.5	0.5	0.5	1.5
G.	**UNIT SPINNING, TESTING, COMMISSIONING**				
1	Spinning of the unit	0.5	0.5		1
2	Mechanical Bearing-run/Heat -run of the unit	0.5	0.5		1
3	Synchronization of the unit	0.5	0.5		1
4	Full loading, Load throw of the unit and 72 hours trial run	0.5	0.5		1
5	Operation acceptance of the unit	0.5	0.5		1
6	Field Efficiency Testing in one Unit.			0.5	0.5
	TOTAL	**34**	**34**	**32**	**100**

Note: If desired, further Break-up of BBU can be jointly prepared & agreed between the successive bidder and BHEL construction manager at site.

9. Terms of Payment

9.1 Payment of Final agreed amount shall be in NPR through BHEL account maintained in Nepal through e-payment system directly in the accounts to be opened in Nepal by contractor and as per details furnished by the contractor in the relevant annexure. It is contractors responsibility to open INR account in Nepal. Bank Charges and/or conversion charges upto payee account will be borne by contractor.

9.2 The bids have been invited in NPR (Nepalese Rupees) and shall be evaluated accordingly.

9.3 For conversion the currency, 1 INR (Indian Rupees) = 1.6 NPR (Nepalese Rupees) and vice versa shall be considered.

9.4 All payment shall be released subject to Reserve Bank of India guidelines and guidelines issued by Nepal Authority.

9.5 Retention amount shall be withheld from each RA bill as per provision of clause 2.22 of GCC.

9.6 The Contractor shall be paid on monthly basis for actual Quantity and Percentage measured as per Terms of Payment as certified by the BHEL Engineer in the Measurement Book up to end of the calendar month on prorate basis.

9.7 As per instructions of BHEL site engineer and or due to space constraint at service bay/power house /work site, some of the assemblies, devices like the Stator/rotor lifting devices, hydraulic test device , other T&P may require multiple handling for shifting from power house/work site to BHEL stores and stores to power house /work site. This shall be responsibility of contractor and charges for such material shall be applicable as per 9.11.2 d) as below of Part-II of Rate schedule.

9.8 In order to facilitate part payment, BHEL Site Engineer at his discretion may further split the contracted rates/percentages to suit site conditions, cash flow requirements according to the progress of work as per GCC 2.23.1.

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

9.10 Interest bearing recoverable advance: NOT APPLICABLE (refer clause No. 2.13 of GCC).

9.11 PROGRESSIVE PAYMENT SHALL BE RELEASED ON PRORATA BASIS:

ETC Works- Price for Erection, Testing & Commissioning package shall be payable as per BBU.

Material Handling works- Payable with per MT rate for measured tonnage, as per Terms of Payment. The 'Rate per MT of materials' shall be paid on completion of the activities as mentioned below against relevant Item Nos. on pro-rata basis.

9.11.1 Item No. 1 of Part –II of Rate Schedule

Price shall be payable as per Billing Break-up at **Clause 8.2, Chapter-VIII Rate schedule/BBU of TCC Part-I.**

9.11.2 Item No. 2 of Part –II of Rate Schedule

a) **20%** of the Unit Rate shall be payable on prorate basis after the materials are safely unloaded by using Hydra/Mobile Cranes of contractor, shifted to closed stores/open

storage yard (if required) 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 Engineer.

b) **30%** of the Unit Rate shall be payable on prorate basis after verification, safekeeping/ stacking/re-stacking 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 details in material stock registers, submission of reports as per Material Management forms/specified formats for shortage/open delivery, lodging of police reports, if required, documents for insurance claims etc., and preparation of material receipt certificates in **prescribed formats where ever applicable, within 04 week from receipt of material failure of which 20% of 30% shall be forfeited as certified by BHEL Engineer. Required Proforma shall be provided by site.**

c) **10%** of the Unit Rate shall be payable on prorate basis on preservation till these are transported to power house/work site.

d) **40%** of the Unit Rate shall be payable on prorate basis for transportation of materials including packing (if required) and loading in trucks/trailers from project open store/ closed storage shed to power house, customer store or other work site, and unloading with EOT crane/Mobile crane for further handing-over to erection contractor/customer.

9.11.3 Item No. 3 of Part –II of Rate Schedule

a) **75%** of the Unit Rate shall be payable on prorate basis after the materials are safely unloaded by using EOT Crane by contractor, stacking 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 Engineer.

b) **25%** of the Unit Rate shall be payable on prorate basis after verification, safekeeping/ stacking/re-stacking, preservation 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 details in material stock registers, submission of reports as per Material Management forms/specified formats for shortage/open delivery, lodging of police reports, if required, documents for insurance claims etc., and preparation of material receipt certificates in **prescribed formats where ever applicable, within 04 weeks from receipt of materials failure of which 20% of 25% shall be forfeited as certified by BHEL Engineer. Required Proforma shall be provided by site.**

9.11.4 Total weight of the materials to be handled will be **approximately 2162 MT**. Refer TCC for details.

a) **The total weight of the material to be handled is tentative and may vary during detail design.**

b) Rate for transportation of materials / equipment's including loading either of the project open store/closed storage shed/other storage area to Powerhouse/other work area(s), unloading with EOT Crane/Mobile Crane and handing over for erection, will be same. Contractor has to build the price for above impact in their quoted price.

c) Entire material handling for all materials will be the responsibility of contractor.

d) Some materials may be required to be dispatched back from Site to Manufacturing Units, other sites or any other place, the contractor may be asked by the engineer to get the same packed, loading on to the truck for further dispatch. The payment rate schedule 9.11.2 a) only shall be applicable for this activity.

e) In case of unavailability of EOT crane for any reason, Mobile crane/Hydra required for material handling in Powerhouse/ work site shall be arranged by contractor at his own cost. No additional payment will made for arranging Mobile crane/Hydra etc.

f) 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.

g) **2% of billed value shall be deducted from the material handling bills on non-compliance of the following**

i. **1% for removal of grass/weed and other plant growth in the storage area.**
ii. **1% for complying safety, housekeeping, illumination etc. in the storage area.**

10. Taxes & Other Duties

10.1 Price quoted should be inclusive of all applicable Taxes/charges but **Excluding Value Added Tax (VAT) in Nepal.** The Contractor shall be responsible to pay all other taxes, fees, royalty, commission etc. which may be levied on the contractor in executing the contract as per prevalent laws at Nepal and compliance to all local regulations. In case BHEL is forced to pay any of such taxes, it shall be recovered from Contactor's bills or otherwise as deemed fit.

10.2 Value Added Tax (VAT) in Nepal shall be payable extra as per followings:-

a) The Contractor is required to get registered with Tax Authorities of Nepal and shall submit to BHEL documentary evidence for such registration.

b) The Contractor has to submit VAT compliance invoice as per prevalent VAT laws in Nepal. Any denial of input credit to BHEL or arising of any tax liability on BHEL due to non-compliance of VAT Laws of Nepal by the contractor in any manner, will be recovered along with liability on account of interest and penalty (if any) from the payments due to the contractor

c) The Contractor may be required to submit documentary evidence for deposit of VAT with tax authorities as per prevalent laws in Nepal.

d) The Contractor shall be solely responsible for discharging his VAT liability as per prevalent VAT laws in Nepal and BHEL will not entertain any claim of VAT/Interest/penalty or any other liability on account of failure of contractor in complying the provisions of VAT laws in Nepal or discharging the VAT liability in a manner laid down thereunder.

e) The Contractor shall obtain prior written consent of BHEL before billing the amount towards such taxes. Where prevalent VAT laws in Nepal permit more than one option or methodology for discharging the liability of tax/levy/duty; the contractor shall approach BHEL before choosing any option to discharge his tax liability. BHEL shall have the right to direct the contractor to adopt the appropriate option considering the amount of tax liability on BHEL/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.

10.3 TDS / Withholding Tax as applicable as per prevalent Laws in Nepal shall be deducted.

10.4 For plant and equipment manufactured inside Nepal, all taxes and duties as applicable for destination site/state on all items of supply from Contractor are included in the Contract price.

10.5 Octroi /entry tax as applicable for destination site on all items of supply including bought-out finished items, which shall be dispatched directly from the sub-vendor's works (within or outside Nepal) to the Project site is included in the Contract price.

10.6 In case of local supplies, all Customs duties/Bhansar and Levies, Excise Duties, Sales Tax payable on raw materials, components, sub-assemblies and any other items used

for their consumption or dispatched directly to the BHEL / Customer from their sub-Contractor (i.e. sale-in-transit) is included in the Contract price and any such taxes, duties, levies additionally payable will be to Contractor's account and no separate claim on this behalf will be entertained by the BHEL.

10.7 If any plant and equipment required to complete the facilities, is manufactured outside Nepal, the Contractor shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside the Nepal.

In such case, Customs duties/ Bhansar on the equipment and materials covered in the Contract to be imported into Nepal against BHEL / Customer's Import License and which will become the property of the BHEL / Customer under the Contract, shall be to the contractor's account and shall be paid directly by the Contractor to Government of Nepal or concerned authorities. Bidders are requested to consider exemptions as per Hydro Development Policy of Nepal 2001 which is available at www.doed.gov.np

10.8 Except as otherwise specifically provided in the Contract, the Contractor shall bear and pay all taxes, duties, levies and charges assessed on the Contractor, its Sub-Contractors or their employees by all municipal, state or national government authorities in connection with the plant and equipment supplied in and outside of the country where the Site is located.

10.9 If any tax exemptions, reductions, allowances or privileges may be available to the Contractor in the country where the Site is located, BHEL / Customer shall use its best endeavors to enable the Contractor to benefit from any such tax savings to the maximum allowable extent. However, in the event of failure on part of the contractor same shall not be compensated on this account by BHEL.

10.10 For payment/reimbursement of Value Added Tax or any other tax included in the contract price, in respect of dispatches made directly from Contractor's Works, invoices raised by the Contractor shall be accepted as documentary evidence.

10.11 For the purpose of the Contract, it is agreed that the Contract Price specified in Letter of Award/ Contract Agreement is based on the taxes & duties, levies and charges prevailing at the date twenty eight (28) days prior to the last date of bid submission in the country where the site is located (hereinafter called "Tax" in this GCC Sub –Clause). If any rates of Tax are increased or decreased, a new Tax is introduced, an existing Tax is abolished, or any change in interpretation or application of any Tax occurs in the course of the performance of the Contract, which was or will be assessed on the Contractor in connection with performance of the Contract, an equitable adjustment of the Contract price shall be made, subject to documentary evidence, to fully take into account any such change by addition to the contract price or deduction there from, as the case may be.

These adjustments would be applicable to direct transactions between BHEL and the Contractor as well as on finished bought-out items (Sale-in-transit) supplied directly by the sub-vendor to BHEL but shall not be applicable on procurement of raw materials, intermediary components etc. by the sub-vendor and Contractor.

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

Such adjustment in tax liability will only be with respect to the values and rates quoted by the bidder in relevant Schedules.

10.12 The Contractor shall be solely responsible for the taxes that may be levied on the Contractor's persons or on earnings of any of his employees and shall hold BHEL indemnified and harmless against any claims that may be made against BHEL / Customer. BHEL does not take any responsibility whatsoever regarding taxes under the Income Tax Act of Nepal, for the Contractor or his personnel. If it is obligatory under the provisions of the Income Tax Act of Nepal, deduction of Income Tax at source shall be made by the BHEL.

10.13 The admissibility of VAT, taxes and duties referred in this chapter or elsewhere in the contract is limited to direct transactions between BHEL & its Contractor. BHEL is not responsible for any liability that may arise due to any transaction beyond the direct transaction between BHEL & its contractor.

10.14 The contractor should submit its invoices in such a manner enabling BHEL for availment of Input Tax Credit of all the taxes whether included or excluded in the contract price, wherever applicable. Any denial of input credit to BHEL or arising of any tax liability on BHEL due to non-compliance of any Applicable Tax Laws in Nepal by the contractor in any manner, will be recovered along with liability on account of interest and penalty (if any) from the contractor.

11. Any Other requirement

11.1 In case the contractor opts to furnish Bank Guarantee (BG) as a part of Security Deposit, the BG shall be issued preferably through any of the Schedule Bank in India. The BG may also be accepted from Foreign Bank at the sole discretion of BHEL, provided the BG is duly endorsed by any of the Indian Schedule banks. In case of foreign contractor the BG if issued by a foreign bank the same should be counter guaranteed by Schedule A bank in Nepal. The original BG should be forwarded to BHEL by the bank itself through registered post.

11.2 Security Deposit amount as per GCC 1.10 can also be accepted in equivalent NPR.

11.3 Unless otherwise provided in the Contract, all amount payable or acceptable in NPR.

11.4 **For conversion the currency, 1 INR (Indian Rupees) = 1.6 NPR (Nepalese Rupees) and vice versa shall be considered.**

11.5 The contractor in the event of execution of works, shall adhere to the law and the local provisions regarding the license to carry out an industrial activity, the conditions for employment of national and expatriate staff, import license for equipments and materials, use of radio-telephone, etc. The Contractor will fulfill the obligations arising, even indirectly, from the decisions or orders of the Public Authorities and regulations established by the Client. The provisions regarding safety of the labor, policy of hazardous, unhealthy or inconvenient establishments and hygiene of workers as per local laws are also to be adhered to during execution of the project.

11.6 Contractor has to fulfill quality requirement as per Chapter-VIII of Special Condition of Contract (SCC). In case of any gap in fulfilling these requirements by the contractor, financial penalty shall be imposed on the contractor with the rate mentioned in the "MEMO for penalty imposition against non-compliance in Quality area" enclosed as **Annexure-IV.** Penalty may also be accepted in equivalent NPR.

11.7 If any fine to be imposed against noncompliance of Health, Safety and Environment Plan for Site Operation by Subcontractors, is also acceptable in equivalent NPR.

11.8 **Labour:**

11.8.1 The Contractor shall at all stages of work deploy skilled/ semi-skilled tradesmen who are qualified and possess certificate in particular trade from CPWD Training Institute/ Industrial Training Institute/National Academy construction Management and Research (NICMAR), National Academy of Construction, CIDC or any similar reputed and recognized Institute managed/certified by State/Central Government/Nepal Government. 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 BHEL Engineer 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. Decision of BHEL Engineer as to whether particular tradesman possesses requisite skill and amount of compensation in case of default shall be final and binding.

11.8.2 Unless otherwise provided in the Contract, the Contractor shall be responsible for the recruitment, transportation, accommodation and catering of all labor, local or expatriate, required for the execution of the Contract and for all payments in connection therewith.

11.8.3 Contractor shall be responsible for providing all other necessary facilities to staff and workmen not limited to 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 in Nepal.

11.8.4 The Contractor shall be responsible for obtaining all necessary permit(s) and/or visa(s) from the appropriate authorities for the entry of all labor and personnel to be employed on the Site into the country where the Site is located.

11.8.5 The Contractor shall at its own expense provide the means of repatriation to all of its manpower employed on the Contract at the Site to their various home countries. It shall also provide suitable temporary maintenance of all such persons from the cessation of their employment on the Contract to the date programmed for their departure. In the event that the Contractor defaults in providing such means of transportation and temporary maintenance, the BHEL may provide the same to such personnel and recover the cost of doing so from the Contractor.

11.8.6 The Contractor shall at all times during the progress of the Contract use its best endeavors to prevent any unlawful, riotous or disorderly conduct or behavior by or amongst its employees and the labor.

11.8.7 The Contractor shall, in all dealings with its labor currently employed on or connected with the Contract, pay due regard to all recognized festivals, official holidays, religious or other customs and all local laws and regulations pertaining to the employment of labor.

11.8.8 The bidder shall use maximum Nepali resources and give first consideration and full and fair opportunity to technically and commercially qualified Nepalese citizens, materials and firms provided that in each case, the use of such Nepali resources meet the quality, quantity and availability requirements of the Company.

11.8.9 The bidder shall comply with the Laws of Nepal including the Labour Act, 2048 and Labour Regulation, 2050.

11.8.10 The Contractor is required to get registered with local authorities of Nepal and shall submit to BHEL documentary evidence for such registration

11.9 Provident Fund/SSF

Contractor shall comply with provision of Social Security Fund, Social Security Act 2075 (2017) any other provident provisions and other relevant labour laws applicable for working in Nepal. The contractor shall be responsible for all compliances under these laws. Contractor shall deduct the necessary amount towards this fund, contribute as employer the required amount as per provisions and further duly deposit the amount in the fund as per Nepal laws. BHEL may require furnishing of documentary evidence of the compliances. Any loss or expense arising to BHEL because of non-compliance shall be borne by the Contractor.

11.10 Contractor is to be registered with the local authorities in Nepal, if required.

11.11 Unless specifically stated otherwise, all payment/recovery as mentioned in INR at anywhere in the contract, may also be done in equivalent NPR

11.12 LOCAL PERMITS, LICENCES, CLEARANCES & APPROVALS

Local permits, licences, clearances and approvals of the plants, equipment and materials to be imported into Nepal for use on the Works shall be taken by the contractor. The contractor shall be solely responsible for obtaining such laws, permits, licences, approvals or clearances and the payment of all charges, fees and duties required, and

the contractor shall indemnify and hold BHEL and Employer harmless against and from the consequences of any failure to do so.

11.13 **Access Route:** BHEL shall not be responsible for any claims which may arise from the use or otherwise of any access route, BHEL does not guarantee the stability or availability of particular access route and cost due to non-suitability or non-availability, for the use required by the contractor, of access route shall be borne by the contractor.

11.14 **Rights of Way and Facilities:** The Contractor shall bear all costs and charges for special and/or temporary rights of-way, which he may require, including those for access to the Site. The Contractor shall also obtain, at his risk and cost, any additional facilities outside the Site, which he may require for the purposes of the Works.

11.15 **Engagement of Staff and Labour:** The Contractor shall be responsible for making all necessary arrangements for the engagement of all staff and labour, local or otherwise, and for their payment, housing, feeding and transport.

11.16 **Permits, Licences or Approvals:** The Contractor shall inform BHEL in writing of the details of the Contractor's Equipment, Plants, and Materials to be imported into Nepal for use on the Works at least 30 days prior to arrival of shipment at disembarkation port.
The Contractor shall be responsible for transport from the Port of disembarkation to the Site or location of the Works.
Notwithstanding any reasonable assistance provided by BHEL, the Contractor shall be solely responsible for obtaining such laws, permits, licences, approvals or clearances and the payment of all charges, fees and duties required, and the Contractor shall indemnify and hold BHEL and Employer harmless against and from the consequences of any failure to do so.

11.17 **Rates of Wages and Conditions of Labour:** The Contractor shall pay rates of wages and observe conditions of labour not less favourable than established by district office where the work is carried out. In the absence of any rates of wages or conditions of labour so established, the Contractor shall pay rates of wages and observe conditions of labour which are not less favourable than the general circumstances in the trade or industry in which the Contractor is engaged are similar.

The Contractor shall inform the Contractor's Personnel about their liability to pay personal income taxes in respect of such of their salaries, wages, allowances, and any benefits as are subject to taxes under the Laws of Nepal, and the Contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such Laws.

11.18 **Persons in the Service of Customer:** The Contractor shall not recruit, or attempt to recruit, staff and labour from amongst the Customer’s Personnel.

11.19 **Labour Laws:** The Contractor shall comply with all the relevant labour Laws applicable to the Contractor's Personnel, including Laws relating to their employment, health, safety, welfare, immigration and emigration, and shall allow them all their legal rights.

The Contractor shall require his employees to obey all applicable Laws, including those concerning safety at work.
The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst his staff and labour and for the preservation of peace and protection of person and property in the neighbourhood of the Works. The Contractor is obliged to notify immediately to BHEL of any labour conflict or riot faced by him that could influence the progress of the Works
The Contractor is solely responsible for the industrial relations of the Contractor's Personnel, including obtaining the necessary residential and work permits, visas, documents and any other clearances and permissions (if any) required, for the movement of staff or labour from place to place and for one country to another, as may be necessary for the purpose of, or in connection with, the Works.
Unless otherwise agreed with BHEL/Customer, the Contractor shall recognise the freedom of the Contractor's Personnel to be members of trade unions recognised by the Government of Nepal.

11.20 **Working Hours:** No work shall be carried out on the Site on locally recognized days of rest, or outside the normal working hours (normal working hours shall be between 07:30h and 17:30h, Sunday to Friday inclusive (6 days per week)), unless:
(a) Otherwise stated in the Contract,
(b) BHEL/Customer gives consent, or
(c) The work is unavoidable, or necessary for the protection of life or property or for the safety of the Works, in which case the Contractor shall immediately advise BHEL.

11.21 **Facilities for Staff and Labour:** Except as otherwise stated, the Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel. The Contractor shall not permit any of the Contractor's Personnel to maintain any temporary or permanent living quarters within the structures forming part of the Permanent Works.
Where reasonable and practicable, the Contractor shall give fair and reasonable opportunity to suppliers and workers of Nepal.

11.22 **Health and Safety**: The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's Personnel. In collaboration with local health authorities, the Contractor shall ensure that medical staff, first aid facilities, sick bay and ambulance service are available at all times at the Site and at any accommodation for Contractor's and Employer's Personnel, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.

The Contractor shall (as a minimum) comply with the provisions regarding the Health, Safety and Welfare of, Emergency/Air Evacuation and facilities for, the Contractor's Personnel and their dependants. The Contractor and the Contractor's employees shall, in carrying out the Works, at all times comply with any health and safety policies and procedures of the BHEL/Employer and any other health and safety requirements notified by the BHEL/Employer from time-to-time. The Contractor shall not employ any workman who are suffering from an infectious disease or are known to be carrying of an infectious

disease. All workmen engaged on the construction of water-works shall be certified by a medical officer, acceptable to the BHEL/Customer, as a non-carrier of any water borne disease.

The Contractor shall appoint an accident prevention officer at the Site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility, and shall have the authority to issue instructions and take protective measures to prevent accidents. Throughout the execution of the Works, the Contractor shall provide whatever is required by this person to exercise this responsibility and authority as given in clause 7.0 of **HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by CONTRACTORS**

The Contractor shall ensure that all the Contractor's Personnel are fully conversant with the regulations, policies and procedures, and the Contractor shall enforce the rule that any employee committing a serious breach of such regulations, policies and procedures may be instantly dismissed and may not be re-employed. If the Contractor fails to comply with any of its health and safety obligations under the Contract (including this Sub-Clause 11.22), the BHEL/Customer's Requirements or otherwise at Law, the BHEL/CUSTOMER may take whatever action is necessary to remedy such failure and deduct the cost of such action from moneys due or becoming due to the Contractor.

The Contractor shall send, to BHEL, details of any accident as soon as practicable after its occurrence. The Contractor shall maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as BHEL may reasonably require.
In the event of serious or fatal accidents, the Contractor shall leave unchanged the conditions existing at the place of the accident so that the relevant Government Authorities may proceed with their investigations to ascertain the causes of the accident and carry out any of their statutory duties.
However, if for the safety and to avoid further damage to the structure, immediate remedial measure are to be taken, the same shall be carried out with the prior concurrence of the BHEL/ Customer's Representative at no extra cost.

The Contractor shall be responsible for all damage or injury resulting from any failure by the Contractor to comply with this Sub-Clause 11.22 [Health and Safety] and shall indemnify and hold harmless BHEL/Customer and their respective personnel and agents against and from all claims, damages, losses and expenses (including legal fees and expenses) arising out of or in connection with any failure to comply with this Sub-Clause 11.22 [Health and Safety].

11.23 Records of Contractor‟s Personnel and Equipment:

The Contractor shall submit, to BHEL, details showing the number of each class of Contractor's Personnel and of each type of Contractor's Equipment on the Site. Details shall be submitted each calendar month, in a form approved by BHEL, until the Contractor has completed all work which is known to be outstanding at the completion date stated in the Taking-Over Certificate for the Works.

The Contractor‟s personnel records shall include the name, age, gender, identification number, hours worked and wages paid to all workers, and shall be available for inspection by BHEL/ Customer during normal working hours. The records of the Contractor‟s Equipment shall include a daily record of the status of each major piece of plant and equipment, including operating, standby or under repair. If under repair, the expected date of returning the equipment to operating condition shall be stated together with the availability or otherwise of spare parts.

11.24 Payment of Contractors Personnel:

Before making a payment to the Contractor BHEL may require the Contractor to give Customer a statutory declaration by the Contractor that his personnel who have at any time been engaged on the Works have been paid all moneys payable to them in respect of their engagement on the Works.

If within 7 days after the request the Contractor fails to provide the statutory declaration, BHEL/Customer may withhold payment of moneys due to the Contractor until the statutory declaration is received. If the Contractor provides satisfactory proof of the maximum amount which may be payable to his personnel, the suspension of payment shall not apply to amounts in excess of the maximum amount. At the request of the Contractor and out of moneys payable to the Contractor, BHEL/Customer may on behalf of the Contractor make payments directly to any of the Contractor‟s personnel. If any of the Contractor‟s personnel obtains a court order in respect of moneys payable to them by the Contractor in respect of the Works and produces to BHEL/Customer the court order and a statutory declaration that it remains unpaid, BHEL/Customer may pay the amount of the order, and costs included in the order, to the Contractor‟s personnel and the amount paid shall be a debt due from the Contractor to BHEL/Customer

After the making of a sequestration order or a winding up order in respect of the Contractor, BHEL/Customer shall not make any payment to any of the Contractor‟s personnel without the concurrence of the official receiver or trustee of the estate of the bankrupt or the liquidator as the case may be.

11.25 Set-off

Customer/BHEL may retain or set off any amounts which are or may be payable by the Contractor to BHEL/Customer against:

(a) Any debt or other moneys due from the Contractor to BHEL/Customer under this Contract; or

(b) Any claim to money which BHEL/Customer may have against the Contractor whether for damages or otherwise, whether under the Contract or on any other legal or equitable basis relating to the Works.

BHEL will issue a notice to the Contractor stating the amount to be deducted, the basis of the exercise of the right of set-off, and substantiation of the amount which BHEL/Customer considers itself to be entitled to set-off.

BHEL/Customer shall deduct the amount from amounts due to the Contractor in the next Payment to be issued. Nothing in this Sub-Clause affects the right of BHEL/Customer to recover from the Contractor the whole of the debt or claim or any balance that remains owing. This Sub-Clause shall survive any termination of the Contract.

11.26 Safety procedure:

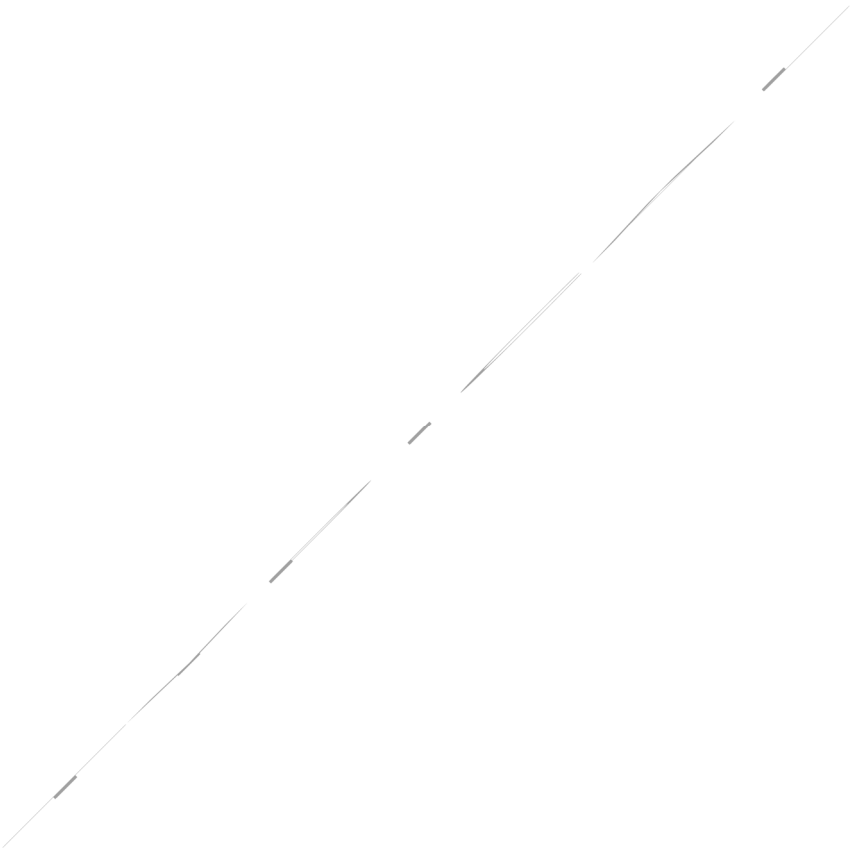
Comply with all applicable safety regulations and requirements of the relevant authorities the requirement as stated in the employers requirement. The contractor shall provide BHEL/Customer with reasonable access to the contractors records and facilities, both on and off the site, to enable BHEL/Customer to assess the contractor's compliance.

Import and customs laws and Regulations: In connection with the performance of the contract, the contractor acknowledges that the laws of the country which may specifically refer to import and customs regulations shall apply, to the furnishing and shipment of any plant, materials, products or components required for the works.

(a) Establish and maintain a regular and direct dialogue with the owners of the land near to the Site is located, the owners of any access routes on, near or to the Site and other major users of the access routes on, near or to the Site, in order to co-ordinate their respective activities and usage requirements;
(b) Be responsible for paying any levy, Tax or any amount payable to the Land Owners or Access Route Owners, or complying with any other conditions of the Land Owners or Access Route Owners, in order to secure on going access to the Site;
(c) Pay any costs, including costs associated with the maintenance and capital upgrade or improvement of any access route on, near or adjacent to the Site, which are reasonably incurred by a Access Route Owner as a result of or in connection with the Contractor's use of that access route;
(d) Take all reasonable precautions to prevent damage or deterioration to access routes on, near or to the Site, including all public roads and bridges adjacent to the Site;

(e) Choose transportation routes, select vehicles and distribute deliveries to the Site, so as to minimize the traffic impact in, on or around the Site;
(f) Permit the Land Owners and Access Route Owners to have free and unrestricted access to the access routes on near or to the sites, as and when they reasonably require;
(g) Fully co-operate with the Access Route Owners, in relation to the maintenance of access routes on, near or to the Site and to inform BHEL/Customer if he considers that the carrying out of maintenance activities on access routes is materially.
(h) Hindering the Contractor's ability to access the Site;
(i) Carefully co-ordinate and interface the Works with any maintenance, upgrading or capital improvement activities to be carried out by the Access Route Owners; and
(j) Fully comply with any use and safety rules imposed from time-to-time by the Access Road Owners.

12. ANNEXURES



ANNEXURE 1

TENTATIVE WEIGHTS OF EQUIPMENTS FOR MATERIAL HANDLING AND TRANSPORTATION TO SITE (PH, VALVE HOUSE, HEAD WORKS, SWITCHYARD, OTHERWORKING AREAS)		
S.No	**Package Description**	**Approx Weight in MT**
1	Two (2) vertical shaft Pelton type hydraulic turbines (375 rpm with 4 jets) and with rated continuous output at rated Head and maximum continuous output capacity as not less than 20513 kW & 22564 kW respectively along with accessories.	**156**
2	Two (2) Governors and pressure oil supply systems.	**50.39**
3	Two (2) Main Inlet Valves (Spherical type) and accessories for turbine.	**78**
4	Two (2) sets of Cooling Water Supply System.	**26**
5	Compressed Air Supply System	**5**
6	One (1) set each of Overhead EOT Crane for Powerhouse and valve chamber	**52**
7	Oil handling & Purifying Equipment	**20**
8	Mechanical and Electrical Workshop Equipment	**19.7**
9	Air Conditioning & Ventilation System	**45**
10	Fire Fighting System for the powerhouse and other areas of the including deluge system for protection of GSU transformers installed in switchyard.	**40**
11	Elevator	**6.797**
12	Emergency closing valve of Butterfly type and accessories at valve chamber.	**26.1**
13	Two (2) alternating current generators each of 20 MW, p.f. 0.85 lagging at rated conditions, with their accessories including CO2 fire protection system. The generators shall be capable to generate 25.882 MVA power corresponding to maximum capacity of turbines at maximum head/maximum discharge conditions.	**341**
14	Two (2) 11/220 kV outdoor Generator Step Up (GSU) Transformer each of 26 MVA, with their accessories	**154**
15	One (1) 11/11 kV, 1000 kVA isolation dry type distribution transformer and its accessories.	**5**
16	Two (2) 11/0.4 kV, 500 kVA dry type station service transformers and their accessories.	**8**
17	Two (2) 11/0.4 kV, 100 kVA pole mounted oil type distribution transformers and accessories one each for head works & valve chamber.	**2**
18	Emergency diesel generator sets of rating 400 kVA/ 100 kVA at Powerhouse/Headworks respectively.	**27**
19	11 kV overhead lines/poles etc. from switchyard to head-works valve chamber.	**518**
20	Switchgear equipment for outdoor 220kV switchyard with single rigid bus bars/ACSR connectors all complete with galvanised steel support structures for equipment/Bus post insulators/Post Insulators and gantry for Outgoing feeders.	
21	Control, automation and protection equipment for generating units, 11/220kV GSU transformers, 11/11 kV isolation/distribution transformers, 11/0.4 kV station service transformers, 220 kV Bus Bars, LILO of one circuit of 220 kV D/C transmission line, 11 kV line to head-works/valve chamber etc. all complete with accessories including computerised control system/SCADA at powerhouse, SCADA upgradation/adaptation at LDC Kathmandu for Control/monitoring through RTUs/OPGW at Power House Control Room/ LDC. .	**52.6**

ANNEXURE 1

TENTATIVE WEIGHTS OF EQUIPMENTS FOR MATERIAL HANDLING AND TRANSPORTATION TO SITE (PH, VALVE HOUSE, HEAD WORKS, SWITCHYARD, OTHERWORKING AREAS)		
S.No	**Package Description**	**Approx Weight in MT**
22	Switchgear equipment for indoor 11 kV system Generator circuit cubicle and local supply cubicle etc. all complete with accessories including termination of XLPE cables/segregated phase bus duct with GCE and of XLPE cables on one end with 11 kV switchboard for local supply and on other end with 11 kV pole of line from switchyard to headworks/valve chamber and to 11 kV pole near switchyard for termination on 11 kV line to camp by Employer.	**60**
23	Station Auxiliary system with 400 V AC Mains &Sub-Distribution Boards at Power House & Switchyard, Head Works, and Valve Chamber etc. including 11 kV overhead line from switchyard to head works with tap-off at valve chamber (& termination on 11 kV pole, near switchyard, of 11 kV line to camp by Employer) along with 110 V/ 48 V DC system with UPS, inverter/ converter at Power House & Switch yard, 110 V/ 48 V DC system at Head Works, 48 V DC system at Valve Chamber and Camp.	**55.713**
24	Power (AC & DC), control, instrumentation and communication cables /cable racks/cable trays for complete power house complex spread over various areas all complete with accessories/terminals etc.	**85**
25	Optical fiber communication equipment (RTUs, Mux etc. and communication interface) at Control room for exchange of data/tele-metry/tele control/tele protection signals for tripping of circuit breakers at Dana/Kushama sub-stations/RGHEP switchyard as well as and SCADA adaptation at LDC, Kathmandu all complete with their accessories for control and monitoring from LDC.	
26	Illumination system and small power outlets complete for powerhouse, switchyard, valve chamber, surge shaft, head-works, other project areas including approach roads for all project areas, access tunnels etc.	**120**
27	Earthing system and lightening protection system complete for equipment/mechanical components/ferrous structures at powerhouse, switchyard, valve chamber, surge shaft, head works area etc.	**40**
28	Optical Fiber (OF), accessories and terminal equipment/panels at powerhouse, switchyard, valve chamber and camp for communication of data/tele-metery/tele-control for SCADA systems at Control Room and LDC, Kathmandu.	**3**
29	Security and surveillances system	**5.7**
30	Miscellaneous items of Generator, Turbine & Axillaries	**87.3**
31	Spare items	**72.7**
	TOTAL	**2162.0**

ANNEXURE 2

Tentative Weight of major components

S. NO.	NAME OF COMPONENT	PACKAGE WT IN MT	DIMENSION, MM		
			L	W	H
1	½ Wound Stator Segment	27	5700	3000	3000
2	Poles	1.2	1400	800	700
3	Rotor Spider	6	2500	2500	1200
4	Shaft	10	6500	2000	2000
5	Thrust collar	3	1200	1200	1200
6	Top Bracket Center	12	3000	3000	1400
7	Top Bracket Arm	1.5	1200	800	1200
8	Bottom Bracket assy.	5	3000	3000	1000
9	26 MVA Power Transformer	75	6000	3500	4000
10	1000 KVA DTT	5	2600	2200	2600
11	Distributor Segment-1	9.96	5300	2800	1650
12	Pit Liner Segment-1	3.29	4800	4000	1400
13	Inner Turbine Housing (Upper)	2.21	2300	2300	700
14	Nozzle	3	2000	1500	1000
15	Pelton Runner	5.2	2400	2400	600
16	Turbine Shaft	4.5	3000	1000	1000
17	Main Inlet Valve assembled	36	2000	3400	2600
18	Inlet Pipe of MIV	4	2900	1800	1800
19	Outlet pipe of MIV	2.5	1400	1800	1800
20	Assembled Penstock Valve	13.5	3100	2800	800
21	Inlet pipe of P/S Valve	2.4	2800	2800	1600
22	Outlet pipe of P/S Valve	7	2800	2800	2000
23	DG Set	12	-	-	-

ANNEXURE-III

CONTRACTOR'S EQUIPMENT

The Bidder shall provide all required equipment to erect and complete the Works in accordance with the Bidding Documents and ensure it is well maintained for the efficient and continuous progress of the Works.

The Bidder shall mention major items of plant and equipment which he proposes to bring to the Site to complete the Works, whether owned, leased or to be purchased, and shall indicate the proposed port of entry. A separate **Annexure-III-1** to be prepared for each major item (or group of similar items) of equipment listed. The plant and equipment must be in excellent operating condition and major plant and equipment shall not be more than 5 years old.

THE TOTAL EQUIPMENT PROPOSED FOR THE ENTIRE WORKS IS SUMMARIZED BELOW:

PROPOSED ITEMS OF EQUIPMENT					
Description (Type, Model, Make)	**No of Each**	**Year of Manufacture**	**Owned (O) Leased (L) To be purchased (P) Subcontractor Owned (S)**	**Power Rating**	**Capacity (tonnes, m^3, etc as appropriate)**

DETAILS OF CONTRACTOR'S EQUIPMENT

All the equipments for Erection & Commissioning works shall be arranged by E&C Contractor, the details of which as per below table shall be furnished after award of work

Item of Equipment		
Equipment Information	**Name of manufacturer**	**Model and power rating**
	Capacity	**Year of manufacture**
		Original Cost [USD Equivalent]
		Current book value as on..... [USD Equivalent]
Current Status	**Current location**	
	Details of current commitments	
Source	**Indicate source of the equipment** ☐ **Owned** ☐ **Rented** ☐ **Leased** ☐ **Specially manufactured**	

For equipment not owned by the Bidder complete the following:

Owner	**Name of owner**	
	Address of owner	
	Telephone	**Contact name and title**
	Fax	**Telex**
Agreements	**Details of rental / lease / manufacture agreements specific to the project**	

Bharat Heavy Electricals Limited
(A Govt. of India Undertaking)
Power Sector- Northern Region

Rev. 01

BHEL/PSNR/Site..... Dated: _____

MEMO for imposition of penalty against non-compliances in Quality area

The Lapse as tick marked below has been observed in your area and penalty is being imposed as per the details mentioned at the bottom of this memo:-

S. No	Nature of non- compliance	Penalty (in Rs.)	Remarks
1.	Non availability of required no. of Quality Engineers/NDT certified person as per contract	1000	Per Person
Calibration:-			
2.	Use of IMTEs without having valid calibration certificate	1000	Per equipment per instance
3.	Use of NDT equipment, welding equipment's without having valid calibration certificate, condition not as per requirement	1000	Per equipment per instance
Welding & NDT area:-			
4.	Un qualified Welder carrying out weld/ tack weld	1000	Per welder per instance
5.	Not using portable oven	500	Per welder per instance
6.	Not using electrodes pre- baked in master oven/ approved make of electrodes/correct electrodes as per EWS/ WPS	500	Per instance
7.	Non- removal of slag and spatters after welding	200	Per Joint
8.	Not using NDT equipment as prescribed in the manual/contract/guidelines	1000	Per equipment per instance
9.	Welder doing welding without job card	500	Per instance
10.	Discrepancy observed in the RT taken of weld joints vs RT offered	2000	Per joint
Material management:-			
11.	Mismatch of location of material in store area wrt in Stock register	200	Per instance
12.	Non- compliance of preservation of material as per storage & preservation manual	1000	Per equipment
13.	Non verification of material within stipulated time as per contract	500	Per instance
Other Areas:-			
14.	Painting without surface cleaning	500	Per instance
15.	Not attending Quality meeting by the nominated member	1000	Per meeting

Details of non- compliance (Name of Sub contractors, persons, description of deficiency, etc.)

_____

_____

Penalty imposed:-

1, Rate as per above chart_____

2. No. of Persons/ equipment/ instance/ Joint/ welder/meeting. _____

3. Total Penalty= 1. X 2. =_____

Signature

(Witnessed by Sub- Contractor representative)
Name_____

(Witnessed by PSNR Personnel)
Name_____

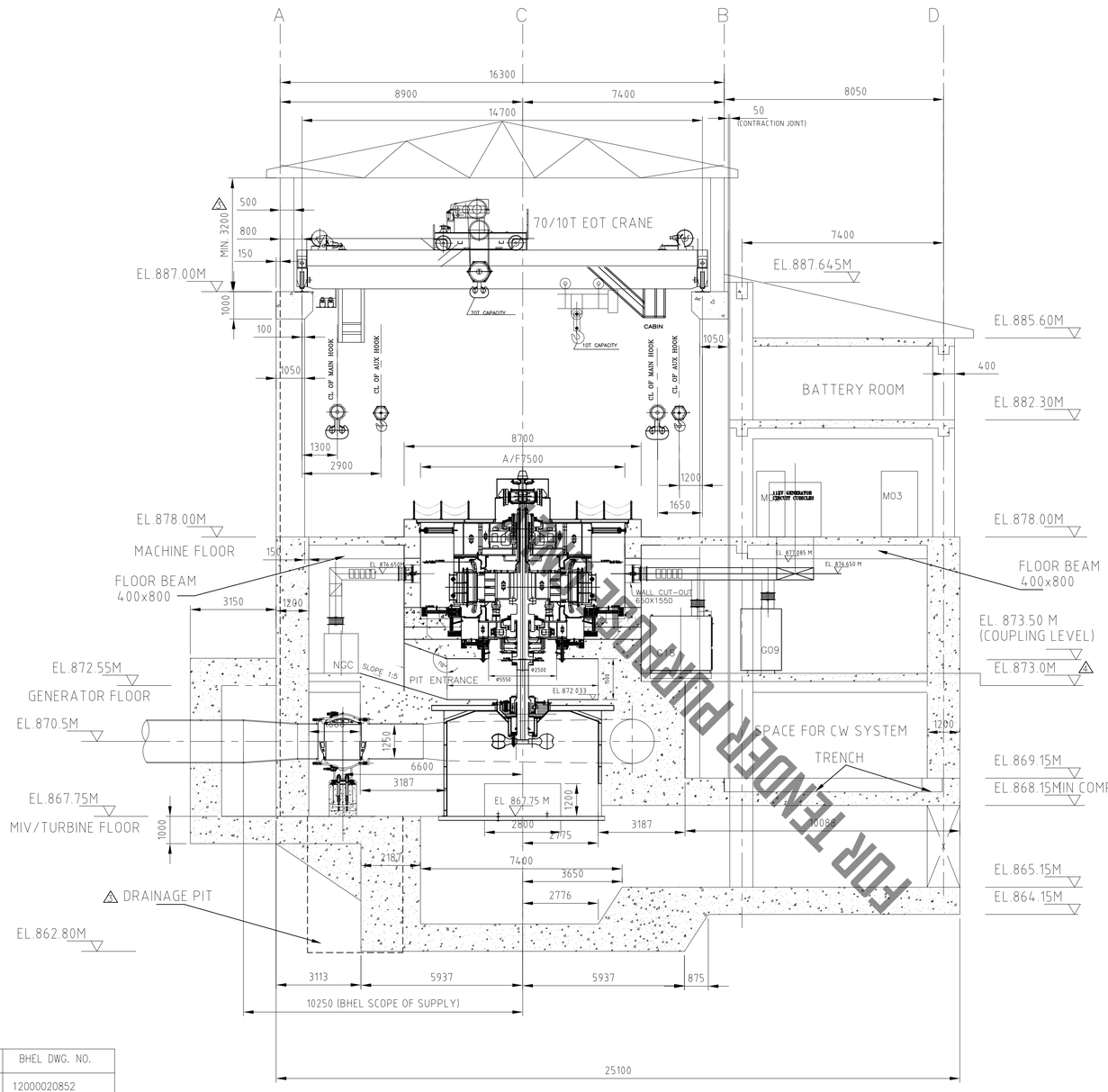
Distribution: 1. Sub- contractor
2. Head (Quality & Safety)/ BHEL PSNR

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO.

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IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY DETRIMENTAL TO THE INTEREST OF THE COMPANY.



CROSS SECTION

NOTES:

01. ALL DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS ARE IN METRES.
02. EQUIPMENT SHOWN AND LISTED ARE TENTATIVE AND SHALL BE FINALISED INCLUDING SIZES DURING DETAILED DESIGN.
03. FOR STAGE WISE CONCRETING AND EMBEDMENT DETAILS REFER TURBINE DRAWINGS OF BHEL.
04. FOR MIV, MIV FOUNDATION AND COUNTERWEIGHT DETAILS REFER TURBINE DRAWINGS OF BHEL.
05. SIZES OF COLUMNS/BEAMS/SLABS/STAIRS ARE INDICATIVE ONLY. FOR DETAILS REFER CIVIL CONSTRUCTION DRAWINGS.
06. THIS DRAWING IS INTENDED FOR SHOWING LAYOUT & CIVIL REQUIREMENTS OF FLOOR ONLY. FOR CIVIL DETAILS/EMBEDMENTS INSIDE BARREL/HOUSING RESPECTIVE SYSTEM DRAWING .
07. POWERHOUSE FLOOR DRAIN TO BE SUITABLY DESIGNED BY CIVIL.
DRAINAGE PIT (IF REQUIRED MAY BE PLANNED SUITABLY BY WAPCOS/CIVIL.
08. THIS DRAWING IS INTENDED FOR SHOWING THE LAYOUT OF EQUIPMENTS ONLY.CIVIL DETAILS LIKE FLOOR CUTOUTS , FOUNDATION & EMBEDMENT DETAILS ,SHALL BE INCORPORATED AFTER FINALIZATION OF EQUIPMENTS DESIGN.

LINKED DRAWINGS :-

SL. No.	DESCRIPTION	BHEL DWG. NO.
01	STATION LAYOUT PLAN AT EL. 867.75M (MIV/TURBINE FLOOR)	12000020852
02	STATION LAYOUT PLAN AT EL. 872.55M	12000020853
03	STATION LAYOUT PLAN AT EL. 878.00M	12000020854
04	STATION LAYOUT PLAN AT EL. 882.30M	12000020855
05	LONGITUDINAL SECTION OF POWER HOUSE	12000020356
06	GENERATOR SECTIONAL ARRGT DRG	02500008703
07	SECTION THROUGH TURBINE	02000020802
08	INSTALLATION OF TURBINE HOUSING	02021120801
09	ARRANGEMENT OF COOLING WATER SYSTEM	02292020801
10	CRANE CLEARANCE DIAGRAM OF 70/10T EOT CRANE OF PH	PE-DG-479-501-A001
11	FOUNDATION AND CUT-OUTS IN FIRST STAGE	02010020801
12	LOADS ON FOUNDATION (TURBINE)	02000020803

REV.	DATE			ZONE	DESCRIPTION
04	18.01.21	ALTERED	T.KHAN	⚠	DRAWING REVISED AS PER REVISED CIVIL DRAWINGS
		CHECKED	S.SAHU		
		APPD.	R.S		
03	09.09.20	ALTERED	T.KHAN	⚠	DRAWING REVISED AS PER CUSTOMER COMMENTS
		CHECKED	S.SAHU		
		APPD.	R.S		
02	22.06.20	ALTERED	T.KHAN		DRAWING REVISED AS PER CUSTOMER COMMENTS
		CHECKED	S.SAHU		
		APPD.	R.S		
01	13.04.20	ALTERED	T.KHAN		DRAWING REVISED AS PER CUSTOMER COMMENTS
		CHECKED	S.SAHU		
		APPD.	R.S		

CUSTOMER :

RAGHUGANGA HYDROPOWER LIMITED

CONSULTANT

WAPCOS LIMITED, GURGAON
(A GOVT. OF INDIA UNDERTAKING)

PROJECT

RAHUGHAT HYDROELETRIC PROJECT (2x20 MW)

BHARAT HEAVY ELECTRICALS LTD.
BHOPAL

DEPT. CODE		NAME	SIGN	DATE	NO. OF VAR
HPE 415	DRN	T.KHAN		06.12.19	
	CKD	S.SAHU		06.12.19	
	APPD	R.S		06.12.19	

SUB-VENDOR DRG. NO. | PO REF | NO. OF ITEMS

TITLE

CROSS SECTION ARRANGEMENT OF POWER HOUSE

DRG. NO. —

SUB-VENDOR NAME | WEIGHT (kg) | SCALE 1:100

BHEL DRG. NO. 12000020851 | REV. 04

SHEET NO. 01 | NO. OF SHT. 01

A1 SIZE

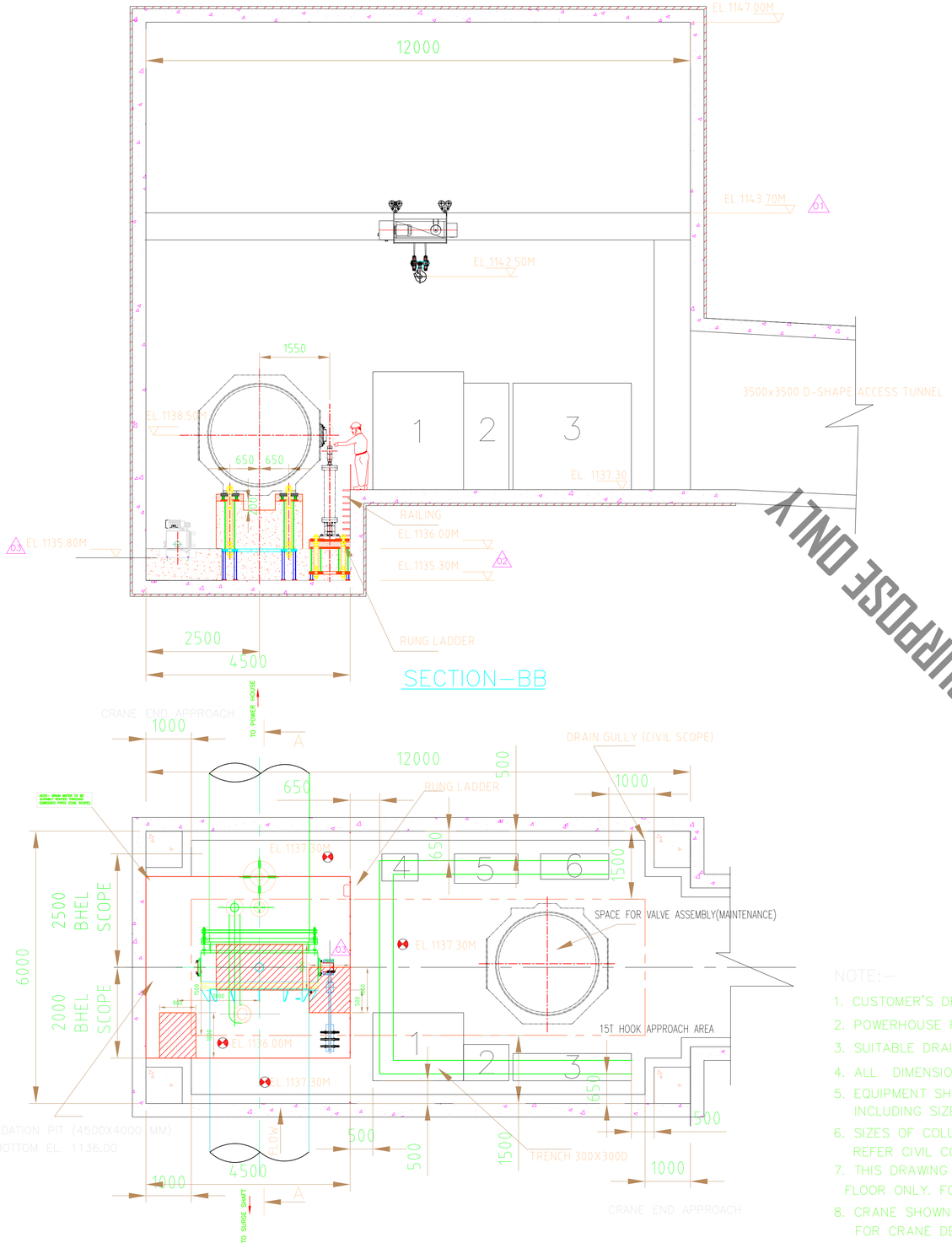
FOR TENDER PURPOSE

FIRST ANGLE PROJECTION

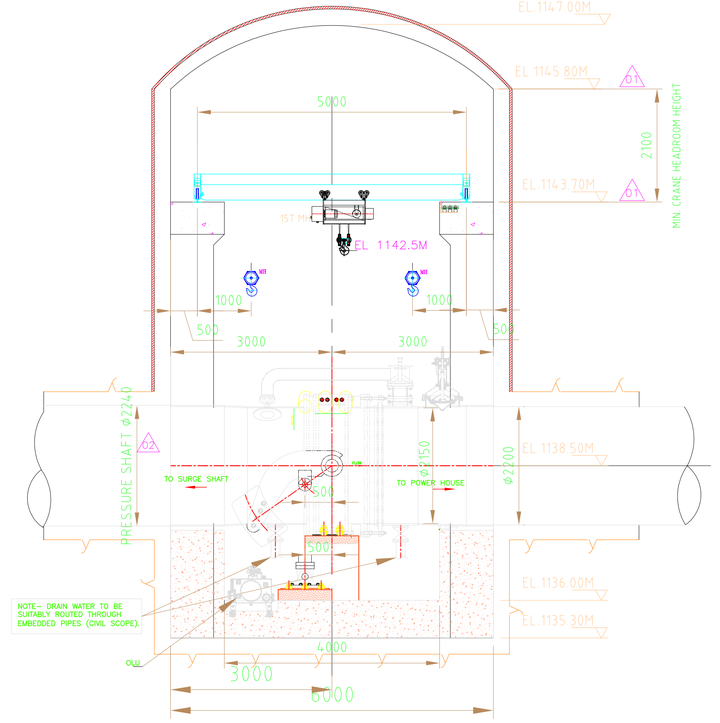
(ALL DIMENSIONS ARE IN mm)

DRG. NO. 12000020857

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PLAN LAYOUT OF B.F. VALVE HOUSE 02



SECTION–AA

FOR TENDER PURPOSE ONLY

01 LIST OF EQUIPMENTS:–(TENTATIVE)

SL. No.	DESCRIPTION	QTY	DIMENSION IN mm			WEIGHT	DIV.	LOCATION
			LENGTH	WIDTH	HEIGHT			
1	OIL SUMP TANK WITH HYDRAULIC CONTROL PANEL	1	2000	1500	2600	NA	HPE(GOV)	EL.1137.3
2	ELECTRICAL CONTROL PANEL	1	1000	800	2350	NA	HPE(GOV)	EL.1137.3
3	415V MAIN DISTRIBUTION BOARD	1	2610	600	2350	NA	HPE(ELEC)	EL.1137.3
4	48V DC BATTERY BANK	1	800	600	600	NA	HPE(ELEC)	EL.1137.3
5	48V DC BATTERY CHARGER	1	1400	650	1500	NA	HPE(ELEC)	EL.1137.3
6	48V DCDB	1	1500	560	2300	NA	HPE(ELEC)	EL.1137.3

NOTE:–

1. CUSTOMER'S DRAWING REFERENCE No. RGHEP/T/EM/2016/005
2. POWERHOUSE FLOOR DRAIN TO BE SUITABLY DESIGNED BY CIVIL.
3. SUITABLE DRAINAGE TRENCH IN BFV HOUSE MAY BE PLANNED BY CIVIL
4. ALL DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS ARE IN METRES.
5. EQUIPMENT SHOWN AND LISTED ARE TENTATIVE AND SHALL BE FINALIZED INCLUDING SIZES DURING DETAILED DESIGN.
6. SIZES OF COLUMNS/BEAMS/SLABS/STAIRS ARE INDICATIVE ONLY. FOR DETAILS REFER CIVIL CONSTRUCTION DRAWINGS.
7. THIS DRAWING IS INTENDED FOR SHOWING LAYOUT & CIVIL REQUIREMENTS OF FLOOR ONLY. FOR CIVIL DETAILS/EMBEDMENTS PLEASE REFER RESPECTIVE Dwg.
8. CRANE SHOWN IN THE DRAWING IS TENTATIVE ONLY. FOR CRANE DETAILS PLEASE REFER DRAWING NO. PE–DG–479–501–A002. (CRANE CLEARANCE DIAGRAM OF 15T EOT CRANE FOR VALVE HOUSE) 02
9. FOR LOADS ON FOUNDATION DETAILS PLEASE REFER DWG NO– 12160020801.

REV.	DATE	ALTERED	T.KHAN
03	03.12.20	CHECKED	S.SAHU
		APPD.	R.S
ZONE	DRAWING REVISED AS PER REVISED DRAWING– 'LOADS ON FOUNDATION'		

REV.	DATE	ALTERED	T.KHAN
02	07.08.20	CHECKED	S.SAHU
		APPD.	R.S
ZONE	DRAWING REVISED AS PER REVISED DRAWING– 'LOADS ON FOUNDATION'		

REV.	DATE	ALTERED	T.KHAN
01	18.05.20	CHECKED	S.SAHU
		APPD.	R.S
ZONE	DRAWING REVISED AS PER CUSTOMER COMMENTS		

CUSTOMER : RAGHUGANGA HYDROPOWER LIMITED

CONSULTANT WAPCOS LIMITED, GURGAON
(A GOVT. OF INDIA UNDERTAKING)

PROJECT: RAHUGHAT HYDROELETRIC PROJECT (2x20 MW)

BHARAT HEAVY ELECTRICALS LTD. BHOPAL

DEPT. CODE		NAME	SIGN	DATE	NO. OF VAR
HPE 415	DRN	T.KHAN		10.04.20	
	CKD	S.SAHU		10.04.20	
	APPD	R.S		10.04.20	

SUB–VENDOR DRG. NO. | PO REF | NO. OF ITEMS

TITLE: LAYOUT AND CROSSE SECTION OF B.F. VALVE HOUSE

DRG. NO. –

SUB–VENDOR NAME | WEIGHT (kg) | SCALE 1:55

BHEL DRG. NO. 12000020857 | REV. 03

SHEET NO. | NO. OF SHT. 01

A1 SIZE

INVENTORY NO. | SIGN. & DATE | REF. DRG. NO.

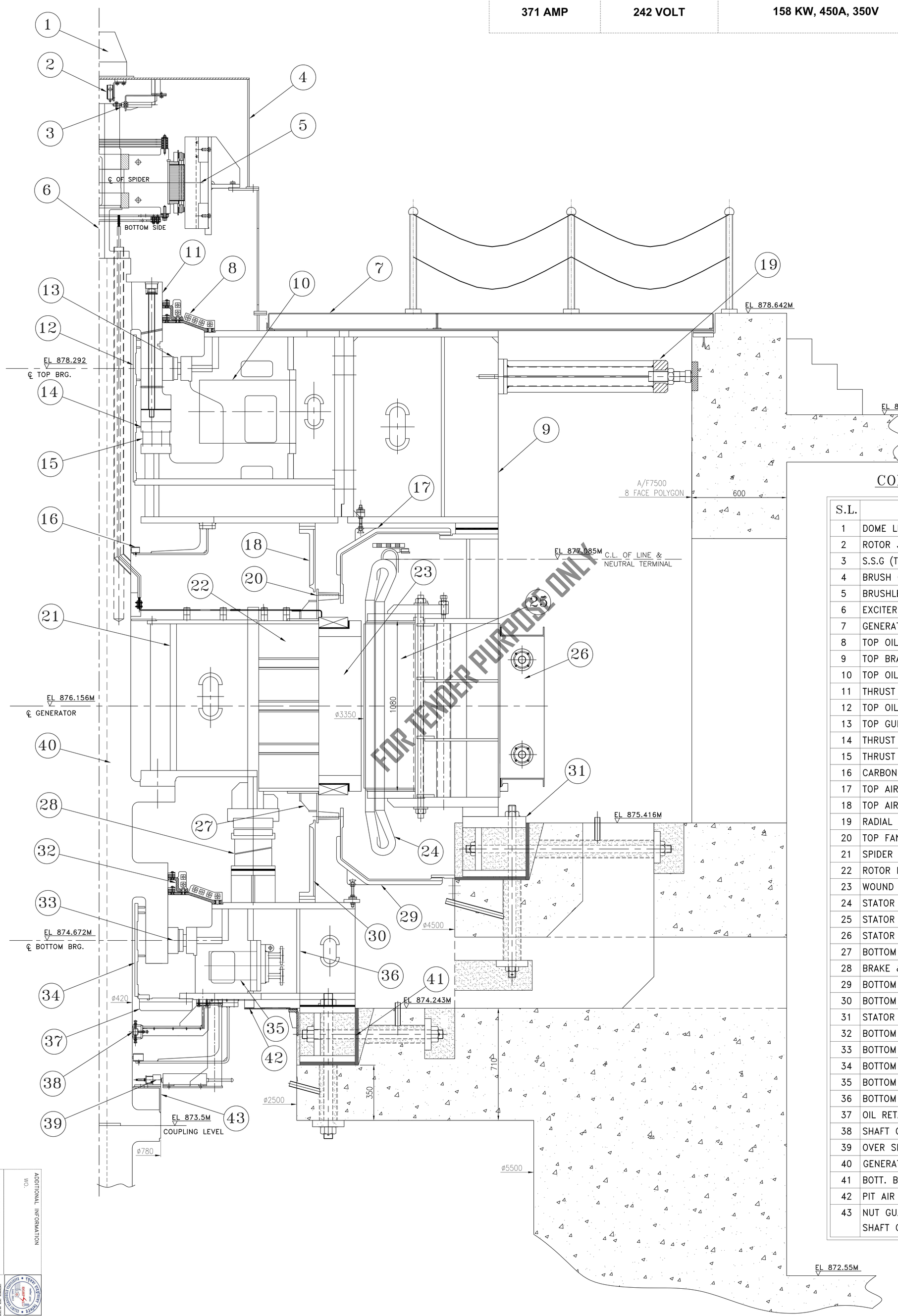
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0 250 00 08703 '0N 'QSD

FIRST ANGLE PROJECTION

FRAME SIZE	MVA	MW	OVERLOAD	KV	AMPERES	PF	PHASES	HZ	POLES	SPEED (RPM)	RUNAWAY SPEED (RPM)	UNITS	DIRECTION OF ROTATION VIEWED FROM TOP	TYPE OF TURBINE
HGT-400/108-16D	23.529	20	10%	11 ± 5%	1235	0.8500	3	50 ± 2%	16	375	695	2	CW	PELTON

EXCITATION CURRENT	EXCITATION VOLTAGE	BRUSHLESS EXCITATION RATING
371 AMP	242 VOLT	158 KW, 450A, 350V



FOR TENDER PURPOSE ONLY

COMPONENT LIST

S.L.	NOMENCLATURE
1	DOME LIGHT
2	ROTOR JACKING LIMIT SWITCH
3	S.S.G (TURBINE SCOPE OF SUPPLY)
4	BRUSH GEAR CASING
5	BRUSHLESS EXCITER
6	EXCITER SHAFT
7	GENERATOR FLOORING
8	TOP OIL VAPOUR SEAL ASSY.
9	TOP BRACKET CENTRE & ARM ASSY.
10	TOP OIL COOLER
11	THRUST COLLAR
12	TOP OIL RETAINING SLEEVE ASSY.
13	TOP GUIDE BEARING ASSY.
14	THRUST BEARING PAD
15	THRUST BEARING SPRING
16	CARBON BRUSH (FOR EARTHING)
17	TOP AIR GUIDE ASSY.
18	TOP AIR BAFFLE ASSY.
19	RADIAL JACK
20	TOP FAN ASSEMBLY
21	SPIDER ASSY.
22	ROTOR RIM ASSY.
23	WOUND POLE ASSY.
24	STATOR WINDING
25	STATOR FRAME & CORE ASSY.
26	STATOR AIR COOLER
27	BOTTOM FAN ASSEMBLY
28	BRAKE & JACK ASSY.
29	BOTTOM AIR GUIDE ASSY.
30	BOTTOM AIR BAFFLE ASSY.
31	STATOR SOLE PLATE ASSY.
32	BOTTOM OIL VAPOUR SEAL ASSY.
33	BOTTOM GUIDE BEARING ASSY.
34	BOTTOM OIL RETAINING SLEEVE ASSY.
35	BOTTOM OIL COOLER
36	BOTTOM BRACKET ASSY.
37	OIL RETAINER
38	SHAFT CURRENT MONITOR
39	OVER SPEED DEVICE
40	GENERATOR SHAFT
41	BOTT. BKT. SOLE PLATE ASSY.
42	PIT AIR SEAL
43	NUT GUARD ASSY.(TURBINE & GENERATOR SHAFT COUPLING)

(ALL DIMENSIONS ARE IN mm)

REV.	DATE	ALTERED
01	22/09/20	CHECKED SSC —sd—
		APPROVED RG —sd—

01.Updated as per WAPCOS comments vide letter no. WAP/hydro/Rahu/EM/2020/60 dated 25.08.2020

ADDITIONAL INFORMATION
WO.

STATUS OF DRAWING
U

DISTRIBUTION OF PRINTS
HGE-3

उत्पादन का ग्राहक/परियोजना का नाम
NAME OF CUSTOMER/PROJECT
भा.हि.इ.लि.
BHARAT HEAVY ELECTRICALS LTD.
BHOPAL

RAHUGANGA HYDROPOWER LIMITED
NEPAL

HGS-400/108-16D
RAHUGHAT HEP(2x20MW)

SECTIONAL ARRANGEMENT

विभाग DEPT.	HGE
कोड CODE	403
ड्रा./चार्ट सं. SHEET NO. OF	NA
ड्रा. सं. REF. TO ASSY. DRG.	—
ड्रॉइंग सं. DRAWING NO.	0 250 00 08703
शीट सं. SHEET NO.	01
स्केल SCALE	NTS
वजन WEIGHT (KGS)	—
संख्या NO. OF ITEMS	—
संशोधन सं. REVN. NO.	01
तैयार किया PREPD.	SSC/SC
जांचा CHKD.	PKV/RG/AD
स्वीकृत APPRD.	—sd—
दिनांक DATE	18/09/20
दिनांक DATE	18/09/20
दिनांक DATE	—

SHEET NUMBER 01 | NUMBER OF SHEETS 01

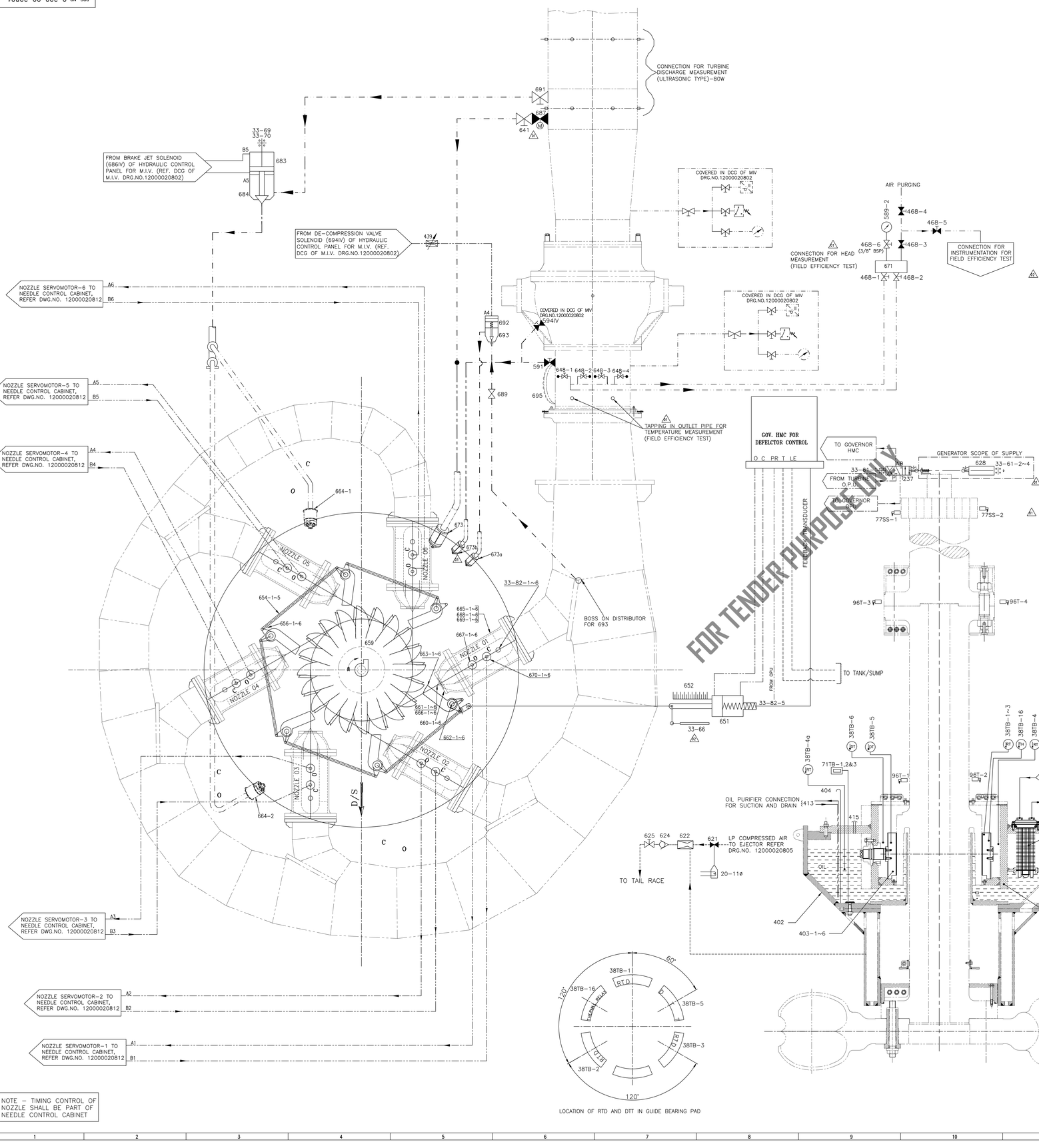
A0 SIZE

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. 0 200 00 20801

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FOR TENDER PURPOSE ONLY

DETAIL OF NOZZLE

MECHANICAL DEVICES			
POSITION	DEVICE NO.	DESCRIPTION	
L	237	HYDRAULIC OVERSPEED DEVICE	
L	301	OIL LEAKAGE PUMP	OIL LEAKAGE UNIT–ONE NO. FOR POWER HOUSE (COMMON FOR TURBINE & MIV OF TWO UNITS)
L	313	OIL LEAKAGE TANK	
L	341	FOOT STRAINER ON 301	
L	401	TURBINE GUIDE BEARING (PAD TYPE)	
L	402	BEARING OIL SUMP	
L	403–1~6	BEARING PADS (6 NOS.)	
L	404	DIPSTICK FOR TURBINE GUIDE BEARING OIL LEVEL	
L	409–1~4	BEARING OIL COOLERS (TUBE AND FIN TYPE)	
L	413	OIL PURIFIER CONNECTIONS FOR TGB OIL SUCTION/RETURN	
L	415	AIR BREATHER FOR BEARING SUMP	
L	439	ORIFICE PLATE FOR 692 (ADJUSTABLE)	
L	468–1~6	ISOLATING VALVE (¾" BSP) FOR FIELD EFFICIENCY TEST (TEMP. MEASUREMENT)	
L	468–6	ISOLATING VALVE FOR PRESSURE GAUGE 589–2	
L	589–2	PRESSURE GUAGE (0–60 kg/cm²), FOR FIELD EFFICIENCY TEST	
L	591	ISOLATING VALVE FOR DISTRIBUTOR DRAIN, ON OUTLET PIPE (ø100 CL.300)	
L	621	SOLENOID OPERATED VALVE FOR 622	LOGIC FOR EJECTOR OPERATION SHALL BE BUILT IN SCADA
L	622	EJECTOR	
L	624	NRV FOR EJECTOR	
L	625	ISOLATING VALVE FOR EJECTOR	
L	628	MECHANICAL OVERSPEED DEVICE	
L	641	ISOLATING VALVE FOR PENSTOCK DRAIN (ø150 CL.300)	
L	648–1~4	ISOLATING VALVE (¼" BSP)	
L	651	DEFLECTOR SERVOMOTOR	
L	652	DEFLECTOR POSITION INDICATOR SCALE	
L	654–1~5	SYNCHRONIZING LINKS	
L	656–1~6	DEFLECTOR LEVERS	
L	657	DISTRIBUTOR	
L	659	PELTON RUNNER	
L	660–1~6	NOZZLE TIPS	
L	661–1~6	SPEARS/NEEDLES	
L	662–1~6	DEFLECTOR SHAFTS	
L	663–1~6	DEFLECTORS	
L	664–1&2	BRAKE JET NOZZLE	
L	665–1~6	NOZZLES SPIDER/NOZZLE GUIDEVANE	
L	666–1~6	SPEAR STEMS	
L	667–1~6	NOZZLE SERVOMOTORS OPENING PORTS	
L	668–1~6	NOZZLE SERVOMOTORS (INTERNAL)	
L	669–1~6	NOZZLE SERVOMOTORS PISTON	
L	670–1~6	NOZZLE SERVOMOTORS CLOSING PORTS	
L	671	PRESSURE MANIFOLD (FIELD EFFICIENCY TESTING)	
L	673	DIFFUSER FOR PENSTOCK DRAIN	
L	673a	DIFFUSER FOR DECOMPRESSION VALVE DRAIN	
L	673b	DIFFUSER FOR OUTLET PIPE+MIV DRAIN	
L	683	SERVOMOTOR FOR 684	
L	684	BRAKE JET VALVE (NOMINAL DIA 100)	
L	687	MOTORISED ISOLATING VALVE ON PENSTOCK FOR 641	
L	689	ISOLATING VALVE FOR 693	
L	691	ISOLATING VALVE FOR BRAKE JET VALVE (ø150 CL.300)	
L	692	SERVOMOTOR FOR 693	
L	693	DECOMPRESSION VALVE FOR DISTRIBUTOR	
L	695	MAN HOLE / INSPECTION HOLE ON OUTLET PIPE	

ELECTRICAL DEVICES		
POSITION	DEVICE NO.	DESCRIPTION
L	20–11ø	SOLENOID FOR 621
L	33–61–1~4	LIMIT SWITCHES FOR HYDRAULIC & MECHANICAL OVER–SPEED DEVICES
L	33–66	DEFLECTOR FEEDBACK TRANSDUCER
L	33–69,33–70	LIMIT SWITCHS FOR BRACK JET VALVE OPEN/CLOSE POSITION
L	33–82–1~6	NOZZLE POSITION FEEDBACK TRANSDUCER (INTERNAL CYLINDER TYPE)
P	38TB–1~3	R.T.D. IN T.G.B. PAD FOR INDICATION RECORDER & MMI.
P	38TB–4,4a	R.T.D. IN T.G.B. OIL FOR INDICATION RECORDER & MMI.
P	38TB–5	D.T.T. IN T.G.B. PAD FOR ALARM INDICATION & TRIPPING
P	38TB–6	D.T.T. IN T.G.B. OIL FOR ALARM INDICATION
P	38TB–16	THERMAL RELAY IN T.G.B. PADS FOR INDICATION
P	71TB–1,2&3	LEVEL RELAY FOR BEARING OIL LEVEL NORMAL & LOW & INDICATION IN UCB.
L	71G–6	LEVEL SWITCH FOR HIGH LEVEL ALARM IN 301
L	71G–7	LEVEL SWITCH FOR PUMP (301) START
L	71G–8	LEVEL SWITCH FOR PUMP (301) STOP
L	77SS–1&2	SPEED SENSING PROBE (MAGNETIC PICK–UP) (2NOS) WITH TOOTHED WHEEL. (1NO.)
L	80W	TURBINE DISCHARGE MEASURING SYSTEM (ULTRASONIC TYPE)
L	88ML–G	MOTOR FOR 301
L	96T–1&2	VIBRATION DETECTOR PROBES ON T.G.B.
L	96T–3&4	VIBRATION DETECTOR PROBES ON TURBINE–GENERATOR SHAFT COUPLING

SYMBOL	DESCRIPTION
	ISOLATING VALVE (NORMALLY OPEN)
	ISOLATING VALVE (NORMALLY CLOSE)
	NON RETURN VALVE
	ORIFICE PLATE (ADJUSTABLE)
	PRESSURE GAUGE
	LIMIT SWITCH
	MECHANICAL OVERSPEED DEVICE
RT	RESISTANCE TYPE THERMOMETER
DT	DIAL TYPE THERMOMETER
TH	THERMAL RELAY
	LEVEL INDICATOR WITH RELAY
	PROXIMITY PROBE (FOR VIBRATION)

REFERENCE DRAWINGS		
SL.NO.	DRAWING NO.	DESCRIPTION
1	22000020801	DIAGRAM OF CONTROL GEAR FOR GOVERNOR AND MIV OPU
2	12000020802	DIAGRAM OF CONTROL GEAR FOR MAIN INLET VALVE
3	12000020804	DIAGRAM OF CONTROL GEAR FOR COOLING WATER SYSTEM
4	12000020804	DIAGRAM OF CONTROL GEAR FOR LP COMPRESSED AIR SYSTEM
5	12000020811	HYDRAULIC SCHEME OF GOVERNOR HMC FOR DEFLECTOR
6	12000020812	HYDRAULIC SCHEME OF GOVERNOR HMC FOR NEEDLE CONTROL (NCC)

NOTE
1. ALL DEVICES SHOWN IN CLOSED DE–ENERGISED AND NO PRESSURE CONDITION.
2. L – LOCAL POSITION ON OR NEAR EQUIPMENT AND P – POSITION ON PANEL

LEGEND
- DRAIN LINE
- CONTROL LINE
- PRESSURE LINE (OIL)
- PRESSURE LINE (WATER)

REV.	DATE	ALTERED	CHECKED	APPROVED
02	29.07.2021	ALTERED RS	CHECKED ND	APPROVED SK
01	05.11.2020	ALTERED RS	CHECKED ND	APPROVED SK

SEE ⚠2 FOR REVISION
A COMMON DEFLECTOR SERVOMOTOR HAS BEEN PROVIDED. SEE DEVICE NO. 651.

SEE ⚠1 FOR REVISION
DRG. IS REVISED IN LINE WAPCOS LETTER NO. WAP/Hydro/Rahu/EM/2020/73 DATED 24.09.2020

CUSTOMER	RAGHUGANGA HYDROPOWER LIMITED
CONSULTANT	WAPCOS LIMITED, GURGAON (A GOVT. OF INDIA UNDERTAKING)
PROJECT	RAHUGHAT HYDROELETRIC PROJECT (2x20 MW)
ADDITIONAL INFORMATION	
STATUS OF DRAWING	"U"
DISTRIBUTION OF PRINTS	HTE–2 HPE–2

BHARAT HEAVY ELECTRICALS LTD. BHOPAL

	NAME	SIGN	DATE
DRN	RS		13.06.2020
CKD	ND		13.06.2020
APPD	SK		13.06.2020

DEPT. HTE | UNITS,DIMS. OR. | SCALE NTS | WEIGHT (K.G.) | REF. TO ASSY. DRG. | ITEM NO. | NO. OF ITEMS

CODE 400 32000049014

TITLE: DIAGRAM OF CONTROL GEAR FOR TURBINE

DRAWING NO. 0 200 00 20801 REV 02

SHEET No. 01 NO. OF SHT. 01

REF. DRG. NO. | SIGN. & DATE | INVENTORY NO.

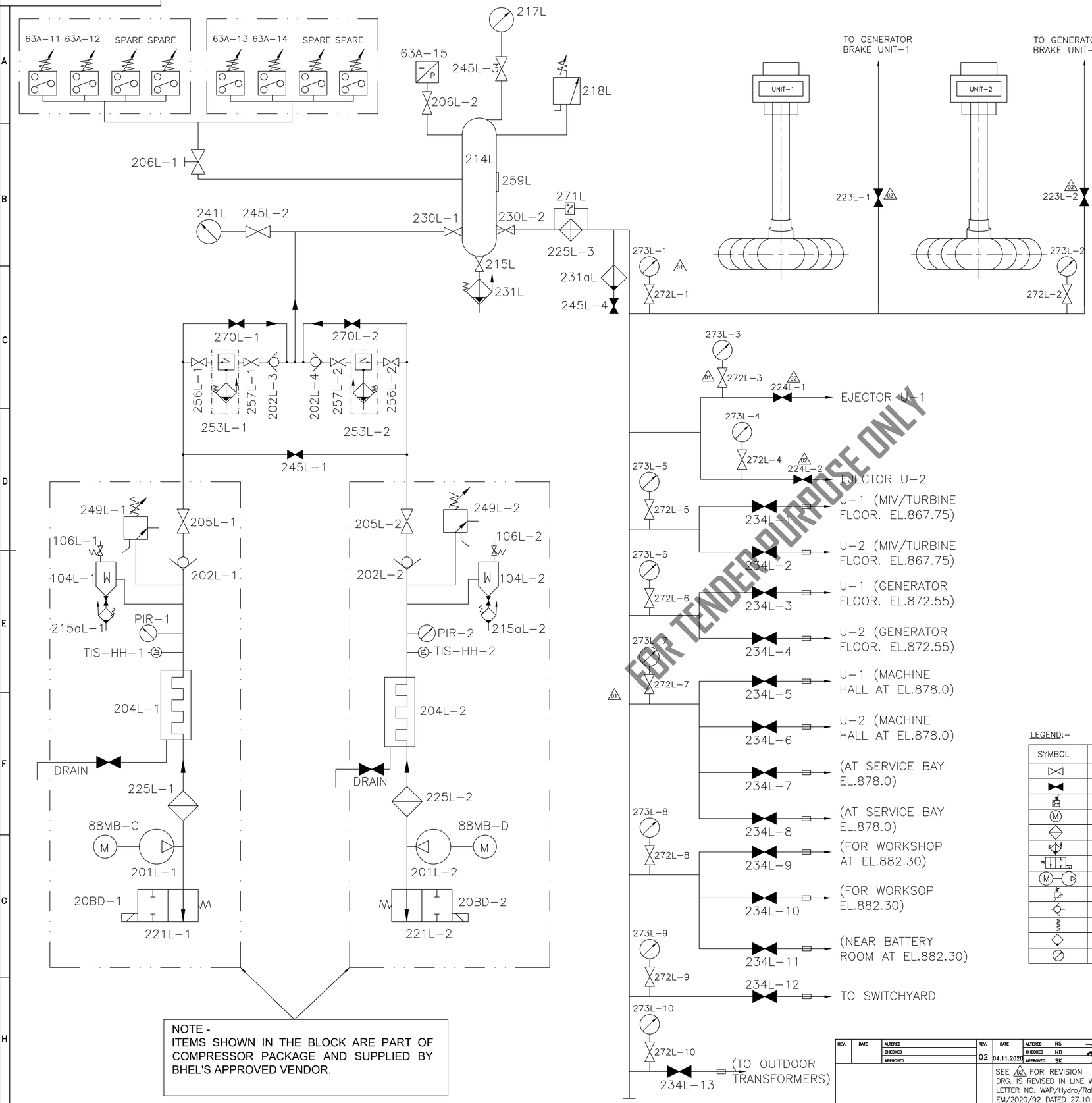
A0 SIZE

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. 1 200 00 20805

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IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN any WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.



NOTE -
ITEMS SHOWN IN THE BLOCK ARE PART OF COMPRESSOR PACKAGE AND SUPPLIED BY BHEL'S APPROVED VENDOR.

FOR TENDER PURPOSE ONLY

MECHANICAL DEVICES :-

	104L-1&2	WATER SEPARATOR
	106L-1&2	SAFETY VALVE
	201L-1	L.P. AIR COMPRESSOR (MAIN) / ROTARY SCREW AIR COOLED (FAD= 60m³/hr) (REMOTELY OPERATED FROM SCADA & ALSO LOCAL OPERATED)
	201L-2	L.P. AIR COMPRESSOR (STAND-BY) / ROTARY SCREW AIR COOLED (FAD=60m³/hr) (REMOTELY OPERATED FROM SCADA & ALSO LOCAL OPERATED)
	202L-1&2	NON-RETURN VALVE (COMPRESSOR PACKAGE)
	202L-3&4	NON-RETURN VALVE AFTER AIR DRYER
	204L-1&2	AIR COOLED AFTER COOLER WITH DRAIN VALVE.
	205L-1&2	ISOLATING VALVE (COMPRESSOR PACKAGE)
	206L-1	ISOLATING VALVE FOR PRESSURE SWITCHES
	206L-2	ISOLATING VALVE FOR PRESSURE TRANSMITTERS
	214L	LOW PRESSURE AIR RECEIVER (CAPACITY 1.5 m³)
	215L	ISOLATING VALVE ON 214 FOR AUTO DRAIN VALVE
	215aL-1&2	AUTOMATIC DRAIN VALVE ON 104
01	217L	PRESSURE GAUGE WITH COCK ON 214L (0-16 kg/cm²)
	218L	SAFETY CUM AIR RELEASE VALVE ON 214
	221L-1&2	UNLOADER VALVE ON 201L-1&2
	223L-1&2	ISOLATING VALVE IN LP LINE TO GENERATOR BRAKES
02	224L-1&2	ISOLATING VALVE IN LP LINE TO EJECTOR
	225L-1&2	L.P. AIR FILTER (AT INTAKE) OF COMPRESSOR – 0.01 MICRONS
	225L-3	L.P. AIR LINE FILTER AFTER 214
	230L-1&2	ISOLATING VALVE ON 214 AT INLET & OUTLET REPECTIVELY
	231L	AUTO DRAIN VALVE
	231aL	MOISTURE TRAP
	234L-1~13	ISOLATING VALVE IN STATION SERVICE LINES
	241L	PRESSURE GAUGE IS COMMON DELIVERY LINE AFTER AIR DRYER
	245L-1	INTER CONNECTING ISOLATING VALVE (NORMALLY CLOSED)
01	245L-2	ISOLATING VALVE FOR 241L IN COMMON DELIVERY LINE AFTER AIR DRYER
	245L-3	ISOLATING VALVE FOR 217L
	245L-4	DRAIN VALVE FOR MOISTURE TRAP
	249L-1&2	SAFETY VALVE ON L.P. AIR COMPRESSOR
	253L-1&2	AIR DRYER (REGENERATIVE TYPE, HEATLESS) WITH AUTO DRAIN
	256L-1&2	ISOLATING VALVE BEFORE AIR DRYER
	257L-1&2	ISOLATING VALVE AFTER AIR DRYER
	259L	HAND HOLE / INSPECTION HOLE
	270L-1&2	ISOLATING VALVE FOR BY PASS OF AIR DRYER
	271L	DIFFERENTIAL PRESSURE SWITCH ACROSS 225L-3
01	272L-1~10	ISOLATING VALVE FOR PRESSURE GUAGE
01	273L-1~10	PRESSURE GAUGE FOR GT. BRAKE / EJECTOR /STATION SERVICE
	PIR-1&2	PRESSURE INDICATOR

ELECTRICAL DEVICES :-

20BD-1	SOLENOID FOR NO LOAD START VALVE FOR MAIN COMPRESSOR
20BD-2	SOLENOID FOR NO LOAD START VALVE FOR STAND-BY COMPRESSOR
63A-11	PRESSURE SWITCH CONTACT FOR MAIN L.P. COMPRESSOR START/STOP
63A-12	PRESSURE SWITCH CONTACT FOR STAND-BY L.P. COMPRESSOR START/STOP
63A-13	PRESSURE SWITCH CONTACT FOR VERY LOW PRESSURE ALARM
63A-14	PRESSURE SWITCH CONTACT FOR HIGH PRESSURE ALARM
63A-15	PRESSURE TRANSMITTER (0-15 kg/cm²) WITH COCK ON 214L FOR SCADA
88MB-C	MOTOR FOR MAIN L.P. AIR COMPRESSOR
88MB-D	MOTOR FOR STAND-BY L.P. AIR COMPRESSOR
TIS-HH-1&2	TEMPERATURE INDICATOR / SENSOR FOR SHUT OFF AT HIGH TEMPERATURE

LEGEND:-

SYMBOL	DESCRIPTION
	ISOLATING VALVE (NORMALLY OPEN)
	ISOLATING VALVE (NORMALLY CLOSED)
	PRESSURE SWITCH
M	MOTOR
	FILTER
	AUTO DRAIN VALVE
	SOLENOID
M	AIR COMPRESSOR WITH MOTOR
	SAFETY VALVE
	NON-RETURN VALVE
	AIR COOLED AFTER COOLER
	MOISTURE TRAP
	PRESSURE GAUGE

CUSTOMER	RAGHUGANGA HYDROPOWER LIMITED
CONSULTANT	WAPCOS LIMITED, GURGAON (A GOVT. OF INDIA UNDERTAKING)
PROJECT	RAHUGHAT HYDROELETRIC PROJECT (2x20 MW)
ADDITIONAL INFORMATION	U
STATUS OF DRAWING	
DISTRIBUTION OF PRINTS	HTE-2, HPE-1

BHARAT HEAVY ELECTRICALS LTD. BHOPAL

	NAME	SIGN	DATE
DRN	RS		22.06.2020
CKD	ND		22.06.2020
APPD	SK		22.06.2020

DEPT	UNTOL.DIMS. GR.	SCALE	WEIGHT (K.G.)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEMS
HTE	–	NTS	–	–	–	–
CODE 402	32000049014					

TITLE: DIAGRAM OF CONTROL GEAR FOR LP COMPRESSED AIR SYSTEM

DRAWING NO. 1 200 00 20805 REV 02

SHEET No. 01 NO. OF SHT. 01

REV.	DATE	ALTERED	CHECKED	APPROVED

REV.	DATE	ALTERED	CHECKED	APPROVED
02	04.11.2020	RS	ND	SK

SEE 02 FOR REVISION DRG. IS REVISED IN LINE WAPCOS LETTER NO. WAP/Hydro/Rahu/EM/2020/92 DATED 27.10.2020

REV.	DATE	ALTERED	CHECKED	APPROVED
01	14.10.2020	RS	ND	SK

SEE 01 FOR REVISION DRG. IS REVISED IN LINE WAPCOS LETTER NO. WAP/Hydro/Rahu/EM/2020/46 DATED17.08.2020

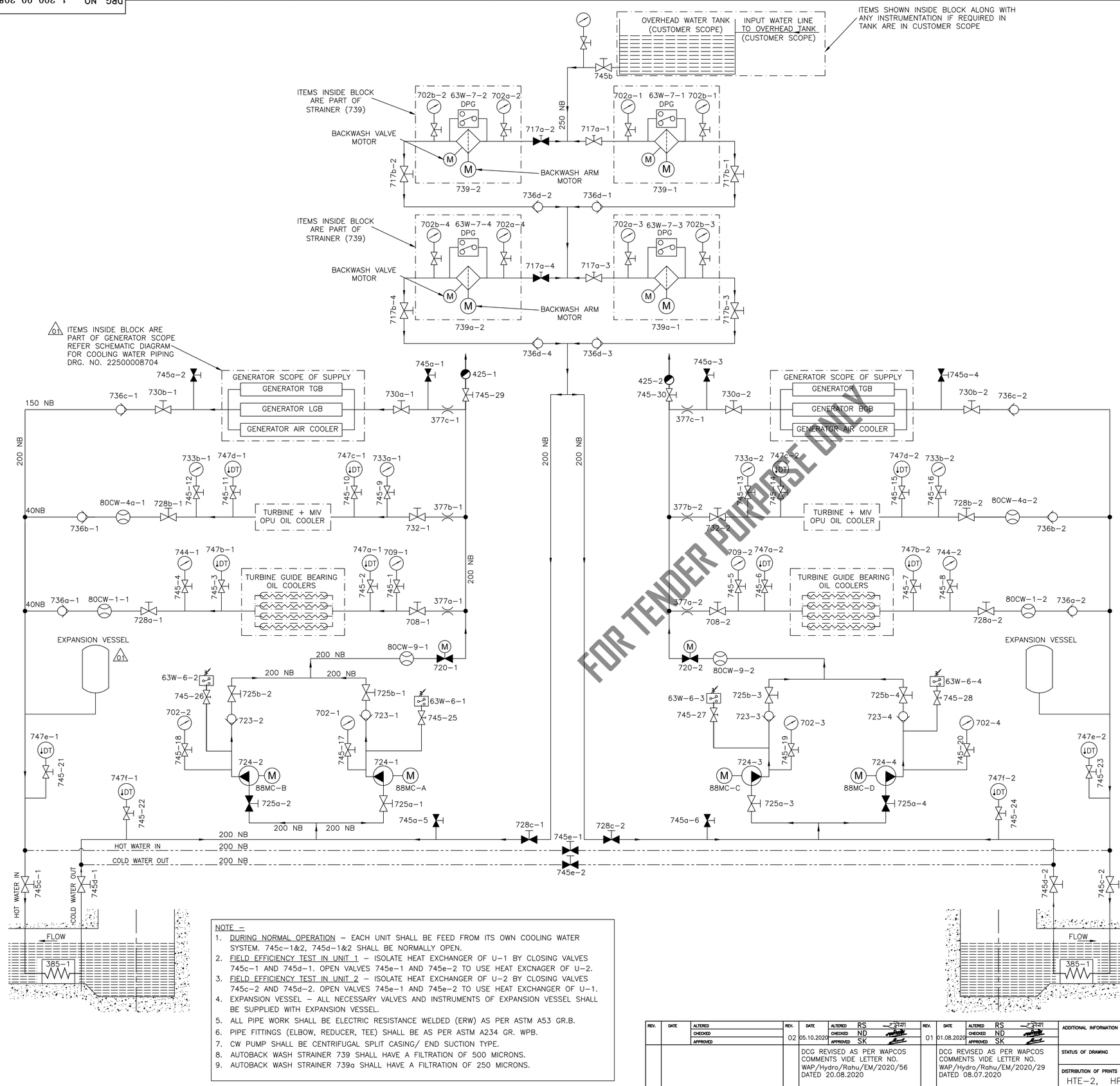
A1 SIZE

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. 1 200 00 20804

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IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.



FOR TENDER PURPOSE ONLY

MECHANICAL DEVICES	
DEVICE NO.	DESCRIPTION
377a–1~2	ORIFICE PLATE AT TGB COOLING WATER INLET FOR FLOW SETTING
377b–1~2	ORIFICE PLATE AT OPU COOLING WATER INLET FOR FLOW SETTING
377c–1~2	ORIFICE PLATE AT GENERATOR COOLING WATER INLET FOR FLOW SETTING
385–1~2	HEAT EXCHANGER FOR COOLING WATER
425–1~2	AUTOMATIC AIR RELEASE VALVE
702–1~4	PRESSURE GAUGE AT OUTLET OF 724
702a–1~4	PRESSURE GAUGE AT INLET OF STRAINER (PART OF STRAINER)
702b–1~4	PRESSURE GAUGE AT OUTLET OF STRAINER (PART OF STRAINER)
708–1~2	ISOLATING VALVE ON TURBINE BEARING COOLING WATER INLET
709–1~2	PRESSURE GAUGE FOR TGB COOLING WATER INLET PRESSURE
717a–1~4	ISOLATING VALVE BEFORE STRAINER
717b–1~4	ISOLATING VALVE AFTER STRAINER
720–1~2	MOTORISED VALVE FOR UNIT START AFTER COOLING WATER PUMP
723–1~4	NON RETURN VALVE AFTER 724
724–1~4	CENTRIFUGAL TYPE COOLING WATER PUMP (MAIN AND STANDBY)
725a–1~4	ISOLATING VALVE BEFORE 724
725b–1~4	ISOLATING VALVE AFTER 724
728a–1~2	ISOLATING VALVE FOR TGB COOLING WATER FLOW RELAY (INLET)
728b–1~2	ISOLATING VALVE FOR OPU COOLING WATER FLOW RELAY (INLET)
728c–1~2	ISOLATING VALVE BETWEEN CW PUMPS AND MAKE UP WATER LINE
728d–1~2	ISOLATING VALVE BEFORE FLOW RELAY 80CW–9
730a–1~2	ISOLATING VALVE AT INLET TO GENERATOR COOLING WATER SYSTEM
730b–1~2	ISOLATING VALVE AT OUTLET OF GENERATOR COOLING WATER SYSTEM
732–1~2	ISOLATING VALVE ON OPU COOLING WATER INLET
01 733a–1~2	PRESSURE GUAGE ON OPU COOLING WATER INLET
733b–1~2	PRESSURE GUAGE ON OPU COOLING WATER INLET
736a–1~2	NON RETURN VALVE AT FOR TGB COOLING WATER OUTLET
736b–1~2	NON RETURN VALVE AT OPU COOLING WATER OUTLET
736c–1~2	NON RETURN VALVE AT GENERATOR COOLING WATER OUTLET
736d–1~4	NON RETURN VALVE AT STRAINER OUTLET
739–1~2	AUTO BACKWASH STRAINER WITH DP SWITCH IN LINE FROM OVERHEAD TANK (PRIMARY)
739a–1~2	AUTO BACKWASH STRAINER WITH DP SWITCH IN LINE FROM OVERHEAD TANK (SECONDARY)
744–1~2	PRESSURE GAUGE FOR TGB COOLING WATER OUTLET PRESSURE
01 745–1~30	ISOLATING VALVE
745a–1~6	ISOLATING VALVE IN TAP OFF CONNECTION FOR CHECKING PRESSURE
745b–1~12	ISOLATING VALVE IN INLET LINE FROM OVERHEAD TANK
745c–1~2	ISOLATING VALVE IN HOT WATER LINE BEFORE HEAT EXCHANGER
745d–1~2	ISOLATING VALVE IN COLD WATER LINER AFTER HEAT EXCHANGER
745e–1~2	ISOLATING VALVES IN HEADER PIPE BETWEEN U–1 AND U–2
747a–1~2	DTT ON TGB COOLING WATER INLET
747b–1~2	DTT ON TGB COOLING WATER OUTLET
747c–1~2	DTT ON OPU COOLING WATER INLET
747d–1~2	DTT ON OPU COOLING WATER OUTLET
747e–1~2	DTT ON COOLING WATER INLET LINE TO 385 (HOT LINE) FOR ALARMS
747f–1~2	DTT ON COOLING WATER OUTLET LINE FROM 385 (COLD WATER) FOR ALARMS
ELECTRICAL DEVICES	
01 63W–6–1~4	PRESSURE SWITCH AFTER COOLING WATER PUMP
63W–7–1~4	DIFFERENTIAL PRESSURE GUAGE CUM SWITCH ACROSS STRAINER 739
80CWa–1~2	ELECTROMAGNETIC FLOWMETER CUM SWITCH ON TGB COOLING WATER OUTLET WITH STARTING INTERLOCK WITH MACHINE & LOW FLOW ALARM
80CW–4a–1~2	ELECTROMAGNETIC FLOWMETER CUM SWITCH ON OPU COOLING WATER OUTLET WITH STARTING INTERLOCK WITH MACHINE & LOW FLOW ALARM
80CW–9–1~2	ELECTROMAGNETIC FLOWMETER CUM SWITCH ON COMMON LINE AFTER CW PUMP WITH STARTING INTERLOCK WITH MACHINE & LOW FLOW ALARM
88MC–A~D	MOTOR FOR COOLING WATER PUMP (MAIN AND STANDBY)

LEGEND:–

SYMBOL	DESCRIPTION
	ISOLATING VALVE (NORMALLY OPEN)
	ISOLATING VALVE (NORMALLY CLOSED)
	CENTRIFUGAL PUMP WITH MOTOR
	FLOWMETER
	NON–RETURN VALVE
	DIAL TYPE THERMOMETER
	BALANCING TANK
	PRESSURE GAUGE
	MOTORIZED VALVE
	ORIFICE PLATE
	AUTOMATIC BACKWASH STRAINER WITH DP SWITCH
	DP SWITCH

NOTE –

1. DURING NORMAL OPERATION – EACH UNIT SHALL BE FEED FROM ITS OWN COOLING WATER SYSTEM. 745c–1&2, 745d–1&2 SHALL BE NORMALLY OPEN.
2. FIELD EFFICIENCY TEST IN UNIT 1 – ISOLATE HEAT EXCHANGER OF U–1 BY CLOSING VALVES 745c–1 AND 745d–1. OPEN VALVES 745e–1 AND 745e–2 TO USE HEAT EXCNAGER OF U–2.
3. FIELD EFFICIENCY TEST IN UNIT 2 – ISOLATE HEAT EXCHANGER OF U–2 BY CLOSING VALVES 745c–2 AND 745d–2. OPEN VALVES 745e–1 AND 745e–2 TO USE HEAT EXCHANGER OF U–1.
4. EXPANSION VESSEL – ALL NECESSARY VALVES AND INSTRUMENTS OF EXPANSION VESSEL SHALL BE SUPPLIED WITH EXPANSION VESSEL.
5. ALL PIPE WORK SHALL BE ELECTRIC RESISTANCE WELDED (ERW) AS PER ASTM A53 GR.B.
6. PIPE FITTINGS (ELBOW, REDUCER, TEE) SHALL BE AS PER ASTM A234 GR. WPB.
7. CW PUMP SHALL BE CENTRIFUGAL SPLIT CASING/ END SUCTION TYPE.
8. AUTOBACK WASH STRAINER 739 SHALL HAVE A FILTRATION OF 500 MICRONS.
9. AUTOBACK WASH STRAINER 739a SHALL HAVE A FILTRATION OF 250 MICRONS.

REV.	DATE		REV.	DATE		REV.	DATE	
		ALTERED			ALTERED RS			ALTERED RS
		CHECKED			CHECKED ND			CHECKED ND
		APPROVED	02	05.10.2020	APPROVED SK	01	01.08.2020	APPROVED SK
					DCG REVISED AS PER WAPCOS COMMENTS VIDE LETTER NO. WAP/Hydro/Rahu/EM/2020/56 DATED 20.08.2020			DCG REVISED AS PER WAPCOS COMMENTS VIDE LETTER NO. WAP/Hydro/Rahu/EM/2020/29 DATED 08.07.2020

ADDITIONAL INFORMATION

STATUS OF DRAWING 'U'

DISTRIBUTION OF PRINTS HTE–2, HPE–1

CUSTOMER	RAGHUGANGA HYDROPOWER LIMITED
CONSULTANT	WAPCOS LIMITED, GURGAON (A GOVT. OF INDIA UNDERTAKING)
PROJECT	RAHUGHAT HYDROELETRIC PROJECT (2x20 MW)

BHARAT HEAVY ELECTRICALS LTD. BHOPAL

	NAME	SIGN	DATE
DRN	RS		25.06.2020
CKD	ND		25.06.2020
APPD	SK		25.06.2020

DEPT HTE | CODE 402 | UNTOL.DIMS. GR. 32000049014 | SCALE NTS | WEIGHT (K.G.) –

REF. TO ASSY. DRG. – | ITEM NO. – | NO. OF ITEMS –

TITLE DIAGRAM OF CONTROL GEAR FOR COOLING WATER SYSTEM

DRAWING NO. 1 200 00 20804 | REV 02

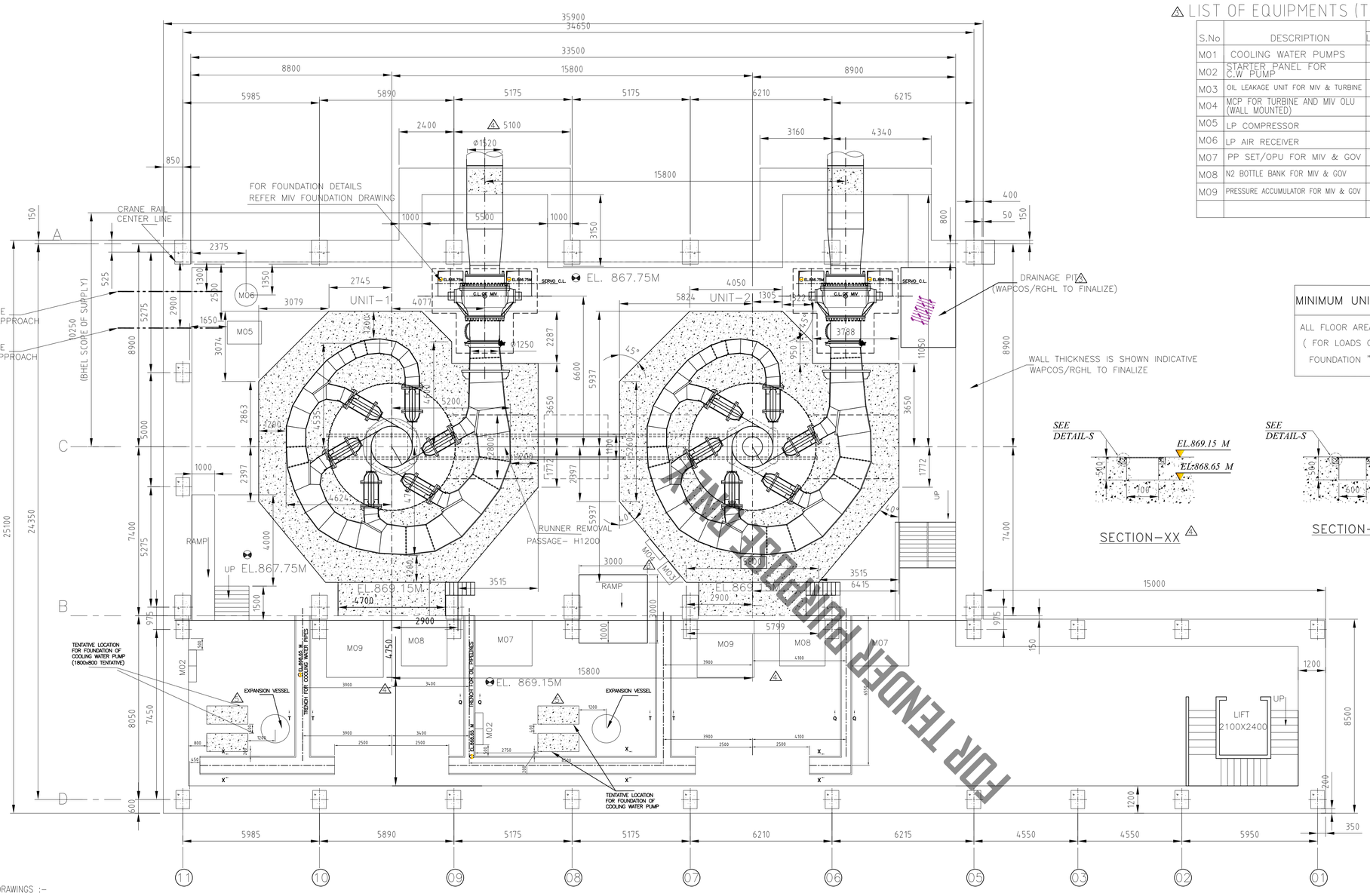
SHEET No. 01 | NO. OF SHT. 01

A1 SIZE

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO.



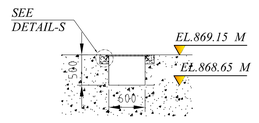
⚠ LIST OF EQUIPMENTS (TENTATIVE)

S.No	DESCRIPTION	SIZE (mm) LENGTH	WIDTH	HEIGHT	LOCATED AT	WEIGHT (KgS.)	QTY./ UNIT	TOTAL QTY.	DRG. No	REMARKS
M01	COOLING WATER PUMPS	–	–	–	EL 869.15	NA	2	4		HTE BPL
M02	STARTER PANEL FOR C.W PUMP	2X700	350	1275	EL 869.15	NA	2	4		HPE BPL
M03	OIL LEAKAGE UNIT FOR MIV & TURBINE	850	600	900	EL 867.75	NA	–	1		HTE BPL
M04	MCP FOR TURBINE AND MIV OLU (WALL MOUNTED)	1000	250	800	EL 867.75	NA	–	1		HPE BPL
M05	LP COMPRESSOR	1500	1000	1100	EL 869.15	NA	–	1		HTE BPL
M06	LP AIR RECEIVER	ø1000	–	2000	EL 869.15	NA	–	1		HTE BPL
M07	PP SET/OPU FOR MIV & GOV	2500	2000	2100	EL 867.75	NA	1	2		HPE GOV
M08	N2 BOTTLE BANK FOR MIV & GOV	2000	2000	2800	EL 867.75	NA	1	2		HPE GOV
M09	PRESSURE ACCUMULATOR FOR MIV & GOV	2500	2500	2800	EL 867.75	NA	1	2		HPE GOV

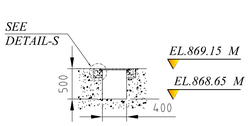
MINIMUM UNIFORMLY DISTRIBUTED LOADS ON FLOOR (IS 4247)

ALL FLOOR AREA OTHER THEN MIV FOUNDATION (EL.867.75 M) ⚠ 1.5 T/M^2
(FOR LOADS ON AREA BELOW MIV FOUNDATION REFER DRAWING " LOADS ON FOUNDATION ").

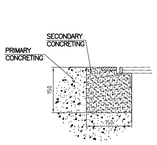
SECTION–XX ⚠



SECTION–TT ⚠



SECTION–QQ ⚠



DETAIL–S

LINKED DRAWINGS :–

SL. No.	DESCRIPTION	BHEL DWG. NO.
01	CROSS SECTION ARRANGEMENT OF POWER HOUSE	12000020851
02	STATION LAYOUT PLAN AT EL. 872.55M	12000020853
03	STATION LAYOUT PLAN AT EL. 878.00M	12000020854
04	STATION LAYOUT PLAN AT EL. 882.30M	12000020855
05	LONGITUDINAL SECTION OF POWER HOUSE	12000020356
06	GENERATOR SECTIONAL ARRGT DRG	02500008703
07	SECTION THROUGH TURBINE	02000020802
08	INSTALLATION OF TURBINE HOUSING	02021120801
09	ARRANGEMENT OF COOLING WATER SYSTEM	02292020801
10	CRANE CLEARANCE DIAGRAM OF 70/10T EOT CRANE OF PH	PE-DG-479-501-A001
11	FOUNDATION AND CUT-OUTS IN FIRST STAGE	02010020801
12	LOADS ON FOUNDATION (TURBINE)	02000020803
13	PIPES AND EMBEDMENTS IN FIRST STAGE	02010420801

MIV/TURBINE FLOOR AT EL. 867.75M

NOTES:

01. ALL DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS ARE IN METRES.
02. EQUIPMENT SHOWN AND LISTED ARE TENTATIVE AND SHALL BE FINALISED INCLUDING SIZES DURING DETAILED DESIGN.
03. FOR STAGE WISE CONCRETING AND EMBEDMENT DETAILS REFER TURBINE DRAWINGS OF BHEL.
04. FOR MIV, MIV FOUNDATION AND COUNTERWEIGHT DETAILS REFER TURBINE DRAWINGS OF BHEL.
05. SIZES OF COLUMNS/BEAMS/SLABS/STAIRS ARE INDICATIVE ONLY. FOR DETAILS REFER CIVIL CONSTRUCTION DRAWINGS.
06. ** EQUIPMENT SHALL BE SHOWN LATER AFTER FINALIZATION OF COOLING WATER DRG
07. THIS DRAWING IS INTENDED FOR SHOWING LAYOUT & CIVIL REQUIREMENTS OF FLOOR ONLY. FOR CIVIL DETAILS/EMBEDMENTS INSIDE BARREL/HOUSING RESPECTIVE SYSTEM DRAWING .
08. POWERHOUSE FLOOR DRAIN TO BE SUITABLY DESIGNED BY CIVIL.
    DRAINAGE PIT (IF REQUIRED MAY BE PLANNED SUITABLY BY WAPCOS/CIVIL.
09. THIS DRAWING IS INTENDED FOR SHOWING THE LAYOUT OF EQUIPMENTS ONLY.CIVIL DETAILS LIKE FLOOR CUTOUTS , FOUNDATION & EMBEDMENT DETAILS ,SHALL BE INCORPORATED AFTER FINALIZATION OF EQUIPMENTS DESIGN.

REV.	DATE	ALTERED / CHECKED / APPD.		ZONE	DRAWING REVISED AS PER
05	22.06.21	ALTERED	T.KHAN	⚠	WAPCOS COMMENTS
		CHECKED	S.SAHU		
		APPD.	R.S		
04	18.01.21	ALTERED	T.KHAN	⚠	REVISED CIVIL DRAWINGS
		CHECKED	S.SAHU		
		APPD.	R.S		
03	09.09.20	ALTERED	T.KHAN		CUSTOMER COMMENTS
		CHECKED	S.SAHU		
		APPD.	R.S		
02	22.06.20	ALTERED	T.KHAN		CUSTOMER COMMENTS
		CHECKED	S.SAHU		
		APPD.	R.S		
01	13.04.20	ALTERED	T.KHAN		CUSTOMER COMMENTS
		CHECKED	S.SAHU		
		APPD.	R.S		

CUSTOMER : RAGHUGANGA HYDROPOWER LIMITED

CONSULTANT WAPCOS LIMITED, GURGAON
(A GOVT. OF INDIA UNDERTAKING)

PROJECT: RAHUGHAT HYDROELETRIC PROJECT (2x20 MW)

BHARAT HEAVY ELECTRICALS LTD. BHOPAL

DEPT. CODE		NAME	SIGN	DATE	NO. OF VAR
HPE 415	DRN	T.KHAN		06.12.19	
	CKD	S.SAHU		06.12.19	
	APPD	R.S		06.12.19	

SUB–VENDOR DRG. NO. | PO REF | NO. OF ITEMS

TITLE: STATION LAYOUT PLAN AT EL. 867.75M (MIV/TURBINE FLOOR)

DRG. NO. –

SUB–VENDOR NAME | WEIGHT (kg) | SCALE 1:100

BHEL DRG. NO. 12000020852 | REV. 05

SHEET NO. 01 | NO. OF SHT. 01

A1 SIZE

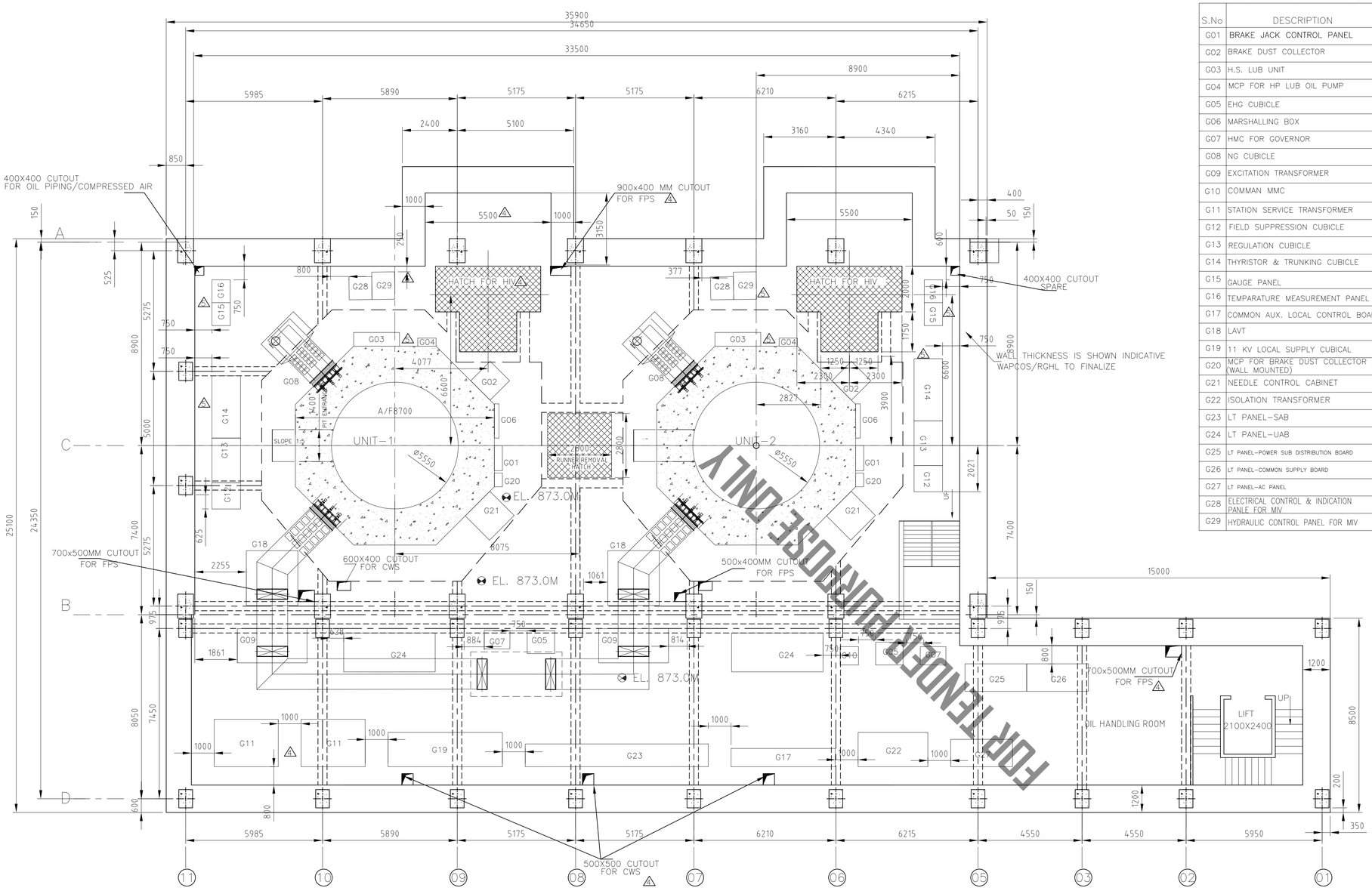
THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED
IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

FOR TENDER PURPOSE ONLY

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO.



LIST OF EQUIPMENTS (TENTATIVE)

S.No	DESCRIPTION	SIZE (mm) LENGTH	WIDTH	HEIGHT	LOCATED AT	WEIGHT (KgS.)	QTY./ UNIT	TOTAL QTY.	DRG. No.	REMARKS
G01	BRAKE JACK CONTROL PANEL	1100	350	1200	EL 872.55	NA	1	2		HGE BPL
G02	BRAKE DUST COLLECTOR	1200	1200	2500	EL 872.55	NA	1	2		HGE BPL
G03	H.S. LUB UNIT	2000	800	800	EL 872.55	NA	1	2		HGE BPL
G04	MCP FOR HP LUB OIL PUMP	600	350	800	EL 872.55	NA	1	2		HPE BPL
G05	EHG CUBICLE	1200	1000	2520	EL 872.55	NA	1	2		HPE GOV
G06	MARSHALLING BOX	1500	200	1200	EL 872.55	NA	1	2		HGE BPL
G07	HMC FOR GOVERNOR	1125	800	2800	EL 872.55	NA	1	2		HTE BPL
G08	NG CUBICLE	2200	1600	2035	EL 872.55	NA	1	2		RP
G09	EXCITATION TRANSFORMER	3050	1500	2700	EL 872.55	NA	1	2		EDN
G10	COMMAN MMC	800	800	2415	EL 872.55	NA	1	2		EDN
G11	STATION SERVICE TRANSFORMER	2800	2075	3250	EL 872.55	NA	1	2		JHS
G12	FIELD SUPPRESSION CUBICLE	1150	1250	2295	EL 872.55	NA	1	2		EDN
G13	REGULATION CUBICLE	1951	1250	2295	EL 872.55	NA	1	2		EDN
G14	THYRISTOR & TRUNKING CUBICLE	2723	1250	2995	EL 872.55	NA	–	1		EDN
G15	GAUGE PANEL	1000	800	2415	EL 872.55	NA	–	1		EDN
G16	TEMPARATURE MEASUREMENT PANEL	1000	800	2415	EL 872.55	NA	1	2		EDN
G17	COMMON AUX. LOCAL CONTROL BOARD	4555	800	2415	EL 872.55	NA	1	2		EDN
G18	LAVT	3300	2250	2500	EL 872.55	NA	1	2		RDPE
G19	11 KV LOCAL SUPPLY CUBICAL	5000	1500	2350	EL 872.55	NA	–	1		SWE
G20	MCP FOR BRAKE DUST COLLECTOR (WALL MOUNTED)	600	350	800	EL 872.55	NA	–	1		HPE
G21	NEEDLE CONTROL CABINET	1525	1500	2830	EL 872.55	NA	1	2		HTE BPL
G22	ISOLATION TRANSFORMER	3050	1500	2700	EL 872.55	NA	–	1		JHS
G23	LT PANEL-SAB	8000	1000	2350	EL 872.55	NA	–	1		HPE
G24	LT PANEL-UAB	4000	1200	2300	EL 872.55	NA	1	2		HPE
G25	LT PANEL-POWER SUB DISTRIBUTION BOARD	2700	1200	2415	EL 872.55	NA	–	1		HPE
G26	LT PANEL-COMMON SUPPLY BOARD	2700	1200	2415	EL 872.55	NA	–	1		HPE
G27	LT PANEL-AC PANEL	2700	1200	2415	EL 872.55	NA	–	1		HPE
G28	ELECTRICAL CONTROL & INDICATION PANLE FOR MIV	1000	1000	2400	EL 872.55	NA	1	2		HPE-GOV
G29	HYDRAULIC CONTROL PANEL FOR MIV	1200	1000	2500	EL 872.55	NA	1	2		HPE-GOV

MINIMUM UNIFORMLY DISTRIBUTED LOADS ON FLOOR (IS 4247)		
GENERATOR FLOOR AREAS	=	1 T/M^2

GENERATOR FLOOR AT EL. 873.0M

LINKED DRAWINGS :-

SL. No.	DESCRIPTION	BHEL DWG. NO.
01	CROSS SECTION ARRANGEMENT OF POWER HOUSE	12000020851
02	STATION LAYOUT PLAN AT EL. 867.75M (MIV/TURBINE FLOOR)	12000020852
03	STATION LAYOUT PLAN AT EL. 878.00M	12000020854
04	STATION LAYOUT PLAN AT EL. 882.30M	12000020855
05	LONGITUDINAL SECTION OF POWER HOUSE	12000020356
06	GENERATOR SECTIONAL ARRGT DRG	02500008703
07	ARRANGEMENT OF COOLING WATER SYSTEM	02292020801
08	CRANE CLEARANCE DIAGRAM OF 70/10T EOT CRANE OF PH	PE-DG-479-501-A001

NOTES:

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02. EQUIPMENT SHOWN AND LISTED ARE TENTATIVE AND SHALL BE FINALISED INCLUDING SIZES DURING DETAILED DESIGN.
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REV.	DATE	ALTERED / CHECKED / APPD.	
05	22.06.21	ALTERED	T.KHAN
		CHECKED	S.SAHU
		APPD.	R.S
ZONE	DRAWING REVISED AS PER WAPCOS COMMENTS		
04	18.01.21	ALTERED	T.KHAN
		CHECKED	S.SAHU
		APPD.	R.S
ZONE	DRAWING REVISED AS PER REVISED CIVIL DRAWINGS		
03	09.09.20	ALTERED	T.KHAN
		CHECKED	S.SAHU
		APPD.	R.S
ZONE	DRAWING REVISED AS PER CUSTOMER COMMENTS		
02	22.06.20	ALTERED	T.KHAN
		CHECKED	S.SAHU
		APPD.	R.S
ZONE	DRAWING REVISED AS PER CUSTOMER COMMENTS		
01	13.04.20	ALTERED	T.KHAN
		CHECKED	S.SAHU
		APPD.	R.S
ZONE	DRAWING REVISED AS PER CUSTOMER COMMENTS		

CUSTOMER : RAGHUGANGA HYDROPOWER LIMITED

CONSULTANT WAPCOS LIMITED, GURGAON
(A GOVT. OF INDIA UNDERTAKING)

PROJECT: RAHUGHAT HYDROELETRIC PROJECT (2x20 MW)

BHARAT HEAVY ELECTRICALS LTD. BHOPAL

DEPT. CODE		NAME	SIGN	DATE	NO. OF VAR
HPE 415	DRN	T.KHAN		06.12.19	
	CKD	S.SAHU		06.12.19	
	APPD	R.S		06.12.19	

SUB-VENDOR DRG. NO. | PO REF | NO. OF ITEMS

TITLE: STATION LAYOUT PLAN AT EL. 873.0M

DRG. NO. —

SUB-VENDOR NAME | WEIGHT (kg) | SCALE 1:100

BHEL DRG. NO. 12000020853 | REV. 05

SHEET NO. 01 | NO. OF SHT. 01

A1 SIZE

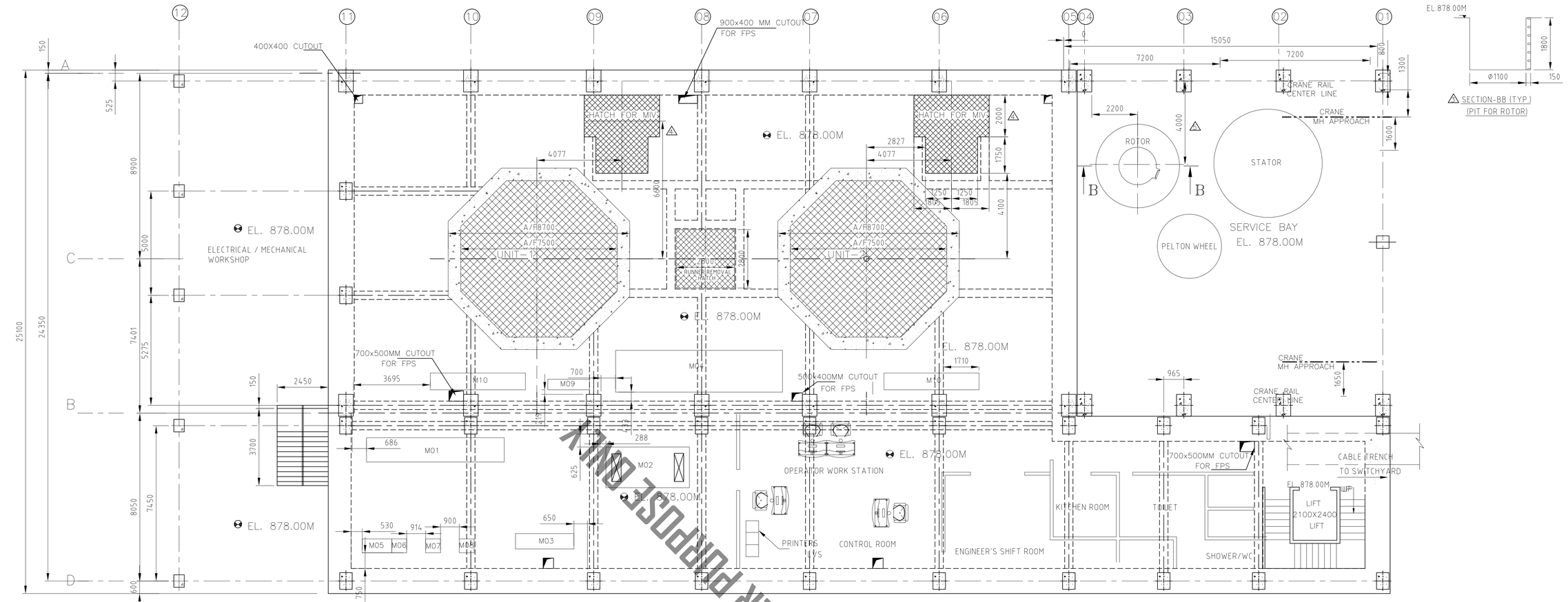
FOR TENDER PURPOSE ONLY

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FIRST ANGLE PROJECTION

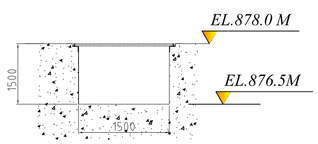
(ALL DIMENSIONS ARE IN mm)

DRG. NO.



MACHINE HALL FLOOR AT EL. 878.00M

MINIMUM UNIFORMLY DISTRIBUTED LOADS ON FLOOR(IS : 4247)
SERVICE BAY = REFER DWG. LOADS ON SERVICE BAY



⚠ SECTION–CC

LINKED DRAWINGS :–

SL. No.	DESCRIPTION	BHEL DWG. NO.
01	CROSS SECTION ARRANGEMENT OF POWER HOUSE	12000020851
02	STATION LAYOUT PLAN AT EL. 867.75M (MIV/TURBINE FLOOR)	12000020852
03	STATION LAYOUT PLAN AT EL. 872.55M	12000020853
04	STATION LAYOUT PLAN AT EL. 882.30M	12000020855
05	LONGITUDINAL SECTION OF POWER HOUSE	12000020356
06	GENERATOR SECTIONAL ARRGT DRG	02500008703
07	CRANE CLEARANCE DIAGRAM OF 70/10T EOT CRANE OF PH	PE-DG-479-501-A001
08	LOADING ON SERVICE BAY	22500008703

NOTES:

01. ALL DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS ARE IN METRES.
02. EQUIPMENT SHOWN AND LISTED ARE TENTATIVE AND SHALL BE FINALISED INCLUDING SIZES DURING DETAILED DESIGN.
03. FOR STAGE WISE CONCRETING AND EMBEDMENT DETAILS REFER TURBINE DRAWINGS OF BHEL.
04. SIZES OF COLUMNS/BEAMS/SLABS/STAIRS ARE INDICATIVE ONLY. FOR DETAILS REFER CIVIL CONSTRUCTION DRAWINGS.
05. THIS DRAWING IS INTENDED FOR SHOWING LAYOUT & CIVIL REQUIREMENTS OF FLOOR ONLY. FOR CIVIL DETAILS/EMBEDMENTS INSIDE BARREL/HOUSING RESPECTIVE SYSTEM DRAWING .
06. POWERHOUSE FLOOR DRAIN TO BE SUITABLY DESIGNED BY CIVIL.
07. THIS DRAWING IS INTENDED FOR SHOWING THE LAYOUT OF EQUIPMENTS. CIVIL DETAILS LIKE FLOOR CUTOUTS , FOUNDATION & EMBEDMENT DETAILS ,SHALL BE INCORPORATED AFTER FINALIZATION OF EQUIPMENTS DESIGN.

⚠ LIST OF EQUIPMENTS (TENTATIVE)

S.No	DESCRIPTION	SIZE (mm) LENGTH	WIDTH	HEIGHT	LOCATED AT	WEIGHT (KgS.)	QTY./ UNIT	TOTAL QTY.	DRG. No	REMARKS
M01	220KV GENERATOR CIRCUIT & RELAY PANEL				EL 878.00	NA	1	1		
M02	11KV GENERATOR CIRCUIT CUBICLES				EL 878.00	NA	1	1		
M03	SWITCHYARD CONTROL BOARD				EL 878.00	NA	1	1		
M04	CO2 CYLINDER BANK FOR FIRE PROTECTION	8000	2000	2500	EL 878.00	NA		1		
M05	PABX POWER SUPPLY				EL 878.00	NA	1	1		
M06	PABX				EL 878.00	NA	1	1		
M07	MAIN DISTRIBUTION FRAME				EL 878.00	NA	1	1		
M08	FIBER OPTICAL EQUIPMENT				EL 878.00	NA		2		
M09	PANEL FOR CO2 FIRE FIGHTING	2000	500	2300	EL 878.00	NA	1	1		
M10	UNIT CONTROL BOARD(SUIT OF 6 PANELS) ELECTRONIC PANEL(3), RELAY PANEL(1) CONTROL & METERING PANEL(1) TERMINATION PANEL(1)	4555	800	2415	EL 878.00	NA	1	2		EDN

REV.	DATE	ALTERED	T.KHAN	ZONE	DRAWING REVISED AS PER
05	22.06.21	CHECKED	S.SAHU	⚠	WAPCOS COMMENTS
		APPD.	R.S		
04	18.01.21	CHECKED	S.SAHU	⚠	REVISED CIVIL DRAWINGS
		APPD.	R.S		
03	09.09.20	CHECKED	S.SAHU	⚠	CUSTOMER COMMENTS
		APPD.	R.S		
02	22.06.20	CHECKED	S.SAHU		CUSTOMER COMMENTS
		APPD.	R.S		
01	13.04.20	CHECKED	S.SAHU		CUSTOMER COMMENTS
		APPD.	R.S		

CUSTOMER : RAGHUGANGA HYDROPOWER LIMITED

CONSULTANT WAPCOS LIMITED, GURGAON
(A GOVT. OF INDIA UNDERTAKING)

PROJECT: RAHUGHAT HYDROELETRIC PROJECT (2x20 MW)

BHARAT HEAVY ELECTRICALS LTD. BHOPAL

DEPT. CODE		NAME	SIGN	DATE	NO. OF VAR
HPE 415	DRN	T.KHAN		06.12.19	
	CKD	S.SAHU		06.12.19	
	APPD	R.S		06.12.19	

SUB-VENDOR DRG. NO. | PO REF | NO. OF ITEMS

TITLE: STATION LAYOUT PLAN AT EL. 878.00M

DRG. NO. –

SUB-VENDOR NAME | WEIGHT (kg) | SCALE 1:100

BHEL DRG. NO. 12000020854 | REV. 05

SHEET NO. 01 | NO. OF SHT. 01

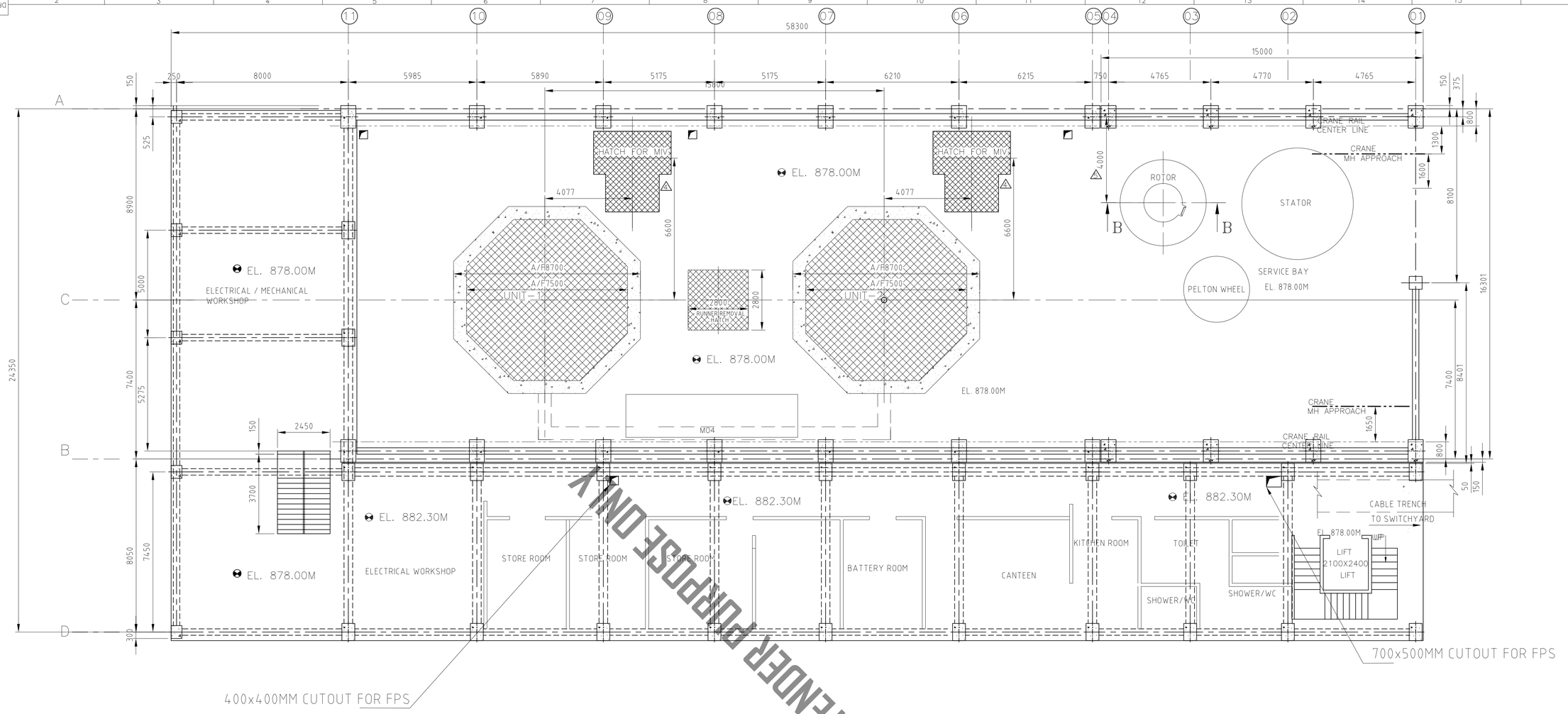
A1 SIZE

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FIRST ANGLE PROJECTION

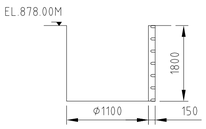
(ALL DIMENSIONS ARE IN mm)

DRG. NO.



FOR TENDER PURPOSE ONLY

MINIMUM UNIFORMLY DISTRIBUTED LOADS ON FLOOR(IS : 4247)
SERVICE BAY = REFER DWG. LOADS ON SERVICE BAY



⚠ SECTION-BB (TYP.)
(PIT FOR ROTOR)

LINKED DRAWINGS :-

SL. No.	DESCRIPTION	BHEL DWG. NO.
01	CROSS SECTION ARRANGEMENT OF POWER HOUSE	12000020851
02	STATION LAYOUT PLAN AT EL. 867.75M (MIV/TURBINE FLOOR)	12000020852
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07	CRANE CLEARANCE DIAGRAM OF 70/10T EOT CRANE OF PH	PE-DC-479-501-A001

NOTES:

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REV.	DATE			ZONE	DRAWING REVISED AS PER
05	22.06.21	ALTERED	T.KHAN	⚠3	WAPCOS COMMENTS
		CHECKED	S.SAHU		
		APPD.	R.S		
04	18.01.21	ALTERED	T.KHAN	⚠4	REVISED CIVIL DRAWINGS
		CHECKED	S.SAHU		
		APPD.	R.S		
03	09.09.20	ALTERED	T.KHAN	⚠6	CUSTOMER COMMENTS
		CHECKED	S.SAHU		
		APPD.	R.S		
02	22.06.20	ALTERED	T.KHAN		CUSTOMER COMMENTS
		CHECKED	S.SAHU		
		APPD.	R.S		
01	13.04.20	ALTERED	T.KHAN		CUSTOMER COMMENTS
		CHECKED	S.SAHU		
		APPD.	R.S		

CUSTOMER : RAGHUGANGA HYDROPOWER LIMITED

CONSULTANT: WAPCOS LIMITED, GURGAON
(A GOVT. OF INDIA UNDERTAKING)

PROJECT: RAHUGHAT HYDROELETRIC PROJECT (2x20 MW)

BHARAT HEAVY ELECTRICALS LTD. BHOPAL

DEPT. CODE		NAME	SIGN	DATE	NO. OF VAR
HPE 415	DRN	T.KHAN		06.12.19	
	CKD	S.SAHU		06.12.19	
	APPD	R.S		06.12.19	

SUB-VENDOR DRG. NO. | PO REF | NO. OF ITEMS

TITLE: STATION LAYOUT PLAN AT EL. 882.30M

DRG. NO. –

SUB-VENDOR NAME | WEIGHT (kg) | SCALE 1:100

BHEL DRG. NO. 12000020855 | REV. 05

SHEET NO. 01 | NO. OF SHT. 01

A1 SIZE

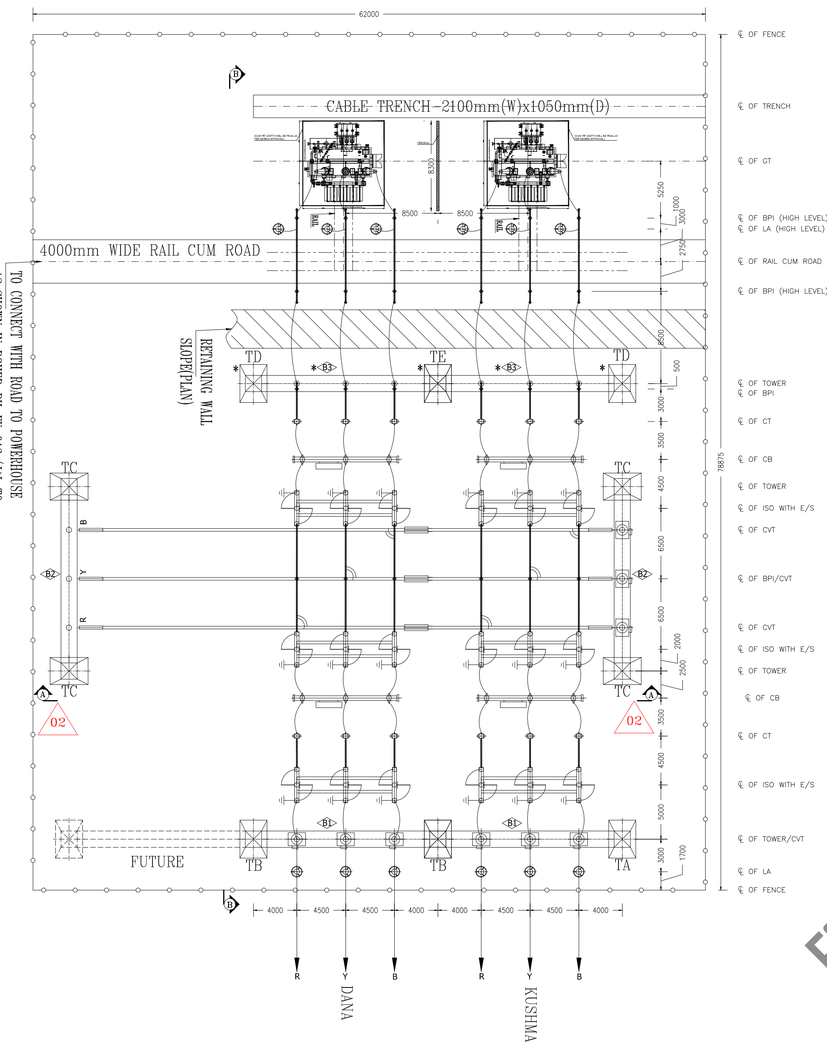
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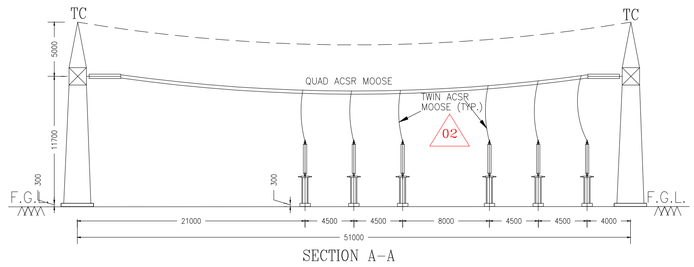
SIGN. & DATE | REF. DRG. NO. | INVENTORY NO.

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MM.)

DRAWING No. TB-1-410-316-002

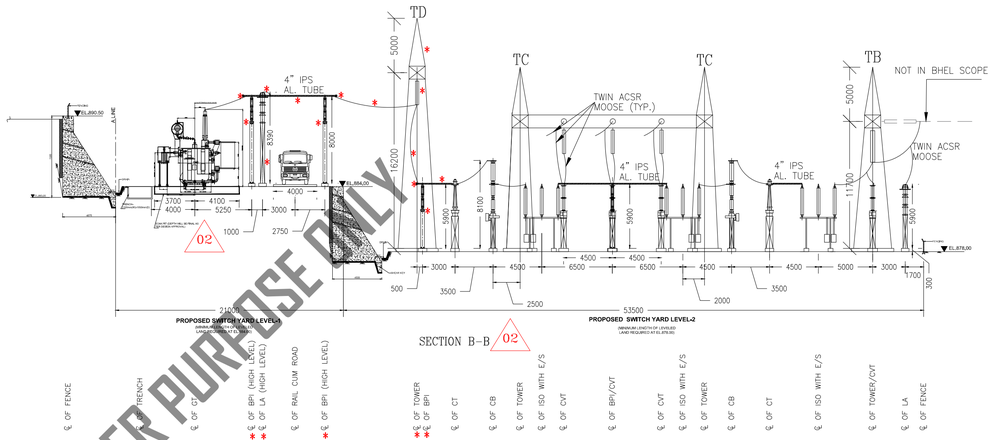
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SECTION A-A

MINIMUM CLEARANCE TABLE	220kV
PHASE TO PHASE (PP) (mm)	2100
PHASE TO EARTH (PE) (mm)	2100
SECTION CLEARANCE (SC) (mm)	5000
HEIGHT OF TUBE CENTRE LINE OF FIRST LEVEL (MIN.) MM. (FROM PLINTH LEVEL)	5900
GROUND CLEARANCE TO NEAREST PART NOT AT EARTH POTENTIAL OF AN INSULATOR SUPPORTING LIVE CONDUCTOR	2550



SECTION B-B 02

FOR TENDER PURPOSE ONLY

02 TOWER DETAIL :-

TOWERS DESIGNATION	STR. HEIGHT DETAIL FROM PLINTH TOP (m)	DEVIATION(H/V) (Degree)	TYPE	MAIN QUANTITY (NOS.)	ADDITIONAL * QUANTITY (NOS.)
TA	11.7+5(P)=16.7m	±15°	END	01	--
TB	11.7+5(P)=16.7m	±15°	END/MIDDLE	02	--
TC	11.7+5(P)=16.7m	±15°	END	04	--
TD	16.2+5(P)=21.2m	±15°	END	--	02
TE	16.2+5(P)=21.2m	±15°	MIDDLE	--	01
			TOTAL NO. OF TOWERS	07	03

02 BEAM DETAIL :-

BEAM TYPE	BEAM SPAN	DEVIATION(H/V) (Degree)	MAIN QUANTITY (NOS.)	ADDITIONAL * QUANTITY (NOS.)
B1	17m	±15°	02	--
B2	17m	±15°	02	--
B3	17m	±15°	--	02
	TOTAL NO. OF BEAMS		04	02

SWITCHYARD EQUIPMENT -BILL OF QUANTITY:- 02

S.NO.	DESCRIPTION	SYMBOLS	UNIT	QTY.	ADDITIONAL QTY.*
1.	220kV, 2000A, 40kA FOR 1 SECOND SF6 CIRCUIT BREAKER - 3PH		NOS	4	--
2.	220kV, 1600A, 40kA FOR 1 SECOND DISCONNECTOR WITH ONE EARTH SWITCH - 3PH		NOS	06	--
3.	220kV, 2400A, 40kA FOR 1 SECOND CURRENT TRANSFORMER - 1PH		NOS	12	--
4.	220kV, 4400pF, CAPACITIVE VOLTAGE TRANSFORMER FOR BUS AND LINE - 1PH		NOS	09	--
5.	216kV, 20kA, CLASS-IV, SURGE ARRESTER - 1PH		NOS	12	--
6.	220kV BUS POST INSULATOR - 1PH		NOS	06	18
7.	26 MVA, 11/220 KV GENERATOR STEP UP TRANSFORMER		NOS	02	--

NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. ALL STRUCTURE/CONDUCTOR HEIGHTS ARE ABOVE PLINTH LEVEL. PLINTH LEVEL IS 300 MM ABOVE F.G.L.
3. TYPE OF GANTRY STRUCTURES SHALL BE AS PER APPROVED STRUCTURAL LAYOUT DRAWING.
4. SWITCHYARD LIGHTNING PROTECTION IS ACHIEVED THROUGH SHIELD WIRES AS PER APPROVED DSLP.
5. SA PRESSURE RELIEF VALVE SHALL NOT BE TOWARDS TRANSFORMER SIDE / ANY EQUIPMENT KEPT NEAR LIGHTING ARRESTER AND BHEL SHALL ENSURE THE SAME DURING ERECTION AT SITE.
6. DEAD END TOWERS LOCATION TO BE CONFIRMED BY CUSTOMER.
7. TRENCH DETAILS SHALL BE AS PER APPROVED TRENCH LAYOUT.
8. ALL RIGID CONNECTIONS ARE 4 INCH ALUMINIUM TUBE AND ALL FLEXIBLE CONNECTION ARE TWIN ACSR MOOSE
9. 02 THE SWITCHYARD AREA WITHIIN FENCE SHALL BE FILLED WITH 150/100MM THICK GRAVELS TO RESTRICT THE GROWTH OF GRASS IN OUTDOOR SWITCHYARD. THE GRAVEL SHALL CONSIST OF 75/50MM THICK OF 40MM STONE SIZE ON THE TOP AND 75/50MM THICK OF 20MM STONE SIZE BELOW. EACH LAYER SHALL BE COMPACTED BY ½ TON ROLLER WITH 4-5 PASSES AND SUITABLE WATER SPRINKLER. BEFORE LAYING THE GRAVEL FILL, THE TOP LAYER OF THE SOIL SHALL BE TREATED FOR ANTI-WEED CONSIDERING THE TYPE OF WEEDS FOUND IN THE VICINITY.

NOTES FOR ADDITIONAL QUANTITY OF MATERIAL:

02 1. ADDITIONAL QUANTITY AS MARKED IN BOQ & AS MARKED WITH * IN PLAN & SECTION VIEW IS REQUIRED TO BE PROVIDED DUE TO CHANGE SUGGESTED BY CUSTOMER IN LAND AREA TO BE PROVIDED FOR SWITCHYARD. THIS QUANTITY WILL BE SUPPLIED WITH ADDITIONAL COST IMPLICATION. SUITABLE AMENDMENT IN CONTRACT IS REQUIRED FOR PROCUREMENT OF ADDITIONAL QUANTITY.

02 2. DETAILED BOQ OF STRING INSULATOR HARDWARE, CORONA BELL, 4 INCH ALUMINIUM TUBE, ACSR MOOSE CONDUCTOR, EQUIPMENT FIXING STRUCTURE, CLAMP & CONNECTOR, EARTHING MATERIAL, SHIELD WIRE ETC. FOR ITEMS/CONNECTIONS MARKED * WILL BE GIVEN SEPARATELY FOR CONTRACT AMENDMENT AFTER APPROVAL OF THIS LAYOUT.

02 REFERENCE CIVIL DRAWING (FROM JAL):

RGHEP-PH-EX-013 TO RGHEP-PH-EX-017B: POWER HOUSE COMPLEX SWITCHYARD HILL SLOPE PROTECTION DETAILS OF RETAINING WALL

NOA NO.	WAP/HYDRO/BHEL-RAGHUGHAT/NP/2019/266 DATED 04.12.19
ADDITIONAL INFORMATION W.O.No.	
STATUS OF DRAWING	
DISTRIBUTION OF PRINTS	
ग्राहक/परियोजना का नाम NAME OF CUSTOMER/PROJECT	RAGHUGANGA POWER LIMITED RAGHUGHAT HYDRO ELECTRIC PROJECT (2X20MW)

भारत हेवी इलेक्ट्रिकल्स लिमिटेड
भारी विद्युतिकरण परियोजना विभाग
BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION PROJECTS DIVISION

	नाम /NAME	हस्ता./SIGN.	दि./DATE
बनाया DRAWN	NS		17-01-20
जाँचा CHECKED	SKS		17-01-20
स्वीकृत APPROVED	AG		17-01-20

विभाग DEPT. कोड CODE	अनुपात / SCALE	कार्ड कोड CARD CODE	CONSULTANT WAPCOS LIMITED

शीर्षक/TITLE: 220kV SWITCHYARD LAYOUT AND SECTION

ड्राइंग क्र./DRAWING NO.: TB-1-410-316-002 पुनः/REV.: 02

पृष्ठ क्र./SHEET No. 01 अगला पृष्ठ/NEXT SHEET --

REV.	DATE	ALTERED / CHECKED / APPROVED	ZONE
02	13-05-21	ALTERED SS; CHECKED SKS; APPROVED AG	REVISED AS PER WAP/Hydro/Rahu/EM/2020/62 dated 27.08.2020 AND TOUR INSPECTION REPORT JAL: RGHEP: CIVIL: 2021: 013 DATED 13.03.2021
01	09-07-20	ALTERED NS; CHECKED SKS; APPROVED AG	

COMPUTER DRG. PATH NAME :
REF. DRG. No.
SIGN. & DATE
INVENTORY No.

FIRST ANGLE PROJECTION

SCALE : NTS

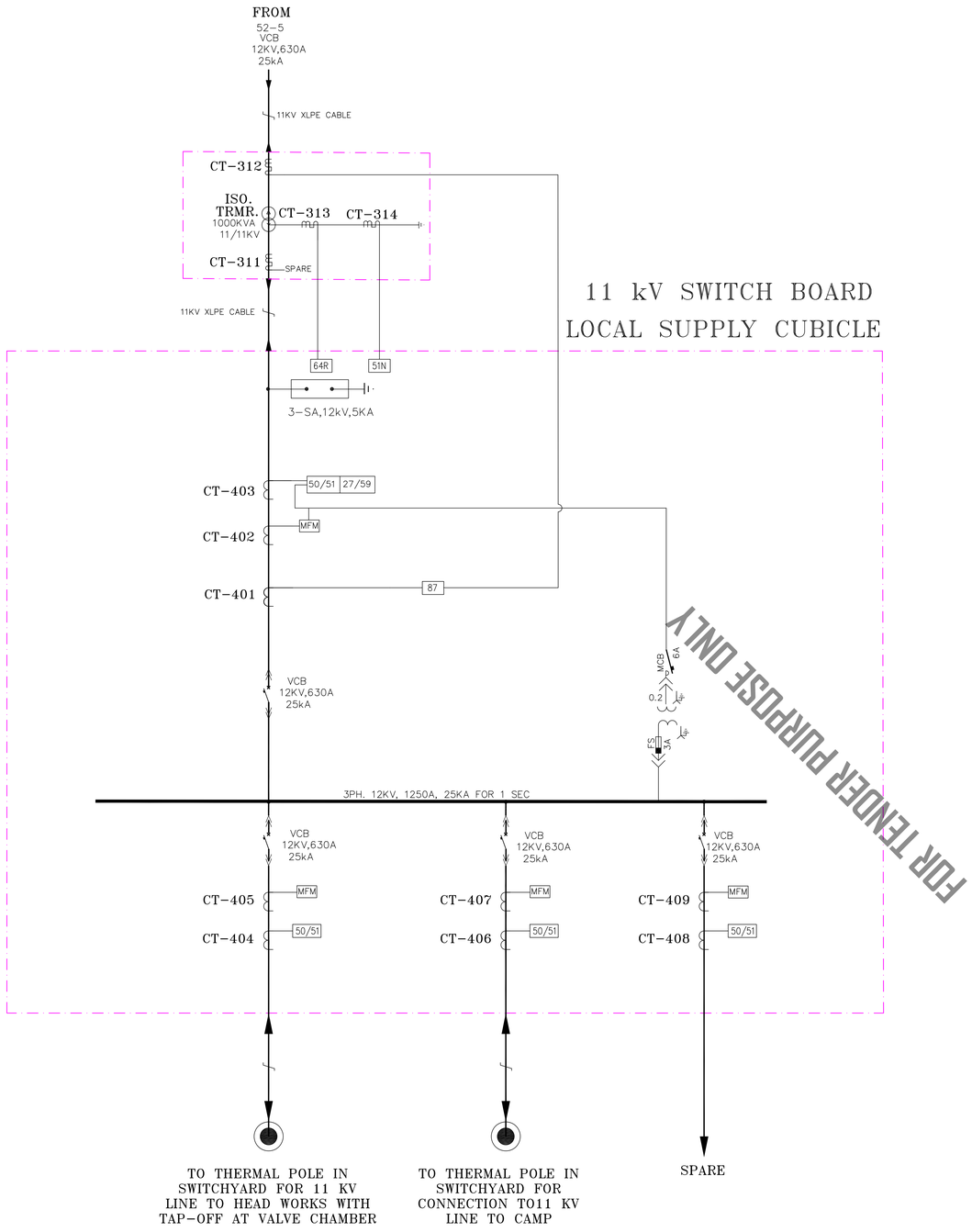
DRG. NO. 12920073001

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IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

REF. DRG. NO.

SIGN. & DATE

INVENTORY NO.



NOTES :- – ALL CTs AND PTs ARE OF SINGLE PHASE.

– * NEAREST POLE DISTANCE FROM 11 kV LOCAL SUPPLY CUBICLE CONSIDERED TO BE 100 m

PROTECTION RELAYS-DEVICE FUNCTION

DEVICE NO.	FUNCTION
27	UNDER VOLTAGE PROTECTION
50/51	INST. & IDMT O/C PROTECTION
51N	E/F PROTECTION
59	OVERVOLTAGE PROTECTION
64R	R.E.F. PROTECTION
87	OVERALL DIFFERENTIAL PROTECTION

SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION
	VOLTAGE TRANSFORMER		ISOLATOR		INDICATING METER ELECTROMAGNETIC
CT	CURRENT TRANSFORMER		BUSHING CURRENT TRANSFORMER	TRD	TRANSDUCER / MULTI FUNCTION TRANSDUCER
	TRANSFORMER		RELAY		INDICATING METER DIGITAL
	CIRCUIT BREAKER (D.C)	DLK/SLK	DISCONNECTING LINK/ SHORTING LINK		RECORDING METER
	GENERATOR	SC	SURGE CAPACITOR		RESISTOR
		SA/LA	LIGHTENING/ SURGE ARRESTER		11 kV POLE

LEGEND	DESCRIPTION	LEGEND	DESCRIPTION
VCB	VACUUM CIRCUIT BREAKER	MFM	MULTIFUNCTION METER
MCB	MINIATURE CIRCUIT BREAKER	SC	SURGE CAPACITOR
A	AMMETER	VT	VOLTAGE TRANSFORMER
V	VOLTMETER	CT	CURRENT TRANSFORMER
PF	POWER FACTOR METER		
WM	MEGAWATT METER		
MVAR	MEGAVAR METER		
F	FREQUENCY METER		
KWH	KILOWATT HOUR METER		
KVARH	KILOVAR HOUR METER		

CT DETAILS:-

NO.	CIRCUIT	RATIO	ACC. CLASS	BURDEN VA	KNEE POINT VOLTAGE Vkp(V)	MAG. CURRENT Im A	PHYSICAL LOCATION
11KV CTS							
CT-311	SPARE	100/1A	0.5	10VA	–	–	ISO. TRMR.
CT-312	DIFFERENTIAL PROTECTION ISOLATION TRMR. (87)	100/1A	PS	–	>32Rct +30	30mA AT Vkp/2	ISO. TRMR.
CT-313	PROTECTION ISOLATION TRANSFORMER	100/1A	PS	–	>32Rct +30	30mA AT Vkp/2	ISO. TRMR.
CT-314	PROTECTION ISOLATION TRANSFORMER	100/1A	5P20	10VA	–	–	ISO. TRMR.
CT-401	DIFFERENTIAL PROTECTION ISOLATION TRMR. (87)	100/1A	PS	–	>32Rct +30	30mA AT Vkp/2	LSC
CT-402	METERING	100/1A	0.5	10VA	–	–	LSC
CT-403	INSTANTANEOUS & IDMT O/C	100/1A	5P20	10VA	–	–	LSC
CT-404	PROTECTION	30/1A	5P20	10VA	–	–	LSC
CT-405	METERING	30/1A	0.5	10VA	–	–	LSC
CT-406	PROTECTION	30/1A	5P20	10VA	–	–	LSC
CT-407	METERING	30/1A	0.5	10VA	–	–	LSC
CT-408	PROTECTION	30/1A	5P20	10VA	–	–	LSC
CT-409	METERING	30/1A	0.5	10VA	–	–	LSC

VT DETAILS :-

NO.	CIRCUIT	QTY/ UNIT	RATIO V/V	ACCURACY CLASS	BURDEN VA	PHASE	PHYSICAL LOCATION
11KV VTs							
VT	METERING	3	11000/√3 / 110/√3	0.5	50	1PH	11 kV LOCAL SUPPLY CUBICLE

REV.	DATE	ALTERED	–
–	–	CHECKED	–
		APPROVED	–

–

RAGHUGANGA HYDROPOWER LIMITED

CONSULTANT
WAPCOS LIMITED

BHARAT HEAVY ELECTRICALS LTD.
BHOPAL, INDIA
(A GOVT OF INDIA UNDERTAKING)

	NAME	SIGN	DATE
PREPARED	NARESH		06.08.2020
DESIGNED	PS		06.08.2020
CHECKED	WG		06.08.2020
APPROVED	RMP		06.08.2020

PROJECT
2 x 20 MW – RAHUGHAT HYDROELECTRIC PROJECT, NEPAL

DEPT. HSE
CODE 415

TITLE
SINGLE LINE DIAGRAM
11 kV LOCAL SUPPLY CUBICLE

DWG. NO. 12920073002

REV. OO

SHEET 01 OF 01

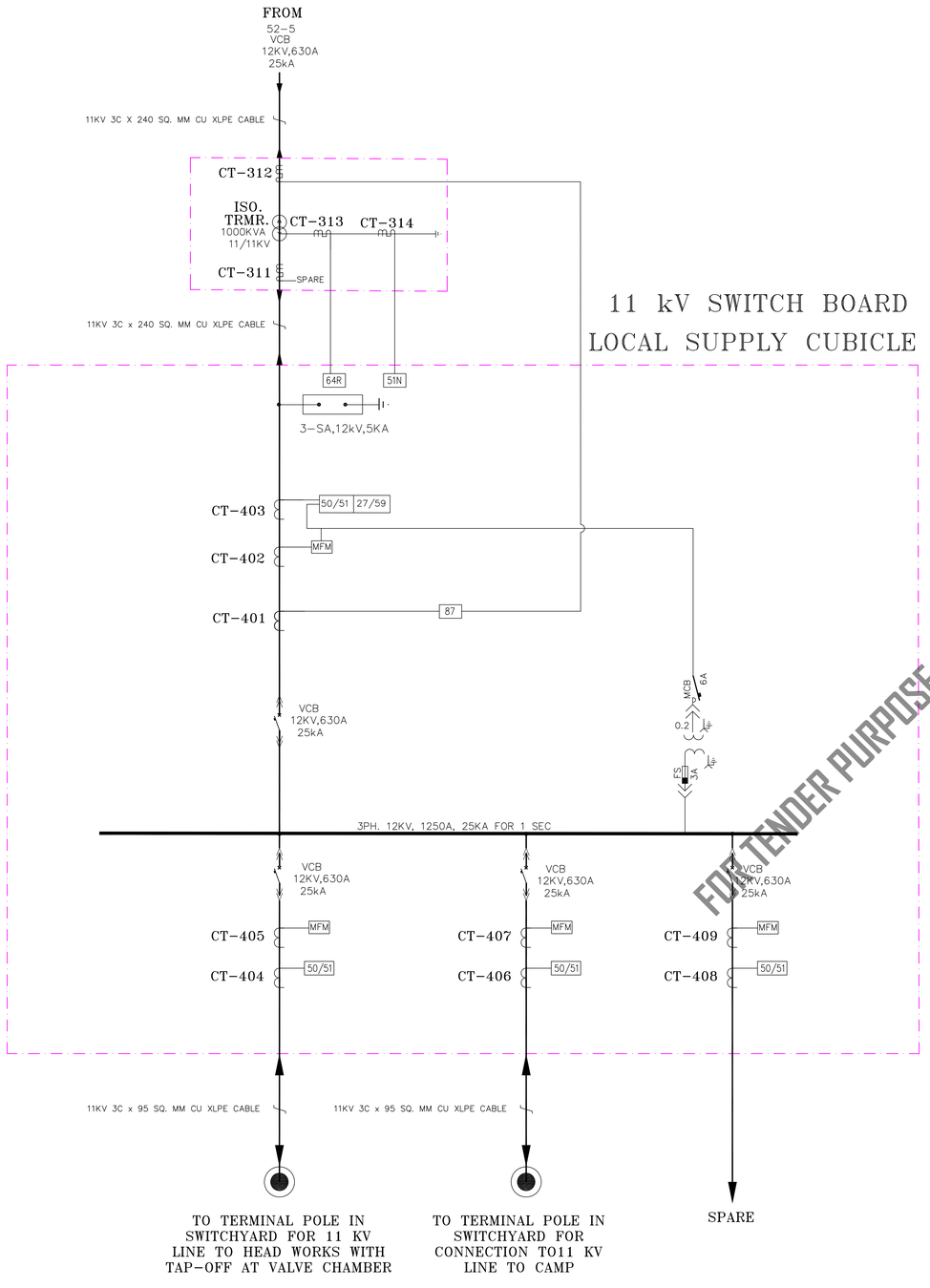
A1 SIZE

FIRST ANGLE PROJECTION

SCALE : NTS

DRG. NO. 1292007300 1

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IT MUST NOT BE USED DIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.



NOTES :- – ALL CTs AND PTs ARE OF SINGLE PHASE.

– * NEAREST POLE DISTANCE FROM 11 kV LOCAL SUPPLY CUBICLE CONSIDERED TO BE 100 m

PROTECTION RELAYS-DEVICE FUNCTION

DEVICE NO.	FUNCTION
27	UNDER VOLTAGE PROTECTION
50/51	INST. & IDMT O/C PROTECTION
51N	E/F PROTECTION
59	OVERVOLTAGE PROTECTION
64R	R.E.F. PROTECTION
87	OVERALL DIFFERENTIAL PROTECTION

SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION
			ISOLATOR		INDICATING METER ELECTROMAGNETIC
VT	VOLTAGE TRANSFORMER		BUSHING CURRENT TRANSFORMER	TRD	TRANSDUCER / MULTI FUNCTION TRANSDUCER
CT	CURRENT TRANSFORMER				INDICATING METER DIGITAL
	TRANSFORMER		RELAY		RECORDING METER
	CIRCUIT BREAKER (D.C)	FS	FUSE		RESISTOR
	GENERATOR	DLK/SLK	DISCONNECTING LINK/ SHORTING LINK		11 kV POLE
		SC	SURGE CAPACITOR		
		SA/LA	LIGHTENING/ SURGE ARRESTER		

LEGEND	DESCRIPTION	LEGEND	DESCRIPTION
VCB	VACUUM CIRCUIT BREAKER	MFM	MULTIFUNCTION METER
MCB	MINIATURE CIRCUIT BREAKER	SC	SURGE CAPACITOR
A	AMMETER	VT	VOLTAGE TRANSFORMER
V	VOLTMETER	CT	CURRENT TRANSFORMER
PF	POWER FACTOR METER		
WH	MEGAWATT METER		
MVAR	MEGAVAR METER		
F	FREQUENCY METER		
KWH	KILOWATT HOUR METER		
KVARH	KILOVAR HOUR METER		

CT DETAILS:-

NO.	CIRCUIT	RATIO	ACC. CLASS	BURDEN VA	KNEE POINT VOLTAGE Vkp(V)	MAG. CURRENT Im A	PHYSICAL LOCATION
11KV CTS							
CT-311	SPARE	100/1A	0.5	10VA	–	–	ISO. TRMR.
CT-312	DIFFERENTIAL PROTECTION ISOLATION TRMR. (87)	100/1A	PS	–	>32Rct +30	30mA AT Vkp/2	ISO. TRMR.
CT-313	PROTECTION ISOLATION TRANSFORMER	100/1A	PS	–	>32Rct +30	30mA AT Vkp/2	ISO. TRMR.
CT-314	PROTECTION ISOLATION TRANSFORMER	100/1A	5P20	10VA	–	–	ISO. TRMR.
CT-401	DIFFERENTIAL PROTECTION ISOLATION TRMR. (87)	100/1A	PS	–	>32Rct +30	30mA AT Vkp/2	LSC
CT-402	METERING	100/1A	0.5	10VA	–	–	LSC
CT-403	INSTANTANEOUS & IDMT O/C	100/1A	5P20	10VA	–	–	LSC
CT-404	PROTECTION	30/1A	5P20	10VA	–	–	LSC
CT-405	METERING	30/1A	0.5	10VA	–	–	LSC
CT-406	PROTECTION	30/1A	5P20	10VA	–	–	LSC
CT-407	METERING	30/1A	0.5	10VA	–	–	LSC
CT-408	PROTECTION	30/1A	5P20	10VA	–	–	LSC
CT-409	METERING	30/1A	0.5	10VA	–	–	LSC

VT DETAILS :-

NO.	CIRCUIT	QTY/ UNIT	RATIO V/V	ACCURACY CLASS	BURDEN VA	PHASE	PHYSICAL LOCATION
11KV VTs							
VT	METERING	3	11000/√3 /110/√3	0.5	50	1PH	11 kV LOCAL SUPPLY CUBICLE

RAGHUGANGA HYDROPOWER LIMITED

CONSULTANT
WAPCOS LIMITED

BHARAT HEAVY ELECTRICALS LTD.
BHOPAL, INDIA
(A GOVT OF INDIA UNDERTAKING)

	NAME	SIGN	DATE
PREPARED	NARESH		25.02.2021
DESIGNED	PS		25.02.2021
CHECKED	VKG		25.02.2021
APPROVED	RMP		25.02.2021

REV.	DATE	ALTERED	–
–	–	CHECKED	–
		APPROVED	–

PROJECT
2 x 20 MW – RAHUGHAT HYDROELECTRIC PROJECT, NEPAL

DEPT. HPE
CODE 415

TITLE
SINGLE LINE DIAGRAM
11 kV LOCAL SUPPLY CUBICLE

DWG. NO. 12920073002 REV. 01

SHEET 01 OF 01

A1 SIZE

REF. DRG. NO.
SIGN. & DATE
INVENTORY NO.

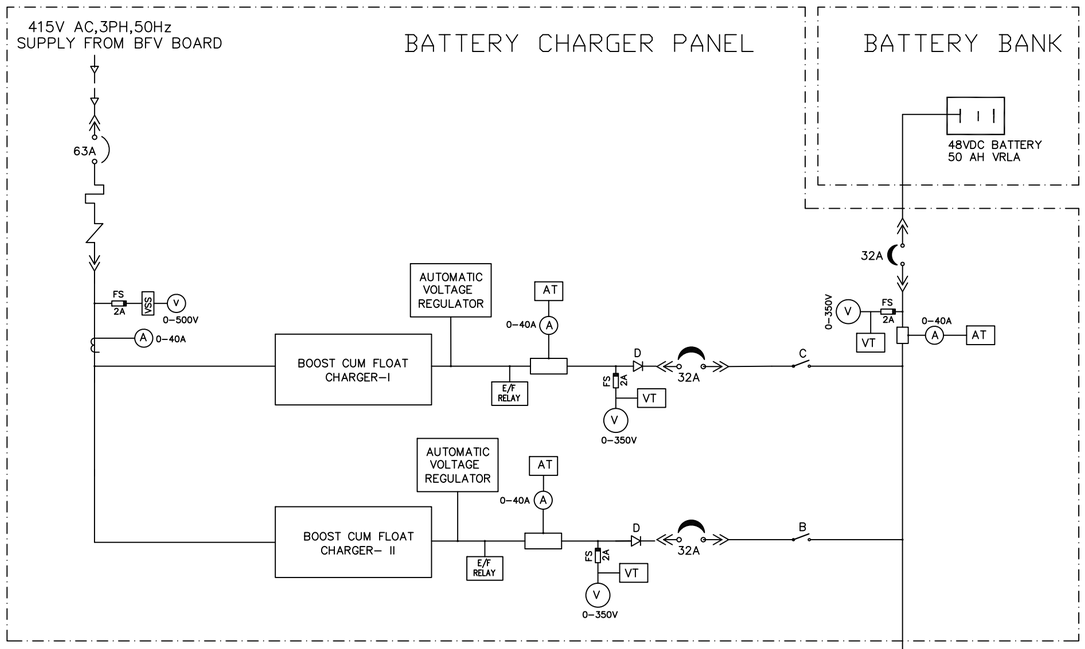
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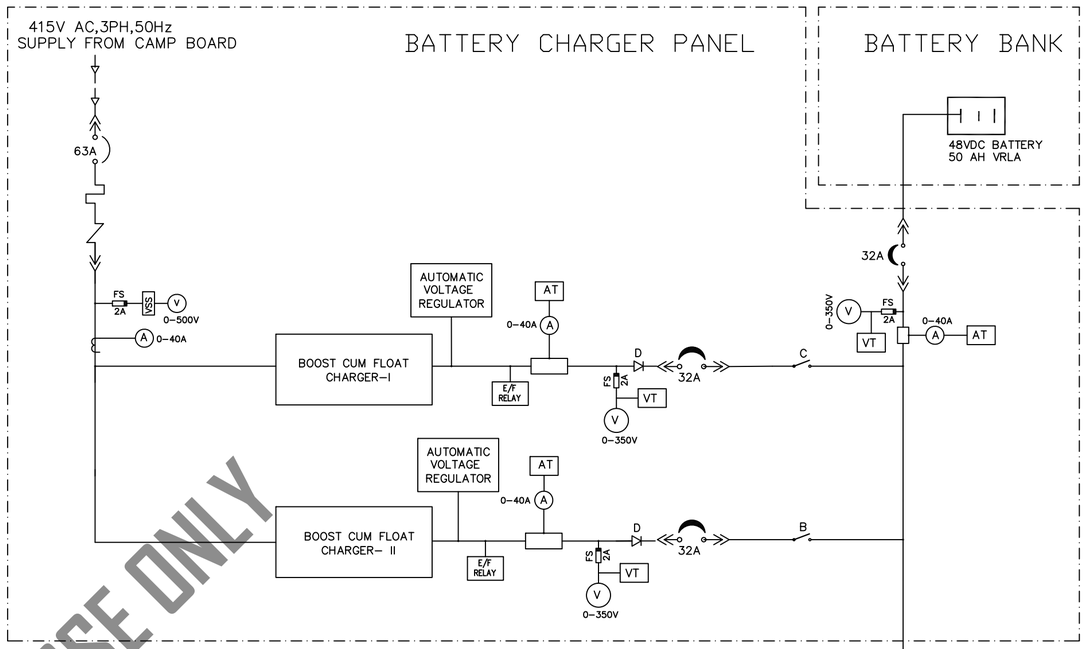
SCALE : NTS

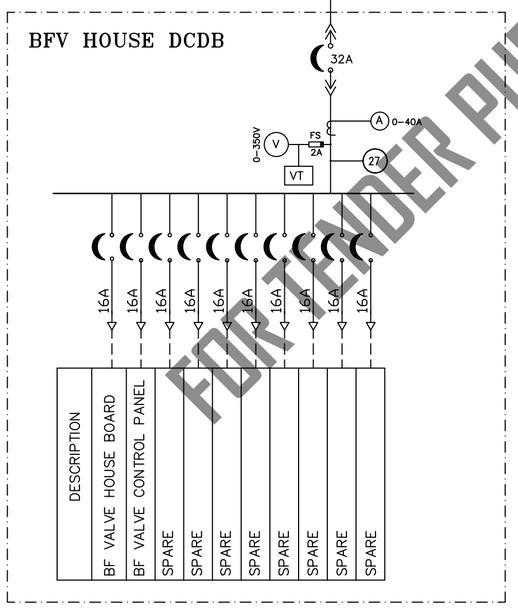
DRG. NO.

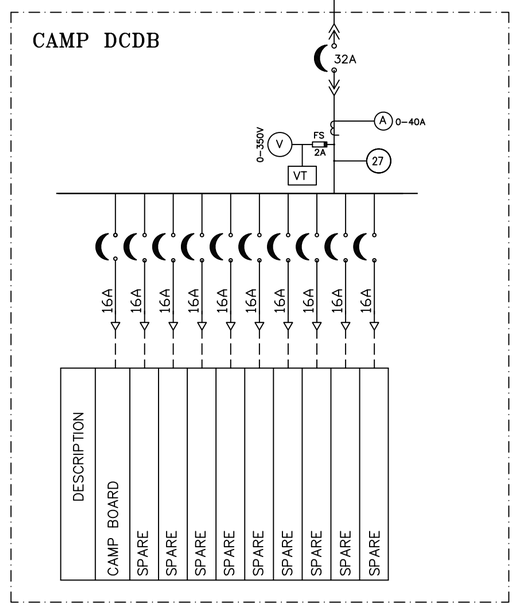
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INVENTORY NO. | SIGN. & DATE | REF. DRG. NO.









FOR TENDER PURPOSE ONLY

SYMBOLS	DESCRIPTION
	MOULDED CASE CIRCUIT BREAKER WITH FIXED SHORT CKT. & ADJUSTABLE THERMAL RELEASE (MCCB)
D	BLOCKING DIODE
A	AMMETER WITH SHUNT
FS	FUSE
	DISCONNECTING LINK
CT	CURRENT TRANSFORMER
SW	CHANGEOVER SWITCH
	DC MCCB (2 POLES) WITH FIXED SHORT CKT. & FIXED THERMAL RELEASE
	DRAWOUT
	NORMALLY OPEN CONTACTS

DEVICE NO.	DESCRIPTION
27	UNDERVOLTAGE RELAY

LEGEND	DESCRIPTION	LEGEND	DESCRIPTION
CT	CURRENT TRANSFORMER	MCCB	MOULDED CASE CIRCUIT BREAKER
A	AMMETER	AT	AMMETER TRANSDUCER
V	VOLTMETER	VT	VOLTAGE TRANSDUCER
VSS	VOLTMETER SELECTOR SWITCH	B	BOOST CONTACTOR(MAIN)
		C	FLOAT CONTACTOR(MAIN)

NOTE : 1. CONFIGURATION OF BATTERY CHARGER IS TYPICAL & SUBJECT TO CHANGE AS PER DETAILED DESIGN OF VENDOR.
2. RATING OF BATTERY CHARGER EQUIPMENT WILL BE GIVEN AFTER DETAILED DESIGN BY VENDOR.
3.FEEDERS RATING OF DISTRIBUTION BOARD MAY CHANGE AS PER FINAL APPROVED RATING OF EQUPS.

RAGHUGANGA HYDROPOWER LIMITED

CONSULTANT
WAPCOS LIMITED

BHARAT HEAVY ELECTRICALS LTD.
BHOPAL, INDIA
(A GOVT OF INDIA UNDERTAKING)

	NAME	SIGN	DATE
PREPARED	NARESH		09.12.20
DESIGNED	VKG		09.12.20
CHECKED	VKG		09.12.20
APPROVED	RNP		09.12.20

REV.	DATE		
–	–	ALTERED	–
		CHECKED	–
		APPROVED	–

PROJECT
2 x 20 MW – RAHUGHAT HYDROELECTRIC PROJECT, NEPAL

DEPT. HPE
CODE 415

TITLE
SINGLE LINE DIAGRAM FOR
48VDC SYSTEM FOR BF VALVE HOUSE AND CAMP

DWG. NO. 12900073007

REV. 00

SHEET 01 OF 01

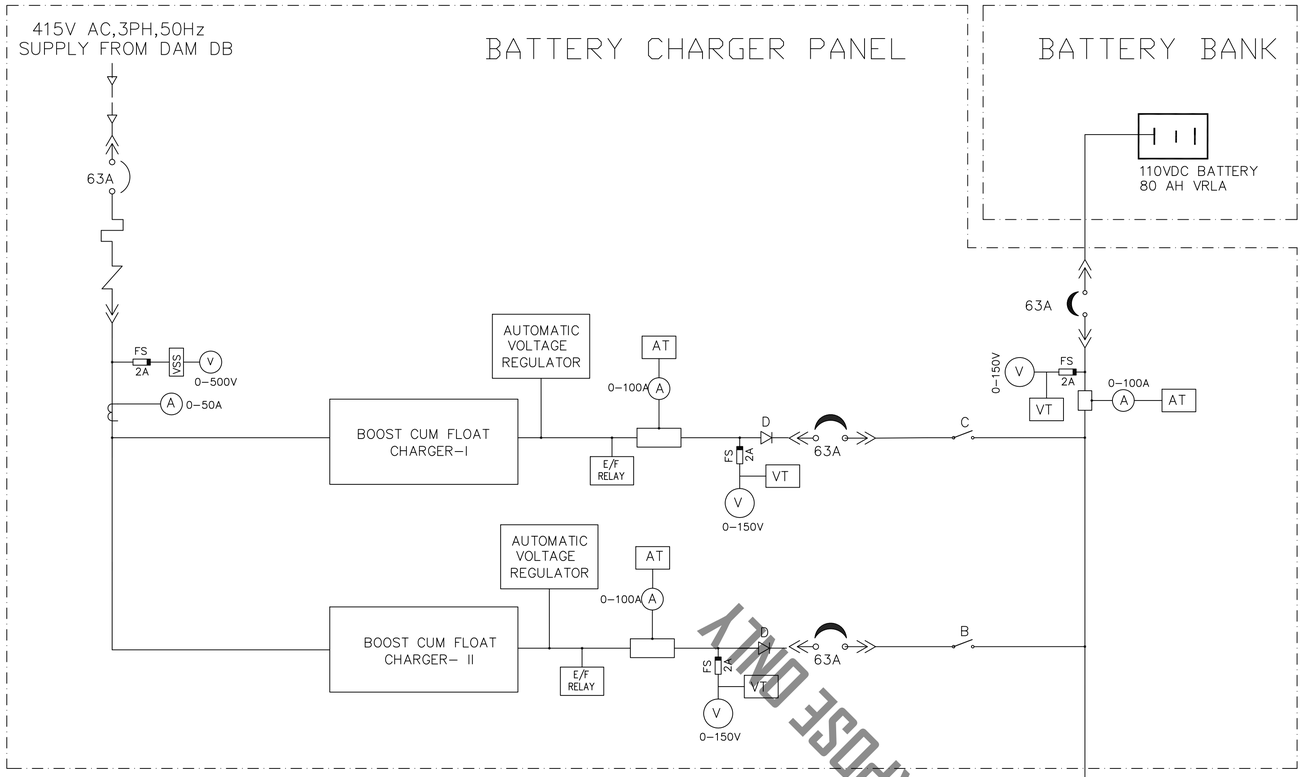
A1 SIZE

FIRST ANGLE PROJECTION

SCALE : NTS

DRG. NO.

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SYMBOLS	DESCRIPTION
	MOULDED CASE CIRCUIT BREAKER WITH FIXED SHORT CKT. & ADJUSTABLE THERMAL RELEASE (MCCB)
D	BLOCKING DIODE
A	AMMETER WITH SHUNT
FS	FUSE
	DISCONNECTING LINK
CT	CURRENT TRANSFORMER
SW	CHANGEOVER SWITCH
	DC MCCB (2 POLES) WITH FIXED SHORT CKT. & FIXED THERMAL RELEASE
	DRAWOUT
	NORMALLY OPEN CONTACTS

DEVICE NO.	DESCRIPTION
27	UNDERVOLTAGE RELAY

LEGEND	DESCRIPTION	LEGEND	DESCRIPTION
CT	CURRENT TRANSFORMER	MCCB	MOULDED CASE CIRCUIT BREAKER
A	AMMETER	AT	AMMETER TRANSDUCER
V	VOLTMETER	VT	VOLTAGE TRANSDUCER
VSS	VOLTMETER SELECTOR SWITCH	B	BOOST CONTACTOR(MAIN)
		C	FLOAT CONTACTOR(MAIN)

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2. RATING OF BATTERY CHARGER EQUIPMENT WILL BE GIVEN AFTER DETAILED DESIGN BY VENDOR.
3. FEEDERS RATING OF DISTRIBUTION BOARD MAY CHANGE AS PER FINAL APPROVED RATING OF EQUPS.
4. E/F PROTECTION SHALL BE PROVIDED THROUGH ELECTRONIC CARD

FOR TENDER PURPOSE ONLY

RAGHUGANGA HYDROPOWER LIMITED

CONSULTANT
WAPCOS LIMITED

BHARAT HEAVY ELECTRICALS LTD.
BHOPAL, INDIA
(A GOVT OF INDIA UNDERTAKING)

	NAME	SIGN	DATE
PREPARED	NARESH		14.12.20
DESIGNED	YKG		14.12.20
CHECKED	YKG		14.12.20
APPROVED	RMP		14.12.20

REV.	DATE	ALTERED	-
-	-	CHECKED	-
		APPROVED	-

PROJECT
2 x 20 MW – RAHUGHAT HYDROELECTRIC PROJECT, NEPAL

DEPT. HPE
CODE 415

TITLE
SINGLE LINE DIAGRAM FOR 110VDC SYSTEM FOR DAM

DWG. NO. 12900073006

REV. 00

SHEET 01 OF 01

REF. DRG. NO.

SIGN. & DATE

INVENTORY NO.

A1 SIZE

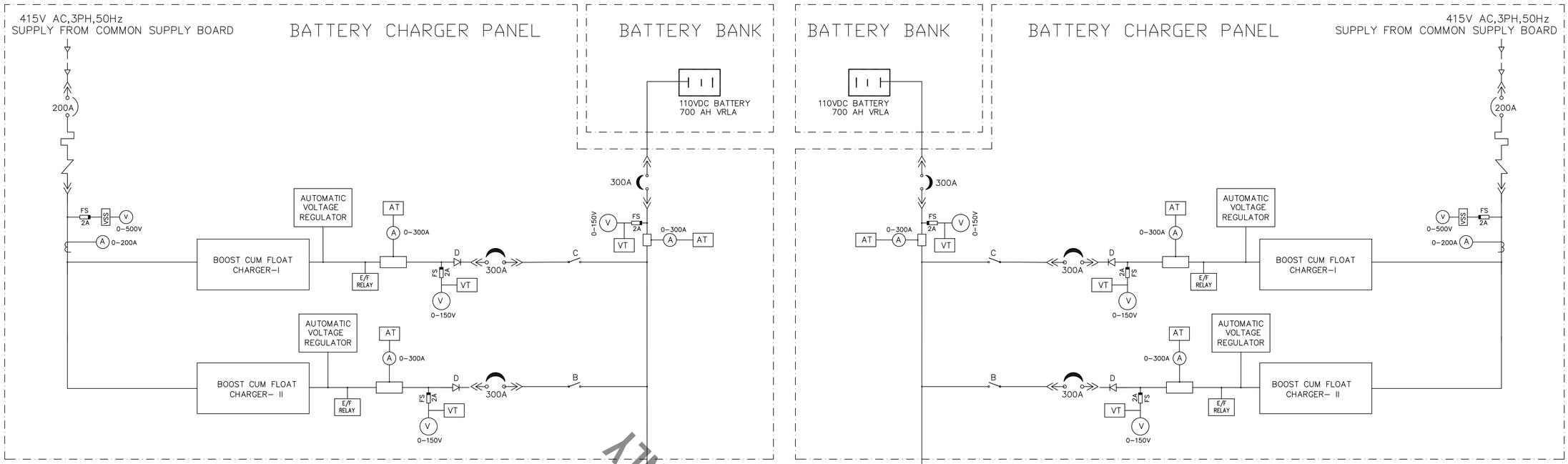
FIRST ANGLE PROJECTION

SCALE : NTS

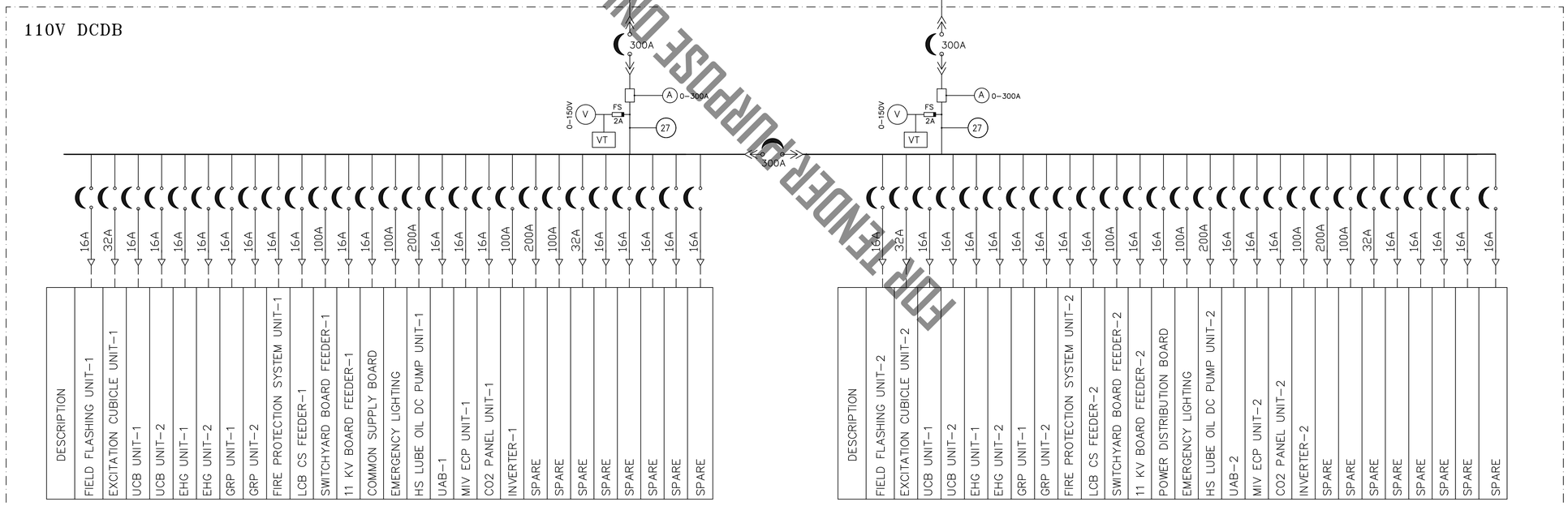
DRG. NO.

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FOR TENDER PURPOSE ONLY



110V DCDB



SYMBOLS	DESCRIPTION
	MOULDED CASE CIRCUIT BREAKER WITH FIXED SHORT CKT. & ADJUSTABLE THERMAL RELEASE (MCCB)
D	BLOCKING DIODE
A	AMMETER WITH SHUNT
FS	FUSE
	DISCONNECTING LINK
CT	CURRENT TRANSFORMER
SW	CHANGEOVER SWITCH
	DC MCCB (2 POLES) WITH FIXED SHORT CKT. & FIXED THERMAL RELEASE
	DRAWOUT
	NORMALLY OPEN CONTACTS

DEVICE NO.	DESCRIPTION
27	UNDERVOLTAGE RELAY

LEGEND	DESCRIPTION	LEGEND	DESCRIPTION
CT	CURRENT TRANSFORMER	MCCB	MOULDED CASE CIRCUIT BREAKER
A	AMMETER	AT	AMMETER TRANSDUCER
V	VOLTMETER	VT	VOLTAGE TRANSDUCER
VSS	VOLTMETER SELECTOR SWITCH	B	BOOST CONTACTOR(MAIN)
		C	FLOAT CONTACTOR(MAIN)

NOTE : 1. CONFIGURATION OF BATTERY CHARGER IS TYPICAL & SUBJECT TO CHANGE AS PER DETAILED DESIGN OF VENDOR.
2. RATING OF BATTERY CHARGER EQUIPMENT WILL BE GIVEN AFTER DETAILED DESIGN BY VENDOR.
3. FEEDERS RATING OF DISTRIBUTION BOARD MAY CHANGE AS PER FINAL APPROVED RATING OF EQUPS.
4. E/F PROTECTION SHALL BE PROVIDED THROUGH ELECTRONIC CARD

REV.	DATE		
–	–	ALTERED	–
		CHECKED	–
		APPROVED	–

–

RAGHUGANGA HYDROPOWER LIMITED

CONSULTANT
WAPCOS LIMITED

BHARAT HEAVY ELECTRICALS LTD.
BHOPAL, INDIA
(A GOVT OF INDIA UNDERTAKING)

	NAME	SIGN	DATE
PREPARED	NARESH		12.12.20
DESIGNED	PS		12.12.20
CHECKED	VKG		12.12.20
APPROVED	RMP		12.12.20

PROJECT
2 x 20 MW – RAHUGHAT HYDROELECTRIC PROJECT, NEPAL

DEPT. HPE
CODE 415

TITLE
SINGLE LINE DIAGRAM
FOR 110VDC SYSTEM FOR POWERHOUSE

DWG. NO. 12900073005

REV. 00

SHEET 01 OF 01

A1 SIZE

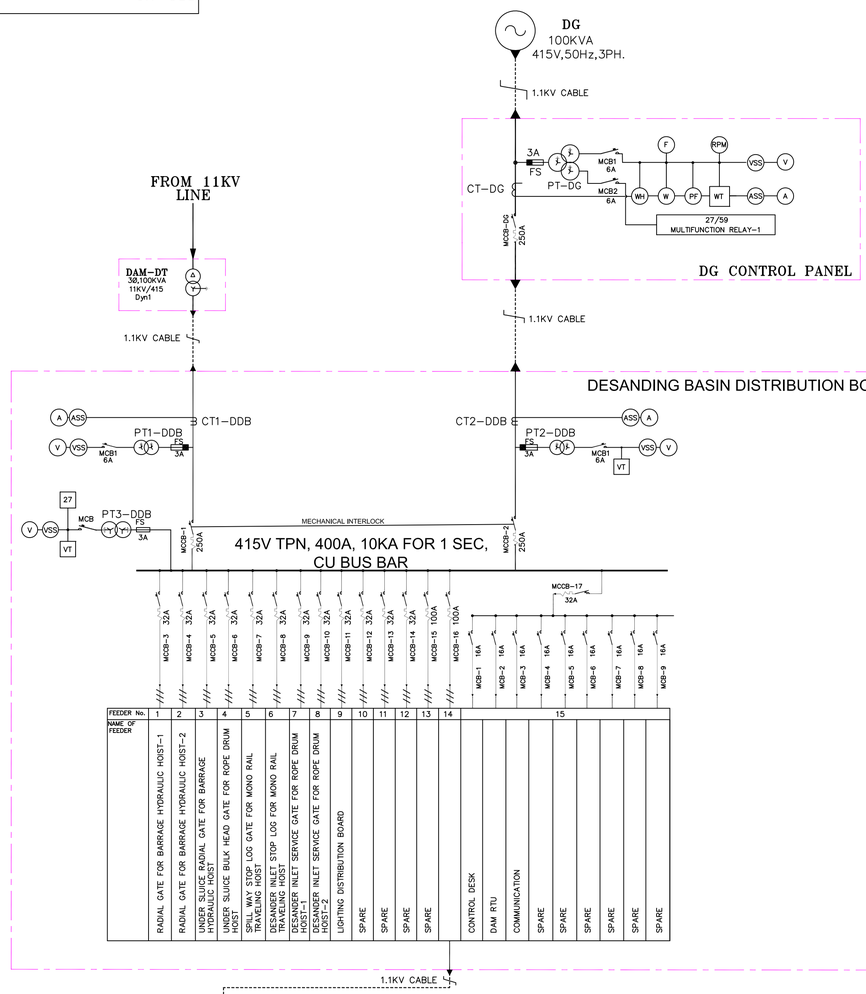
REF. DRG. NO. | SIGN. & DATE | INVENTORY NO.

FIRST ANGLE PROJECTION

SCALE : NTS

DRG. NO.

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IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.



FOR TENDER PURPOSE ONLY

LEGENDS :-

LEGEND	DESCRIPTION
A	AMMETER
ASS	AMMETER SELECTOR SWITCH
AT	CURRENT TRANSDUCER
V	VOLTMETER
VSS	VOLTMETER SELECTOR SWITCH
W	WATT METER
WH	WATT HOUR METER
FS	FUSE
CT	CURRENT TRANSFORMER
PT	POTENTIAL TRANSFORMER
ACB	AIR CIRCUIT BREAKER
MCB	MINIATURE CIRCUIT BREAKER
MCCB	MOULDED CASE CIRCUIT BREAKER
VT	VOLTAGE TRANSDUCER
WT	WATT TRANSDUCER
WHT	WATT HOUR TRANSDUCER

SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION
	AIR CIRCUIT BREAKER (ACB)		INDICATING METER ELECTROMAGNETIC
		TRD	TRANSDUCER / MULTI FUNCTION TRANSDUCER
			RELAY
	MOULDED CASE CIRCUIT BREAKER (MCCB)	FS	FUSE
			TRANSFORMER
	MINIATURE CIRCUIT BREAKER (MCB)		GENERATOR
		CT	CURRENT TRANSFORMER
	DRAW-OUT TERMINAL	PT	POTENTIAL TRANSFORMER

PROTECTION RELAYS-DEVICE FUNCTION

DEVICE NO.	FUNCTION
27	UNDER VOLTAGE PROTECTION
59	OVER-VOLTAGE PROTECTION

CT DETAILS:-

NO.	CIRCUIT	RATIO	ACC. CLASS	BURDEN VA	KNEE POINT VOLTAGE Vkp(V)	MAG. CURRENT Ime A	PHYSICAL LOCATION
DAMDB							
CT-DG	DG METERING	250/1A	0.2	60VA	–	–	DG CONTROL PANEL
CT1-DDB	DESANDING BASIN DB INCOMER-1 METERING	250/1A	0.2	60VA	–	–	DAMDB
CT2-DDB	DESANDING BASIN DB INCOMER-2 METERING	250/1A	0.2	60VA	–	–	DAMDB
INTDB							
CT-INTB	INTAKE GATE BOARD METERING	100/1A	0.2	60VA	–	–	INTDB
VHB							
CT-INTB	VALVE HOUSE BOARD METERING	250/1A	0.2	60VA	–	–	VHB

VT DETAILS :-

NO.	CIRCUIT	QTY/ UNIT	RATIO V/V	ACCURACY CLASS	BURDEN VA	PHASE	PHYSICAL LOCATION
DGCP							
PT-DG	DG CONTROL PANEL METERING & PROTECTION	3	11000/√3 / 110/√3	0.2	50	1PH	DG CONTROL PANEL
DAMDB							
PT1-DDB	DESANDING BOARD INCOMER-1 METERING	3	11000/√3 / 110/√3	0.2	50	1PH	DAMDB
PT2-DDB	DESANDING BOARD INCOMER-2 METERING	3	11000/√3 / 110/√3	0.2	50	1PH	DAMDB
PT3-DDB	DESANDING BOARD BUS METERING & PROTECTION	3	11000/√3 / 110/√3	0.2	50	1PH	DAMDB
DAMDB							
PT1-INT	INTAKE BOARD INCOMER METERING	3	11000/√3 / 110/√3	0.2	50	1PH	INTDB
PT2-INT	INTAKE BOARD BUS METERING	3	11000/√3 / 110/√3	0.2	50	1PH	INTDB
DAMDB							
PT1-VHB	VALVE HOUSE BOARD INCOMER METERING	3	11000/√3 / 110/√3	0.2	50	1PH	VHB
PT2-VHB	VALVE HOUSE BOARD BUS METERING	3	11000/√3 / 110/√3	0.2	50	1PH	VHB

REV.	DATE	ALTERED	–
–	–	CHECKED	–
		APPROVED	–

RAGHUGANGA HYDROPOWER LIMITED

CONSULTANT
WAPCOS LIMITED

BHARAT HEAVY ELECTRICALS LTD.
BHOPAL, INDIA
(A GOVT OF INDIA UNDERTAKING)

	NAME	SIGN	DATE
PREPARED	NARESH		19.10.2020
DESIGNED	PS		19.10.2020
CHECKED	WG		19.10.2020
APPROVED	RMP		19.10.2020

PROJECT
2 x 20 MW – RAHUGHAT HYDROELECTRIC PROJECT, NEPAL

DEPT. HPE
CODE 415

TITLE
SINGLE LINE DIAGRAM FOR 415V SWITCHGEAR AT INTAKE & VALVE HOUSE

DWG. NO. 12900073004

REV. OO

SHEET 01 OF 01

SIGN. & DATE

REF. DRG. NO.

INVENTORY NO.

A1 SIZE

FIRST ANGLE PROJECTION

SCALE : NTS

DRG. NO.

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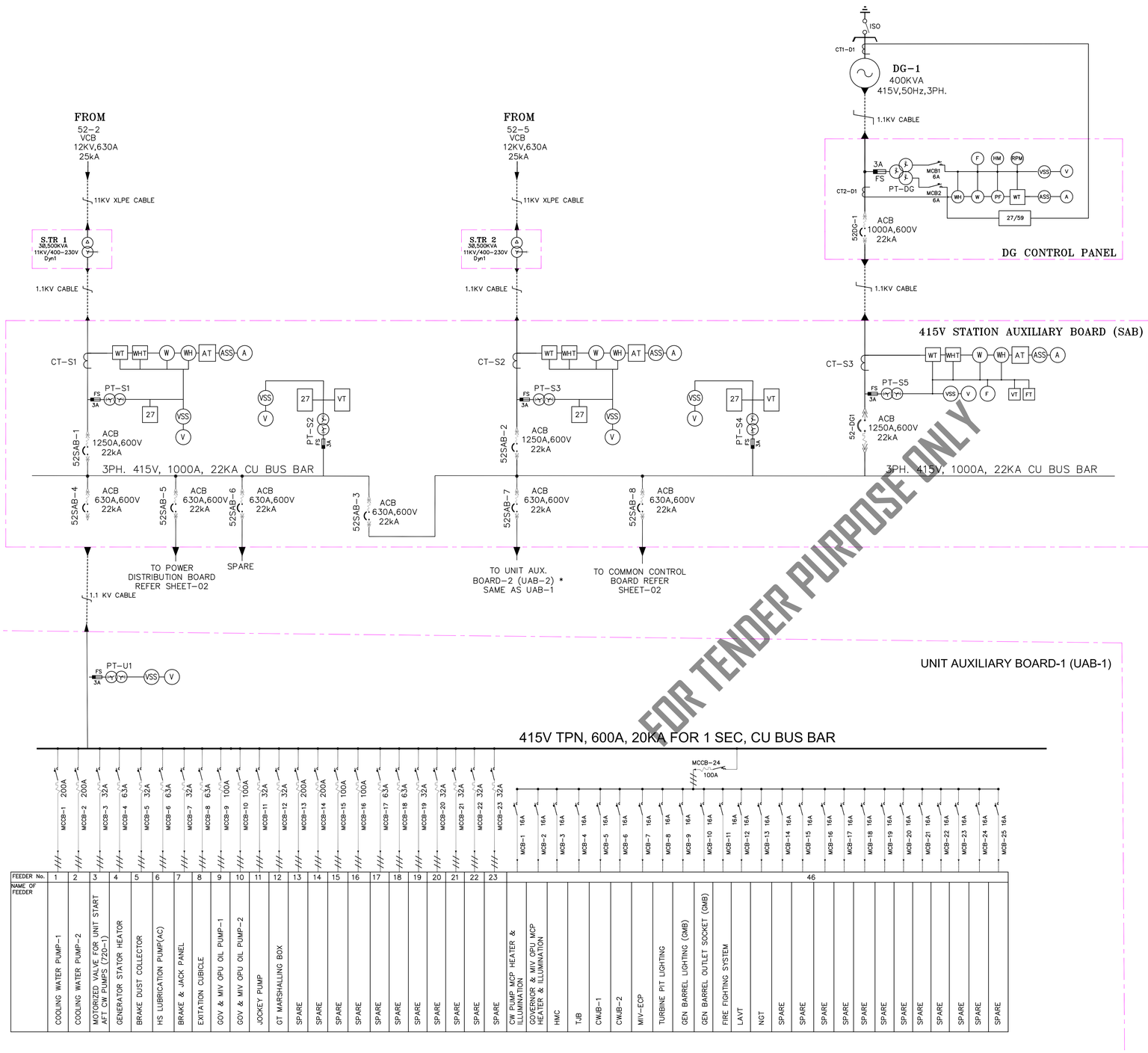
SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION
	AIR CIRCUIT BREAKER (ACB)		INDICATING METER ELECTROMAGNETIC
		TRD	TRANSDUCER / MULTI FUNCTION TRANSDUCER
			RELAY
	MOULDED CASE CIRCUIT BREAKER (MCCB)	FS	FUSE
			TRANSFORMER
	MINIATURE CIRCUIT BREAKER (MCB)		GENERATOR
		CT	CURRENT TRANSFORMER
	DRAW-OUT TERMINAL	PT	LINE POTENTIAL TRANSFORMER

LEGENDS :-

LEGEND	DESCRIPTION
A	AMMETER
ASS	AMMETER SELECTOR SWITCH
AT	CURRENT TRANSDUCER
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VT	VOLTAGE TRANSDUCER
WT	WATT TRANSDUCER
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PROTECTION RELAYS-DEVICE FUNCTION

DEVICE NO.	FUNCTION
27	UNDER VOLTAGE PROTECTION
50/51	INST. & IDMT O/C PROTECTION
59	OVER-VOLTAGE PROTECTION



FOR TENDER PURPOSE ONLY

CT DETAILS:-

NO.	CIRCUIT	RATIO	ACC. CLASS	BURDEN VA	KNEE POINT VOLTAGE Vkp(V)	MAG. CURRENT Im A	PHYSICAL LOCATION
SAB CTs							
CT-S1	SAB INCOMER-1 METERING	800/5A	1.0	30VA	–	–	SAB
CT-S2	SAB INCOMER-2 METERING	800/5A	1.0	30VA	–	–	SAB
CT-S3	SAB DG INCOMER METERING	800/5A	1.0	30VA	–	–	SAB
PDB CTs							
CT-PDB	PDB INCOMER METERING	800/5A	1.0	30VA	–	–	PDB
AC PANEL CTs							
CT-AC	AC PANEL INCOMER METERING	800/5A	1.0	30VA	–	–	AC PANEL

PT DETAILS :-

NO.	CIRCUIT	QTY/ UNIT	RATIO V/V	ACCURACY CLASS	BURDEN VA	PHASE	PHYSICAL LOCATION
SAB PTs							
PT-S1	SAB INCOMER-1 METERING AND PROTECTION	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	SAB
PT-S2	SAB BUS-1 METERING AND PROTECTION	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	SAB
PT-S3	SAB INCOMER-2 METERING AND PROTECTION	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	SAB
PT-S4	SAB BUS-2 METERING AND PROTECTION	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	SAB
PT-S5	SAB DG INCOMER METERING AND PROTECTION	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	SAB
UAB PTs							
PT-U1	UAB-1 INCOMER METERING	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	UAB-1
PT-U2	UAB-2 INCOMER METERING	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	UAB-2
DG CONTROL PANEL PTs							
PT-DG	DG CONTROL PANEL METERING AND PROTECTION	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	3P/1.0	50	1PH	DGCP
CCB PTs							
PT-CCB	CCB INCOMER METERING	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	CCB
PDB PTs							
PT-PDB	PDB INCOMER METERING	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	PDB
AC PANEL PTs							
PT-AC	AC PANEL INCOMER METERING & PROTECTION	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	AC PANEL

REV.	DATE		
–	–	ALTERED	–
		CHECKED	–
		APPROVED	–

–

RAGHUGANGA HYDROPOWER LIMITED

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PREPARED	NARESH		26.09.2020
DESIGNED	PS		26.09.2020
CHECKED	WG		26.09.2020
APPROVED	RMP		26.09.2020

PROJECT
2 x 20 MW – RAHUGHAT HYDROELECTRIC PROJECT, NEPAL

DEPT. HSE
CODE 415

TITLE
SINGLE LINE DIAGRAM
415V SWITCHGEAR FOR POWERHOUSE

DWG. NO. 12900073003

REV. OO

SHEET 01 OF 02

A1 SIZE

INVENTORY NO. | SIGN. & DATE | REF. DRG. NO.

FIRST ANGLE PROJECTION

SCALE : NTS

DRG. NO.

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POWER DISTRIBUTION BOARD

FROM SAB
REFER SHEET-01

PT-PDB (FS 3A) — VSS — V

CT-PDB — ASS — A

415V TPN, 600A, 20KA FOR 1 SEC, CU BUS BAR

FEEDER No.	NAME OF FEEDER	MCCB
1	OUTDOOR LIGHTING	MCCB-1 100A
2	WELDING RECEPTACLE	MCCB-2 100A
3	POWER PANEL-1	MCCB-3 100A
4	POWER PANEL-2	MCCB-4 100A
5	POWER PANEL-3	MCCB-5 100A
6	SERVICE BAY ROLLING SHUTTER	MCCB-6 32A
7	PACKAGED AC FOR CONTROL ROOM	MCCB-7 100A
8	PACKAGED AC FOR CONFRENCE ROOM	MCCB-8 32A
9	PACKAGE AC FOR OFFICE ROOM-1	MCCB-9 32A
10	PACAKGE AC FOR OFFICE ROOM-2	MCCB-10 32A
11	SERVICE BAY	MCCB-11 100A
12	ELEVATOR	MCCB-12 100A
13	EOT CRANE	MCCB-13 100A
14	EOT OVERHEAD MONORAIL CRANE	MCCB-14 32A
15	VENTILLATION SYSTEM IN PH GENERAL AREAS	MCCB-15 100A
16	VENTILLATION SYSTEM IN PH GENERAL AREAS	MCCB-16 100A
17	DG SET	MCCB-17 32A
18	SPARE	MCCB-18 100A
19	SPARE	MCCB-19 100A
20	SPARE	MCCB-20 32A
21	SPARE	MCCB-21 32A
22	SPARE	MCCB-22 200A
23	SPARE	MCCB-22 200A

1.1KV CABLE

COMMON SUPPLY BOARD

FROM SAB
REFER SHEET-01

PT-CCB (FS 3A) — VSS — V

415V TPN, 600A, 20KA FOR 1 SEC, CU BUS BAR

FEEDER No.	NAME OF FEEDER	MCCB	MCB
1	OUTDOOR LIGHTING	MCCB-1 32A	MCB-1 16A
2	WELDING RECEPTACLE	MCCB-2 63A	MCB-2 16A
3	POWER PANEL-1	MCCB-3 63A	MCB-3 16A
4	POWER PANEL-2	MCCB-4 200A	MCB-4 16A
5	POWER PANEL-3	MCCB-5 200A	MCB-5 16A
6	SERVICE BAY ROLLING SHUTTER	MCCB-6 100A	MCB-6 16A
7	PACKAGED AC FOR CONTROL ROOM	MCCB-7 100A	MCB-7 16A
8	PACKAGED AC FOR CONFRENCE ROOM	MCCB-8 100A	MCB-8 16A
9	PACKAGE AC FOR OFFICE ROOM-1	MCCB-9 63A	MCB-9 16A
10	PACKAGE AC FOR OFFICE ROOM-2	MCCB-10 63A	MCB-10 16A
11	SERVICE BAY	MCCB-11 63A	MCB-11 16A
12	ELEVATOR	MCCB-12 32A	MCB-12 16A
13	EOT CRANE	MCCB-13 200A	MCB-13 16A
14	EOT OVERHEAD MONORAIL CRANE	MCCB-14 200A	MCB-14 16A
15	VENTILLATION SYSTEM IN PH GENERAL AREAS	MCCB-15 200A	MCB-15 16A
16	VENTILLATION SYSTEM IN PH GENERAL AREAS	MCCB-16 100A	MCB-16 16A
17	DG SET	MCCB-17 63A	MCB-17 16A
18	SPARE	MCCB-18 63A	MCB-18 16A
19	SPARE	MCCB-19 32A	MCB-19 16A
20	SPARE	MCCB-20 32A	MCB-20 16A
21	SPARE	MCCB-21 32A	MCB-21 16A
22	SPARE	MCCB-22 32A	MCB-22 16A
23	LP COMPRESSOR MCP HEATER & ILLUMINATION	MCCB-23 32A	MCB-23 16A
24	BATTERY CHARGER HEATER & ILLUMINATION	MCCB-24 100A	MCB-24 16A
	CWJB		MCB-25 16A
	STATION TRANSFORMER-1		
	STATION TRANSFORMER-2		
	ISOLATION TRANSFORMER		
	SPARE		

AC PANEL

PT-AC (FS 3A, 27) — VSS — V

CT-AC — ASS — A

415V TPN, 600A, 20KA FOR 1 SEC, CU BUS BAR

FEEDER No.	NAME OF FEEDER	MCCB
1	245KV GEN UNIT CB(1)	MCCB-2 32A
2	245KV GEN UNIT CB(2)	MCCB-3 32A
3	245KV FEEDER(CB)-1	MCCB-4 32A
4	245KV FEEDER(CB)-2	MCCB-5 32A
5	RECPTACLE FOR GEN HOUSING-1	MCCB-6 32A
6	RECPTACLE FOR GEN HOUSING-2	MCCB-7 32A
7	LIGHTING PANEL-1	MCCB-8 32A
8	LIGHTING PANEL-2	MCCB-9 32A
9	LIGHTING PANEL-3	MCCB-10 100A
10	RECEPTACLE FOR MECHANICAL WORKSHOP-1	MCCB-11 32A
11	RECEPTACLE FOR MECHANICAL WORKSHOP-2	MCCB-12 100A
12	RECEPTACLE FOR MECHANICAL WORKSHOP-3	MCCB-13 100A
13	INVERTER	MCCB-14 100A
14	SPARE	MCCB-15 100A
15	SPARE	MCCB-16 32A
16	SPARE	MCCB-17 32A
17	SPARE	MCCB-18 32A
18	SPARE	MCCB-19 32A
19	SPARE	MCCB-20 32A
20	SPARE	MCCB-21 32A
21	SPARE	MCCB-22 32A
22	GENERATOR CONTROL FOR NO.1 UNIT	MCB-1 16A
	GENERATOR CONTROL FOR NO.2 UNIT	MCB-2 16A
	CONTROL SYSTEM	MCB-3 16A
	PROTECTION SYSTEM	MCB-4 16A
	SPARE	MCB-5 16A
	LIGHTING FOR TURBINE PIT NO.1	MCB-6 16A
	LIGHTING FOR TURBINE PIT NO.2	MCB-7 16A
	GENERATOR FIRE PROTECTION	MCB-8 16A
	CONTROL ROOM	MCB-9 16A
	INTERPHONE	MCB-10 16A
	LIGHTING FOR GENERATOR HOUSING NO.1	MCB-11 16A
	LIGHTING FOR GENERATOR HOUSING NO.2	MCB-12 16A
	SPARE	MCB-13 16A
	SPARE	MCB-14 16A
	SPARE	MCB-15 16A
	SPARE	MCB-16 16A
	SPARE	MCB-17 16A
	SPARE	MCB-18 16A
	SPARE	MCB-19 16A
	SPARE	MCB-20 16A
	SPARE	MCB-21 16A
	SPARE	MCB-22 16A
	SPARE	MCB-23 16A
	SPARE	MCB-24 16A
	SPARE	MCB-25 16A

FOR TENDER PURPOSE ONLY

CT DETAILS:-

NO.	CIRCUIT	RATIO	ACC. CLASS	BURDEN VA	KNEE POINT VOLTAGE Vkp(V)	MAG. CURRENT Im A	PHYSICAL LOCATION
SAB CTs							
CT-S1	SAB INCOMER-1 METERING	800/5A	1.0	30VA	–	–	SAB
CT-S2	SAB INCOMER-2 METERING	800/5A	1.0	30VA	–	–	SAB
CT-S3	SAB DG INCOMER METERING	800/5A	1.0	30VA	–	–	SAB
PDB CTs							
CT-PDB	PDB INCOMER METERING	800/5A	1.0	30VA	–	–	PDB
AC PANEL CTs							
CT-AC	AC PANEL INCOMER METERING	800/5A	1.0	30VA	–	–	AC PANEL

PROTECTION RELAYS–DEVICE FUNCTION

DEVICE NO.	FUNCTION
27	UNDER VOLTAGE PROTECTION
50/51	INST. & IDMT O/C PROTECTION
59	OVER–VOLTAGE PROTECTION

SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION
	AIR CIRCUIT BREAKER (ACB)		INDICATING METER ELECTROMAGNETIC
		TRD	TRANSDUCER / MULTI FUNCTION TRANSDUCER
			RELAY
	MOULDED CASE CIRCUIT BREAKER (MCCB)	FS	FUSE
		A	TRANSFORMER
	MINIATURE CIRCUIT BREAKER (MCB)		GENERATOR
		CT	CURRENT TRANSFORMER
	DRAW-OUT TERMINAL	PT	LINE POTENTIAL TRANSFORMER

LEGENDS :-

LEGEND	DESCRIPTION
A	AMMETER
ASS	AMMETER SELECTOR SWITCH
AT	CURRENT TRANSDUCER
V	VOLTMETER
VSS	VOLTMETER SELECTOR SWITCH
W	WATT METER
WH	WATT HOUR METER
FS	FUSE
CT	CURRENT TRANSFORMER
PT	POTENTIAL TRANSFORMER
ACB	AIR CIRCUIT BREAKER
MCB	MINIATURE CIRCUIT BREAKER
MCCB	MOULDED CASE CIRCUIT BREAKER
VT	VOLTAGE TRANSDUCER
WT	WATT TRANSDUCER
WHT	WATT HOUR TRANSDUCER

PT DETAILS :-

NO.	CIRCUIT	QTY/ UNIT	RATIO V/V	ACCURACY CLASS	BURDEN VA	PHASE	PHYSICAL LOCATION
SAB PTs							
PT-S1	SAB INCOMER-1 METERING AND PROTECTION	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	SAB
PT-S2	SAB BUS-1 METERING AND PROTECTION	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	SAB
PT-S3	SAB INCOMER-2 METERING AND PROTECTION	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	SAB
PT-S4	SAB BUS-2 METERING AND PROTECTION	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	SAB
PT-S5	SAB DG INCOMER METERING AND PROTECTION	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	SAB
UAB PTs							
PT-U1	UAB-1 INCOMER METERING	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	UAB-1
PT-U2	UAB-2 INCOMER METERING	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	UAB-2
DG CONTROL PANEL PTs							
PT-DG	DG CONTROL PANEL METERING AND PROTECTION	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	3P/1.0	50	1PH	DGCP
CCB PTs							
PT-CCB	CCB INCOMER METERING	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	CCB
PDB PTs							
PT-PDB	PDB INCOMER METERING	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	PDB
AC PANEL PTs							
PT-AC	AC PANEL INCOMER METERING & PROTECTION	3	$\frac{415}{\sqrt{3}}/\frac{110}{\sqrt{3}}$	1.0	50	1PH	AC PANEL

REV.	DATE	ALTERED	–
–	–	CHECKED	–
		APPROVED	–

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PROJECT
2 x 20 MW – RAHUGHAT HYDROELECTRIC PROJECT, NEPAL

DEPT. HSE
CODE 415

TITLE
SINGLE LINE DIAGRAM
415V SWITCHGEAR FOR POWERHOUSE

DWG. NO. 12900073003 REV. 00

SHEET 02 OF 02

A1 SIZE

REF. DRG. NO. | SIGN. & DATE | INVENTORY NO.

FIRST ANGLE PROJECTION

SCALE : NTS

DRG. NO. 12900073001

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TO 220KV BUS

220KV SIDE CT
(TBG SCOPE)

###
220KV SWITCHYARD

TO 220KV BUS

GRP

64GT

51N GT | 87T/ 99T

GSUT-1
26MVA
11/220KV
3 PHASE
YNd11,DNAN

CT-111

CORE-I CT-112 CORE-II

11KV, 2 RUN/ PHASE, 1C X 1000 SQ.MM XLPE CU CABLE

3PH. 12KV, 2000A, 25KA FOR 1 SEC.

BPT1

52-1
VCB
12kV,1600A
25KA

ES1 $

11 kV SWITCH BOARD
GENERATOR CIRCUIT CUBICLE

52-2
VCB
12KV,630A
25kA

52-3
VCB
12KV,1600A
25kA

INTERLOCK

CT-302
CT-301
MFM
50/51
50N/51N
27
NR1

CT-304
CT-303
MFM
50/51
NR2

87-0A-1

87-0A-2

11KV 3C X 95 SQ. MM
XLPE CABLE

S.TR 1
30,500KVA
11KV/400-230V
Dyn1

TO STATION SERVICE

GSUT-2

CT-211

CT-212

11KV, 2 RUN/ PHASE, 1C X 1000 SQ.MM XLPE CU CABLE

52-4
VCB
1600A
12KV

ES2 $

52-5
VCB
12KV,630A
25kA

52-6
VCB
12KV,630A
25kA

52-7
VCB
12KV,630A
25kA

BPT2

CT-306
CT-305
MFM
50/51
50N/51N
27
NR3

CT-308
CT-307
MFM
50/51
NR4

CT-310
CT-309
MFM
50/51
NR5

11KV 3C X 95 SQ. MM
XLPE CABLE

11KV 3C X 95 SQ. MM
XLPE CABLE

S.TR 2
30,500KVA
11KV/400-230V
Dyn1

TO STATION SERVICE

CT-312
ISO.
TRMR.
1000KVA
11/11KV
CT-311
CT-313 CT-314

51N

TO 11KV LOCAL
SUPPLY CUBICLE

SPARE

9KV, 10KA LAVT
LA
SC
0.5 µF
FS VT-2
MCB 6A 3P
MCB 6A 0.2
SPARE
VT-1
MCB 6A 3P
MCB 6A 0.2

60 60 60 60

ET-1
7.5KVA
11/0.415KV
Dy5

FS

ET
CUBICLE

DLK DLK

1.1 KV CABLE

ET-2

ET
CUBICLE

DLK DLK

LAVT

CT-110 SPARE
CT-109 SPARE
CT-108
CT-107
CT-106
CT-105 SPARE
CT-104 SPARE
CT-103 SPARE
CT-102
CT-101

TO DVR
FET

50/51G
87G
32G
27/50G
78G
21G
40G
46G
49S
37G
27G
81U
81O
59G
64G1
64G2
GR

EXCITATION EQUIPMENT
(DAVR)

DVR
V
(FROM VT-1)
(FROM CT-107)

THY. CONV.
FIELD

41(Q1)

Q2
D
R
FV
FA

110V DC
FROM DCDB

ROTATING
RECTIFIER
F1
F2

G1
23.529MVA,11KV,
0.85PF, 3 PH,
50Hz, 375 RPM

UCB
AUTO SYN.
VR PR VI PI

UCB
3 V TRD
3 V
1 F
A MW MVAR MVARH PF MVAR TRD MW TRD MVARH TRD A TRD
3 1 1 1 1 1 1 1 3

CT & PT SIGNAL
TO EHG
(ELECTRO
HYDROLIC
GOVERNOR
CUBICLE)

V TRD
W

SPBD

NG CUBICLE

NGT
11000/220V,1PH
50HZ,10KVA CONT.
47KVA FOR 1 MIN.

R NGR 0.72 OHMS
176 A

ET-2
ET
CUBICLE

LAVT

CT-210
CT-209
CT-208
CT-207
CT-206
CT-205
CT-204
CT-203
CT-202
CT-201

G2

NG CUBICLE

FOR TENDER PURPOSE ONLY

NOTES :-

- UNIT-2 HAS BEEN PROVIDED WITH SIMILAR PROTECTION & METERING AS INDICATED FOR UNIT -1.
- ALL CTs AND PTs ARE OF SINGLE PHASE.

- LV SIDE OTHER PROTECTION & METERING WILL BE SHOWN IN RESPECTIVE SLD FOR 415V AC SUPPLY. CT NUMBERING OF UAB & SSB HAS BEEN DONE AS PER THEIR RESPECTIVE BOARD.

$ - BREAKER TYPE EARTHING TRUCK FOR EARTHING WITH MECHANICAL INTERLOCK SHALL BE PROVIDED

-THE OUTPUTS OF MULTIFUNCTION TRANSDUCER i.e. A, V, MW, MVAR, MVARH, MWH, F, PF SHALL BE MADE AVAILABLE FOR SCADA LOGGING THROUGH COMMUNICATION AND FROM UCB THE MW SIGNAL OF MULTIFUNCTION TRANSDUCER SHALL BE FURTHER MADE AVAILABLE ON EHG THROUGH COMMUNICATION.

-REFER BHEL TBG SLD FOR 220KV SWITCHYARD

-RELAY SETTING CALCULATIONS SHALL BE DONE BY OEM AND VETTED BY HPE

PROTECTION RELAYS-DEVICE FUNCTION

DEVICE NO.	FUNCTION
21G	GEN. BACK-UP IMPEDANCE PROTECTION
26	TRANSFORMER OIL TEMPERATURE DETECTOR
27G	UNDER VOLTAGE PROTECTION
32G	GENERATOR LOW FORWARD POWER PROTECTION
37G	GENERATOR REVERSE POWER PROTECTION
40G	LOSS OF EXCITATION PROTECTION
46G	NEGATIVE PHASE SEQUENCE PROTECTION
27/50G	DEAD MACHINE PROTECTION
49S	STATOR OVERLOAD PROTECTION
49T	TRANSFORMER WINDING TEMPERATURE DETECTOR
50E/51E	ET INST. & IDMT O/C PROTECTION
51NGT	GEN. TRANS.B/U E/F PROTECTION
59G	GEN. OVERVOLTAGE PROTECTION
60	PT FUSE FAILURE PROTECTION FOR VT
63	BUCCHOLZ RELAY
64G1	100% STATOR E.F. PROTECTION
64G2	95% STATOR E.F. PROTECTION
64GT	GEN. TRANS.R.E.F. PROTECTION
71	LEVEL SWITCH
74	TRANSFORMER OIL LEVEL INDICATOR
78G	POLE SLIPPING/OUT OF STEP PROTECTION
81O/U	OVER/UNDER FREQUENCY PROTECTION
87G	GENERATOR DIFFERENTIAL PROTECTION
87-0A-1	OVERALL DIFFERENTIAL PROTECTION
87-0A-2	OVERALL DIFFERENTIAL PROTECTION DUPLICATE
87T	GENERATOR TRANSFORMER DIFFERENTIAL PROTECTION
97	PRESSURE RELIEVE DEVICE/ BUCCHOLZ RELAY
99T	GENERATOR TRANSFORMER OVERFLUXING PROTECTION
P	SUDDEN PRESSURE RELEASE ALARM & TRIP

SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION
VT	VOLTAGE TRANSFORMER		ISOLATOR		INDICATING METER ELECTROMAGNETIC
CT	CURRENT TRANSFORMER		BUSHING CURRENT TRANSFORMER	TRD	TRANSDUCER / MULTI FUNCTION TRANSDUCER
	TRANSFORMER		RELAY		INDICATING METER DIGITAL
	CIRCUIT BREAKER (O.C)	FS	FUSE		RECORDING METER
	GENERATOR	DLK/SLK	DISCONNECTING LINK/SHORTING LINK	R	RESISTOR
		SC	SURGE CAPACITOR		
		SA/LA	LIGHTENING/ SURGE ARRESTER		

PROTECTIVE RELAYS :-

DEVICE NO.	DESCRIPTION	
GR	GENERATOR PROTECTIVE RELAY (21G, 27G, 37G, 40G, 46G, 49S, 27/50G, 59G, 64G1, 64G2, 78G, 81U, 81O, 87G, 50/51G, 59/81)	NUMERICAL
87-0A-1	OVERALL DIFFERENTIAL PROTECTIVE RELAY	NUMERICAL
87-0A-2	OVERALL DIFFERENTIAL PROTECTIVE RELAY DUPLICATE	NUMERICAL
87T/51NGT	GEN. TRANSFORMER PROTECTIVE RELAY	NUMERICAL
64GT	GEN. TRANSFORMER R.E.F. PROTECTIVE RELAY	NUMERICAL
60	PT FUSE FAILURE RELAY FOR VT	EM
NR1	NUMERICAL RELAY FOR ST. TRMR.1 (50/51,50N/51N,27)	NUMERICAL
NR2	NUMERICAL RELAY FOR BUS COUPLER (50/51)	NUMERICAL
NR3	NUMERICAL RELAY FOR ST. TRMR.2 (50/51,50N/51N,27)	NUMERICAL
NR4	NUMERICAL RELAY FOR ISOLATION TRMR. (50/51)	NUMERICAL
NR5	NUMERICAL RELAY FOR SPARE (50/51)	NUMERICAL

LEGEND	DESCRIPTION	LEGEND	DESCRIPTION
FA	FIELD AMMETER	NGT	NEUTRAL GROUNDING TRANSFORMER
FV	FIELD VOLTMETER	VT	VOLTAGE TRANSFORMER
A	AMMETER	CT	CURRENT TRANSFORMER
V	VOLTMETER	SC	SURGE CAPACITOR
PF	POWER FACTOR METER	DCDB	DC DISTRIBUTION BOARD
MW	MEGAWATT METER	GRP	GENERATOR PROTECTION PANEL
MVAR	MEGAVAR METER	41	FIELD CKT. BREAKER
F	FREQUENCY METER	SPBD	SEGREGATED PHASE BUS DUCT
KWH	KILOWATT HOUR METER	Q1	DC POWER CONTACTOR
KVARH	KILOVAR HOUR METER	LA	LIGHTENING ARRESTER
OVP	FIELD OVER VOLTAGE PROTECTION	LAVT	LIGHTENING ARRESTER & VT CUBICLE
T	FIELD FLASHING TRANSFORMER	GT	GENERATOR TRANSFORMER
ET	EXCITATION TRANSFORMER	EM	ELECTROMECHANICAL
D	DIODE RECTIFIER	EHG	ELECTRO HYDRAULIC GOVERNOR CUBICLE
TRD	TRANSDUCER	DVR	DIGITAL VOLTAGE REGULATOR
UCB	UNIT CONTROL BOARD	FET	FIELD EFFICIENCY TEST
NGR	NEUTRAL GROUNDING RESISTOR	GCC	GENERATOR CIRCUIT CUBICLE
GR	GENERATOR PROTECTION RELAY	MFM	MULTIFUNCTION METER

CT DETAILS:-

NO.	CIRCUIT	RATIO	ACC. CLASS	BURDEN VA	KNEE POINT VOLTAGE Vkp(V)	MAG. CURRENT Ime A	PHYSICAL LOCATION
11KV CTS							
CT-101, 201	OVER ALL DIFFERENTIAL (87-0A-2) DUPLICATE	1600/1A	PS	–	32Rct + 30 V	30mA AT Vkp/2	BUSDUCT
CT-102, 202	OVER ALL DIFFERENTIAL (87-0A-1)	1600/1A	PS	–	32Rct + 30 V	30mA AT Vkp/2	BUSDUCT
CT-103, 203	SPARE	1600/1A	0.2	60VA	–	–	BUSDUCT
CT-104, 204	SPARE	1600/1A	PS	–	32Rct + 30 V	30mA AT Vkp/2	BUSDUCT
CT-105, 205	GEN.PROTECTION (GR) (87G,37G,78G,21G, 40G,46G,49S,27/50G,50/51G)	1600/1A	PS	–	32Rct + 30 V	30mA AT Vkp/2	BUSDUCT
CT-106, 206	TO METERING/GOVERNOR	1600/1A	0.2	60VA	–	–	BUSDUCT
CT-107, 207	DVR	1600/1A	0.2	60VA	–	–	BUSDUCT
CT-108, 208	SPARE	1600/1A	PS	–	32Rct + 30 V	30mA AT Vkp/2	BUSDUCT
CT-109, 209	SPARE	1600/1A	0.2	60VA	–	–	BUSDUCT
CT-110, 210	GENERATOR PROTECTION-GR	1600/1A	PS	–	32Rct + 30 V	30mA AT Vkp/2	BUSDUCT
CT-111, 211	GT DIFFERENTIAL 87T	1600/1A	PS	–	32Rct + 30 V	30mA AT Vkp/2	GT LV SIDE
CT-112, 212 CORE-I	GT NEUTRAL BACKUP EARTH FAULT (51NGT)	100/1A	5P20	10VA	–	–	GT
CORE-II	RESTRICTED E/F PROT. OF GT (64GT)	100/1A	PS	–	16Rct + 15 V	30mA AT Vkp/2	NEU. BUSH.
CT-301	VCB 52-2 PROTECTION	100/1A	5P20	10VA	–	–	GCC
CT-302	METERING	100/1A	0.5	10VA	–	–	GCC
CT-303	VCB 52-3 PROTECTION	1600/1A	5P20	10VA	–	–	GCC
CT-304	METERING	1600/1A	0.2	10VA	–	–	GCC
CT-305	VCB 52-5 PROTECTION	100/1A	5P20	10VA	–	–	GCC
CT-306	METERING	100/1A	0.5	10VA	–	–	GCC
CT-307	VCB 52-6 PROTECTION	100/1A	5P20	10VA	–	–	GCC
CT-308	METERING	100/1A	0.5	10VA	–	–	GCC
CT-309	VCB 52-7 PROTECTION	100/1A	5P20	10VA	–	–	GCC
CT-310	METERING	100/1A	0.5	10VA	–	–	GCC
CT-311	SPARE	100/1A	0.5	10VA	–	–	ISOLATION TRANS.
CT-312	DIFFERENTIAL PROTECTION ISOLATION TRFR. 87	100/1A	PS	–	32Rct + 30 V	30mA AT Vkp/2	ISOLATION TRANS.
CT-313	PROTECTION ISOLATION TRANSFORMER	100/1A	PS	–	32Rct + 30 V	30mA AT Vkp/2	ISOLATION TRANS.
CT-314	PROTECTION ISOLATION TRANSFORMER	100/1A	5P20	10VA	–	–	ISOLATION TRANS.

VT DETAILS :-

NO.	CIRCUIT	QTY/ UNIT	RATIO V/V	ACCURACY CLASS	BURDEN VA	PHASE	PHYSICAL LOCATION
11KV VTs							
VT-1 CORE-1	DVR, METERING & GOV.	3	11000/√3 / 110/√3	0.2	120	1PH	LAVT CUBICLE
VT-1 CORE-2	PROTECTION (32G,27/50G,78G,21G, 40G,27G,81U,81O,59G,)	3	11000/√3 / 110/√3	3P	120	1PH	LAVT CUBICLE
VT-2 CORE-1	SPARE	3	11000/√3 / 110/√3	0.2	30	1PH	LAVT CUBICLE
VT-2 CORE-2	99T	3	11000/√3 / 110	3P	30	1PH	LAVT CUBICLE
BPT1,BPT2 CORE-1	METERING & SYNC. PROTECTION	3	11000/√3 / 110/√3	0.2	50	1PH	GCC
BPT1,BPT2 CORE-2	UNDERVOLTAGE PROTECTION	3	11000/√3 / 110/√3	3P	50	1PH	GCC

RAGHUGANGA HYDROPOWER LIMITED

CONSULTANT
WAPCOS LIMITED

BHARAT HEAVY ELECTRICALS LTD.
BHOPAL, INDIA
(A GOVT OF INDIA UNDERTAKING)

	NAME	SIGN	DATE
PREPARED	NARESH		25.02.2021
DESIGNED	PS		25.02.2021
CHECKED	VKG		25.02.2021
APPROVED	RMP		25.02.2021

REV.	DATE	ALTERED	–
–	–	CHECKED	–
		APPROVED	–

PROJECT
2 x 20 MW – RAHUGHAT HYDROELECTRIC PROJECT, NEPAL

DEPT. HPE
CODE 415

TITLE
SINGLE LINE DIAGRAM
UNIT PROTECTION & METERING

DWG. NO. 12900073001

REV. 03

SHEET 01 OF 01

A1 SIZE

REF. DRG. NO. | SIGN. & DATE | INVENTORY NO.

TECHNICAL CONDITIONS OF CONTRACT (TCC) PART-II

BHARAT HEAVY ELECTRICALS LIMITED

TECHNICAL CONDITIONS OF CONTRACT (TCC) PART-II
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1.0 GENERAL

BHEL has been awarded the work of Design, Manufacture, supply, installation, erection, testing & commissioning of 2x20MW **MW Rahughat HYDRO ELECTRIC POWER PROJECT, NEPAL.**

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 Customer stores / scrap yard/BHEL stores as per the instructions of BHEL engineer

(J) Re-conciliation of materials with BHEL and Customer.

(K) 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 India as well as our vendors located both in India 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.

Approx. weight to be handled under this contract will be approximately 2162 MT. 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, depending upon availability of space in powerhouse/ stores.

2.0 PRELIMINMARY & CIVIL WORKS

2.1 The contractor shall as a first field activity check all the foundations for the correctness of the same as per the drawings and satisfy himself in all respects such as location of foundations, absence of voids, **levels**, correctness of **bolt holes, pocket levels**, Centre lines, elevations etc. and all measurements should be recorded and submitted to engineer **for approval** before erection. Contractor shall also involve himself for correctness of pockets, foundation etc. during concreting.

2.2 Before starting erection job, contractor shall ensure that area in which work is being carried out by the bidder is sufficiently enclosed against ingress of dust and water and all debris have been cleared off from the floor to a designated area as per instruction of engineer. The contractor shall arrange to get the working area and surroundings cleared daily to ensure the dust free atmosphere **and free from seepage water** for working and shall maintain sufficient labour for general cleaning of work areas. Delay of work on this account will not be acceptable.

2.3 The contractor shall cover all opening on floor and put temporary hand railing on all sides of the floor to avoid any accident to the working personnel.

2.4 Contractor shall fix up and maintain plates, supports for X & Y axis and elevation at different locations as required for each unit and **transfer the same from bench mark and XY axis given at one point by BHEL's client.** Joint protocol records for such benchmarks shall be got signed from BHEL's Engineer, customer's Supervisory and QA Engineer.

2.5 Once X-Y axis and elevation are fixed at different floors and protected, marking for other equipment's shall be transferred from these and joint protocol as above shall be got signed for each equipment or as required as per drawings.

2.6 All matching surfaces of components shall be well cleaned with cleaning agent and burrs shall be removed by filling and blue matched. Wherever necessary sealing/lubricating/ anti-seize compounds shall be applied as per recommendation of Engineer. Machining/grinding required for fitting of keys, pins, packers, dowels etc. shall be carried out by contractor.

2.7 The accuracy of all equipment/ instruments and their functioning shall be established before they are permitted for use on the job. If the Engineer doubts the accuracy of the precision tools, at any time during erection, the contractor shall arrange the checking of tools/ equipment/ instruments at his cost.

2.8 All the works shall be performed to the lines, grades and elevations indicated on the drawings. The contractor shall be responsible to locate and layout the works. The horizontal & vertical control points established by the engineer shall be used as datum for the works under this contract. Any work done without being properly located may be removed and dismantled by the Engineer at the contractor's expenses if the contractor refuse to do it.

2.9 The contractor shall create all the facility at storage site as per the tender scope of work for unloading the equipment, its safekeeping, protection and proper record. No material should be lying loose anywhere in the power house as well as stores.

2.10 Contractor has to take care of general cleanliness in his area of work. For area cleaning within the premises of his work, the cleanliness shall be the total responsibility of contractor. Contractor within his scope of work shall keep the separate gang of workers for cleanliness operations. If the area under the scope is found unclean, BHEL can take measures on its own for cleaning and deduct the amount so spent from the running bills of contractor. De-watering of the areas/ floors in general will be by Contractor.

2.11 Necessary civil works shall be provided by BHEL client. The dimensions & locations shall be checked by the contractor for their correctness as per drawings. Further, top elevation and axis/ centrelines of all the foundations shall be checked with respect to benchmark etc. During the civil works, contractor shall check for all the block-outs, dimensions as required in their various mechanical drawings for installation of components/ assemblies and help BHEL wherever required for checking. All minor adjustments of foundation level, dressing and chipping of foundation surfaces up to 25 to 50 mm, enlarging the pockets in foundations etc., and repair of same as may be required for the erection of equipment shall be carried out by the contractor within the finally accepted rates.

2.12 Besides above, any works required for safe and efficient operation of tools and tackles like winches, ropes fastening scaffoldings etc. or any other temporary supports shall also be the contractor's responsibility. For these works all materials including wood / steel and required facilities will have to be arranged by contractor at his own cost.

2.13 While on the job, care is essential to avoid too much chipping and resultant lowering of level. In case of excess chipping, contractor has to arrange additional packing plates as per requirements provided BHEL Engineer allows it. When required as per drawings/ manufacturing unit, the embedded sole plates shall be scraped and checked with Prussian blue to get the required contact with frames and concreting at no extra cost to BHEL.

2.14 The contractor shall ensure perfect matching of packer plates including scraping and blue matching with foundation by dressing the foundation, as well as perfect matching between the packer plates and the base plate of equipment to the satisfaction of BHEL Engineer.

2.15 The contractor shall provide his T&P stores for special tools and instruments at a convenient place near to the working area.

2.16 All mechanical works of machine related to civil works including foundations, grouting, concreting, erection of chequered plates along with embedment in concrete, grouting of liners, any civil works relating to setting of anchor bolts and foundation bolts including preparation of bolt holes will be in the scope of contractor.

2.17 BHEL has developed a storage space approx. 7-8 km away from power house for storage of project material. Temporary works like soiling of land from time to time for upkeep of the storage area shall be the responsibility of the contractor.

2.18 Contractor has to provide proper Security arrangement at store, responsibility of watch and ward of plant material/ equipment (erected or yet to be erected) at powerhouse and other work places shall lie with the contractor.

3.0 MATERIAL MANAGEMENT AT STORES & POWER HOUSE

3.1 The scope of work mainly involves receipt, unloading from road carriers (Trucks/Trailers etc.) of total materials for two units of 20MW each of BHEL (like Hydro-turbines, valves, generators, transformers, bus-duct, piping, auxiliaries equipment, C&I, BOP and other miscellaneous materials/ equipment) at project stores/ storage yards, 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, security, 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 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 (Material Discrepancy Report) 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 as indicated in TCC Part-I is of the order of 2162 MT (Approx.). But the contractor has to handle whatever actual materials are dispatched for the project irrespective of variations in weight and sizes.

TCC Part- I gives the general idea for tender's information about the weights of components/ equipment. The weights and dimensions in drawings 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 to be arranged by 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 contractor 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/ wharfages 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/ wharfage 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.

3.14 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.

3.15 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.

3.16 BHEL reserves the right to recover from the contractor any loss which arises out of undue delay/ discrepancy/ shortage/ damages or any other cause during unloading/loading ,storage at BHEL storage yard/ store sheds/ project site and while transportation from stores to erection/work site.

3.17 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.

3.18 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 them 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.

3.19 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.

3.20 Consignments coming on Saturday 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.

3.21 In the event unloading from the carrier is delayed by the contractor, the detention charges, if any, will be contractors account.

3.22 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.

3.23 All material shall be stored above ground level by use of concrete or wooden sleepers. 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.

3.24 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.

3.25 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.

3.26 Stacking/restacking of the material shall be done as per the instruction and to the satisfaction of engineer. 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.

3.27 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.

3.28 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.

3.29 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).

3.30 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/- (or equivalent NPR). 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.

3.31 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 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 INR. 3000/- (or equivalent NPR) 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 INR. 3000/-(or equivalent NPR) shall be arranged by BHEL. Packing material required shall be provided by BHEL free of cost.

3.32 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. The contractor will however be reimbursed expenses incurred for such work for person deputed, as below:

a) 2nd class train fare worth reservation / supplementary charges/ bus fare subject to furnishing details regarding ticket nos., journey details, amount of fare etc.
b) Local conveyance charges (Actual bus/ cycle rickshaw/ auto rickshaw fare for local journeys at outstation) as permitted by the Engineer.
c) Daily allowances @ INR.250/- per day and @ INR.500/- per day for lodging (or equivalent NPR).
d) Postal/ telegraph/ telephone charges if any subject to production of proof of having incurred such expenditure.
e) Freight and other charges, if any, paid on production of actual receipts.

Payment for the above will be made by BHEL within a month from the date of submission of bill along with details/ desired documents by the contractor subject to completion of work assigned to contractor's personnel and to the entire satisfaction of engineer.

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 stores/erection sites, contractor has to arrange sufficient numbers of security and 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. In case of any theft of material from the contractors custody, the contractor has to lodge FIR at police station.

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 As per the erection requirement contractor shall deliver material to powerhouse/ work site(s). The maximum care has to be taken during that time of loading the material at storage area, transportation and unloading at powerhouse/work site(s). 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 COMPOENENTS

Preservation of all material received at store/site shall be in the scope of contractor.

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

6.0 CLEANING OF EQUIPMENTS

6.1 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.

6.2 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.

6.3 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 pipelines 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. 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 testing instruments and torque wrenches shall be calibrated. 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 motorized 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.

7.28 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.

7.29 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.**

7.30 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**.**

7.31 In view of the tight erection schedule, limited area in both the 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.

7.32 Parts or the components supplied as assembly or sub-assembly from BHEL units/vendors, should be checked for its assembly completeness as well as dimensional accuracy as per drawing. Also checking the tightness of fasteners needs to be done before further erection, and if required re-tightening to be done within the quoted price.

7.33 Where ever required wrapping, lagging, painting etc. supplied by BHEL shall be done over the pipes to prevent condensation.

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.

Two shifts or preferably three shifts working with deployment of sufficient number of certified welders, fitters etc. shall be adopted to ensure completion of distributor assembly within scheduled period.

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 undergo welder Qualification Test as per Standard Procedure in accordance with requirements of ISO 9002 and as per welding manual of BHEL**.**

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/consumables etc**. 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/CUSTOMER approved electrodes and filler wire** will be used (if in scope of contractor). All electrodes shall be baked and dried in the electric electrode-drying oven to the required temperature for the period specified by the Engineer before these are used in erection work. All welders shall have electrodes drying portable oven at the work spot. The electrodes brought to the site will have valid manufacturing test certificate. The test certificate 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 For major/critical items, 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 anti-corrosive red oxide primer/paint once radiography and stress reliving works are over. Necessary consumables and scaffolding etc. (excl. primer/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 drawing/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 as per welding schedule /drawings within the finally accepted price/rates on all equipments. Welding in Distributor, inlet pipe of distributor, MIV inlet pipe, BFV Inlet & outlet pipe and also in piping and other areas as applicable. Necessary help including surface preparation and scaffolding required for conducting all the tests 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 0.05mm. 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 which should be acceptable to BHEL. 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 Air-conditioner/ 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 (as applicable/as per drawings) will be done at the initial stages on all the welding joints as specified in the drawings. 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.

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 Customer/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/Customer 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. Making/removal of temporary electrical/mechanical joints, links, openings etc. for testing are part of testing and may need repetition based on the test methodology and results.

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 offsite disposal of effluents.

9.5 For testing of distributor, 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, re-alignment 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 re-alignment 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

10.1 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. All under water parts inner surface are to be painted with coal tar to the required thickness.

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

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

10.4 Any painting required for preservation of items during storage shall be done by contractor including supply of paint, primer and other consumables.

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SPECIAL CONDITIONS OF CONTRACT (SCC)

(Document No PS:MSX:SCC)

BHARAT HEAVY ELECTRICALS LIMITED



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1.0	**INTENT OF THE SPECIFICATION**
1.1	The intent of this erection specification is to provide services for execution of the project according to most modern and proven techniques and codes. The omission of specific reference to any method, equipment or material necessary for the proper and efficient services towards installation of the plant shall not relieve the contractor of the responsibility of providing such services / facilities to complete the work or portion of work awarded to him. The quoted / accepted rates / price shall deem to be inclusive of all such contingencies.
1.2	The work shall conform to dimensions and tolerances given in various drawings and documents that will be provided during erection. If any portion of works is found to be defective in workmanship and not conforming to drawings / documents or other stipulations, the contractor shall dismantle and re-do the work duly replacing the defective materials at their own cost, failing which recoveries, as determined by BHEL, shall be effected from contractor's bills.
1.3	It is not the intent of this specification to specify herein all the details of erection and commissioning. However, the system shall conform in all respects to high standards of quality and workmanship for performing the required duties in a manner acceptable to purchaser who will interpret the meaning of drawings and specifications and shall be entitled to reject any work or material, which in his judgments is not in full accordance herewith.
1.4	The omission of specific reference to any fabrication / erection or other method, equipment or material necessary for proper and efficient working of the plant shall not relieve the tenderer of the responsibility of providing such facilities to complete the work at quoted rates. Any mismatch/ defect found due to mistake in fabrication / erection shall have to be rectified by the vendor free of cost. Inspection by BHEL/Customer does not relieve vendor of his responsibility of executing quality erection.
1.5	The work covered under this specification is of highly sophisticated nature, requiring the best quality workmanship, supervision, engineering and construction management. The contractor should ensure proper planning and successful and timely completion of the work to meet the overall project schedule. The contractor must deploy adequate quantity of tools & plants, modern / latest construction aids etc. He must also deploy adequate trained, qualified and experienced supervisory staff and skilled personnel.

1.6	Contractor shall erect and commission all the equipments and auxiliaries as per the sequence & methodology prescribed by BHEL depending upon the technical requirements. Availability of materials and fronts will decide this. BHEL Engineer's decision regarding correctness of the work and method of working shall be final and binding on the contractor. No claims for extra payment from the contractor will be entertained on the ground of deviation from the methods / sequence adopted in erection of similar sets elsewhere.
1.7	Following shall be the minimum responsibility of contractor and have to be provided within finally accepted rates / prices:
1.7.1	Provision as required of all types of labour, supervisors, engineers, watch and ward, tools & tackles, calibrated MMEs (Monitoring and Measuring Equipment) as specified and otherwise required for the work, consumables for erection, testing and commissioning including material handling
1.7.2	Achieving Proper out-turn / Turn-over as per BHEL plan and commitment.
1.7.3	Completion of work as per BHEL Schedule
1.7.4	Good quality and accurate workmanship for proper performance of the equipment
1.7.5	Repair and rectification
1.7.6	Preservation / Re-conservation of all components during storage / erection / commissioning till handing over.

2.0	**GENERAL SERVICES TO BE RENDERED BY THE BIDDER**
2.1	Services for construction, fabrication, equipment erection testing as well as trial run & commissioning of various equipment and accessories under the contract shall include but not be limited to the following:
2.2	Issuing materials from store/open yard from time to time for erection as per the construction programme. The Contractor shall be the custodian of all the materials issued till the plant/equipment is officially taken over by the owner / BHEL after complete erection any successful trial run & commissioning.
2.3	Transport of material to their respective places of erection and erection of the complete plant & equipment as supplied under this specification.
2.4	Trial run and commissioning of individual equipment / sub-systems to the satisfaction of Owner/BHEL.
2.5	Deployment of all skilled and unskilled manpower required for erection, supervision of erection, watch & ward, commissioning and other services to the rendered under this specification.
2.6	Deployment of all erection tools & tackle, construction machinery, transportation vehicles and all other implements in adequate number and size, appropriate for the erection work to be handled under scope of this specification except otherwise specified.
2.7	Supply of all consumables, eg welding electrodes, cleaning agents, diesel oil, lubricant etc as well as materials required for temporary supports, scaffolding etc as necessary for such erection work, unless specified otherwise.
2.8	Providing support services for the contractor's erection staff eg construction of site offices, temporary stores, residential accommodation and transport to work site for erection personnel, watch and ward for security and safety of the materials under the Contractor's custody etc. as required.
2.9	Maintaining proper documentation of all the site activities undertaken by the Contractor as per the proforma mutually agreed with BHEL, Submission of monthly progress reports and any such document as and when desired by BHEL/owner, taking approval of all statutory authorities i.e Boiler Inspector, Factory Inspector, Inspector of Explosives etc , as applicable for respective portions of work fall under the jurisdiction of such statutes of laws.
2.10	Any other service, although not specifically called for but required for a contract of the size and nature indicated in the specification.

3.0	**GENERAL TECHNICAL REQUIREMENTS (CODES AND STANDARDS)**
3.1	Except where otherwise specified, the plant/equipment shall comply with the appropriate Indian Standard or an agreed internationally accepted Standard Specification as mentioned elsewhere in contract specifications, each incorporating the latest revisions at the time of tendering. Where no internationally accepted standard is applicable, the Bidder shall give all particulars and details as necessary, to enable BHEL to identify all of the plant/equipment in the same detail as would be possible had there been a Standard Specification.
3.2	Where the Bidder proposes alternative codes or standards he shall include in his tender one copy (in English) of each Standard Specification to which materials offered shall comply. In such case, the adopted alternative standard shall be equivalent or superior to the standards mentioned in the specification.
3.3	In the event of any conflict between the codes and standards referred above, and the requirements of this specification, the requirements which are more stringent shall govern.
3.4	Tools used during erection and commissioning shall not be accepted except with the specific approval of the Engineer.

4.0	**OBLIGATIONS OF CONTRACTOR**
4.1	**CONSUMABLES & OTHER ITEMS**
4.1.1	The contractor shall provide within finally accepted price / rates, all consumables (excepting those indicated in BHEL scope) like welding electrodes (including alloy steel and stainless steel), filler wires, TIG filler wires (over & above as supplied by the unit along with the plant materials, which will be given free of cost to bidder), gases (inert, welding, cutting), soldering material, dye penetrants, radiography films, etc. Other erection consumables such as tapes, jointing compound, grease, mobile oil, M-seal, Araldite, petrol, CTC / other cleaning agents, grinding and cutting wheels are to be provided by the contractor. Steel, packers, shims, wooden planks, scaffolding materials hardware items etc required for temporary works such as supports, scaffoldings are to be arranged by the contractor. Sealing compounds, gaskets, gland packing, wooden/concrete sleepers, for temporary work, required for completion of work except those which are specifically supplied by manufacturing unit are also to be arranged by the contractor.
4.1.2	All the shims, gaskets and packing, which go finally as part of plant equipment, shall be supplied by BHEL free of cost.
4.1.3	It shall be the responsibility of the contractor to plan the activities and store sufficient quantity of consumables. Non-availability of any consumable materials or equivalent suggested by BHEL cannot be considered as reason for not attaining the required progress or for additional claim.
4.1.4	Not Applicable
4.1.5	It shall be the responsibility of the contractor to obtain prior approval of BHEL, regarding suppliers, type of electrodes etc before procurement of welding electrodes. On receipt of electrodes at site these shall be subjected to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch number, date of expiry etc and produce test certificate for each lot / batch with correlation of batch / lot number with respective test certificate. No electrode without a valid test certificate will to be used.
4.1.6	BHEL reserves the right to reject the use of any consumable including electrodes, gases, lubricants / special consumables if it is not found to be of the required standard / make / purity or when shelf life has expired. Contractor shall ensure display of shelf life on consumable wherever required and records maintained.
4.1.7	Storage of all consumables including welding electrodes shall be done as per requirement / instruction of the Engineer by the contractor at his cost.

4.1.8	In case of improper arrangement for procurement of any consumable, BHEL reserves the right to procure the same from any source and recover the cost from the Contractor's first subsequent bill at market value plus the departmental charges of BHEL from time to time. Postponement of such recovery is normally not permitted. The decision of Engineer in this regard shall be final and binding on the Contractor.
4.1.9	All lubricants and chemicals required for pre-commissioning, commissioning, testing, preservation and lubricants for trial runs of the equipment shall be supplied by BHEL / BHEL's client. All services including labour and T&P will be provided by the contractor for handling, filling, emptying, refilling etc. The consumption of lubricants / chemicals shall be properly accounted for. Surplus material if any shall be properly stacked/ tagged and returned to BHEL/ CUSTOMER stores at no extra cost to BHEL. BHEL reserves the right to recover costs for wastage by the contractor.
4.1.10	Transportation of oil drums, from stores, filling of oil for flushing, first filling, subsequent changeover if any, topping/making up till the unit is fully commissioned and handed over to customer is included in scope of this contract. The contractor shall have to return all the empty drums to BHEL / BHEL's client store at no extra cost. Any loss / damage to above drums shall be to contractor's account.
4.1.11	All charges on account of Octroi, terminal or sales tax and other duties on materials obtained from any source for carrying out the works in the scope of the contractor shall be borne by the contractor.
4.2	**TOOLS AND PLANTS / MONITORING AND MEASURING EQUIPMENT (MMEs)**
4.2.1	**T&Ps and MMEs to be provided by Contractor**
4.2.1.1	All T&Ps and MMEs excepting those specifically indicated in BHEL scope are to be provided by the Contractor. Contractor has to make his own arrangement at his cost for completing the formalities (including arrangement of Road permits, if any) if required with Sales Tax/VAT authorities, for bringing their materials, plants and equipments at site for the execution of work under this contract.
4.2.1.2	All suitable cranes, lifting and transport equipments for material handling at stores/yard/siding of BHEL/Customer are included in scope. BHEL's cranes will not be available for this purpose unless otherwise specifically permitted as per contract conditions
4.2.1.3	All T&Ps to be deployed by the contractor shall have the approval of BHEL Engineer with regard to brand, quality and specification.

4.2.1.4	Indicative list of Major T&Ps in the scope of Contractor are given in the Technical Conditions of Contract. Bidders to note that these are only indicative and as such all other T&P necessary for timely and satisfactory completion of work in scope shall be mobilized by Contractor
4.2.1.5	Timely deployment of adequate T&Ps is the responsibility of the contractor. The contractor shall be prepared to augment the T&P at short notice to match the planned programme and to achieve the milestones.
4.2.1.6	Contractor shall maintain and operate his tools and plants in such a way that major breakdowns are avoided. In the event of major breakdown, contractor shall make alternative arrangements expeditiously so that the progress of work is not hampered.
4.2.1.7	In the event of contractor failing to arrange the required tools, plants, machinery, equipment, material or non-availability of the same owing to breakdown, BHEL will make alternative arrangement at the risk and cost of the contractor. Decision of BHEL shall be final and binding on the contractor. It is not obligatory on the part of BHEL to provide any tools and tackles or other materials other than those specifically agreed to do so by BHEL. However, depending upon the availability, BHEL/ BHEL 's Customer handling equipment and other plants may be made available to the contractor on payment of hire charges as fixed, subject to the conditions laid down by BHEL/ Customer from time to time, Unless paid in advance, such hire charges, if applicable, shall be recovered from contractor's bill /security deposit or any other due payment in one instalment.
4.2.1.8	The T&P to be arranged by the contractor shall be in proper working condition and their operation shall not lead to unsafe condition. The movements of cranes, and other equipment should be such that no damage / breakage occurs to foundations, other equipments, material, property and men. All arrangements for the movement of the T&P etc shall be the contractor's responsibility.
4.2.1.9	Use of welding generators/ rectifiers only shall be permitted for welding. Use of welding transformers will be subject to specific approval of BHEL engineer.
4.2.1.10	The contractor at his cost shall carry out periodical testing of his construction equipments. Test certificates shall be furnished to BHEL.
4.2.1.11	Contractor shall ensure deployment of serviced and healthy T&Ps including cranes, lifting tackles, wire ropes, manila ropes, winches and slings etc. History card and maintenance records for major T&Ps will be maintained by the contractor and will be made available to BHEL Engineer for inspection as and when required. Fitness

	certificate / Test Certificates of T&P shall have to be submitted before it is put in use. Identification for such T&Ps will be done as per BHEL Engineer's advice. BHEL reserves the right to permit only new slings up to 20 mm and lifting tackles up to 3 MT capacities.
4.2.1.12	Contractor shall ensure deployment of reliable and calibrated MMEs (Inspection measuring and Monitoring equipment). The MMEs shall have test / calibration certificates from authorized / Government approved / accredited agencies traceable to National / International standards. Each MME shall have a label indicating calibration status i.e. date of calibration, calibration agency and due date for calibration. A list of such instruments deployed by contractor at site with its calibration status is to be submitted to BHEL Engineer for control.
4.2.1.13	Re-testing/ re-calibration shall also be arranged at regular intervals during the period of use as advised by BHEL Engineer within the contract price. The contractor will also have alternate arrangements for such MME so that work does not suffer when the particular instrument is sent for calibration. If any MMEs not found fit for use, BHEL shall have the right to stop the use of such item. It will be necessary for the contractor to deploy proper item. Any readings taken by the defective instrument will be recalled and repeat the readings taken by that instrument with a proper one. In case he fails to do so, BHEL may deploy MMEs and retake the readings at contractor's cost.
4.2.1.14	BHEL shall have lien on all T&P, MMEs and other equipment of the contractor brought to the site for the purpose of erection, testing and commissioning. BHEL shall continue to hold the lien on all such items throughout the period of contract / extended period. The contractor and/ or his sub-contractors, without the prior written approval of the Engineer, shall remove no material brought to the site.
4.2.1.15	The month wise T&P deployment plan to execute the work is to be submitted as per relevant format as per the instruction of BHEL. It shall be the contractor's responsibility to deploy the required T&P, for timely and successful completion of the job, to any extent.
4.2.2	**Obligations in respect of T&Ps and MMEs provided by BHEL**
4.2.2.1	T&P **/** MMEs being provided by BHEL to sub-contractor free of hire charges shall be shared by other subcontractors working for BHEL at site and the allotment done by BHEL Engineer shall be final and binding.
4.2.2.2	BHEL T&P will be issued in basic assembled condition. Additional loose components / sub-assemblies / attachments as and when necessary, will be issued

	by BHEL. Assembly of such additional loose components/sub-assemblies/ attachments is in contractor's scope.
4.2.2.3	In case of non-availability of the T&Ps to be provided by BHEL due to breakdown, major overhauls, distribution pattern or any other reason, the contractor shall plan / amend / alter his activities to meet erection / commissioning targets in consultation with BHEL.
4.2.2.4	**void**
4.2.2.5	The contractor shall engage trained and experienced operators for the operation of BHEL's T&Ps. Their skill / performance will be checked by BHEL Engineer before they are allowed to operate the same. However checking of skills by BHEL does not absolve the contractor of his responsibilities for proper and safe handling of equipment, consistent good performance of operators and regular performance evaluation of operators.
4.2.2.6	The day to day operation and maintenance of BHEL's T&Ps **(Other than cranes)** shall be carried out by contractor as per manufacturer's / BHEL's maintenance schedule at his cost. The contractor shall arrange, at his own cost, trained operators, fuel and other consumables for their operation. BHEL shall arrange all spares needed for upkeep of major T&Ps provided like Huck Bolting Machine*, DG Set, Induction Machine and Hydraulic Test pumps. The contractor has to arrange for fixing of the spares; supervision in specialized cases will be provided by BHEL. For upkeep of all other T&Ps supplied by BHEL, spares shall be arranged by the Contractor. BHEL supplied T&Ps shall be maintained in good working condition during the entire period of use. T&Ps in defective / damaged condition shall be rectified promptly to the full satisfaction of BHEL engineer. Contractor shall maintain records for maintenance of major T&Ps. These shall be made available for Inspection whenever required. In case of any lapses on the part of the contractor, BHEL at its own discretion shall get the servicing/ repair of equipment done at the risk and cost of the contractor along with BHEL overheads. Further, if there are breakdowns / damages due to negligence of the contractor, the complete service / repair charges and cost of all the spares damaged with BHEL overheads shall be recovered from contractor's RA bills. *: for operation and maintenance of ESP Huck bolting machine, BHEL shall provide the basic power rig and hose. Balance toolings ie Guns, chuck jaws etc are to be arranged by contractor.
4.2.2.7	void

4.2.2.8	Increasing / shortening of the crane boom to suit work requirements shall have to be arranged by the indenting contractor at his cost including restoration to a state as directed by BHEL. All necessary manpower tools, support, consumables, illumination etc. will have to be arranged by contractor at his cost. If required, contractor has to return the crane with original boom.
4.2.2.9	The area and infrastructure development of the area to be carried out by the customer. However in construction projects of this magnitude it is possible that all the areas / approaches may not be ready. In such cases backfilling of approaches where ever necessary, consolidation of ground and arrangement of sleepers / sand bag filling etc for safe operation / movement of equipment including cranes / trailers etc shall be the responsibility of the contractor at his cost. No compensation on this account shall be payable.
4.2.2.10	In the event of contractor not using and maintaining BHEL T&Ps according to BHEL's instructions. BHEL will have the right to withdraw such item without any notice and no claim in this regard shall be entertained and contractor shall be responsible for delay in execution on this account.
4.2.2.11	The contractor shall furnish regular utilization report of the BHEL T&Ps, as per requirement of BHEL.
4.2.2.12	Any loss / damage to any part of BHEL T&Ps and MMEs shall be to the contractor's account and any expenditure on these accounts by BHEL will be recovered from the contractor's bill in case the contractor fails to make good the loss.
4.2.2.13	It shall be responsibility of the contractor to take delivery of T&Ps and MMEs from stores or place of use by other contractor at project site, transport the same to site and return the same to BHEL store / place as intimated by Engineer in project site in good working conditions after use.
4.2.2.14	The contractor shall return BHEL T&Ps and MMEs issued to him in good working condition as and when desired by BHEL (on completion or reduction of workload). If contractor delays return of T&P and MME, hire charges as applicable shall be levied by BHEL from time, it was requisitioned till the time of actual return. T&Ps and MMEs returned in damaged / unserviceable condition shall be got repaired by BHEL at its own discretion and entire cost of repair with BHEL overheads shall be recovered from the contractor.
4.2.2.15	Replacement cost including BHEL overheads in respect of irreparable / completely damaged / non return of T&Ps and MMEs shall be recovered from the contractor's running / final bills

4.2.2.16	**Obligations in respect of Cranes provided by BHEL**
a)	BHEL will make available the cranes (as per Technical Conditions of Contract**)** free of charge to the contractor on sharing basis mainly for the purposes enumerated/ indicated therein**.** BHEL cranes have to be shared with other agencies / contractors of BHEL. The allocation of cranes shall be the discretion of BHEL engineer, which shall be binding on the contractor.
b)	BHEL Cranes may be initially issued in basic assembled condition. Any alteration/addition like boom reduction / extension, assembly of components/sub-assemblies needed for modulating the capacity/reach/other features of cranes and restoration to the state as directed by BHEL shall be the contractor's responsibility.
c)	In case the BHEL cranes are not covered under AMC of BHEL, then the day-to-day upkeep and running maintenance like filling / topping up of lubricants, changing filters, etc including repair of self starter and dynamo of these cranes shall be the responsibility of the contractor. If on checking it is found that the same is not followed, BHEL will exercise its right to get the job/works done at the risk and cost of contactor. In case BHEL cranes are covered under AMC awarded by BHEL, then the day-to-day upkeep and running maintenance as described above are excluded from scope. However any additional helpers if any required during Preventive/ Breakdown Maintenance, Assembly/ disassembly shall be provided by contractor at no extra cost. BHEL may also provide cranes through crane hiring agencies in which case the day-to-day upkeep and running maintenance shall be excluded from scope of contractor.
d)	Minor consumables like cotton cloth, cotton waste, etc is to be supplied by Contractor. All spares and lubricants/grease is excluded from scope. Contractor to give the requirements of these items well in advance in case the cranes provided by BHEL are BHEL owned cranes.
e)	Unless otherwise specified, trained operators for BHEL owned cranes shall be provided by the contractor. These operators should possess valid license for heavy vehicle.
f)	BHEL cranes will be withdrawn for regular and capital maintenance as per the respective schedule of maintenance. As far as possible such schedules will be intimated to the contractor in advance and may be adjusted depending on the work requirements at site. However no claim whatsoever will be entertained on account of non-availability of cranes.

g)	Where the services of the cranes provided by BHEL are to be shared by other agencies/ contractors of BHEL, the contractor's responsibilities defined above will also be apportioned accordingly to the beneficiary agency. Working arrangements in this regard will be done at site by BHEL engineer and in any case his decision shall be final and binding.
h)	Major breakdowns will be attended to by BHEL. However, in case of breakdowns or damages due to negligence of the contractor, the complete service/repair charges including cost of spares shall be to the account of the contractor, along with BHEL overheads.
4.2.2.17	**Obligations in respect of Construction Lift/Elevators provided by BHEL**
a)	The total erection including commissioning, maintenance, statutory clearances shall be in included in scope of work. Supervision by the original equipment supplier or their authorized agency shall be arranged for by BHEL, in case found necessary.
b)	All day to day and routine maintenance and checking is to be carried out by the contractor as per the recommendations of the supplier. He should periodically check the brakes and carry out the all works to ensure the safety of all those using the lift/elevator. BHEL shall arrange spares required for upkeep of Construction lift/elevator
c)	The construction lift/ elevator should never be overloaded as this can lead to serious accidents. Ensuring all safety aspects in operation of the lift shall be the responsibility of the contractor. Erection of all the required number of landing platforms is included in scope. Landing platforms are to be provided with proper barricades and hand railings.
d)	After completion of contractual scope of work or as per BHEL advice, the temporary elevator/lift shall be dismantled and handed over to BHEL neatly identified/tagged. Temporary structures/ platforms etc. erected for the elevators/ lifts are also to be dismantled and materials to be returned to stores as applicable. **The construction and dismantling of the foundations required for the construction/elevator lifts is included in the scope of the contractor.**

5.0	**RESPONSIBILITIES OF CONTRACTOR IN RESPECT OF LABOUR, SUPERVISORY STAFF, ETC.**
5.1	Refer relevant clauses of General Conditions of Contract (GCC) also in this regard
5.2	The contractor shall deploy all the necessary skilled/semiskilled/ unskilled labour including highly skilled workmen etc. These workmen should have previous experience on similar job. They shall hold valid certificates wherever necessary. BHEL reserves the right to insist on removal of any employee of the contractor at any time if he is found to be unsuitable and the contractor shall forthwith remove him.
5.3	Contractor shall also comply with the requirements of local authorities/ project authorities calling for police verification of antecedents of the workmen, staff etc.
5.4	It is the responsibility of the contractor to engage his workmen in shifts and or on overtime basis for achieving the targets set by BHEL. This target may be set to suit BHEL's commitments to its customer or to advance date of completion of events or due to other reasons. The decision of BHEL in regard to setting the erection and commissioning targets will be final and binding on the contractor.
5.5	Contractor shall provide at different elevation suitable arrangement for urinal and drinking water facility with necessary plumbing & disposal arrangement including construction of septic tank. These installations shall be maintained in hygienic condition at all times.
5.6	The Contractor in the event of engaging 20 or more workmen, shall obtain Independent license under the Contract labour (Regulation and Abolition) Act 1970 from the concerned authorities based on Form-V issued by the Principal Employer/Customer. In order to issue Form-V by Customer, Contractor shall fulfill all Statutory requirements like Insurance Policy, PF Code/PF Account number etc as per the requirement of BHEL/Customer
5.7	Not Applicable
5.8	Contractor may also be required to comply with provisions of ESI Act in vogue if applicable and submit evidence to BHEL.
5.9	BHEL / customer may insist for witnessing the regular payment to the labour. They may also like to verify the relevant records for compliance with statutory requirements. Contractor shall enable such facilities to BHEL/ Customer.
5.10	Contractor shall deploy only qualified and experienced engineers/ supervisors. They shall have professional approach in executing the work.

5.11	The contractor's supervisory staff shall execute the work in the most professional manner in the stipulated time. Accuracy of work and aesthetic finish are essential part of this contract. They shall be responsible to ensure that the assembly and workmanship conform to dimensions and tolerances given in the drawings/instructions given by BHEL engineer from time to time.
5.12	The supervisory staff employed by the contractor shall ensure proper outturn of work and discipline on the part of the labour put on the job by the contractor. Also in general they should see that the works are carried out in a safe and proper manner and in coordination with other labour and staff employed directly by BHEL or other contractors of BHEL or BHEL's client.
5.13	It is the responsibility of the contractor to arrange gate pass for all his employees, T&P etc for entering the project premises. Necessary coordination with customer officials is the responsibility of the contractor. Contractor to follow all the procedures laid down by the customer for making gate passes. Where permitted, by customer / BHEL, to work beyond normal working hours, the contractor shall arrange necessary work permits for working beyond normal working hours.
5.14	The actual deployment will of Labour and Engineer/supervision staff shall be so as to satisfy the erection and commissioning targets set by BHEL. If at any time, it is found that the contractor is not in a position to deploy the required engineers/supervisors/workmen due to any reason, BHEL shall have the option to make alternate arrangements at the contractor's risk and cost. The expenditure incurred along with BHEL overheads thereon shall be recovered from the contractor.
5.15	Contractor shall not deploy women labour at night.

6.0	**MATERIAL HANDLING, STORAGE AND PRESERVATION ETC**
6.1	**MATERIAL HANDLING AND STORAGE**
6.1.1	All the equipments/ materials furnished under this contract shall be received from the project stores, sheds / storage yards and transported to pre assembly area / erection site and stored in the storage spaces in a manner so that they are easily retrievable till the contractor erects them. **While drawing/lifting material from BHEL / customer stores, the contractor shall ensure that the balance / other materials are stacked back immediately. No claim is admissible on this account**
6.1.2	While BHEL will endeavor to store / stack / identify materials properly in their open / close / semi closed / tarpaulins covered storage yard / shed, it shall be contractor's responsibility to assist BHEL in identifying materials well in time for erection. They should take the delivery of the same, following the procedure indicated by BHEL, and transport the material safely to pre-assembly yard / erection site in time, according to program.
6.1.3	The contractor shall take delivery of components, equipment / consumables from storage area after getting the approval of BHEL Engineer on standard indent forms.
6.1.4	The contractor shall identify and deploy necessary Engineers / supervisors / workmen for the above work in sufficient number as may be needed by BHEL, for areas covering their scope.
6.1.5	All the equipment shall be handled very carefully to prevent any damage or loss. No untested wire ropes / slings etc. shall be used for unloading / handling. The equipment shall be properly protected to prevent damage either to the equipment or to the floor where they are stored. The equipment from the stores shall be moved to the actual location at the appropriate time so as to avoid damage of such equipment at site.
6.1.6	Contractor shall ensure that while lifting slings shall be put over the points indicated on the equipment or as indicated in the manufacturer's drawings. Slings / shackles of proper size shall be used for all lifting and rigging purposes. All care shall be taken to safe guard the equipment against any damage. Dragging of piping / valves should be avoided. In case of any damage the cost shall be covered from the contractor.
6.1.7	Approach road conditions from the stores/ yards to the erection site may not be equipped and ideal for smooth transportation of the equipment. Contractor may have to be adequately prepared to transport the materials under the above

	circumstances without any extra cost. The contractor may familiar himself with soil conditions at site.
6.1.8	Contractor shall be responsible for examining all the plant and materials issued to him and notify the Engineer immediately of any damage, shortage, discrepancy etc. before they are moved out of the stores / storage area. The contractor shall be solely responsible for any shortages or damages in transit, handling, storage and erection of the equipment once received by him. As the erection work will be spread in different areas/ locations of the project, contractor has to arrange sufficient number of watch / ward personal to avoid any pilferage of material
6.1.9	The contractor shall maintain an accurate and exhaustive record-detailing out the list of all equipment received by him for the purpose of erection and keep such record open for the inspection of the engineer at any time.
6.1.10	All the material in the custody of contractor and stored in the open or dusty locations must be covered with suitable weather proof / fire retardant covering material wherever applicable and shall be blocked up on raised level above ground. All covering materials including blocks and sleeper shall be arranged by the contractor at his cost.
6.1.11	If the material belonging to the contractor are stored in area other than those earmarked for his operation the engineer will have the right to get it moved to the area earmarked for the contractor at the contractors risk and cost.
6.1.12	The contractor shall be responsible for making suitable indoor storage facilities to store all equipment (drawn by the contractor from BHEL/ customer stores), which require indoor storage till the time of their installation. The Engineer will direct the contractor in this regard, which item in his opinion will require indoor storage, and the contractor shall comply with Engineer's decision.
6.1.13	The contractor shall ensure that all surplus / damaged / scrap / unused material, packing wood / containers/ special transporting frames etc are returned to BHEL at a place in project area identified by the Engineer. The contractor will maintain an account for all items received and returned to BHEL. Any shortage in returning such items shall be chargeable to the contractor except allowable wastage for packing wood only.
6.1.14	The contractor shall hand over all parts / materials remaining extra over the normal requirement with proper identification tags to the stores as directed by the concerned BHEL engineer.

6.1.15	The contractor shall ensure that all the packing materials and protective devices installed on equipment during transit and storage are removed before installation.
6.1.16	It shall be the responsibility of the contractor to keep the work / storage areas in neat, tidy and working conditions. All surplus/unusable packing and other materials shall be removed and deposited at location(s) specified by BHEL within the project premises. If required weighing of the same within the project premises will have to be carried out.
6.2	**PRESERVATION OF COMPONENTS**
6.2.1	After taking delivery from BHEL / customer's stores, plant materials storage shall be subjected to the following protection besides other provisions indicated in these specifications elsewhere.
6.2.1.1	Items stored outdoors shall be stacked up at least six inches (6") off the ground. Items should not be stored in a low lying area where water logging is a possibility. Contractor should have sufficient numbers of wooden / concrete / steel sleepers for the job.
6.2.1.2	Motors, valves, electrical equipment, control equipment and instruments, and special or precision items requiring special care, etc shall be stored indoors. Motor windings shall be kept dry by use of external heat or space heaters.
6.2.1.3	Bearings and other wearing surfaces of plant materials shall be protected against corrosion and kept clean and should be regularly monitored.
6.2.1.4	Insulation materials shall be stored indoors or otherwise protected against getting wet/ damaged, using suitable measures and should be protected from direct rain.
6.2.2	It shall be the responsibility of the contractor to apply preservatives / touch up paints (primer) on equipment handled and erected by him till such time of final painting. It shall be contractor's responsibility to arrange for required paints (primer), thinners, labour, scaffolding materials, cleaning materials like wire brush, emery sheets, etc, cleaning of surface and provide one coat of preservatives / paints (primer) from time to time as decided by BHEL engineer. The accepted rate shall include this work also. It is to be noted that such painting may have to be done as and when required till such time the final painting is carried out.
6.2.3	The contractor shall effectively protect the finished work from action of weather and from damage or defacement and shall cover the finished parts then and there for their protection.

6.2.4	Any failure on the part of contractor to carry out works according to above clauses will entail BHEL to carry out the job from any other party and recover the cost from contractor.

7.0	**DRAWINGS AND DOCUMENTS**
7.1	The detailed drawings, specifications available with BHEL engineers will be made available to the contractor during execution of work at site. The contractor will also ensure availability of all drawings / documents at work place.
7.2	Necessary drawings to carry out the erection work will be furnished to the contractor by BHEL on loan, which shall be returned to BHEL Engineer at site after completion of work. Contractor shall ensure safe storage and quick retrieval of these documents.
7.3	The contractor shall maintain a record of all drawings and documents available with him in a register as per format given by BHEL Engineer. Contractor shall ensure use of pertinent drawings / data / documents and removal of obsolete ones from work place and returning to BHEL.
7.4	The data furnished in various annexure enclosed with this tender specification are only approximate and for guidance. However, the change in the design and in the quantity may occur as is usual in any such large scale of work. The contractors quoted rates shall be inclusive of the above factor
7.5	Should any error or ambiguity be discovered in the specification or information the contractor shall forthwith bring the same to the notice of BHEL before commencement of work. BHEL's interpretation in such cases shall be final and binding on the contractor.
7.6	Deviation from design dimensions should not exceed permissible limit. The contractor shall not correct or alter any dimension / details, without specific approval of BHEL.

8.0	**INSPECTION AND QUALITY**
8.1	**Inspection, Quality Assurance, Quality Control**
8.1.1	Preparation of quality assurance log sheets and protocols with customer/ consultants/statutory authority, welding logs, NDE records, testing & calibration records and other quality control and quality assurance documentation as per BHEL engineer's instructions, is within the scope of work/specification. These records shall be submitted to BHEL/customer for approval from time to time.
8.1.2	The protocols between contractor and customer/ BHEL shall be made prior to installation for correctness of foundations, materials, procedures, at each stage of installation, generally as per the requirement of customer/ BHEL. This is necessary to ensure elimination of errors or keeping them within tolerable limits and to avoid accumulation and multiplication of errors.
8.1.3	A daily log book should be maintained by every supervisor/engineer of contractor on the job in duplicate (one for BHEL and one for contractor) for detailing and incorporating alignment/clearance / centering / leveling readings and inspection details of various equipments etc. High pressure welding details like serial number of weld joints, welders name, date of welding, details of repair, heat treatment etc. will be documented in welding log as per BHEL Engineer's instructions. Record of radiography containing details like serial number of weld joints, date of radiography, repairs, if any, re-shots etc shall also be maintained as per BHEL Engineer's instructions. **Record of heat treatments performed shall be maintained as prescribed by BHEL**
8.1.4	The performance of welders will be reviewed from time to time as per the BHEL standards. Welders' performance record shall be furnished periodically furnished for scrutiny of BHEL's Engineer. Corrective action as informed by BHEL shall be taken in respect of those welders not conforming to these standards. This may include removal/ discontinuance of concerned welder(s). Contractor shall arrange for the alternate welders immediately
8.1.5	All the welders shall carry identity cards as per the proforma prescribed by BHEL/ Customer/ Consultant. Only welders duly authorized by BHEL/ customer/ consultant shall be engaged on the work.

8.1.6	Contractor shall provide all the Measuring Monitoring Equipments (MMEs) required for completion of the work satisfactorily. These MMEs shall be of brand, quality and accuracy specified by BHEL Engineer and should have necessary calibration and other certificates as per the requirement of BHEL Engineer. Decision of BHEL Engineer regarding acceptance or otherwise of the measuring instruments/gauges/tools for the work under this specification, is final and binding on the contractor. BHEL may give an indicative list of MMEs required for this work and to be made available by the contractor. The list will be reviewed by BHEL and the contractor shall meet any augmentation needed wherever required.
8.1.7	It is the responsibility of the contractor to prove the accuracy of the testing/measuring/calibrating equipments brought by him based on the periodicity of calibration as called for in the BHEL's quality assurance standards/BHEL Engineer's instructions.
8.1.8	Any re-laying or re-termination of cables/re-erection of instruments/ recalibration of instruments etc. required due to contractor's mistake or design requirement and found at any stage inspection, shall be carried out by the contractor at no extra cost.
8.1.9	BHEL, Power Sector Regions (PSNR/PSER/PSWR/PSSR) have already been accredited with ISO 9001 certification and as such this work is subject to various audits to meet ISO 9001 requirements. One particular aspect which needs special mention is about arrangement of calibration of instruments by the contractor. Contractor shall ensure deployment of reliable and calibrated MMEs (Measuring and Monitoring Equipments). The MMEs shall have test / calibration certificates from authorised / Government approved / Accredited agencies traceable to National / International Standards. Re-testing / re-calibration shall also be arranged at regular intervals during the period of use as advised by BHEL Engineer within the contract price. The contractor will also have alternate arrangements for such MMEs so that work does not suffer when the particular equipment / instrument is sent for calibration. Also if any MMEs not found fit for use, BHEL shall have the right to stop the use of such item and instruct the contractor to deploy proper item and recall ie repeat the readings taken by that instrument, failing which BHEL may deploy MME and retake the readings at Contractor's cost.
8.1.10	Re-work necessitated on account of use of invalid MMEs shall be entirely to the contractor's account. He shall be responsible to take all corrective actions,

	including resource augmentation if any, as specified by BHEL to make-up for the loss of time.
8.1.11	In the courses of erection, it may become necessary to carry repeated checks of the work with instruments recently calibrated, re-calibrated. BHEL may counter/ finally check the measurements with their own MMEs. Contractor shall render all assistance in conduct of such counter/final measurements.
8.1.12	Total Quality is the watchword of the work and Contractor shall strive to achieve the Quality Standards, procedures laid down by BHEL. He shall follow all the instructions as per BHEL drawings and Quality Standards.
8.2	**Stage Inspection By FES/QA Engineers**
8.2.1	Apart from day-to-day inspection by BHEL Engineers stationed at Site and Customer's Engineers, stage inspection of equipments under erection and commissioning at various stages shall also be conducted by teams of Engineers from Field Engineering Services of BHEL's Manufacturing Units, Quality Assurance teams from Field Quality Assurance, Unit/Factory Quality Assurance and Commissioning Engineers from Technical Services etc. Contractor shall arrange all labour, tools and tackles etc along with proper access for such stage inspections free of cost.
8.2.2	Any modifications suggested by BHEL FES and QA Engineers' team shall be carried out. Claims of contractor, if any, shall be dealt as per Section 13, and provided such modifications have not arisen for reasons attributable to the contractor.
8.3	**Statutory Inspection of Work**
8.3.1	The work to be executed under these specifications has to be offered for inspection, at appropriate stages of work completion, to various statutory authorities for compliance with applicable regulations. The work related statutory inspections, though not limited to, are as under: 1) Inspectorate of Steam Boilers and Smoke Nuisance 2) Electrical Inspector 3) Factory Inspector, Labour Commissioner, PF Commissioner and other authoritiy connected to this project work The scope includes getting the approvals from the statutory authorities, which includes arranging for inspection visits of statutory authority periodically as per

	BHEL Engineer's instructions, arranging materials for ground inspection, taking rub outs for the pressure parts to be offered for inspection, submitting co-related inspection reports, documents, radiographs etc and following up the matter with them. Contractor shall also make all arrangements for offering the Products / Systems for inspection at location, as applicable, to the concerned authority.
8.3.2	Not Applicable
8.3.3	Not Applicable
8.3.4	Not Applicable
8.4	The Quality Management System of BHEL, Power Sector Regions (PSNR/ PSER/ PSWR/ PSSR) have already been certified and accredited under ISO 9002 standards in this regard. The basic philosophy of the Quality Management System is to define the organizational responsibility, work as per documented procedures, verify the output with respect to acceptance norms, identify the non-conforming product/ procedure and take corrective action for removal of non-conformance specifying the steps for avoiding recurrence of such non-conformities, & maintain the relevant quality records. The non-conformities are to be identified through the conduct of periodical audit of implementation of quality systems at various locations/stages of work. Suppliers/vendors of various products/services contributing in the work are also considered as part of the quality management system. .as such the contractor is expected not only to conform to the quality management system of BHEL but also it is desirable that they themselves are accredited under any quality management system standard.
8.5	**Field Quality Assurance**
8.5.1	Contractor shall carry out all activities conforming to the approved Field Quality Plan (FQP) as revised from time to time. Total quality shall be the watchword of the work and contractor shall strive to achieve the quality standards, procedures laid down by BHEL. He shall follow all the instructions as per BHEL drawings and quality standards. Contractor shall provide the services of quality assurance engineer as per the relevant clauses.
8.6	Contractor has to fulfil quality requirement as per this chapter. In case of any gap in fulfilling these requirements by the contractor, financial penalty shall be imposed on the contractor with the rate mentioned in the "MEMO for penalty imposition against non-compliance in Quality area" enclosed as Annexure-IV.

9.0	**OCCUPATIONAL HEALTH, SAFETY & ENVIRONMENT MANAGEMENT/ QUALITY ASSURANCE PROGRAMME** : BHEL, Power Sector Regions (PSNR/ER/WR/SR) are each certified for ISO 9001. Quality of work to customer's satisfaction and fulfillment of system requirements are the essence of ISO 9001 certification. BHEL, PS Regions have HSE certification (ISO 14001 & OHSAS 18001) and therefore Contractor also shall organise/ plan/ perform all their activities to meet with the applicable requirements of these standards.
9.1	**HSE (Health, Safety & Environment):** Contractor will comply with HSE (Health, safety & Environment) requirements of BHEL as per the "HSE Plan for Site Operations by Subcontractor" (Document no. HSEP:14 Rev 01) Please see the attached document
9.2	In case of any financial deduction made by Customer for lapses of safety other than what is provided above or elsewhere in the contract, the same shall be charged on back-to-back basis on the defaulting contractor without prejudice to any other right spelt anywhere in the tender /contract.

10.0	**RA Bill Payments**
10.1	The contractor shall submit his monthly RA bills with all the details required by BHEL on specified date every month covering progress of work in all respects and areas for the previous calendar month.
10.2	Mode of payment and measurement of work completed shall be as per relevant clauses of General Conditions of Contract
10.3	Release of payment in each running bill including PVC Bills where ever applicable will be restricted to 95% of the value of work admitted as per stages of progressive pro rata payments.
10.4	The 5% thus remaining shall be treated as 'Retention Amount' and shall be released as per terms specified in the General Conditions of Contract.
10.5	The payment for running bills will normally be released within 30 days of submission of running bill complete in all respects with all documents. It is the responsibility of the contractor to make his own arrangements for making timely payments towards labour wages, statutory payments, outstanding dues etc and other dues in the meanwhile. In case of Civil works, 60% of RA Bills complete and correct in all respects and certified by BHEL Engineer, shall be paid within 15 days of receipt. Balance payment shall be within 30 days.
10.6	BHEL shall release payment through Electronic Fund Transfer (EFT)/RTGS. In order to implement this system, Contractor to furnish details pertaining to his Bank Accounts where proceeds will be transferred through BHEL's banker, as per prescribed formats: Note: BHEL may also choose to release payment by other alternative modes as applicable
10.7	Paying Authority shall be the Construction Manager of the Site. Any change in the paying Authority shall be intimated to the Contactor accordingly.

11.0	**Performance Monitoring**
11.1	Performance of the contractor is monitored through various reports/reviews and shall be jointly evaluated every month for unit wise identified packages as per prescribed formats. Based on the net weighted scores obtained, Contractors shall be rated 'Good' or 'Satisfactory' or 'Unsatisfactory'
11.2	In case of any dispute on performance rating and the contractor refuses to sign on the performance rating given by BHEL package Incharge, the same shall be reviewed by BHEL site Incharge/Construction Manager and his decision shall be final.
11.3	Release of RA Bills will be contingent upon joint evaluation of performance
11.4	Performance of the contractor will be taken into consideration for assessing the capacity of the bidder to execute future jobs under tender, as detailed in the Notice Inviting Tender. Risk of non evaluation or non availability of the Monthly performance evaluation reports is to be borne by the Bidder.
11.5	In case of 'Unsatisfactory performance' for a continuous period of three or more months for a package or packages, BHEL has the right to get the balance works executed at the risk and cost of the contractor.
11.6	In case of 'Unsatisfactory performance' in a financial year, BHEL reserves the right to put on hold such Contractors for a period of six months for similar package or similar packages

12.0	**Suspension of Business dealings**
12.1	BHEL reserves the right to take action against contractors who fail to perform or indulge in malpractices, by suspending business dealings with them.
12.2	Suspension could be in the form of 'Hold', 'De-listing' or 'Banning' a contractor.
12.3	A bidder may be put on HOLD for a period of 6 months, for future tenders for specific works on the basis of one or more of the following reasons: a) Bidder does not honour his own offer or any of its conditions within the validity period. b) Bidder fails to respond against three consecutive enquires of BHEL. c) After placement of order, Bidder fails to execute a contract. d) Bidder fails to settle sundry debt account, for which he is legitimately liable, within one year of its occurrence. e) Bidder's performance rating falls below 60% in specific category (more fully described in chapter 'Performance Monitoring') f) Bidder works are under strike/ lockout for a long period.
12.4	A Bidder may be de-listed from the list of registered Bidders of the region for a period of 1 year on the basis of one or more of the following reasons:- a) Bidder tampers with tendering procedure affecting ordering process or commits any misconduct which is contrary to business ethics. b) Bidder has substituted, damaged, failed to return, short returned or unauthorizedly disposed off materials/ documents/ drawings/ tools etc of BHEL. c) Bidder no longer has the technical staff, equipment, financial resources etc. required to execute the orders/ contracts.
12.5	A Bidder can be banned from doing any business with all Units of BHEL for a period of 3 years on the basis of one or more of the following reasons: a) Bidder is found to be responsible for submitting fake/ false/ forged documents, certificates, or information prejudicial to BHEL's interest. b) In spite of warnings, the Bidder persistently violates or circumvents the provisions of labour laws/ regulations/ rules and other statutory requirements. c) Bidder is found to be involved in cartel formation

	d) The Bidder has indulged in malpractices or misconduct such as bribery, corruption and fraud, pilferage etc which are contrary to business ethics. e) The Bidder is found guilty by any court of law for criminal activity/ offences involving moral turpitude in relation to business dealings. f) The Bidder is declared bankrupt, insolvent, has wound up or been dissolved; i.e ceases to exist for all practical purposes. g) Bidder is found to have obtained Official Company information/ documentation by questionable means. h) Communication is received from the administrative Ministry of BHEL to ban the Bidder from business dealings.
12.6	Contracts already entered with a contractor before the date of issue of order of 'HOLD' or 'DE-LISTING' shall not be affected.
12.7	All existing contracts with a 'BANNED' contractor shall normally be short closed
12.8	Once the order for suspension is passed, existing offers/new offers of the contractor shall not be entertained
12.9	The above guidelines are not exhaustive but enunciate broad principles governing action against contractors

Bharat Heavy Electricals Limited
(A Govt. of India Undertaking)
Power Sector- Northern Region

Rev. 01

BHEL/PSNR/Site..... Dated: _____

MEMO for imposition of penalty against non-compliances in Quality area

The Lapse as tick marked below has been observed in your area and penalty is being imposed as per the details mentioned at the bottom of this memo:-

S. No	Nature of non- compliance	Penalty (in Rs.)	Remarks
1.	Non availability of required no. of Quality Engineers/NDT certified person as per contract	1000	Per Person
Calibration:-			
2.	Use of IMTEs without having valid calibration certificate	1000	Per equipment per instance
3.	Use of NDT equipment, welding equipment's without having valid calibration certificate, condition not as per requirement	1000	Per equipment per instance
Welding & NDT area:-			
4.	Un qualified Welder carrying out weld/ tack weld	1000	Per welder per instance
5.	Not using portable oven	500	Per welder per instance
6.	Not using electrodes pre- baked in master oven/ approved make of electrodes/correct electrodes as per EWS/ WPS	500	Per instance
7.	Non- removal of slag and spatters after welding	200	Per Joint
8.	Not using NDT equipment as prescribed in the manual/contract/guidelines	1000	Per equipment per instance
9.	Welder doing welding without job card	500	Per instance
10.	Discrepancy observed in the RT taken of weld joints vs RT offered	2000	Per joint
Material management:-			
11.	Mismatch of location of material in store area wrt in Stock register	200	Per instance
12.	Non- compliance of preservation of material as per storage & preservation manual	1000	Per equipment
13.	Non verification of material within stipulated time as per contract	500	Per instance
Other Areas:-			
14.	Painting without surface cleaning	500	Per instance
15.	Not attending Quality meeting by the nominated member	1000	Per meeting

Details of non- compliance (Name of Sub contractors, persons, description of deficiency, etc.)

_____

_____

Penalty imposed:-

1, Rate as per above chart_____

2. No. of Persons/ equipment/ instance/ Joint/ welder/meeting. _____

3. Total Penalty= 1. X 2. =_____

Signature

(Witnessed by Sub- Contractor representative)
Name_____

(Witnessed by PSNR Personnel)
Name_____

Distribution: 1. Sub- contractor
2. Head (Quality & Safety)/ BHEL PSNR



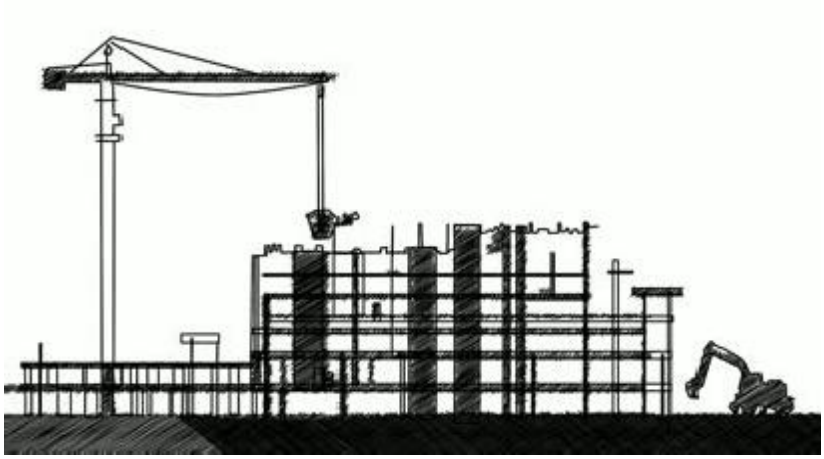
HEALTH, SAFETY and ENVIRONMENT PLAN

for

SITE OPERATIONS

by

SUB-CONTRACTORS



POWER SECTOR

HSE PLAN FOR SITE OPRATIONS BY BHEL'S SUBCONTRACTORS

AT A GLANCE

BEFORE START

SIGNING OF MOU
Agree to comply to HSE requirement- Statutory and BHEL's

PLAN

HSE ORGANISATION	
Manpower • 1 (one) safety officer for every 500 workers or part thereof • 1(one) safety-steward/ supervisor for every 100 workers **Qualification** As per Cl. 7.1	**HSE Roles and responsibilities** • Site In-charge- As per clause 7.2.1 • Safety officer- As per clause 7.2.2

HSE Planning for Man, Machinery/Equipment/Tools & Tackles

PROVIDE

HSE INFRASTUCTURE	
• PPEs • Drinking Water • Washing Facilities • Latrines and Urinals • Provision of shelter for rest • Medical facilities	• Canteen facilities • Labour Colony • Emergency Vehicle • Pest Control • Scrapyard • Illumination

TRAIN

HSE TRAINING , AWARENESS & PROMOTION	
Training • Induction training • Height work and other critical areas • Tool Box talk & Pep Talk	**Awareness & Promotion** • Signage • Poster • Banner • Competition • Awards

COMMUNICATE

HSE COMMUNICATION	
Incident Reporting • Accident- Fatal & Major • Property damage • Near Miss	**Event Reporting** • Celebrations • Training • Medical camp

EXECUTE SAFELY

OPERATIONAL CONTROL PROCEDURES

PERMIT TO WORK

Height work (above 2 metres), Hot Work, Heavy Lifting, Confined Space, Radiography, excavation (More than 4 metres)

SAFETY DURING WORK EXECUTION	
• Welding • Rigging • Cylinder- storage & Movement • Demolition work • T&Ps • Chemical Handling • Electrical works	• Fire • Scaffolding • Height work • Working Platform • Excavation • Ladder • Lifting • Hoisting appliance
HOUSE KEEPING	
WASTE MANGEMENT	
TRAFFIC MANAGEMENT	
ENVIRONMENTAL CONTROL	
EMERGENCY PREPAREDNESS AND RESPONSE PLAN	

CHECKS

HSE AUDITS & INSPECTION	
• Daily Checks • Inspection of PPEs • Inspection of T& Ps • Inspection of Cranes & Winches	• Inspection of Height work • Inspection of Welding and Gas cutting • Inspection of elevators etc.

HSE PERFORMANCE EVALUATION PARAMETERS

NON CONFORMANCE

PENALTY for NON CONFORMANCE

Refer Clause 16

Incremental penalty

For repeated violation by the same person, the penalty would be double of the previous penalty

For repeated fatal incident in the same Unit incremental penalty to be imposed. The subcontractor will pay 2 times the penalty compared to previously paid in case there are repeated cases of fatal incidents under the same subcontractor for the same package in the same unit.

REVISION HISTORY SHEET

Date	Revision No.	Details of Changes	Reason	Prepared	Reviewed	Approved
12.08.2014	00	First Issue	First Issue	S. B. Jayant, Dy Manager-FQA & Safety	A. K. Sinha, GM-FQA & Safety	Anuj Bhatnagar, ED-FQA & Safety
20.01.2020	01	Formats added: **HSEP:14-F30 – Monthly HSE Planning & Review** (Page 11, Clause 8.0 - updated) HSEP:14-F13E-Excavation Inspection Format (part of F30)) HSEP:14-F32B – Job Safety Analysis Format (part of F30) **HSEP:14-F31A – Daily HSE Reporting** (Page 18, Clause 10.3 – added) **HSEP:14-F33 – HSE Performance Evaluation** (Page 31, Clause 13 – revised)	IOM No. **PSHQHSE/MONREP/02** Dated 08-Jan-2020	Rohit Kumar	Santosh Nair, GM (MSX & HSE)	

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1.0 PURPOSE

1.1 The purpose of this HSE Plan is to provide for the systematic identification, evaluation, prevention and control of general workplace hazards, specific job hazards, potential hazards and environmental impacts that may arise from foreseeable conditions during installation and servicing of industrial projects and power plants.

1.2 This document shall be followed by BHEL's subcontractors at all installation and servicing sites. In case customer specific documents are to be implemented, this document will be followed in conjunction with customer specific documents.

1.3 Although every effort has been made to make the procedures and guidelines in line with statutory requirements, in case of any discrepancy relevant statutory guidelines must be followed.

1.4 In case the customer has any specific requirement, the same is to be fulfilled.

2.0 SCOPE

The document is applicable for BHEL's Subcontractors at all installation / servicing activities of BHEL Power Sector as per the relevant contractual obligations.

3.0 OBJECTIVES AND TARGETS

The HSE Plan reflects that BHEL places high priority upon the Occupational Health, Safety and Environment at workplaces.

- Ensure the Health and Safety of all persons at work site is not adversely affected by the work.
- Ensure protection of environment of the work site.
- Comply at all times with the relevant statutory and contractual HSE requirements.
- Provide trained, experienced and competent personnel. Ensure medically fit personnel only are engaged at work.
- Provide and maintain plant, places and systems of work that are safe and without risk to health and the environment.
- Provide all personnel with adequate information, instruction, training and supervision on the safety aspect of their work.
- Effectively control, co-ordinate and monitor the activities of all personnel on the Project sites including subcontractors in respects of HSE.
- Establish effective communication on HSE matters with all relevant parties involved in the Project works.
- Ensure that all work planning takes into account all persons that may be affected by the work.
- Ensure fitness testing of all T&Ps/Lifting appliances like cranes, chain pulley blocks etc. are to be certified by competent person.
- Ensure timely provision of resources to facilitate effective implementation of HSE requirements.
- Ensure continual improvements in HSE performance
- Ensure conservation of resources and reduction of wastage.
- Capture the data of all incidents including near misses, process deviation etc. Investigate and analyze the same to find out the root cause.
- Ensure timely implementation of correction, corrective action and preventive action.

HSE TARGETS

EXPLOSION	**ZERO**
FATALITY	**ZERO**
LOST TIME INJURY	**ZERO**
FIRE	**ZERO**
VEHICLE INCIDENTS	**ZERO**
ENVIRONMENTAL INCIDENTS	**ZERO**

4.0 BHEL POWER SECTOR HEALTH, SAFETY & ENVIRONMENT POLICY

Power Sector HSE Policy

We, at BHEL Power Sector, reaffirm our belief that the Health and Safety of our stakeholders and conservation of Environment is of utmost importance and takes precedence in all our business decisions. In pursuit of this belief and commitment, we strive to:

- ✓ **Ensure total compliance with applicable legislation, regulations and other requirements concerning Occupational Health, Safety and Environment.**
- ✓ **Ensure continual improvement in the Occupational Health, Safety and Environment Management System performance.**
- ✓ **Enhance Occupational Health, Safety and Environment awareness amongst employees, customers and suppliers by proactive communication and training.**
- ✓ **Review periodically and improve Occupational Health, Safety and Environment Management System to ensure its continuing suitability, adequacy and effectiveness in a continuously changing business environment.**
- ✓ **Develop a culture of safety through active leadership and provide appropriate training at all levels to enable employees to fulfill their Health, Safety and Environmental obligations.**
- ✓ **Incorporate appropriate Occupational Health, Safety and Environmental criteria into business decisions for selection of plant, technology and services as well as appointment of key personnel.**
- ✓ **Ensure availability at all times of appropriate resources to fully implement the Occupational Health, Safety and Environmental policy of the company.**

This policy will be communicated to all employees and made available to interested parties.

Sd/-

Date: 01.05.2013

Director (Power)

5.0 MEMORANDUM OF UNDERSTANDING:

After award of work, subcontractors are required to enter into a memorandum of understanding as given below:

Memorandum of Understanding

BHEL, Power Sector_____Region is committed to Health, Safety and Environment Policy (HSE Policy).

M/s_____do hereby also commit to comply with the same HSE Policy w h i l e executing the Contract Number _____

M/s_____shall ensure that safe work practices as per the HSE plan. Spirit and content therein shall be reached to all workers and supervisors for compliance.

In addition to this, M/S_____shall comply to all applicable statutory and regulatory requirements which are in force in the place of project and any special requirement specified in the contract document of the principal customer.

M/s_____shall co-operate in HSE audits/inspections conducted by BHEL /customer/ third party and ensure to close any non-conformity observed/reported within prescribed time limit.

Signed by authorized representative of M/s ----------

Name :

Place & Date:

6.0 TERMS AND DEFINITIONS

6.1 DEFINITIONS

6.1.1 INCIDENT

Work- related or natural event(s) in which an injury, or ill health (regardless of severity), damage to property or fatality occurred, or could have occurred.

6.1.2 NEAR MISS

An incident where no ill health, injury, damage or other loss occurs, but it had a potential to cause, is referred to as "Near-Miss".

6.1.3 MAN-HOURS WORKED

The total number of man hours worked by all employees including subcontractors working in the premises. It includes managerial, supervisory, professional, technical, clerical and other workers including contract labours. Man-hours worked shall be calculated from the payroll or time clock recorded including overtime. When this is not feasible, the same shall be estimated by multiplying the total man-days worked for the period covered by the number of hours worked per day. The total number of workdays for a period is the sum of the number of men at work on each day of period. If the daily hours vary from department to department separate estimate shall be made for each department and the result added together.

6.1.4 FIRST AID CASES

First aids are not essentially all reportable cases, where the injured person is given medical treatment and discharged immediately for reporting on duty, without counting any lost time.

6.1.5 LOST TIME INJURY

Any work injury which renders the injured person unable to perform his regular job or an alternative restricted work assignment on the next scheduled work day after the day on which the injury occurred.

6.1.6 MEDICAL CASES

Medical cases come under non-reportable cases, where owing to illness or other reason the employee was absent from work and seeks Medical treatment.

6.1.7 TYPE OF INCIDENTS & THEIR REPORTING:

The three categories of Incident are as follows:

Non-Reportable Cases:
An incident, where the injured person is given medical help and discharged for work without counting any lost time.

Reportable Cases:
In this case the injured person is disable for 48 hours or more and is not able to perform his duty.

Injury Cases:
These are covered under the heading of non-reportable cases. In these cases the incident caused injury to the person, but he still continues his duty.

6.1.8 TOTAL REPORTABLE FREQUENCY RATE

Frequency rate is the number of Reportable Lost Time Injury (LTI) per one Million Man hours worked. Mathematically, the formula read as:

$$\frac{\text{Number of Reportable LTI}}{\text{Total Man Hours Worked}} \times 1{,}000{,}000$$

6.1.9 SEVERITY RATE

Severity rate is the Number of days lost due to Lost Time Injury (LTI) per one Million Man hours worked. Mathematically, the formula reads as:

$$\frac{\text{Days lost due to LTI}}{\text{Total Man Hours Worked}} \times 1{,}000{,}000$$

6.1.10 INCIDENCE RATE

Incidence Rate is the Number of LTI per one thousand manpower deployed. Mathematically, the formula reads as:

$$\frac{\text{Number of LTI}}{\text{Average number of manpower deployed}} \times 1000$$

7.0 HSE ORGANISATION

Number of safety officers:
The subcontractor must deploy one safety officer for every 500 workers or part thereof in each package. In addition, there must be one safety-steward/safety-supervisor for every 100 workers.

Deployment: The subcontractor should deploy sufficient safety officers and safety-steward/Safety-supervisor, as per requirement given above, since initial stage and add more in proportion to the added strength in work force. Any delay in deployment will attract a penalty of Rs.30,000/- per man month for the delayed period.

7.1 QUALIFICATION FOR HSE PERSONNEL

Sl.no	Designation	Qualification	Experience
1	Safety officer (Construction Agency)	Degree or Diploma in Engineering with full time diploma in Industrial Safety with construction safety as one of the subjects	Minimum two years for degree holder and five years for diploma holder in the field of Construction of power plant/ major industries

2	Safety-Steward/ Safety-Supervisor	Degree or diploma in any discipline with full time diploma in Industrial Safety with construction safety as one of the subjects	Minimum two years

7.2 RESPONSIBILITIES

7.2.1 SITE IN -CHARGE OF SUBCONTRACTOR

- Shall sign Memorandum of Understanding (MoU) for compliance to BHEL's HSE Plan for Site Operations as per clause 5.0
- Shall engage qualified safety officer(s) and steward (s) as per clause 7.0
- Shall adhere to the rules and regulations mentioned in this code, practice very strictly in his area of work in consultation with his concerned engineer and the safety coordinator.
- Shall screen all workmen for health and competence requirement before engaging for the job and periodically thereafter as required.
- Shall not engage any employee below 18 years.
- Shall arrange for all necessary PPEs like safety helmets, belts, full body harness, shoes, face shield, hand gloves etc. before starting the job. Shall ensure that no working men/women carry excessive weight more than stipulated in Factory Rule Regulation R57.
- Shall ensure that all T&Ps engaged are tested for fitness and have valid certificates from competent person.
- Shall ensure that provisions stipulated in contract Labour Regulation Act 1970, Chapter V C.9, canteen, rest rooms/washing facilities to contracted employees at site.
- Shall adhere to the instructions laid down in Operation Control Procedures (OCPs) available with the site management.
- Shall ensure that person working above 2.0 meter should use Safety Harness tied to a life line/stable structure.
- Shall ensure that materials are not thrown from height. Cautions to be exercised to prevent fall of material from height.
- Shall report all incidents (Fatal/Major/Minor/Near Miss) to the Site engineer /HSE officer of BHEL.
- Shall ensure that Horseplay is strictly forbidden.
- Shall ensure that adequate illumination is arranged during night work.
- Shall ensure that all personnel working under subcontractor are working safely and do not create any Hazard to self and to others.
- Shall ensure display of adequate signage/posters on HSE.
- Shall ensure that mobile phone is not used by workers while working.
- Shall ensure conductance of HSE audit, mockdrill, medical camps, induction training and training on HSE at site.
- Shall ensure full co-operation during HQ/External /Customer HSE audits.

- Shall ensure submission of look-ahead plan for procurement of HSE equipment's and PPEs as per work schedule.
- Shall ensure good housekeeping.
- Shall ensure adequate valid fire extinguishers are provided at the work site.
- Shall ensure availability of sufficient number of toilets /restrooms and adequate drinking water at work site and labour colony.
- Shall ensure adequate emergency preparedness.
- Shall be member of site HSE committee and attend all meetings of the committee
- Power source for hand lamps shall be maximum of 24 v.
- Temporary fencing should be done for open edges if Hand – railings and Toe-guards are not available.

7.2.2 HEALTH, SAFETY AND ENVIRONMENT OFFICER OF SUBCONTRACTOR

- Carry out safety inspection of Work Area, Work Method, Men, Machine & Material, P&M and other tools and tackles.
- Facilitate inclusion of safety elements into Work Method Statement.
- Highlight the requirements of safety through Tool-box / other meetings.
- Help concerned HOS to prepare Job Specific instructions for critical jobs.
- Conduct investigation of all incident/dangerous occurrences & recommend appropriate safety measures.
- Advice & co-ordinate for implementation of HSE permit systems, OCPs & MPs.
- Convene HSE meeting & minute the proceeding for circulation & follow-up action.
- Plan procurement of PPE & Safety devices and inspect their healthiness.
- Report to PS Region/HQ on all matters pertaining to status of safety and promotional program at site level.
- Facilitate administration of First Aid
- Facilitate screening of workmen and safety induction.
- Conduct fire Drill and facilitate emergency preparedness
- Design campaigns, competitions & other special emphasis programs to promote safety in the workplace.
- Apprise PS– Region on safety related problems.
- Notify site personnel non-conformance to safety norms observed during site visits / site inspections.
- Recommend to Site In charge, immediate discontinuance of work until rectification, of such situations warranting immediate action in view of imminent danger to life or property or environment.
- To decline acceptance of such PPE / safety equipment that do not conform to specified requirements.
- Encourage raising Near Miss Report on safety along with, improvement initiatives on safety.
- Shall work as interface between various agencies such customer, package-in-charges, subcontractors on HSE matters

8.0 PLANNING BY SUBCONTRACTOR

Monthly planning and review of HSE activities shall be carried out by subcontractor as per format No. HSEP:14-F30 jointly along with BHEL.

8.1 MOBILISATION OF MACHINERY/EQUIPMENT/TOOLS BY SUBCONTRACTOR

- As a measure to ensure that machinery, equipment and tools being mobilized to the construction site are fit for purpose and are maintained in safe operating condition and complies with legislative and owner requirement, inspection shall be arranged by in-house competent authority for acceptance as applicable.

- The machinery and equipment to be embraced for this purpose shall include but not limited to the following:

  - Mobile cranes.
  - Side Booms.
  - Forklifts.
  - Grinding machine.
  - Drilling machine.
  - Air compressors.
  - Welding machine.
  - Generator sets.
  - Dump Trucks.
  - Excavators.
  - Dozers
  - Grit Blasting Equipment.
  - Hand tools.

- Subcontractor shall notify the engineer, of his intention to bring on to site any equipment or any container, with liquid or gaseous fuel or other substance which may create a hazard. The Engineer shall have the right to prescribe the condition under which such equipment or container may be handled and used during the performance of the works and the subcontractor shall strictly adhere to such instructions. The Engineer shall have the right to inspect any construction tool and to forbid its use, if in his opinion it is unsafe. No claim due to such prohibition will be entertained.

8.2 MOBILISATION OF MANPOWER BY SUBCONTRACTOR

- The subcontractor shall arrange induction and regular health check of their employees as per schedule VII of BOCW rules by a registered medical practitioner.
- The subcontractor shall take special care of the employees affected with occupational diseases under rule 230 and schedule II of BOCW Rules. The employees not meeting the fitness requirement should not be engaged for such job.
- Ensure that the regulatory requirements of excessive weight limit (to carry/lift/ move weights beyond prescribed limits) for male and female workers are complied with.
- Appropriate accommodation to be arranged for all workmen in hygienic condition.

8.3 PROVISION OF PPEs

- Personnel Protective Equipment (PPEs), in adequate numbers, will be made available at site & their regular use by all concerned will be ensured
- The following matrix recommends usage of minimum PPEs against the respective job.

Sl. No	Type of work	PPEs
1	Concrete and asphalt mixing	Nose mask, hand glove, apron and gum boot
2	Welders/Grinders/ Gas cutters	Welding/face screen, apron, hand gloves, nose mask and ear muffs if noise level exceeds 90dB. Helmet fitted with welding shield is preferred for welders
3	Stone/ concrete breakers	Ear muffs, safety goggles, hand gloves
4	Electrical Work	Rubber hand glove, Electrical Resistance shoes
5	Insulation Work	Respiratory mask, Hand gloves, safety goggles
6	Work at height	Double lanyard full body harness, Fall arrestor (specific cases)
7	Grit/Sand blasting	Blast suit, blast helmet, respirator, leather gloves
8	Painting	Plastic gloves, Respirators (particularly for spray painting)
9	Radiography	As per BARC guidelines

- The PPEs shall conform to the relevant standards as below and bear ISI mark.

Relevant is-codes for personal protection

IS: 2925 – 1984	Industrial Safety Helmets.
IS: 4770 – 1968	Rubber gloves for electrical purposes.
IS: 6994 – 1973 (Part-I)	Industrial Safety Gloves (Leather &Cotton Gloves).
IS: 1989 – 1986 (Part-I-II)	Leather safety boots and shoes.
IS: 5557 – 1969	Industrial and Safety rubber knee boots.
IS: 6519 – 1971	Code of practice for selections care and repair of Safety footwear.
IS: 11226 – 1985	Leather Safety footwear having direct molding sole.
IS: 5983 – 1978	Eye protectors.
IS: 9167 – 1979	Ear protectors.
IS: 1179-1967	Eye & Face protection during welding
IS: 3521 – 1983	Industrial Safety Belts and Harness
IS:8519 -1977	Guide for selection of industrial Safety equipment for body protection
IS:9473-2002,14166-1994,14746-1999	Respiratory Protective Devices

The list is not exhaustive. The safety officer may demand additional PPEs based on specific requirement.

- Where workers are employed in sewers and manholes, which are in use, the subcontractor shall ensure that the manhole covers are opened and ventilated at least for an hour before the workers are allowed to get into manhole, and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent incident to the public
- Besides the PPEs mentioned above, the persons shall use helmet and safety shoe. The visitors shall use Helmet and any other PPEs as deemed appropriate for the area of work.

Colour scheme for Helmets:

1. Workmen: Yellow
2. Safety staff: Green or white with green band
3. Electrician: Red
4. Others including visitors: White

- All the PPEs shall be checked for its quality before issue and the same shall be periodically checked. The users shall be advised to check the PPEs themselves for any defect before putting on. The defective ones shall be repaired/ replaced.
- The issuing agency shall maintain register for issue and receipt of PPEs.
- The Helmets shall have logo or name (abbreviation of agency name permitted) affixed or printed on the front.
- The body harnesses shall be serial numbered.

8.4 ARRANGEMENT OF INFRASTRUCTURE

8.4.1 DRINKING WATER

- Drinking water shall be provided and maintained at suitable places at different elevations.
- Container should be labeled as " Drinking Water"
- Cleaning of the storage tank shall be ensured atleast once in 3 months indicating date of cleaning and next due date.
- Potability of water should be tested as per IS10500 at least once in a year.

8.4.2 WASHING FACILITIES

- In every workplace, adequate and suitable facilities for washing shall be provided and maintained.
- Separate and adequate cleaning facilities shall be provided for the use of male and female workers. Such facilities shall be conveniently accessible and shall be kept in clean and hygienic condition and dully illuminated for night use.
- Overalls shall be supplied by the subcontractor to the workmen and adequate facilities shall be provided to enable the painters and other workers to wash during the cessation of work.

8.4.3 LATRINES AND URINALS

- Latrines and urinals shall be provided in every work place.
- Urinals shall also be provided at different elevations.
- They shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times, by appointing designated person.
- Separate facilities shall be provided for the use of male and female worker if any.

8.4.4 PROVISION OF SHELTER DURING REST

Proper Shed & Shelter shall be provided for rest during break

8.4.5 MEDICAL FACILITIES

8.4.5.1 MEDICAL CENTRE (As per Schedule V, X and XI of BOCW central Rules, 1998)

- A medical centre shall be ensured/identified at site with basic facilities for handling medical emergencies. The medical center can be jointly developed on proportionate sharing basis with permission from BHEL
- A qualified medical professional, not less than MBBS, shall be deployed at the medical centre
- The medical centre shall be equipped with one ambulance, with trained driver and oxygen cylinder.
- Medical waste shall be disposed as per prevailing legislation (Bio-Medical Waste –Management and Handling Rules, 1998)

8.4.5.2 FIRST AIDER

- Ensure availability of Qualified First-aider throughout the working hours.
- Every injury shall be treated, recorded and reported.
- Refresher course on first aid shall be conducted as necessary.
- List of Qualified first aiders and their contact numbers should be displayed at conspicuous places.

8.4.5.3 FIRST AID BOX (as per schedule III of BOCW)

- The subcontractor shall provide necessary first aid facilities as per schedule III of BOCW. At every work place first aid facilities shall be provided and maintained.
- The first aid box shall be kept by first aider who shall always be readily available during the working hours of the work place. His name and contact no to be displayed on the box.
- The first aid boxes should be placed at various elevations so as to make them available within the reach and at the quickest possible time.
- The first aid box shall be distinctly marked with a Green Cross on white background.
- Details of contents of first aid box is given in Annexure No. 01
- Monthly inspection of First Aid Box shall be carried out by the owner as per format no. HSEP:14-F01
- The subcontractor should conduct periodical first –aid classes to keep his supervisor and Engineers properly trained for attending to any emergency.

8.4.5.4 HEALTH CHECK UP (As per schedule VII and Form XI)

The persons engaged at the site shall undergo health checkup as per the format no. HSEP:14-F02 before induction. The persons engaged in the following works shall undergo health checkup at least once in a year:

a. Height workers
b. Drivers/crane operators/riggers

c. Confined space workers
d. Shot/sand blaster
e. Welding and NDE personnel

8.4.6 PROVISION OF CANTEEN FACILITY

- Canteen facilities shall be provided for the workmen of the project inside the project site.
- Proper cleaning and hygienic condition shall be maintained.
- Proper care should be taken to prevent biological contamination.
- Adequate drinking water should be available at canteen.
- Fire extinguisher shall be provided inside canteen.
- Regular health check-up and medication to the canteen workers shall be ensured.

8.4.7 PROVISION OF ACCOMODATION/LABOUR COLONY

- The subcontractor shall arrange for the accommodation of workmen at nearby localities or by making a labour colony.
- Regular housekeeping of the labour colony shall be ensured.
- Proper sanitation and hygienic conditions to be maintained.
- Drinking water and electricity to be provided at the labour colony.
- Bathing/ washing bay
- Room ventilation and electrification.

8.4.8 PROVISION OF EMERGENCY VEHICLE

- Dedicated emergency vehicle shall be made available at workplace by each subcontractor to handle any emergency

8.4.9 PEST CONTROL

Regular pest control should be carried out at all offices, mainly laboratories, canteen, labour colony and stores.

8.4.10 SCRAPYARD

- In consultation with customer, scrapyard shall be developed to store metal scrap, wooden scrap, waste, hazardous waste.
- Scrap/Waste shall be segregated as Bio-degradable and non-bio-degradable and stored separately.

8.4.11 ILLUMINATION

- The subcontractor shall arrange at his cost adequate lighting facilities e.g. flood lighting, hand lamps, area lighting etc. at various levels for safe and proper working operations at dark places and during night hours at the work spot as well as at the pre-assembly area.

- Adequate and suitable light shall be provided at all work places & their approaches including passage ways as per IS: 3646 (Part-II). Some recommended values are given below:

S. No.	Location	Illumination (Lux)
A.	**Construction Area**	
1.	Outdoor areas like store yards, entrance and exit roads	20
2.	Platforms	50
3.	Entrances, corridors and stairs	100
4.	General illumination of work area	150
5.	Rough work like fabrication, assembly of major items	150
6.	Medium work like assembly of small machined parts rough measurements etc.	300
7.	Fine work like precision assembly, precision measurements etc.	700
8.	Sheet metal works	200
9.	Electrical and instrument labs	450
B.	**Office**	
1.	Outdoor area like entrance and exit roads	20
2.	Entrance halls	150
3.	Corridors and lift cars	70
4.	Lift landing	150
5.	Stairs	100
6.	Office rooms, conference rooms, library reading tables	300
7.	Drawing table	450
8.	Manual telephone exchange	200

- Lamp (hand held) shall not be powered by mains supply but either by 24V or dry cells.
- Lamps shall be protected by suitable guards where necessary to prevent danger, in case of breakage of lamp.
- Emergency lighting provision for night work shall be made to minimise danger in case of main supply failure.

If the subcontractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instructions issued by the authorized BHEL official, BHEL shall have the right to take corrective steps at the risk and cost of the subcontractor

9.0 HSE TRAINING& AWARENESS

9.1 HSE INDUCTION TRAINING

All persons entering into project site shall be given HSE induction training by the HSE officer of BHEL /subcontractor before being assigned to work.

In-house induction training subjects shall include but not limited to:

- Briefing of the Project details.
- Safety objectives and targets.
- Site HSE rules.
- Site HSE hazards and aspects.
- First aid facility.
- Emergency Contact No.
- Incident reporting.
- Fire prevention and emergency response.
- Rules to be followed in the labour colony (if applicable)

- Proper safety wear & gear must be issued to all the workers being registered for the induction (i.e., Shoes/Helmets/Goggles/Leg guard/Apron etc.)
- They must arrive fully dressed in safety wear & gear to attend the induction.
- Any one failing to conform to this safety wear& gear requirement shall not qualify to attend.
- On completing attending subcontractor's in-house HSE induction, each employee shall sign an induction training form (format no. HSEP:14-F03) to declare that he had understood the content and shall abide to follow and comply with safe work practices. They may only then be qualified to be issued with a personal I.D. card, for access to the work site.

9.2 HSE TOOLBOX TALK

- HSE tool Box talk shall be conducted by frontline foreman/supervisor of subcontractor to specific work groups prior to the start of work. The agenda shall consist of the followings:
    - Details of the job being intended for immediate execution.
    - The relevant hazards and risks involved in executing the job and their control and mitigating measures.
    - Specific site condition to be considered while executing the job like high temperature, humidity, unfavorable weather etc.
    - Recent non-compliances observed.
    - Appreciation of good work done by any person.
    - Any doubt clearing session at the end.
- Record of Tool box talk shall be maintained as per format no. HSEP:14-F04
- Tool box talk to be conducted at least once a week for the specific work.

9.3 TRAINING ON HEIGHT WORK

Training on height work shall be imparted to all workers working at height by in-house/external faculty at least twice in a year. The training shall include following topics:

- Use of PPEs
- Use of fall arrester, retractable fall arrester, life line, safety nets etc.
- Safe climbing through monkey ladders.
- Inspection of PPEs.
- Medical fitness requirements.
- Mock drill on rescue at height.
- Dos & Don'ts during height work.

9.4 HSE TRAINING DURING PROJECT EXECUTION

- Other HSE training shall be arranged by BHEL/ subcontractor as per the need of the project execution and recommendation of HSE committee of site.
- The topics of the HSE training shall be as follows but not limited to:
    - Hazards identification and risk analysis (HIRA)
    - Work Permit System
    - Incident investigation and reporting
    - Fire fighting
    - First aid
    - Fire-warden training
    - EMS and OHSMS
    - T & Ps fitness and operation

- Electrical safety
- Welding, NDE & Radiological safety
- Storage, preservation & material handling.

- A matrix shall be maintained to keep an up-to-date record of attendance of training sessions carried out.

9.5 HSE PROMOTION-SIGNAGE, POSTERS, COMPETITION, AWARDS ETC

9.5.1 Display of HSE posters and banners

- Site shall arrange appropriate posters, banners, slogans in local/Hindi/English languages at work place

9.5.2 Display of HSE signage

- Appropriate HSE signage shall be displayed at the work area to aware workmen and passersby about the work going on and do's and don'ts to be followed

9.5.3 Competition on HSE and award

- Site will arrange different competition (slogan, poster, essay etc.) on HSE time to time (Safety day, BHEL day, World Environment Day etc.) and winners will be suitably awarded.

9.5.4 HSE awareness programme

- Subcontractor shall arrange HSE awareness programme periodically on different topics including medical awareness for all personnel working at site

10.0 HSE COMMUNICATION

10.1 INCIDENT REPORTING

- The subcontractor shall submit report of all incidents, fires and property damage etc to the Engineer immediately after such occurrence, but in any case not later than 24 hours of the occurrence. Such reports shall be furnished in the manner prescribed by BHEL. (Refer HSE procedure for incident investigation, analysis and reporting for details)
- In addition, periodic reports on safety shall also be submitted by the subcontractor to BHEL from time to time as prescribed by the Engineer. Compiled monthly reports of all kinds of incidents, fire and property damage to be submitted to BHEL safety officer as per prescribed formats.
- HSE incidents of site shall be reported to BHEL site Management as per Procedure for Incident Investigation and Reporting in format no. HSEP:14-F15. Corrective action shall be immediately implemented at the work place and compliance shall be verified by BHEL HSE officer and until then, work shall be put on hold by Construction Manager.

10.2 HSE EVENT REPORTING

- Important HSE events like HSE training, Medical camp etc. organized at site shall be reported to BHEL site management in detail with photographs for publication in different in-house magazines
- Celebration of important days like National Safety Day, World Environment Day etc. shall also be reported as mentioned above.

10.3 DAILY HSE ACTIVITY REPORTING

Daily HSE activities shall be reported by subcontractor to BHEL as per Format No. HSEP:14-F31A

11.0 OPERATIONAL CONTROL

All applicable OCPs (Operational control procedures) will be followed by subcontractor as per BHEL instructions. This will be done as part of normal scope of work. List of such OCPs is given below. In case any other OCP is found to be applicable during the execution of work at site, then subcontractor will follow this as well, within quoted rate. These OCPs (applicable ones) will be made available to subcontractor during work execution at site. However for reference purpose, these are kept with Safety Officer of BHEL at the Power Sector Regional HQ, or available in downloadable format in the website, which may be refereed by subcontractor, if they so desire.

LIST OF OCPs

Safe handling of chemicals	Safety in use of cranes	Hydraulic test
Electrical safety	Storage and handling of gas cylinders	Spray insulation
Energy conservation	Manual arc welding	Trial run of rotary equipment
Safe welding and gas cutting operation	Safe use of helmets	Stress relieving
Fire safety	Good house keeping	Material preservation
Safety in use of hand tools	Working at height	Cable laying/tray work
First aid	Safe excavation	Transformer charging
Food safety at canteen	Safe filling of hydrogen in cylinder	Electrical maintenance
Illumination	Vehicle maintenance	Safe handling of battery system
Handling and erection of heavy metals	Safe radiography	Computer operation
Safe acid cleaning	Waste disposal	Storage in open yard
Safe alkali boil out	Working at night	For sanitary maintenance
Safe oil flushing	Blasting	Batching
Steam blowing	DG set	Piling rig operation
Safe working in confined area	Handling & storage of mineral wool	Gas distribution test
Safe operation of passenger lift, material hoists & cages	Drilling, reaming and grinding(machining)	Cleaning of hotwell / deaerator
Electro-resistance heating	Compressor operation	O&M of control of AC plant & system
Air compressor	Passivation	Safe Loading of Unit
Safe EDTA Cleaning	Safe Chemical cleaning of Pre boiler system	Safe Boiler Light up
Safe Rolling and Synchronization		

11.1 HSE ACTIVITIES

HSE activities shall be conducted at site based on the HSEMSM developed by Power Sector and issued to site by Regions.
While planning for any activity the following documents shall be referred for infrastructural requirements to establish control measures:

1) HSE Procedure for Register of OHS Hazards and Risks
2) HSE Procedure for Register of Environmental Aspects and Impacts
3) HSE Procedure for Register of Regulations

4) Operational Control Procedures
5) HSE Procedure for Emergency Preparedness and Response Plan
6) Contract documents

11.2 WORK PERMIT SYSTEM

- The following activities shall come under Work Permit System
  a. Height working above 2 metres
  b. Hot working at height
  c. Confined space
  d. Radiography
  e. Excavation more than 4 meter depth
  f. Heavy lifting above 50 ton
  Refer Annexure 05 for Work permit formats.
- "HSE Procedure for Work Permit System" shall be followed while implementing permit system. Where customer is having separate Work Permit System the same shall be followed.
- Permit applicant shall apply for work permit of particular work activity at particular location before starting of the work with Job Hazard Analysis.
- Permit signatory shall check that all the control measures necessary for the activity are in place and issue the permit to the permit holder.
- Permit holder shall implement and maintain all control measures during the period of permit .He will close the permit after completion of the work. The closed permit shall be archived in HSE Department of site.

11.3 SAFETY DURING WORK EXECUTION

Respective OCPS are to be followed and adherence to the same would be contractually binding

11.3.1 WELDING SAFETY

All safety precautions shall be taken for welding and cutting operations as per IS-818. All safety precautions shall be taken for foundation and other excavation marks as per IS-3764.

11.3.2 RIGGING

Rigging equipment shall not be loaded in excess of its recommended safe working load. Rigging equipment, when not in use, shall be removed from the original work area so as not to present a hazard to employees.

11.3.3 CYLINDERS STORAGE AND MOVEMENT

All gas cylinders shall be stored in upright position. Suitable trolley shall be used. There shall be flash-back arrestors conforming to IS-11006 at both cylinder and burner ends. Damaged tube and regulators must be immediately replaced. No of cylinders shall not exceed the specified quantity as per OCP
Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be intentionally dragged, struck or permitted to strike each other violently.

When cylinders are transported by powered vehicle they shall be secured in a vertical position.

11.3.4 DEMOLITION WORK

Before any demolition work is commenced and also during the process of the work the following shall be ensured:

- All roads and open areas adjacent to the work site shall either be closed or suitably protected.
- No electric cable or apparatus which is liable to be a source of danger nor a cable or an apparatus used by the operator shall remain electrically charged.
- All practical steps shall be taken to prevent danger to persons employed from the risks of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render them unsafe.

11.3.5 T&Ps

All T&Ps/ MMEs should be of reputed brand/appropriate quality & must have valid test/calibration certificates bearing endorsement from competent authority of BHEL..Subcontractor to also submit monthly reports of T&Ps deployed and validity test certificates to BHEL safety Officer as per the format/procedure of BHEL.

11.3.6 CHEMICAL HANDLING

Displaying safe handling procedures for all chemicals such as lube oil, acid, alkali, sealing compounds etc , at work place.Where it is necessary to provide and/or store petroleum products or petroleum mixture & explosives, the subcontractor shall be responsible for carrying out such provision / storage in accordance with the rules & regulations laid down in the relevant petroleum act, explosive act and petroleum and carbide of calcium manual, published by the chief inspector of explosives of India. All such storage shall have prior approval if necessary from the chief inspector of explosives or any other statutory authority. The subcontractor shall be responsible for obtaining the same.

11.3.7 ELECTRICAL SAFETY

- Providing adequate no. of 24 V sources and ensure that no hand lamps are operating at voltage level above 24 Volts.
- Fulfilling safety requirements at all power tapping points.
- High/ Low pressure welders to be identified with separate colour clothings. No welders will be deployed without passing appropriate tests and holding valid welding certificates. Approved welding procedure should be displayed at work place.
- The subcontractor shall not use any hand lamp energized by Electric power with supply voltage of more than 24 volts in confined spaces like inside water boxes, turbine casings, condensers etc.
- All portable electric tools used by the subcontractor shall have safe plugging system to source of power and be appropriately earthed. Only electricians licensed by appropriate statutory authority shall be employed by the subcontractor to carry out all types of electrical works. Details of earth resource ad their test date to be given to BHEL safety officer as per the prescribed formats of BHEL
- The subcontractor shall use only properly insulated and armored cables which conform to the requirement of Indian Electricity Act and Rules for all wiring, electrical applications at site.

- BHEL reserves the right to replace any unsafe electrical installations, wiring, cabling etc. at the cost of the subcontractor.
- All electrical appliances used in the work shall be in good working condition and shall be properly earthed.
- No maintenance work shall be carried out on live equipment.
- The subcontractor shall maintain adequate number of qualified electricians to maintain his temporary electrical installations.
- Area wise Electrical safety inspection is to be carried out on monthly basis as per "Electrical Safety Inspection checklist' and the report is to be submitted to BHEL safety officer
- Adequate precautions shall be taken to prevent danger for electrical equipment. No materials on any of the sites of work shall be so stacked or placed as to cause danger or inconvenience to any person or the public
- The subcontractor shall carefully follow the safety requirement of BHEL/ the purchaser with the regard to voltages used in critical areas.

11.3.8 FIRE SAFETY

- Providing appropriate fire fighting equipment at designated work place and nominate a fire officer/warden adequately trained for his job.
- Subcontractor shall provide enough fire protecting equipment of the types and numbers at his office, stores, temporary structure in labor colony etc. Such fire protection equipment shall be easy and kept open at all times.
- The fire extinguishers shall be properly refilled and kept ready which should be certified at periodic intervals. The date of changing should be marked on the Cylinders.
- All other fire safety measures as laid down in the "codes for fire safety at construction site" issued by safety coordinator of BHEL shall be followed.
- Non-compliance of the above requirement under fire protection shall in no way relieve the subcontractor of any of his responsibility and liabilities to fire incident occurring either to his materials or equipment or those of others.
- Emergency contacts nos must be displayed at prominent locations
- Tarpaulin being inflammable should not be used (instead, only non-infusible covering materials shall be used) as protective cover while preheating, welding, stress relieving etc. at site.

11.3.9 SCAFFOLDING

- Suitable scaffolds shall be provided for workman for all works that cannot safely be done from the ground, or from solid construction except in the case of short duration of work which can be done safely from ladders.
- When a ladder is used, it shall be of rigid construction made of steel. The steps shall have a minimum width of 45 cm and a maximum rise of 30 cm. Suitable handholds of good quality wood or steel shall be provided and the ladder shall be given an inclination not steeper then ¼ horizontal and 1 vertical.
- Scaffolding or staging more than 3.6 m above the ground floor, swung or suspended from an overhead support or erected with stationery support shall have a guard rail properly bolted, braced or otherwise secured, at least 90 cm above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from saver, from swaying, from the building or structure.

11.3.10 **WORK AT HEIGHT**:

- Guardrails and toe-board/barricades and sound platform conforming to IS:4912-1978 should be provided.

- Wherever necessary, life-line (pp or metallic) and fall arrestor along with Polyamide rope or Retractable lifeline should be provided.
- Safety Net as per IS:11057:1984 should be used extensively for prevention/ arrest of men and materials falling from height. The safety nets shall be fire resistant, duly tested and shall be of ISI marked and the nets shall be located as per site requirements to arrest or to reduce the consequences of a possible fall of persons working at different heights.
- Reaching beyond barricaded area without lifeline support, moving with support of bracings, walking on beams without support, jumping from one level to another, throwing objects and taking shortcut must be discouraged.
- Use of Rebar steel for making Jhoola and monkey-ladder (Rods welded to vertical or inclined structural members), temporary platform etc. must be avoided.
- Monkey Ladder should be properly made and fitted with cages.
- Jhoola should be made with angles and flats and tested like any lifting tools before use.
- Lanyard must be anchored always and in case of double lanyard, each should be anchored separately.
- In case of pipe-rack, persons should not walk on pipes and walk on platforms only.
- In case of roof work, walking ladder/ platform should be provided along with lifeline and/ or fall arrestor.
- Empty drums must not be used.
- For chimney or structure painting, both hanging platform and men should be anchored separately to a firm structure along with separate fall arrestor. Rope ladder should be discouraged.

11.3.11 WORKING PLATFORM

Working platforms, gangways and stairways shall be so constructed that they do not sag unduly or unequally and if the height of the platform gangways provided is more than 3.6 m above ground level or floor level, they shall be closely boarded and shall have adequate width which shall not be less than 750 mm and be suitably fenced as described above. Every opening in the floor or a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 90 cm.

11.3.12 EXCAVATION

Wherever there are open excavation in ground, they shall be fenced off by suitable railing and danger signals installed at night so as to prevent persons slipping into the excavations.

11.3.13 LADDER SAFETY

Safe means of access shall be provided to all working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9 m in the length while the width between side rails in rung ladder shall in no case be less than app. 29.2 cm for ladder upto and including 3 m in length. For longer ladders this width shall be increased at least ¼'' for each additional foot of length.

A sketch of the ladders and scaffolds proposed to be used shall be prepared and approval of the Engineer obtained prior to Construction.

11.3.14 LIFTING SAFETY

- It will be the responsibility of the subcontractor to ensure safe lifting of the equipment, taking due precaution to avoid any incident and damage to other equipment and personnel.

- All requisite tests and inspection of handling equipment, tools & tackle shall be periodically done by the subcontractor by engaging only the Competent Persons as per law.
- Defective equipment or uncertified shall be removed from service.
- Any equipment shall not be loaded in excess of its recommended safe working load.

11.3.15 HOISTING APPLIANCE

- Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safe guards.
- Hoisting appliance should be provided with such means as will reduce to the minimum the risk of any part of a suspended load becoming incidentally displaced.
- When workers employed on electrical installations which are already energized, insulating mats, wearing apparel, such as gloves, sleeves and boots as may be necessary should be provided.
- The worker should not wear any rings, watches and carry keys or other materials which are good conductor of electricity.

11.4 ENVIRONMENTAL CONTROL

Environment protection has always been given prime importance by BHEL. Environmental damage is a major concern of the principal subcontractor and every effort shall be made, to have effective control measures in place to avoid pollution of Air, Water and Land and associated life. Chlorofluorocarbons such as carbon tetrachloride and trichloroethylene shall not be used. Waste disposal shall be done in accordance with the guidelines laid down in the project specification.

Any chemical including solvents and paints, required for construction shall be stored in designated bonded areas around the site as per Material Safety Data Sheet (MSDS).

In the event of any spillage, the principle is to recover as much material as possible before it enters drainage system and to take all possible action to prevent spilled materials from running off the site. The subcontractor shall use appropriate MSDS for clean-up technique

All subcontractors shall be responsible for the cleanliness of their own areas.

The subcontractors shall ensure that noise levels generated by plant or machinery are as low as reasonably practicable. Where the subcontractor anticipates the generation of excessive noise levels from his operations the subcontractor shall inform to Construction Manager of BHEL accordingly so that reasonable &practicable precautions can be taken to protect other persons who may be affected.
It is imperative on the part of the subcontractor to join and effectively contribute in joint measures such as tree plantation, environment protection, contributing towards social upliftment, conversion of packing woods to school furniture, keeping good relation with local populace etc.
The subcontractor shall carry out periodic air and water quality check and illumination level checking in his area of work place and take suitable control measure.

11.5 HOUSEKEEPING

- Keeping the work area clean/ free from debris, removed scaffoldings, scraps, insulation/sheeting wastage /cut pieces, temporary structures, packing woods etc. will be in the scope of the subcontractor. Such cleanings has to be done by

subcontractor within quoted rate, on daily basis by an identified group. If such activity is not carried out by subcontractor / BHEL is not satisfied, then BHEL may get it done by other agency and actual cost along with BHEL overheads will be deducted from contractor's bill. Such decisions of BHEL shall be binding on the subcontractor

- Proper housekeeping to be maintained at work place and the following are to be taken care of on daily basis.
- All surplus earth and debris are removed/disposed off from the working areas to identified locations.
- Unused/Surplus cables, steel items and steel scrap lying scattered at different places/elevation within the working areas are removed to identified locations.
- All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from workplace to identified locations. Sufficient waste bins shall be provided at
- Different work places for easy collection of scrap/waste. Scrap chute shall be installed to remove scrap from high location.
- Access and egress (stair case, gangways, ladders etc.) path should be free from all scrap and other hindrances.
- Workmen shall be educated through tool box talk about the importance of housekeeping and encourage not to litter.
- Labour camp area shall be kept clear and materials like pipes, steel, sand, concrete, chips and bricks, etc. shall not be allowed in the camp to obstruct free movement of men and machineries.
- Fabricated steel structures, pipes & piping materials shall be stacked properly.
- No parking of trucks/trolleys, cranes and trailers etc. shall be allowed in the camp, which may obstruct the traffic movement as well as below LT/HT power line.
- Utmost care shall be taken to ensure over all cleanliness and proper upkeep of the working areas

11.6 WASTE MANAGEMENT

Take suitable measures for waste management and environment related laws/legislation as a part of normal construction activities. Compliance with the legal requirements on storage/ disposal of paint drums (including the empty ones), Lubricant containers, Chemical Containers, and transportation and storage of hazardous chemicals will be strictly maintained.

11.6.1 BINS AT WORK PLACE

- Sufficient rubbish bins shall be provided close to workplaces.
- Bins should be painted yellow and numbered.
- Sufficient nos. of drip trays shall be provided to collect oil and grease.
- Sufficient qty. of broomsticks with handle shall be provided.
- Adequate strength of employees should be deployed to ensure daily monitoring and service for waste management.

11.6.2 STORAGE AND COLLECTION

- Different types of rubbish/waste should be collected and stored separately.
- Paper, oily rags, smoking material, flammable, metal pieces should be collected in separate bins with close fitting lids.
- Rubbish should not be left or allowed to accumulate on construction and other work places.
- Do not burn construction rubbish near working site.

11.6.3 SEGREGATION

- Earmark the scrap area for different types of waste.
- Store wastes away from building.
- Oil spill absorbed by non-combustible absorbent should be kept in separate bin.
- Clinical and first aid waste stored and incinerated separately.

11.6.4 DISPOSAL

- Sufficient containers and scrap disposal area should be allocated.
- All scrap bin and containers should be conveniently located.
- Provide self-closing containers for flammable/spontaneously combustible material.
- Keep drainage channels free from choking.
- Make schedule for collection and disposal of waste.

11.6.5 WARNING AND SIGNS

- Appropriate sign to be displayed at scrap storage area
- No toxic, corrosive or flammable substance to be discarded into public sewage system.
- Waste disposal shall be in accordance with best practice.
- Comply with all the requirements of Pollution Control Board (PCB) for storage and disposal of hazardous waste.

11.7 TRAFFIC MANAGEMENT SYSTEM

11.7.1 SAFE WORKPLACE TRANSPORT SYSTEM

- Traffic routes in a work place shall be suitable for the persons or vehicles using them. This shall be sufficient in number and of sufficient size. This shall reflect the suitability of traffic routes for vehicles and pedestrians.
- Where vehicles and pedestrians use the same traffic routes there shall be sufficient space between them. Where necessary all traffic routes must be suitably indicated. Pedestrians or vehicles must be able to use traffic routes without endangering those at work. There must be sufficient separation of traffic routes from doors, gates and pedestrian traffic routes.
- For internal traffic, lines marked on roads / access routes and between buildings shall clearly indicate where vehicles are to pass.
- Temporary obstacles shall be brought to the attention of drivers by warning signs or hazard cones.
- Speed limits shall be clearly displayed. Speed ramps preceded by a warning signs or marker are necessary.
- The traffic route should be wide enough to allow vehicles to pass and re-pass oncoming or parked traffic and it may be advisable to introduce on-way system or parking restrictions.
- Safest route shall be provided between places where vehicles have to call or deliver.
- Avoid vulnerable areas/items such as fuel or chemicals tanks or pipes, open or unprotected edges and structures likely to collapse

- Safe areas shall be provided for loading and unloading.
- Avoid sharp or blind bends. If this is not possible hazards should be indicated e.g. blind corner.
- Ensure road crossings are minimum and clearly signed.
- Entrance and gateways shall be wide enough to accommodate a second vehicle without causing obstruction.
- Set sensible speed limits which are clearly sign posted.
- Where necessary ramps should be used to retard speed. This shall be preceded by a warning sign or mark on the road.
- Forklift trucks shall not pass over road hump unless of a type capable of doing so.
- Overhead electric cable, pipes containing flammable hazardous chemical shall be shielded by using goal posts height gauge posts or barriers.
- Road traffic signs shall be provided on prominent locations for prevention of incidents and hazards and for quick guidance and warning to employees and public. Safety signs shall be displayed as per the project working requirement and guideline of the state in which project is done. Vehicles hired or used shall not be parked within the 15m radius of any working area. Any vehicle, that is required to be at the immediate/near the vicinity, shall be approved by the person in-charge of the site.

11.7.2 TRAFFIC ROUTE FOR PEDESTRIANS

- Where traffic routes are used by both pedestrians and vehicles road shall be wide enough to allow vehicles and pedestrians safely.
- Separate routes shall be provided for pedestrians to keep them away from vehicles. Provide suitable barriers/guard at entrances/exit and the corners or buildings.
- Where pedestrian and vehicle routes cross, appropriate crossing shall be provided.
- Where crowd is likely to use roadway e.g. at the end of shift, stop vehicles from using them at such times.
- Provide high visibility clothing for people permitted in delivery area.

11.7.3 WORK VEHICLE

Work vehicle shall be as safe stable efficient and roadworthy as private vehicles on public roads. Site management shall ensure that drivers are suitably trained. All vehicle e.g. heavy motor vehicle forklift trucks dump trucks mobile cranes shall ensure that the work equipment conforms to the following:

- A high level of stability.
- A safe means of access/egress.
- Suitable and effective service and parking brakes.
- Windscreens with wipers and external mirrors giving optimum all round visibility.
- Provision of horn, vehicle lights, reflectors, reversing lights, reversing alarms.
- Provision of seat belts.
- Guards on dangerous parts.
- Driver protection - to prevent injury from overturning and from falling objects/materials.
- Driver protection from adverse weather.
- No vehicle shall be parked below HT/LT power lines.
- Valid Pollution Under Control certification for all vehicles

11.7.4 DAILY CHECK BY DRIVER

- There should also be daily safety checks containing below mentioned points by the driver before the vehicle is used.
  - Brakes.
  - Tires.
  - Steering.
  - Mirrors.
  - Windscreen waters.
  - Wipers.
  - Warning signals.
  - Specific safety system i.e. control interlocks
- Management should ensure that drivers carry out these checks.

11.7.5 TRANSPORTATION OF PERSONNEL AND MATERIALS BY VEHICLES

- All drivers shall hold a valid driving License for the class of vehicle to be driven and be registered as an authorized BHEL driver with the Administration Department.
- Securing of the load shall be by established and approved methods, i.e. chains with patented tightening equipment for steel/heavy loads. Sharp corners on loads shall be avoided when employing ropes for securing.
- All overhangs shall be made clearly visible and restricted to acceptable limits
- Load shall be checked before moving off and after traveling a suitable distance.
- On no account is construction site to be blocked by parked vehicles Drivers of vehicles shall only stop or park in the areas designate by the stringing foreman.
- Warning signs shall be displayed during transportation of material.
  All vehicles used by BHEL shall be in worthy condition and in conformance to the Land Transport requirement.

11.7.6 MAINTENANCE

All Vehicles used for transportation of man and material shall undergo scheduled inspections on frequent intervals to secure safe operation. Such inspections shall be conducted in particular for steering, brakes, lights, horn, doors etc. Site management shall ensure that work equipment is maintained in an efficient, working order and in good repair. Inspections and services carried out at regular intervals of time and or mileage. No maintenance shall be carried below HT/LT power lines.

11.8 EMERGENCY PREPAREDNESS AND RESPONSE

- Emergency preparedness and response capability of site shall be developed as per Emergency Preparedness and Response plan issued by Regional HQ
- Availability of adequate number of first aiders and fire warden shall be ensured with BHEL and its subcontractors
- All the subcontractor's supervisory personnel and sufficient number of workers shall be trained for fire protection systems. Enough number of such trained personnel must be available during the tenure of contract. Subcontractor should nominate his supervisor to coordinate and implement the safety measures.
- Assembly point shall be earmarked and access to the same from different location shall be shown
- Fire exit shall be identified and pathway shall be clear for emergency escape.

- Appropriate type and number of fire extinguisher shall be deployed as per Fire extinguisher deployment plan and validity shall be ensured periodically through inspection
- Adequate number of first aid boxes shall be strategically placed at different work places to cater emergency need. Holder of the first aid box shall be identified on the box itself who will have the responsibility to maintain the same.
- First aid center shall be developed at site with trained medical personnel and ambulance
- Emergency contact numbers (format given in EPRP) of the site shall be displayed at prominent locations.
- Tie up with fire brigade shall be done in case customer is not having fire station.
- Tie up with hospital shall be done in case customer is not having hospital.
- Disaster Management group shall be formed at site
- Mock drill shall be arranged at regular intervals. Monthly report of the above to be given to BHEL safety Officer as per prescribed BHEL formats
- Mock drill shall be conducted on different emergencies periodically to find out gaps in emergency preparedness and taking necessary corrective action

12.0 HSE INSPECTION

Inspection on HSE for different activities being carried out at site shall be done to ensure compliance to HSEMS requirements. The subcontractor shall maintain and ensure necessary safety measures as required for inspection and tests HV test, Pneumatic test, Hydraulic test, Spring test, Bend test etc. as applicable, to enable inspection agency for performing Inspection. If any test equipment is found not complying with proper safety requirements then the Inspection Agency may withhold inspection, till such time the desired safety requirements are met.

12.1 DAILY HSE CHECKS

Both the Site Supervisors and safety officer of Subcontractor are to conduct daily site Safety inspection around work activities and premises to ensure that work methods and the sites are maintained to an acceptable standard. The following are to form the common subjects of a daily safety inspection:

- Personal Safety wears & gear compliance.
- Complying with site safety rules and permit-to-work (PTW).
- Positions and postures of workers.
- Use of tools and equipment etc. by the workers.

The inspection should be carried out just when work starts in beginning of the day, during peak activities period of the day and just before the day's work ends.

12.2 INSPECTION OF PPE

- PPEs shall be inspected by HSE officer at random once in a week as per format no. HSEP:14-F06 for its compliance to standard and compliance to use and any adverse observation shall be recorded in the PPE register.
- The applicable PPEs for carrying out particular activities are listed below.

12.3 INSPECTION OF T&Ps

- A master list of T&Ps shall be maintained by each subcontractor.
- All T&Ps being used at site shall be inspected by HSE officer once in a month as per format no. HSEP:14-F07 for its healthiness and maintenance.
- The T&Ps which require third party inspection shall be checked for its validity during inspection. The third party test certificate should be accompanied with a copy of the concerned competent person's valid qualification record.
- The validity of T&P shall be monitored as per "Status of T&Ps" format no. HSEP:14-F08

12.4 INSPECTION OF CRANES AND WINCHES

- Cranes and winches shall be inspected by the operator through a daily checklist for its safe condition (as provided by the equipment manufacturer) before first use of the day.
- Cranes and Winches shall be inspected by HSE officer once in a month as per format no. HSEP:14-F09 for healthiness, maintenance and validity of third party inspection.
- The date of third party inspection and next due date shall be painted on cranes and winches.
- The operators/drivers shall be authorized by sub-contractor based on their competency and experience and shall carry the I-card.
- The operator should be above 18 years of age and should be in possession of driving license of HMV man & goods), vision test certificate and should have minimum qualification so that he can read the instructions and check list.

12.5 INSPECTION ON HEIGHT WORKING

- Inspection on height working shall be conducted daily by supervisors before start of work to ensure safe working condition including provision of
    - Fall arrestor
    - Lifelines
    - Safety nets
    - Fencing and barricading
    - Warning signage
    - Covering of opening
    - Proper scaffolding with access and egress.
    - Illumination
- Inspection on height working shall be conducted once in a week by HSE officer as per format no. HSEP:14-F10.
- Medical fitness of height worker shall be ensured.
- Height working shall not be allowed during adverse weather.

12.6 INSPECTION ON WELDING AND GAS CUTTING OPERATION

- Supervisor shall ensure that no flammable items are available in near vicinity during welding and gas cutting activity.
- Gas cylinders shall be kept upright.
- Use of Flash back arrestor shall be ensured at both ends.

- Inspection during welding and gas cutting operations shall be carried out by HSE officer once a month as per format no. HSEP:14-F11.
- Use of fire blanket to be ensured to avoid falling of splatters during welding or gas cutting operation at height.
- Availability of fire extinguisher at vicinity shall be ensured.

12.7 INSPECTION ON ELECTRICAL INSTALLATION / APPLIANCES

- Ensure proper earthing in electrical installation
- Use ELCB at electrical booth
- Electrical installation shall be properly covered at top where required
- Use appropriate PPEs while working
- Use portable electrical light < 24 V in confined space and potentially wet area.
- Monthly inspection shall be carried out as per format no. HSEP:14-F12.

12.8 INSPECTION OF ELEVATOR

- Elevators shall be inspected by concerned supervisors once in a week as per format no. HSEP:14-F13.
- All elevators shall be inspected by competent person and validity shall be ensured.
- The date of third party inspection and next due date shall be painted on elevator.

12.9 INSPECTION OF EXCAVATION

Excavation activities shall be inspected as per Format HSEP:14-F13A

13.0 HSE PERFORMANCE

- Contractor shall be assessed on monthly basis for HSE Compliance by BHEL Safety In-charge at site.
  The HSE compliance shall be based on Online HSE Evaluation System of BHEL as per Format No. HSEP:14-F33.
- BHEL shall reserve the right to use this assessment for evaluating bidder's capacity for future tenders
- Suitable HSE reward system shall be developed at site level to promote HSE compliance amongst workmen by the subcontractor.
  To decide HSE reward, performance towards HSE shall be evaluated for workmen and it shall be awarded regularly in public gathering.
- If safety record of the subcontractor in execution of the awarded job is to the satisfaction of safety department of BHEL, issue of an appropriate certificate to recognize the safety performance of the subcontractor may be considered by BHEL after completion of the job.

14.0 HSE PENALTIES

- As per contractual provision HSE penalties shall be imposed on subcontractors for non- compliance on HSE requirement as per format no. HSEP:14-F14. The list in the format is only indicative. For any other violation, not listed in the format, the minimum penalty amount is to be decided as per BOCW act.
- If principal customer/statutory and regulatory bodies impose some penalty on HSE due to the non-compliance of the subcontractor the same shall be passed on to them.
- The penalty amount shall be recovered by Site Finance department from subcontractors from the RA/Final bill.

15.0 OTHER REQUIREMENTS

- In case of any delay in completion of a job due to mishaps attributable to lapses by the subcontractor, BHEL shall have the right to recover cost of such delay from the payments due to the subcontractor, after notifying the subcontractor suitably.
- If the subcontractor fails to improve the standards of safety in its operation to the satisfaction of BHEL after being given reasonable opportunity to do so and/or if the subcontractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instruction regarding safety issued by BHEL, BHEL shall have the right to take corrective steps at the risk and cost of the subcontractor after giving a notice of not less than 7 days indicating the steps that would be taken by BHEL.
- If the subcontractor succeeds in carrying out its job in time without any fatal or disabling injury incident and without any damage to property BHEL may, at its sole discretion, favorably consider to reward the subcontractor suitably for the performance.
- In case of any damage to property due to lapses by the subcontractor, BHEL shall have the right to recover the cost of such damages from the subcontractor after holding an appropriate enquiry.
- The subcontractor shall take all measures at the sites of the work to protect all persons from incidents and shall be bound to bear the expenses of defense of every suit, action or other proceeding of law that may be brought by any persons for injury sustained or death owing to neglect of the above precautions and to pay any such persons such compensation or which may with the consent of the subcontractor be paid to compromise any claim by any such person, should such claim proceeding be filed against BHEL, the subcontractor hereby agrees to indemnify BHEL against the same.
- The subcontractor shall not employ men below the age of 18 years and women on the work of painting with products containing lead in any form. Wherever men above the age of 18 are employed on the work of lead painting, overalls shall be supplied by the subcontractor to the workmen and adequate facilities shall be provided to enable the working painters to wash during the cessation of work.
- The subcontractor shall notify BHEL of his intention to bring to site any equipment or material which may create hazard.
- BHEL shall have the right to prescribe the conditions under which such equipment or materials may be handled and the subcontractor shall adhere to such instructions.

- BHEL may prohibit the use of any construction machinery, which according to the organization is unsafe. No claim for compensation due to such prohibition will be entertained by BHEL.

16. NON COMPLIANCE

NONCONFORMITY OF SAFETY RULES AND SAFETY APPLIANCES WILL BE VIEWED SERIOUSLY AND BHEL HAS RIGHT TO IMPOSE FINES ON THE SUBCONTRACTOR AS UNDER FOR EVERY INSTANCE OF VIOLATION NOTICED:

SN	Violation of Safety Norms	Fine (in Rs)
01	Not Wearing Safety Helmet	200/- *
02.	Not wearing Safety Belt or not anchoring life line	500/-*
03	Not wearing safety shoe	200/-*
04	Not keeping gas cylinders vertically	200/-
05	Not using flash back arrestors	100/-
06	Not wearing gloves	50/- *
07.	Grinding Without Goggles	50/- *
08.	Not using 24 V Supply For Internal Work	500/-
09.	Electrical Plugs Not used for hand Machine	100/-
10.	Not Slinging properly	200/-
11.	Using Damaged Sling	200/-
12.	Lifting Cylinders Without Cage	500/-
13.	Not Using Proper Welding Cable With Lot of Joints And Not Insulated Property.	200/-
14.	Not Removing Small Scrap From Platforms	500/-
15.	Gas Cutting Without Taking Proper Precaution or Not Using Sheet Below Gas Cutting	500/-
16.	Not Maintaining Electric Winches Which are Operated Dangerously	500/-
17.	Improper Earthing Of Electrical T&P	500/-
18	No or improper barricading	500/-
19.	Activity carried out without Safety work permit (Height work, Lifting activity, Hot work-each person/case)	1000/-
20.	Incident Resulting in Partial Loss in Earning Capacity	25,000/- per victim
21.	Fatal Incident Resulting in total loss in Earning Capacity	1,00,000/- per victim for first instance #

- Legend:-

  *: per head. For repeated violation by the same person, the penalty would be double of the previous penalty. Date of "Repeated violation" will be counted from subsequent days.

  #: or as deducted by customer, whichever is higher. For repeated fatal incident in the same Unit incremental penalty to be imposed. The subcontractor will pay 2 times the penalty compared to previously paid in case there are repeated cases of fatal incidents under the same subcontractor for the same package in the same unit.

Any other non-conformity noticed not listed above will also be fined as deemed fit by BHEL. The decision of BHEL engineer is final on the above. The amount will be deducted from running bills of the subcontractor. The amount collected above will be utilized for giving award to the employees who could avoid incident by following safety rules. Also the amount will be spent for purchasing the safety appliances and supporting the safety activity at site.

17.0 HSE AUDIT/INSPECTION

- Regular HSE Audit/inspection shall be carried out by Subcontractor as per Site HSE audit calendar.
- HSE checklist **(Annexure 02)** shall be used for carrying out audit/inspection and report shall be submitted to BHEL site management
- All non-conformities and observations on HSE identified during internal or external HSE audit shall be disposed off by site in a time bound manner and reported back the implementation status
- Corrective action and Preventive action on HSE issues raised by certification body issued by Regional HQs shall be implemented by site and reported to Site management.

18.0 MONTHLY HSE REVIEW MEETING

- Site shall hold HSE review meeting every month to discuss and resolve HSE issues of site and improve HSE performance. It will also discuss the incidents occurred since previous meeting,its root cause and Corrective action and Preventive action. The agenda is given below:
  - Implementation of earlier MOM
  - HSE performance
  - HSE inspection
  - HSE audit and CAPA
  - HSE training
  - Health check-up camp
  - HSE planning for the erection and commissioning and installation activities in the coming month
  - HSE reward and promotional activities
- The meeting shall be chaired by Construction Manager, convened by HSE coordinator and attended by all HOS, Site Incharge of Subcontractors and HSE officer of Subcontractors.
- MOM on the discussion will be circulated to the concerned for implementation.

19.0 FORMATS USED (Details available in Annexure-04)

SL. No.	Format Name	Format No.	Rev No.
01	Inspection of First Aid Box	HSEP:14-F01	00
02	Health Check Up	HSEP:14-F02	00
03	HSE Induction Training	HSEP:14-F03	00
04	Tool Box Talk	HSEP:14-F04	00
05	Monthly Site HSE Report	As specified by BHEL	00
06	Inspection of PPE	HSEP:14-F06	00

07	Inspection of T&Ps	HSEP:14-F07	00
08	Status of T&Ps	HSEP:14-F08	00
09	Inspection of Cranes and Winches	HSEP:14-F09	00
10	Inspection on Height Working	HSEP:14-F10	00
11	Inspection on Welding & Gas Cutting	HSEP:14-F11	00
12	Inspection on Electrical Installation	HSEP:14-F12	00
13	Inspection on Elevator	HSEP:14-F13	00
14	HSE Penalty	HSEP:14-F14	00
15	Accident /incident / property damage /fire incident report	HSEP:14-F15	00

20.0 ANNEXURES

ANNEXURE 01

As per Contract Labour (Regulation & Abolition Act), Central Rules, 1971,

(1) The first-aid box shall be distinctively marked with a Red Cross on a white background and shall contain the following items, namely:

(a) For establishments in which the number of contract labour employed does not exceed fifty, each first aid box shall contain the following equipment:

(i)	6 small sterilized dressings
(ii)	3 medium size sterilized dressings
(iii)	3 large size sterilized dressings
(iv)	6 pieces of sterilized eye pads in separate sealed packets.
(v)	6 roller bandages 10 cm wide.
(vi)	6 roller bandages 5 cm wide.
(vii)	One tourniquet
(viii)	A supply of suitable splints
(ix)	Three packets of safety pins.
(x)	Kidney tray.
(xi)	3 large sterilized burn dressings.
(xii)	1 (30ml) bottle containing a two percent alcoholic solution of iodine
(xiii)	1 (30 ml) bottle containing Sal volatile having the dose and mode of administration indicated on the label
(xiv)	1 snake bite lancet
(xv)	1 (30gms) bottle of potassium permanganate crystals.
(xvi)	1 pair scissors
(xvii)	1 copy of the First-Aid leaflet issued by the Director General, Factory Advice Service and Labour Institutes, Government of India.
(xviii)	A bottle containing 100 tablets (each of 5 grains) of aspirin
(xix)	Ointment for burns
(xx)	A bottle of suitable surgical anti-septic solution

(b) For establishment in which the number of contract labour exceeds fifty each first-aid box shall contain the following equipment:

(i)	12 small sterilized dressings
(ii)	6 medium size sterilized dressings
(iii)	6 large size sterilized dressings.
(iv)	6 large size sterilized burn dressings
(v)	6 (15 grams) packets sterilized cotton wool
(vi)	12 pieces of sterilized eye pads in separate sealed packets.

(vii)	12 roller bandages 10 cm wide.
(viii)	12 roller bandages 5 cm wide.
(ix)	One tourniquet.
(x)	A supply of suitable splints.
(xi)	Three packets of safety pins.
(xii)	Kidney tray.
(xiii)	Sufficient number of eye washes bottles filled with distilled water or suitable liquid clearly indicated by a distinctive sign which shall be visible at all times.
(xiv)	4 per cent Xylocaine eye drops, and boric acid eye drops and soda by carbonate eye drops.
(xv)	1 (60ml) bottle containing a two percent alcoholic solution of iodine
(xvi)	One (two hundred ml) bottle of mercurochrome (2 per cent) solution in water.
(xvii)	1 (120ml) bottle containing Sal volatile having the dose and mode of administration indicated on the label.
(xviii)	1 roll of adhesive plaster (6 cmX1 meter)
(xix)	2 rolls of adhesive plaster (2 cmX1 meter)
(xx)	A snake bite lancet.
(xxi)	1 (30 grams) bottle of potassium permanganate crystals.
(xxii)	1 pair scissors
(xxiii)	1 copy of the First-Aid leaflet issued by the Director-General, Factory Advice service and labour Institutes, Government of India.
(xxiv)	a bottle containing 100 tablets (each of 5 grains) of aspirin
(xxv)	Ointment for burns
(xxvi)	A bottle of a suitable surgical anti septic solution.

(2) Adequate arrangement shall be made for immediate recoupment of the equipment when necessary.

ANNEXURE 02

HSE AUDIT/INSPECTION CHECKLIST CUM COMPLIANCE REPORT

PROJECT:_____ SUBCONTRACTOR:_____

DATE : _____ OWNER :_____

INSPECTION BY:_____

Note : write 'NA' wherever the items is not applicable

Item	Yes	No	Remarks	Action
HOUSEKEEPING				
Waste containers provided and used				
Passageways and walkways clear				
General neatness of working area				
Other				
PERSONNELPROTECTIVEEQUIPTMENTS				
Goggles; shields				
Face protection				
Hearing protection				
Respiratory masks etc.				
Safety belts				
Other				
EXCAVATIONS / OPENINGS				
Openings properly covered or barricaded				
Excavations shored				
Excavations barricaded				
Overnight lighting provided				
Other				
WELDING, CUTTING				
Gas cylinders chained upright				
Cable and hoses not obstructing				
Fire extinguisher (s) accessible				
Others				
SCAFFOLDING				
Fully decked platforms				
Guard and intermediate rails in place				
Toe boards in place				
Adequate shoring				
Adequate access				
Others				
LADDER				
Extension side rails 1 m above				
Top of landing				
Properly secured				

Angle + 70^0 from horizontal				
Other				
HOISTS, CRANES AND DERRICKS				
Condition of cables and sheaf OK				
Condition of slings, chains, hooks OK				
Inspection & maintenance log maintained				
Outriggers used				
Signals observed and understood				
Qualified operators				
Others				
MACHINERY, TOOLS & EQUIPMENT				
Proper instruction				
Safety devices				
Proper cords				
Inspection and maintenance				
Other				
VEHICLE AND TRAFFIC				
Rules and regulations observed				
Inspection and maintenance				
Licensed drivers				
Other				
TEMPORARY FACILITIES				
Emergency instructions posted				
Fire extinguishers provided				
Fire-aid equipment available				
General neatness				
Others				
FIRE PREVENTION				
Personnel instructed				
Fire extinguishers checked				
No smoking in prohibited areas.				
Hydrants				
Clearance				
Others				
ELECTRICAL				
Proper wiring				
ELCB's provided				
Ground fault circuit interrupters				
Protection against damage				
Prevention of tripping hazards				
Other				
HANDLING & STORAGE OF MATERIALS				
Properly stored or stacked				
Passageways clear				
Other				
FLAMMABLE GASES AND LIQUIDS				
Containers clearly identified				
Proper storage				
Fire extinguisher nearby				

Other				
WORKING AT HEIGHT				
Safety nets				
Safety belts				
Safety helmets				
Anchoring of safety belt to the life line rope				
ENVIRONMENT				
Lubricant waste/engine oils properly dispose.				
Waste from Canteen, offices, sanitation etc. disposed properly.				
Disposal of surplus earth, stripping materials, expired batteries, oily rags and combustible materials done properly.				
HEALTH CHECKS				
Hygienic conditions at labor camps O.K.				
Availability of first-aid facilities				
Proper sanitation at site, office & labor camps.				
Arrangement of medical facilities.				
Measures for dealing with illness.				
Availability of potable drinking water for workmen & staff.				
Provision of crèches for children.				

ANNEXURE 03

REFERENCES

- Contract documents
- Relevant legislations
- HSEMSM
- Relevant Indian standards as listed below (illustrative only):

SL NO	CODE NAME	TITLE
(1)	IS : 818-1888 (Reaffirmed 2003)	Code of Practice for safety and health requirements in Electric and Gas Welding and Cutting operations.
(2)	IS: 1179-1967 (Reaffirmed 2003)	Specification for Equipment for Eye & Face protection during welding.
(3)	IS : 1989 (Part 2):1986 (Reaffirmed 1997)	Specification for Leather Safety Boots & Shoes
(4)	IS:2925 – 1984 (Reaffirmed 2010)	Specification for Industrial Safety Helmets
(5)	IS:3521 : 1999 (Reaffirmed 2002)	Industrial Safety Belts & Harnesses-Specification
(6)	IS:3646(Part II) – 1966 (Reaffirmed 2003)	Code of Practice for Interior Illumination
(7)	IS:3696 (Part I) – 1987 (Reaffirmed 2002)	Safety Code for Scaffolds and Ladders
(8)	IS: 3696(Part 2) : 1991 (Reaffirmed 2002)	Scaffolds and Ladders-Code of Safety
(9)	IS:3786 – 1983 (Reaffirmed 2002)	Method for Computation of Frequency and Severity Rates for Industrial Injuries and Classification of Industrial Incidents
(10)	IS:4770 : 1991 (Reaffirmed 2006)	Rubber Gloves – Electricals purposes-Specification
(11)	IS:4912 : 1978 (Reaffirmed 2002)	Safety Requirements for Floor and Wall Openings, Railings and Toe Boards
(12)	IS: 5983 – 1980 (Reaffirmed 2002)	Specification for Eye-Protectors
(13)	IS:6519 – 1971 (Reaffirmed 1997)	Code of Practice for Selection, Care and Repair of Safety Footwear
(14)	IS:9167:1979	Specification for Ear-Protectors
(15)	IS:6994(Part I)-1973 (Re affirmed 1996)	Specification for Industrial Safety Gloves Leather and Cotton Gloves
(16)	IS:8519 – 1977 (Reaffirmed 1983)	Guide for Selection of Industrial Safety Equipment for Body Protection.
(17)	IS 11006 : 2011	Flash Back(Flame Arrestor) Specification

(18)	IS:8520 – 1977 (Reaffirmed 2002)	Guide for Selection of Industrial Safety Equipment for Eye, Face and Ear Protection.
(19)	IS:9473:2002	Respiratory Protective Devices-Filtering Half Masks to protect against Particles-Specification.
(20)	IS:9944:1992 (Reaffirmed 2003)	Natural and Man-made Fiber Rope Slings-Recommendations on Safe working loads.
(21)	IS:11057 – 1884 (Reaffirmed 2001)	Specification for Industrial Safety Nets
(22)	IS:12254:1993 (Reaffirmed 2002)	Polyvinyl Chloride (PVC) Industrial Boots-Specification
(23)	IS:13367(Part 1):1992 (Reaffirmed 20030	Safe Use of Cranes-Code of Practice
(24)	IS:14166:1994 (Reaffirmed 2002)	Respiratory Protective Devices-Full Face Masks Specification
(25)	IS:14746 : 1999 (Reaffirmed 2003)	Respiratory Protective Devices-Half Masks and Quarter Masks - Specification
(26)	IS : 15397 :2003 (Reaffirmed 2008)	Portable Extinguisher Mechanical Foam Type(Stored Pressure)-Specification
(27)	IS: 19011:2002	Guidelines for Quality and/or Environmental Management Systems Auditing

ANNEXURE 04 : SAFETY FORMATS
&
ANNEXURE 05 : WORK PERMIT FORMATS

	POWER SECTOR **INSPECTION OF FIRST AID BOX**	FORMAT NO: HSEP:14-F01 REV NO.: 00 PAGE NO. 01 OF 02

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

Number of employees on the site: -_____

Sl.No.	Item	No. Available	Remarks
1	No. of small sterilized dressings		
2	No of medium sized sterilized dressings		
3	No of large sized sterilized dressings.		
4	No of large sized sterilized burn dressings		
5	No of (15 grams) packets sterilized cotton wool		
6	No of pieces of sterilized eye pads in separate sealed packets.		
7	No of roller bandages 10 cm wide.		
8	No of roller bandages 5 cm wide.		
9	Whether tourniquet available		
10	Whether supply of Suitable splints available.		
11	No of packets of safety pins.		
12	Whether kidney tray available		
13	Whether sufficient number of eye wash bottles, filled with distilled water or suitable liquid, clearly indicated by a distinctive sign which shall be visible at all times, available.		
14	Whether 4%-xylocaine eye drops, and boric acid eye drops and soda by carbonate eye drops available.		
15	Whether (60ml) bottle containing a two percent alcoholic solution of iodine available		
16	Whether (two hundred ml) bottle of mercurochrome (2 per cent) solution in water available.		

Sl.No.	Item	No. Available	Remarks
17	Whether 120ml bottle containing Sal volatile having the dose and mode of administration indicated on the label, available.		
18	Whether roll of adhesive plaster (6 cmX1 meter) available		
19	No of rolls of adhesive plaster (2 cmX1 meter)		
20	Whether snake bite lancet available.		
21	Whether (30 grams) bottle of potassium permanganate crystals available.		
22	Whether a pair scissors available		
23	Whether copy of the First-Aid leaflet issued by the Director-General, Factory Advice service and labour Institutes, Government of India available.		
24	Whether bottle containing 100 tablets (each of 5 grains) of aspirin available		
25	Whether Ointment for burns available		
26	Whether bottle of a suitable surgical anti-septic solution available		

Signature of Subcontractor's Site I/C:

	POWER SECTOR **HEALTH CHECK UP**	FORMAT NO: HSEP:14-F02 REV NO.: 00 PAGE NO. 1 OF 02

Name of Site :	
Name of Sub-Contractor :	
Name of Employee :	

NAME:

History Of Past Illness	H/O Epilepsy
	H/O Drug Allergy
	H/O Diabetics/ Hypertension
	H/O Unconsciousness
Personal History	

EXAMINATION		**OBSERVATION**	
General Physical Examination			
Height	:		
Weight	:		
BMI	:		
Built And nourishment	:		
Pallor	:		
Temperature	:		
Chest Expansion	:	Inspiration	Expansion
Lymph Node Enlargement	:		
Ear, Nose, Throat	:		
Ear	:		
Nose	:		
Throat	:		

EXAMINATION		OBSERVATION	
Cardiovascular System Examination :			
Inspection	:		
Palpation	:	Pulse	BP
Auscultation (Heart Sounds)	:		
Respiratory System	:		
Inspection	:	Respiratory Rate	
Palpation:	:		
Percussion	:		
Auscultation (Breath Sounds)	:		
Examination of Abdomen	:		
Inspection	:		
Palpation	:		
Auscultation (Bowel Sounds)	:		
Any Other	:		
Clinical Impression			

Signature of the examining doctor

	POWER SECTOR **HSE INDUCTION TRAINING**	FORMAT NO: HSEP:14-F03 REV NO.: 00 PAGE NO. 01 OF 01

Name of Site :	
Name of Sub-Contractor :	
Date :	
Name of Training Co-ordinator	

Sl No.	**Name**	**Designation**	**Organisation**	**Signature**

Signature of Training co-ordinator :

	POWER SECTOR	FORMAT NO: HSEP:14-F04 REV NO.: 00 PAGE NO. 01 OF 01
	TOOL-BOX TALK	

Name of Site :	
Sub-Contractors Name :	
Date :	

Topic	**Name of person delivered Tool Box Talk**	**No. of Participants attended**	**Remarks**

Signature of Site I/C of Subcontractor :

	POWER SECTOR **PERSONAL PROTECTIVE EQUIPMENTS**	FORMAT NO: HSEP:14-F06 REV NO.: 00 PAGE NO. 01 OF 01

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

Item	**Issued this Month**	**Nos. Issued up to the Month**	**Percentage of usage at site**
Safety Helmet			
Safety Shoes			
Full Body Harness			
Fall Arrestor			
Safety Nets			
Other PPEs.			

Signature of Site I/C of Subcontractor :

	POWER SECTOR **INSPECTION OF T&Ps**	FORMAT NO: HSEP:14-F07 REV NO.: 00 PAGE NO. 01 OF 01

Name of Site :	
Name of Sub-Contractor :	
Date of Inspection :	

Sl.No.	Description	Remarks	
1.0	Name of equipment		
2.0	Basic Information of equipment		
2.1	Specification		
2.2	Sr. No. of equipment		
2.3	Make		
2.4	Year of manufacture		
3.0	Major repairs / overhauls(Furnish details of work carried out)		Date(s) of major repair/overhaul
3.1			
3.2			
3.3	Repairs carried out at site		
4.0	Any performance test conducted	Yes/No	
5.0	Document Submitted	Yes/No	
6.0	Manufacturer's test / guarantee certificate	Available/ Not available	
7.0	Performance test	Done/ Not Done	
8.0	Acceptance Norms		
9.0	Committee Observations		
10.0	Date of next review (if accepted)		

Signature-Site Safety Officer (BHEL)	**Signature-Subcontractor/ Subcontractor's Safety Officer**

	POWER SECTOR **STATUS OF T&Ps**	FORMAT NO: HSEP:14-F08 REV NO.: 00 PAGE NO. 01 OF 01

Name of Site	
Name of Sub-Contractor	
Date of Inspection	

Item	**Nos. Deployed**	**Identification No.**	**Nos. Tested by competent person**	**Validity of Test Certificate**
Winches				
Chain Blocks				
Wire Rope Slings				
Man Cages				
D-Shackles				
Air Compressors				
Crawler Cranes				
Mobile Cranes				
Hydra Cranes				
Others				

Signature of Site I/C of subcontractor:

	POWER SECTOR **INSPECTION OF CRANES AND WINCHES**	FORMAT NO: HSEP:14-F09 REV NO.: 00 PAGE NO. 01 OF 03

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection:	

Crane Reg. No (Make/Model) _____

Name of Driver/Operator _____

Sl.no.	Description	Observation	Measures
1	Valid Driving license		
2	Hook & Hook Latch		
3	Over Hoist limit switch		
4	Boom limit switch		
5	Boom Angle Indicator		
6	Boom limit cutoff switch		
7	Condition of Boom		
8	Condition of ropes		
9	Number of load lines		
10	Size and condition of the slings		
11	Stability of the cranes		
12	Soil Condition		
13	Swing Break And Lock		
14	Proper Break And Lock		
15	Hoist Break And Lock		
16	Boom Break And Lock		
17	Main Clutch		
18	Leakage in Hydraulic Cylinders		
19	Out riggers filly extendable		
20	Tyre pressure		
21	Condition of Battery And Lamps		

Sl.no.	Description	Observation	Measures
22	Guards of moving and rotating parts		
23	Load chart provided		
24	Number and position of pedant ropes		
25	Reverse Horn		
26	Load Test Details		
27	Operator's fitness		
28	Pollution under control certificate		
29	Fire extinguisher of appropriate type.		
30	Training of the operator		

WINCH

Sl. No.	Description	YES	NO	NA	Remarks
1	Has the copy of Third Party Inspection certificate been provided in winch machine shed?				
2	Is winch machine operator experienced enough to operate the winch machine?				
3	Is the winch machine operated by someone other than the winch machine operator?				
4	Is there guard provided in all moving parts like wheel and motor's shaft?				
5	Will it protect against unforeseen operational contingencies?				
6	Are brakes, clutch and locking arrangement working properly?				
7	Has it been ensured that the guard does not constitute a hazard by itself?				
8	Are the cranks and the connecting rods protected by guardrails?				
9	Is there provision for fully covered shed with wooden plank roof?				

Sl. No.	Description	YES	NO	NA	Remarks
10	Is wire rope free from any kind of damage or wear and tear?				
11	Is split pin provided for the protection of clutch and brake locking arrangement?				
12	Is pulley inspected by competent person and certified before use?				
13	Is pulley free from any wear and tear visually?				
14	Is winch rope barricaded with clipsheet for the protection of rope and person?				
15	Is the wire rope lubricated by cardium oil?				
16	Is there any friction in wire rope which may damage the wire rope rather than the rolling parts?				
17	Is there any oil leakage in the hydraulic system of the winch machine?				
18	Has it been ensured that the guard will not cause discomfort or inconvenience to operator?				
	Total Number of NO:				
	Total Number of NA:				
	% Compliance :				

Signature of Site I/C of subcontractor :

	POWER SECTOR	FORMAT NO: HSEP:14-F10 REV NO.: 00 PAGE NO. 01 OF 02
	INSPECTION OF HEIGHT WORKING	

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection:	

Sl. No.	**Descriptions**	**Observation (Yes/No)**	**Remarks**
1	All the workers have been explained safe work method?		
2	An established communication system has been established and explained to the workers.		
3	Adequate illumination has been ensured.		
4	Work area inspected prior to the start of the work.		
5	Area below the work place barricaded, particularly below hot work.		
6	Workers provided with bags /box to carry bolts, nuts and hand tools		
7	Arrangement for fastening hand tools made.		
8	All work platforms ensured to be of adequate strength and ergonomically suitable.		
9	Fabricated makeshift arrangements are checked for quality and type of material welding, anchoring etc.		
10.	Work at more than one elevation at the same segment is restricted.		
	ACCESS/EGRESS		
1	Walkways provided with handrail, mid-rail and toe guard?		
2	All checkered plates, gratings properly welded/ bolted?		
3	Are ladders inspected and they are in good condition?		
4	Are ladders spliced?		
5	Are ladders properly secured to prevent slipping, sliding or falling?		
6	Do side rails extend 36” above top landing?		
7	Are built up ladders constructed of sound materials?		

Sl. No.	Descriptions	Observation (Yes/No)	Remarks
8	Are rugs and cleats not over 12” on center?		
9	Metal ladders not used around electrical hazards.		
10	Proper maintenance and storage.		
11	Ladders placed at right slope.		
12	Ladders / staircases welded/ bolted properly.		
13	Any obstruction in the stairs.		
14	Are landing provided with handrails, knee rails, toe boards etc.?		
15	Whether ramp is provided with proper slope.		
16	Proper hand rails / guards provided in ramps.		
	Housekeeping		
1	Walkways, aisles & all overhead workplaces cleared of loose material.		
2	Flammable materials, if any, are cleared.		
3	All the de shuttering materials are removed after de shuttering is done.		
4	Platforms and walkways free from oil/grease or other slippery material.		
5	Collected scrap are brought down or lowered down and not dropped from height.		
	PPE And Safety Devices		
1	Use of safety helmet, safety belts ensured for all workers		
2	Anchoring points provided at all places of work.		
3	Common lifeline provided wherever linear movement at height is required.		
4	Safety nets are use wherever required.		
5	Proper fall arrest system is deployed at critical workplaces.		
6	Crawler boards/Safety system or works on fragile roof are used.		

Signature of Site I/C of subcontractor :

	POWER SECTOR **INSPECTION OF WELDING AND GAS CUTTING**	FORMAT NO: HSEP:14-F11 REV NO.: 00 PAGE NO. 1 OF 02

Name of Site	
Name of Sub-Contractor	
Inspected by	
Date of Inspection	

Welding				
Sl.no.	Description	Yes	No	Remarks
1	Is electric connection given through 30 mA ELCB/RCCB to welding m/c?			
2	Is electric cable fitted properly in junction box on m/c?			
3	Is electrical cable free from joints?			
4	Are the joints attached firmly & insulated with tape?			
5	Is double earthing given to body of m/c?			
6	Is the physical condition of the m/c good?			
7	Is ON/OFF switch connected to the m/c is working and in good condition?			
8	Are indication lamps on m/c working?			
9	Is the electrode holder in good condition?			
10	Are the cables of the welding m/c lugged & tight properly?			
11	Are return lead connected properly (Rod, Angle, Channels shall not be used)			
	Total No of NO			
	Total No of YES			

	POWER SECTOR **INSPECTION OF WELDING AND GAS CUTTING**	FORMAT NO: HSEP:14-F11 REV NO.: 00 PAGE NO. 2 OF 02

Gas Cutting				
Sl. no	Description	Yes	No	Remarks
1	Are Cylinders kept on trolleys?			
2	Physical condition of Gas cylinders Good?			
3	Is there Oil/Grease on valve of the cylinder?			
4	Are pressure regulators in good condition?			
5	Condition of hose pipe OK?			
6	Are hose pipe clamped with hose clip?			
7	Is flash back arrestor & NRV fitted on torch both for O2 and LPG cylinder?			
8	Is nozzle of the torch cleaned?			
	Total Number of NO			
	Total No of YES			
	% Compliance			

Signature of Site I/C of subcontractor :

	POWER SECTOR **INSPECTION OF ELECTRICAL INSTALLATION**	FORMAT NO: HSEP:14-F12 REV NO.: 00 PAGE NO. 01 OF 02

Name of Site	
Name of Sub-Contractor	
Inspected by	
Date of Inspection:	

Sr. No.	**Contents**	**Yes/No**	**Remarks**
A	**Cable**		
1.	Whether the condition of cable is checked?		
2.	Are cables received from other sites checked for insulation resistance before putting them into use?		
3.	Are all main cables taken either underground / overhead?		
4.	Are welding cables routed properly above the ground?		
5.	Are welding and electrical cables overlapping?		
6.	Is any improper joining of cables/wires prevailing at site?		
B	**DBs/SDBs**		
1.	Is earth conductor continued up to DB / SDB?		
2.	Whether DBs and extension boards are protected from rain / water?		
3.	Is there any overloading of DBs / SDBs?		
4.	Are correct / proper fuses & CBs provided at main boards and sub-boards?		
5.	Is energized wiring in junction boxes, CB panels & similar places covered all times?		
C	**ELCB**		
1.	Whether the connections are routed through ELCB?		
2.	Is ELCB sensitivity maintained at 30 mA?		

Sr. No.	Contents	Yes/No	Remarks
3.	Are the ELCB numbered and tested periodically & test results recorded in a logbook countersigned by a competent person?		
D	**Grounding**		
1.	Is natural earthing ensured at the source of power (main DB at Generator or Transformer)?		
2.	Whether the continuity and tightness of the earth conductor are checked?		
3.	Mention the gauge of the earth conductor used at the site.		
4.	Mention the value of Earth Resistance.		
E	**Electrically operated Machines or Accessories**.		
1.	Whether the plug top is provided everywhere.		
2.	Are all metal parts of electrical equipment and light fittings / accessories grounded?		
3.	Is there any shed or cover for welding machines?		
4.	Are halogen lamps fixed at proper places?		
5.	Are portable power tools maintained as per norms?		
6.	Any other information:		

Signature of Site I/C of subcontractor :

	POWER SECTOR **INSPECTION OF ELEVATOR**	FORMAT NO: HSEP:14-F13 REV NO.: 00 PAGE NO. 01 OF 01

Name of Site	
Name of Sub-Contractor	
Inspected by	
Date of Inspection	

Sr. No.	**Description**	**Remarks**
1.0	Name of equipment	
2.0	Basic Information of equipment	
2.1	Specification	
2.2	Sr. No. of equipment	
2.3	Make	
2.4	Year of manufacture	
3.0	Major repairs/overhauls(Furnish details of work carried out)	Date(s) of major repair/overhaul
3.1		
3.2		
3.3	Repairs carried out at site	
4.0	Any performance test conducted	Yes/No
5.0	Document Submitted	Yes/No
6.0	Manufacturer's test / guarantee certificate	Available/ Not available
7.0	Performance test	Done/ Not Done
8.0	Acceptance Norms	
9.0	Committee Observations	
10.0	Date of next review (if accepted)	

Signature-Subcontractor/ Subcontractor's Safety Officer	**Signature-Site Safety Officer (BHEL)**

	POWER SECTOR **Inspection of Excavation**	FORMAT NO: **HSEP:14-F13E** REV NO.: 00 PAGE NO. 01 OF 01

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

Sl.no.	Description	Yes	No	Remarks
1	Precautions taken for Underground Electrical Cable			
2	Precautions taken for Under / Above ground sewer/ Drinking Water Line			
3	Precautions taken for Underground Telecommunication Line			
4	Precautions taken for Underground Product/Utility Line			
5	Precautions taken for Underground Fire Water Line			
6	Shoring / Shuttering / Sheet piling done to prevent collapse of excavation walls. Strength of Excavation wall ensured at all times			
7	Slope Cutting / Angle Maintained			
8	Hard Barricading & Edge Protection provided			
9	Separate Safe Access for Man and Vehicle			
10	Lighting arrangement			
11	Banksman Provided			
12	Required basic PPEs provided			
13	Excavated soil / Construction Material / equipment kept away from the edge.			
14	First aid in attendance.			
15	Other:			
	Total No of YES			

Signature-Subcontractor/ Subcontractor's Safety Officer **Signature-Site Safety Officer (BHEL)**

Sub: MEMO for Penalty for non-compliances in Safety

Following lapse (tick marked) was observed and penalty is imposed as stated at the bottom of this memo. It is requested that such occurrences be please avoided in future.

Safety Area

SN	Violation of Safety Norms	Fine (in Rs)
01	Not Wearing Safety Helmet	200/- *
02.	Not wearing Safety Belt or not anchoring life line	500/-*
03	Not wearing safety shoe	200/-*
04	Not keeping gas cylinders vertically	200/-
05	Not using flash back arrestors	100/-
06	Not wearing gloves	50/- *
07.	Grinding Without Goggles	50/- *
08.	Not using 24 V Supply For Internal Work	500/-
09.	Electrical Plugs Not used for hand Machine	100/-
10.	Not Slinging properly	200/-
11.	Using Damaged Sling	200/-
12.	Lifting Cylinders Without Cage	500/-
13.	Not Using Proper Welding Cable With Lot of Joints And Not Insulated Property.	200/-
14.	Not Removing Small Scrap From Platforms	500/-
15.	Gas Cutting Without Taking Proper Precaution or Not Using Sheet Below Gas Cutting	500/-
16.	Not Maintaining Electric Winches Which are Operated Dangerously	500/-
17.	Improper Earthing Of Electrical T&P	500/-
18	No or improper barricading	500/-
19.	Activity carried out without Safety work permit (Height work, Lifting activity, Hot work-each person/case)	1000/-
20.	Incident Resulting in Partial Loss in Earning Capacity	25,000/- per victim
21.	Fatal Incident Resulting in total loss in Earning Capacity	1,00,000/- per victim for first instance #

Legend: -

*: per head. For repeated violation by the same person, the penalty would be double of the previous penalty. Date of "Repeated violation" will be counted from subsequent days.

#: or as deducted by customer, whichever is higher. For repeated fatal incident in the same Unit incremental penalty to be imposed. The subcontractor will pay 2 times the penalty compared to previously paid in case there are repeated cases of fatal incidents under the same subcontractor for the same package in the same unit.

Details (if any) related to non- compliance (Name of persons, Nature of deficiency, etc.)

_____

Penalty imposed:

1, Rate as per above chart_____

2. No. of Persons/ machine/ event/ labour _____

3. Total Penalty= 1. X 2. =_____

Signature:

Witnessed by: (Sub- Contractor representative) (BHEL Personnel)

Name_____ Name_____

Distribution: 1 Copy: to Sub- contractor,
1 Copy to Site Construction Manager (BHEL)

बी एच ई एल BHEL	**POWER SECTOR- HQ** **Incident Report** (To be submitted within 24 hours of time of incident)	FORMAT NO: HSEP:14-F15 REV NO.: 00 PAGE NO. 01 OF 01

Type of incident: Fatal/Major/ Minor/Fire/Property Damage/Near-miss

1	NAME OF SITE		3	ACTIVITY AREA	
2	SCOPE OF WORK		4	NAME OF CONTRACTOR	
			5	NAME & DESIGNATION OF BHEL ACTIVITY I/C	
6	DATE & TIME OF ACCIDENT		7	DATE RESUMED	
8	NO. OF WORK-DAYS LOST BY VICTIM (If duty not resumed, give estimated figure)				
9	NO. OF MANHOURS LOST BY OTHERS				
10	PERSONAL DETAILS OF INJURED AND / OR DETAILS OF MATERIALS / EQUIPMENT / PROPERTY DAMAGED				

NAME				NAME OF MATERIAL / EQUIPMENT / PROPERTY	
PERIOD OF EMPLOYMENT					
AGE	YRS	SEX	MALE/ FEMALE	ESTIMATED COST	ACTUAL COST
MARITAL STATUS		SINGLE / MARRIED			
OCCUPATION				NATURE OF DAMAGE	
PART OF BODY INJURED					
NATURE OF INJURY					
AGENCY (OBJECT / EQUIPMENT / SUBSTANCE) MOST RESPONSIBLE FOR CAUSING ACCIDENT / INJURY / DAMAGE					
12	PERSON (NAME & DESIGNATION) WITH MOST CONTROL OVER AGENCY (OBJECT / EQUIPMENT / SUBSTANCE) CAUSING ACCIDENT INJURY / DAMAGE				
13	DESCRIBE CLEARLY HOW THE ACCIDENT OCCURRED (USE ADDITIONAL SHEET, IF REQUIRED				
ANALYSIS					
14	WHAT ACTS AND / OR CONDITIONS CONTRIBUTED MOST DIRECTLY TO THIS ACCIDENT				
15	WHAT ARE THE BASIC REASON FOR THE EXISTENCE OF THESE ACTS AND / OR CONDITION ?				
16	WHAT CORRECTIVE ACTIONS HAVE BEEN TAKEN TO PREVENT ACCIDENT RECURRENCE ?				
	DATE :			SIGNATURE OF SITE HSE COORDINATOR	
17	COMMENTS OF HEAD / SOX				
	DATE:			SIGNATURE OF HEAD/SOX	

	POWER SECTOR	FORMAT NO: **HSEP:14-F30**
	Format for Monthly HSE Planning & Review	REV NO.: 00 PAGE NO. 01 OF 3

Note: This is a template and can be modified in consultation with BHEL			
Name of the Site		**Name of the Subcontractor**	
Scope of Work		**Date**	
PART- A: PLAN OF HSE ACTIVITIES FOR THE MONTH OF……			**PART-B: REVIEW ON ……**
SN.	**Description of HSE Activity & Formats**	**Plan & Targets for the month**	**Review**
1	Availability of First Aid Box at Required Places and Inspection thereof as per Format: F01	Areas 1. … …	
2	Health check-up as per Format: F02	Health check-up for Nos 1. New inductees 2. Drivers & Operators 3. Workers in following high risk areas: a. …	
3	Induction training of newly joined workers as per Format: F03	Minimum No. of workers:	
4	Toolbox talks (TBT) conducted before start of work as per Format: F04	Locations of TBTs & No. of workers **1.** …	
5	PPE usage and issue as per Format: F06		
6	Inspection of T&Ps as per Format: F07	List of T&Ps to be inspected 1.	
7	Identification & Inspection Status of T&Ps as per Format: F08		
8	Inspection of Cranes & Winches as per Format: F09	List of Cranes & Winches & Nos. 1. …	
9	Inspection of Height Working as per Format: F10	Areas: 1. …	
10	Inspection of Welding & Gas Cutting operations as per Format: F11	Areas: 1. …	
11	Inspection of Electrical Installations as per Format: F12	Locations: 1. …	
12	Inspection of Elevators (as applicable) as per Format: F13	Locations: 1. …	
13	Inspection of Excavation as per Format: F13E	**Locations:** **1. …**	

SN.	Description of HSE Activity & Formats	Plan & Targets for the month	Review
14	Job Safety Analysis as per Format F32B	**Activities:** **1. …**	
15	Regular Job Specific Training (Re-training) for workers involved in hazardous activities	Topics/ Hazards & No. of workers **1.** …	
16	Mass housekeeping (HK) drive in work areas	Areas **1.** …	
17	Vertigo Test of Height workers	Minimum No. of workers:	
18	Deployment of qualified HSE Officers as per contract	Location(s) & Nos. **1.** …	
19	Deployment of qualified HSE Stewards as per contract	Location(s) & Nos. **1.** …	
20	Deployment of Safety tools & Equipment (Safety Nets, Lifelines, Fall arrestors, Man-cages, flashback arrestors, scaffolding etc.)	Tool/ Equipment & Location **1.** …	
21	Safety Walks by site in charge of agency (4 -Weekly once)	Dates:	
22	Safety walks by departmental head (8-Weekly twice)	Dates:	
23	Availability/ deployment of Safety posters/ placards/ signage at strategic locations	Locations: Nos. **1.** …	
24	Provision of clean drinking water sources for workers	Locations: Nos. **1.** …	
25	Provision of toilets for workers (separate for male & female workers)	Locations: Nos. **1.** …	
26	Rest sheds for workers during lunchtime, rain, dust storm etc.	Locations: Nos. **1.** …	
27	Availability of following in Labor colony	**1. Clean drinking water** **2. Toilets** **3. Cleanliness & Hygiene** **4. Grass cutting,** **5. Fogging** **6. Electrical Inspection …**	

SN.	Description of HSE Activity & Formats	Plan & Targets for the month	Review
28	Availability of dust/ waste bins at various locations	Locations: **1.** …	
29	Availability of Ambulance (individual/ joint) in each shift	Ambulance No.	
30	Availability of emergency vehicle in each shift	Emergency vehicle	
31	Deployment/ Availability of tested Fire Extinguishers	Locations & Nos. **1.** …	
32	Tree plantation	Locations & Nos. **1.** …	
33	Waste disposal & Scrap Bins	Locations **1.** …	
34	Illumination checks	Locations **1.** …	
35	Safety award function: 1. Display of good practices Award presentation	Minimum 1 per month	
36	**Submission of Daily Reports as per Format No.F31A**	**Daily Reports (Night & Day Shifts)**	

PLAN		**REVIEW**	
Agency Name: Sign: Date:	**BHEL** Name: Sign: Date:	**Agency** Name: Sign: Date:	**BHEL** Name: Sign: Date:

	POWER SECTOR	FORMAT NO: **HSEP:14-F31** A REV NO.: 00 PAGE NO. 01 OF 1
	Format for Daily HSE Reporting	

Note: Following format to be submitted (preferably) in excel/ soft copy by subcontractor daily at the end of each shift. Any photographs/ records to be attached

Site																													
Year									**Month**												**Day**								
SHIFT	Submitted By	Work Area(s)	Staff	Man-Power	Safety Officers	Safety Stewards	Tool Box (Topics and No. of Participants)	Induction Training (No. of Participants)	Vertigo Test (Numbers Tested)	On-the-Job Training (Topic & participants)	Work Permits	Job Safety Analyses conducted	Height Work Inspection	Other Hazardous Activities Inspection	T&P Inspection (Names & Nos. Inspected)	Safety Walk (Designation, Areas)	HSE Meeting	Safety Reward (Details)	Housekeeping/ Dust Suppression/ Tree Plantation Activities (Locations/Details)	Lost time Accident	Restricted Work Case	Medical Treatment Case	First Aid Case	Near miss	Property Damage/ Fire	Non-Compliances Submitted by BHEL	Complied by Agency	Any other Remarks/ Inputs
Day																													
Night															NA		NA	NA	NA										

	POWER SECTOR	FORMAT NO: **HSEP:14-F32B** REV NO.: 00 PAGE NO. 01 OF 1
	Job Safety Analysis Format	

Name of the Site	
Name of the Subcontractor	
Activity, Area	

HAZARDS	**PRECAUTIONS**

(Name)	**Submitted By (Agency HSE)**		**Reviewed By (BHEL Execution)**		**Approved By (BHEL HSE)**	
(Sign)						
(Date)						

SL	Parameter for Measurement	M/ O	Wt	Supporting Documents
1a	Induction training for new workers conducted through audio-visual medium & documented ?	M	1	Induction Training Records
1b	Tool box talk conducted regularly as per plan, and documented?	M	1	Toolbox Talk Records
1c	Contractor in charge and safety in charge attended safety meetings?	M	2	Minutes of Meeting
1d	Whether observations in safety meetings are complied before next meeting?	M	2	-do-
1e	Preparation and submission of Monthly HSE report within stipulated time	M	1	Report submission date
1f	Preparation and submission of Incident/near-miss report and RCA Report (as applicable) within stipulated time	M	1	Incident/ Near Miss Records
1g	Carrying out Inspections and submission of Inspection reports within stipulated time	M	1	Inspection Records
1h	Regular Job Specific Training ensured for High Risk Workers (through audio-visual medium) as per plan	M	1	Training & Attendance Records
2a	Whether the contractor is registered under BOCW	M	2	BOCW Registration Certificate
2b	Availability of Qualified safety officer (1 for every 500 labour)	M	2	Safety Officer qualification & experience records
2c	Availability of Qualified safety supervisor (1 for every 100 labour)	M	2	Safety Officer qualification & experience records
2d	All the workers are provided and using safety helmets and safety shoes/gum boots	M	2	PPE Issue Records, Inspection/ non-conformity records
2e	Housekeeping done on regular basis and scrap removal at site	M	1	Housekeeping records, Inspection/ non-conformity records
2f	Usage of Goggles/Face shields and Hand gloves for gas cutter and grinders		1	PPE Issue Records, Inspection/ non-conformity records
2g	Wall openings & floor openings are guarded?		1	Inspection/ non-conformity records
2h	Adequate illumination provided in all working area?		1	Inspection/ non-conformity records
2i	Safety posters, sign boards and emergency contact numbers in all prominent location are displayed?		1	Inspection/ non-conformity records
2j	Availability of automatic reverse horns, Main horn, hook latches for Vehicles, mobile cranes, Hydras		1	Inspection/ non-conformity records
2k	Ban of carrying mobile phones to work place is implemented for workers		1	Inspection/ non-conformity records
2l	Availability of Tags & Inspection Certificates for Cranes of all capacities		1	Master T&P List with internal & external test details
2l.2	Availability of Tags & Inspection Certificates for Winches of all capacities		1	Master T&P List with internal & external test details
2l.3	Availability of Tags & Inspection Certificates, color coding for Chain pulley blocks		1	Master T&P List with internal & external test details
2l.4	Availability of Tags & Inspection Certificates for Vehicles - Trailers, Dozers, Dumpers, Excavators. Mixers etc.		1	Master T&P List with internal & external test details
2l.5	Availability of Tags & Inspection Certificates for Welding machines, grinders, Drilling machines, etc.		1	Master T&P List with internal & external test details
2l.6	Availability of Tags & Inspection Certificates, colour coding for Wire rope slings etc.		1	Master T&P List with internal & external test details
2l.7	Availability of Tags & Inspection Certificates for Batching plants		1	Master T&P List with internal & external test details

SL	Parameter for Measurement	M/ O	Wt	Supporting Documents
2m.1	Use of Lifting Permit as per requirement		1	Permit Records
2m.2	Use of Height Permit as per requirement		1	Permit Records
2m.3	Use of Hot Work Permit as per requirement		1	Permit Records
2m.4	Use of Excavation permit as per requirement		1	Permit Records
2m.5	Use of Confined space work permit as per requirement		1	Permit Records
2m.6	Use of Grating removal and safety net removal permit as per requirement		1	Permit Records
2m.7	Use of Lockout-Tag out permit as per requirement		1	Permit Records
2m.8	Use of Radiography permit as per requirement		1	Permit Records
2m.9	Use of Night/ Holiday Work Permit as per requirement		1	Permit Records
2m.10	Use of Any other Applicable Permit as per requirement		1	Permit Records
3a	Material safety data sheet(MSDS) available for all chemicals and displayed in usage and storage area?		1	Inspection/ non-conformity records
3b	Spillages of oil/concrete and other chemical is controlled and cleaned by proper method in case of spill?		1	Inspection/ non-conformity records
3c	Availability of adequate number of urinals in workplace and in elevations and maintained	M	1	
3d	Availability of rest rooms for workers at site	M	1	
3e	Availability of Drinking water facility at work spot		1	
3f	Hygienic Labour colony is provided for workers.		1	
4a	Is heavy/complex critical lifting permit obtained for heavy, complex materials before handling/erection activity?		1	Work Permit records
4b	Whether area below lifting activities barricaded		1	Inspection/ non-conformity records
4c	Availability of experienced rigging foreman		1	Experience details of rigging foreman
4d	Is agency is following proper storage and handling procedure as per manufacturer standard for all hazardous material?		1	Procedure for storage & handling
4e	Are oxygen and acetylene cylinders are transported to work place from storage area in trolleys		1	
5a	Whether all deep excavation has been protected by barrier		1	Inspection/ non-conformity records
5b	Sloping/benching & shoring provided for excavation as per requirement?		1	-do-
5c	Proper access and egress provided for excavations?		1	-do-
5d	Blasting is done in controlled manner?		2	-do-
6a	Whether Electrical booth is equipped with Co_2 fire extinguishers and fire buckets filled with sand?		2	Inspection/ non-conformity records
6b	Availability of Illumination lamp in electric booth?		1	-do-
6c	whether Caution Boards have been displayed?		1	-do-
6d	Usage of Metal Plug top for all hand power tools ?		1	-do-
6e	Usage of Insulated welding cables.		1	-do-
6f	Electrical Booth/Distribution Board to be covered by proper Canopy.		1	-do-
6g	Availability of functional & individual 30ma ELCB / RCCB and MCB for protection and conducting periodical check-up?		1	-do-
6h	Double earthing for panel boards and all machinery & proper earth pit with regular inspection available?		1	-do-
6i	Whether Electrician is qualified and experienced		1	Qualification & Experience records of electrician
6j	Availability and usage of Rubber hand gloves by electrician?		1	Inspection/ non-conformity records

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

Note:

- **M: Mandatory; O: Optional**. Points other than mandatory can be excluded with appropriate justification (scope etc.) by BHEL
- Additionally: 30 Marks for each Fatal Accident and 10 mark for each major accident shall be deducted.

SAFETY WORK CLEARANCE	Permit no.
Project:	Emergency Contact Nos:
Subcontractor:	

BURNING/WELDING /HOT WORK PERMIT

Area :_____ Date:_____ Time:_____

Name of Site Engineer (Permit Requesting Authority):_____ Sign:_____

Name of Work Performing Contractor: _____

Name of Package In charge:_____ Sign:_____ Date:_____

Description of Work: _____

_____

Work Execution Date:_____ Time Valid from:_____ to _____

The above signing person(s) will be responsible to ensure that the above described work will be done under all the safety precautions mentioned on the permit to work.

The following precautions are to be taken:

No.	Item	Yes	Not required
1.	Proper Access/Exit available		
2.	Proper ventilation and /or lighting provided.		
3.	Proper and safe scaffolding, platform, ladder provided.		
4.	Welding machine located in a clean and dry area.		
5.	Welding machine grounded at the equipment and proper leakage current protection device (ELCB) provided for welding machine.		
6.	Emergency STOP buttons are in working condition. Welder /Helper knows how to operate it.		
7.	Welding machine input/output cables, welding holder and weld return clamp (Holder) are insulated and in good condition.		
8.	Welder & Fitter trained to connect ground/work return clamps (Holder) to work place prior to energization of welding machine.		
9.	Gas cylinders are stacked vertically and not below the welding / cutting area. Regulator key is available with cylinder.		
10.	Pressure gauges/Flash back arrestor provided and in working condition.		
11.	Personal Protective equipment Minimum applicable: safety helmet, safety goggles, welding helmet, safety shoes, leather gloves, long sleeve and nose mask -provided		
12.	In case of pits, water removed from the pit and wood/rubber insulation provided.		
13.	Safety signboards are in place.		
14.	Adequate and Suitable nos. of fire fighting extinguisher provided.		
15.	Nearby combustible material removed. Housekeeping done.		
16.	Other		

Name of Contractor Safety Officer:_____ Sign:_____ Date:_____ Time: _____

Reviewed and approved by BHEL Site Engineer (Permit Issuing Authority):

Name:_____ Sign:_____ Date:_____ Time:_____

Name of BHEL Safety Representative:_____ Sign: _____

I understand the precaution to be taken as described above and as per project requirement and hereby confirm that work will be executed under my supervision by following all precaution and Safety Rules.

Name of Work Performing Authority:_____ Sign:_____ Date:_____ Time:_____

Permit Cancellation:

I hereby declare that the work is complete, all workers under my control have been withdrawn and the site restored to safe tidy condition.

Name of Work performing Authority:_____ Sign:_____ Date:_____ Time:_____

Name of Site Engr. (Permit Requesting Authority):_____ Sign:_____ Date:_____ Time:_____

Name of BHEL Site Engr. (Permit Issuing Authority):_____ Sign:_____ Date:_____ Time: _____

(This permit is valid only for the date it is issued)

Original at BHEL site **Second Copy – BHEL SAFETY** **Third Copy : Contractor**

SAFETY WORK CLEARANCE	Permit no.
Project:	Emergency Contact Nos:
Subcontractor:	

LIFTING ACTIVITY PERMIT

Area :_____ Date:_____ Time:_____

Name of Site Engineer (Permit Requesting Authority):_____ Sign: Name of Work

Performing Contractor: _____

Name of Package In charge:_____ Sign:_____ Date:_____

Description of Work: _____

_____

Work Execution Date:_____ Time Valid from:_____ to _____

The above signing person(s) will be responsible to ensure that the above described work will be done under all the safety precautions mentioned on the permit to work.

The following precautions are to be taken:

No.	Item	Yes	Not required
1.	Crane used for lifting activity tested, certified and approved for rated lifting		
2.	All lifting tackles, gears/appliances are tested and certified for lifting works.		
3.	Crane operator is trained and competent for lifting operation.		
4.	Lifting sling/ belt is protected against sharp edge of the jobs to be lifted.		
5.	Access and exit marked and without obstruction.		
6.	Lifting arrangement adequate.		
7.	Unwanted rubbish material removed from work platform.		
8.	Minimum 2 guidelines have been provided for balancing and guiding jobs to be lifted.		
9.	Periphery area of crane booms as well as lifting job is barricaded and unauthorized/no-entry sign board posted.		
10.	Rigger and signal man is trained and competent for lifting work.		
11.	No lifting activity to be carried out during lightening, heavy wind/rain.		
12.	If scaffolding to be used during lift, scaffolding with valid tag available for use.		
13.	Double lanyards safety harness/belt checked an in working condition.		
14.	Safety shoes (non-slip), helmet with chin strap available with employees.		
15.	Others.		

Name of Contractor Safety Officer:_____ Sign:_____ Date:_____ Time: _____

Reviewed and approved by BHEL Site Engineer (Permit Issuing Authority):

Name:_____ Sign:_____ Date:_____ Time:_____

Name of BHEL Safety Representative:_____ Sign: _____

I understand the precaution to be taken as described above and as per project requirement and hereby confirm that work will be executed under my supervision by following all precaution and Safety Rules.

Name of Work Performing Authority:_____ Sign:_____ Date:_____ Time:_____

Permit Cancellation:

I hereby declare that the work is complete, all workers under my control have been withdrawn and the site restored to safe tidy condition.

Name of Work performing Authority:_____ Sign:_____ Date:_____ Time:_____

Name of Site Engr. (Permit Requesting Authority):_____ Sign:_____ Date:_____ Time:_____

Name of BHEL Site Engr. (Permit Issuing Authority):_____ Sign:_____ Date:_____ Time: _____

(This permit is valid only for the date it is issued)

Original at BHEL site **Second Copy – BHEL SAFETY** **Third Copy : Contractor**

SAFETY WORK CLEARANCE	Permit no.
Project:	Emergency Contact Nos:
Subcontractor:	

WORKING AT HEIGHT PERMIT

Area :_____Date:_____Time:_____

Name of Site Engineer (Permit Requesting Authority):_____Sign: Name of Work

Performing Contractor: _____

Name of Package In charge:_____Sign:_____Date:_____

Description of Work: _____

_____

Work Execution Date:_____Time Valid from:_____to _____

The above signing person(s) will be responsible to ensure that the above described work will be done under all the safety precautions mentioned on the permit to work.

The following precautions are to be taken:

No.	Item	Yes	Not required
1.	All workers on job are medically fit for working at height (Person should not have vertigo)		
2.	Scaffolding with valid tag available for use		
3.	Safety harness with life line support/ fall arrester are checked and in working condition		
4.	Safety shoes (non-slip), Helmet with chin strip available with employees		
5.	Safety nets are provided as per design and provided 25 ft. below working area & extending 8 ft beyond.		
6.	Horizontal life lines are provided to cater to design specification of 2300kg per person.		
7.	Ladders have been inspected and provided as per BHEL standard/contract.		
8.	All lifting / tightening tools, hand tools/equipment checked and in good condition		
9.	Access and exit marked and without obstruction.		
10.	Lighting arrangement adequate.		
11.	Unwanted and rubbish material removed from working platform.		
12.	Electrical cable, welding Hose/Compressed air hose properly secured and lay down without obstruction.		
13.	Signboards provided on working platforms		
14.	Hazards in the vicinity are identified and communicated to the worker.		
15.	Other		

Name of Contractor Safety Officer:_____Sign:_____Date:_____Time: _____

Reviewed and approved by BHEL Site Engineer (Permit Issuing Authority):

Name:_____Sign:_____Date:_____Time:_____

Name of BHEL Safety Representative:_____Sign: _____

I understand the precaution to be taken as described above and as per project requirement and hereby confirm that work will be executed under my supervision by following all precaution and Safety Rules.

Name of Work Performing Authority:_____Sign:_____Date:_____Time:_____

Permit Cancellation:

I hereby declare that the work is complete, all workers under my control have been withdrawn and the site restored to safe tidy condition.

Name of Work performing Authority:_____Sign:_____Date:_____Time:_____

Name of Site Engr. (Permit Requesting Authority):_____Sign:_____Date:_____Time:_____

Name of BHEL Site Engr. (Permit Issuing Authority):_____Sign:_____Date:_____Time: _____

(This permit is valid only for the date it is issued)

Original at BHEL site **Second Copy – BHEL SAFETY** **Third Copy : Contractor**


बी एच ई एल
BHEL

DOCUMENT NO: PS:MSX:GCC, REV 02, 16TH JUNE'2021

General Conditions of Contract

(Common for Power Sector Regions)

2021

BHARAT HEAVY ELECTRICALS LIMITED

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CHAPTER -1

1. GENERAL INSTRUCTION TO TENDERERS

1.1. DESPATCH INSTRUCTION

i) The General Conditions of Contract form part of the Tender specifications. **All pages of the tender documents shall be duly signed, stamped and submitted along with the offer in token of complete acceptance thereof. (For E-Tender, bidders shall use electronic Signature viz Digital Signature Certificate while uploading on the e-procurement portal.** The information furnished shall be complete by itself. The tenderer is required to furnish all the details and other documents as required in the following pages.

ii) Tenderers are advised to study all the tender documents carefully. Any submission of tender by the tenderer shall be deemed to have been done after careful study and examination of the tender documents and with the full understanding of the implications thereof. Should the tenderers have any doubt about the meaning of any portion of the Tender Specification or find discrepancies or omissions in the drawings or the tender documents issued are incomplete or shall require clarification on any of the technical aspect, the scope of work etc., he shall at once, contact the authority inviting the tender well in time (so as not to affect last date of submission) for clarification before the submission of the tender. Tenderer's request for clarifications shall be with reference to Sections and Clause numbers given in the tender documents. The specifications and terms and conditions shall be deemed to have been accepted by the tenderer in his offer. Non-compliance with any of the requirements and instructions of the tender enquiry may result in the rejection of the tender.

iii) Integrity pact (IP) shall be applicable for all tenders / contracts if indicated in NIT. This integrity pact shall be issued as part of the Tender documents and shall be submitted by the bidder along with Techno-commercial bid duly filled, signed and stamped by the authorized signatory who signs the bid. Only those vendors / bidders who have entered into such an IP with BHEL shall be considered qualified to participate in the bidding. Entering into this pact shall be a preliminary qualification.

1.2. SUBMISSION OF TENDERS

1.2.1 The tenderers must submit their tenders to Officer inviting tender as per instructions in the NIT.

1.2.2 Tenders submitted by post (i.e. by 'REGISTERED POST / by COURIER') shall be sent with due allowance for any postal/courier delays. BHEL takes no responsibility for delay, loss or non-receipt of tenders sent by post/courier. **The tenders received after the specified time of their submission are treated as 'Late Tenders' and shall not be considered under any circumstances.** Offers received by Email shall be considered as per terms of NIT. E-Tenders shall be submitted through E-Procurement portal as per instruction in NIT. Tenderers to upload offers well in advance in order to avoid last minute congestion in e-procurement website. However, after submission of the tender, the tenderer can re-submit revised tender but before due date and time of submission of tender as notified.

1.2.3 Tenders shall be opened by Officer of BHEL at the time and date as specified in the NIT, in the presence of such of those tenderers or their authorized representatives who would like to be present (In case of Manual Tenders). BHEL reserves the right to go ahead with opening of the

Tender even in case of no representative is present on the specified date and time. For e-tenders, bidders may mark their presence online through provisions available in e-procurement portal.

1.2.4 Tenderers whose bids are found techno commercially qualified shall be informed about the date and time of opening of the Price Bids and such Tenderers may depute their representatives to witness the opening of the price bids (In case of Manual Tenders). BHEL's decision in this regard shall be final and binding.

1.2.5 Before submission of Offer, the tenderers are advised to inspect the site of work and the environments and be well acquainted with the actual working and other prevalent conditions, facilities available, position of material and labour, means of transport and access to Site, accommodation etc. No claim will be entertained later on the grounds of lack of knowledge of any of these conditions.

The tenderer may get aware about weather conditions, contingencies & other circumstances which may influence or affect their tender prices. Invariable of inspection by the tenderer, the tenderer shall be considered deemed acquainted with all site conditions such as rain patterns, hazardous conditions, soil patterns, local factors etc. Tenderer to have satisfied himself in all respect before quoting his rates and no claim will be entertained later on the grounds of lack of knowledge of any of these conditions.

1.3. LANGUAGE

1.3.1 The tenderer shall quote the rates in English language and international numerals. These rates shall be entered in figures as well as in words. Tenderers are requested to refer the clauses of NIT/ Vol-II "Price Bid" for more details. For the purpose of the tenders, the metric system of units shall be used.

1.3.2 All entries in the tender shall either be typed or written legibly in ink. Erasing and over-writing is not permitted and may render such tenders liable for rejection. All cancellations and insertions shall be duly attested by the tenderer.

1.4 PRICE DISCREPANCY:

1.4.1 **Price Bid opening**: During opening of price bids (submitted through conventional method or through E-Procurement system), if there is any difference between the amount in figures and in words, the amount quoted by the bidder in words shall be taken as correct.

1.4.2 **Reverse Auction**: In case of Reverse Auction, the successful bidder shall undertake to execute the work as per overall price offered by him during the Reverse Auction process. (Guidelines as available on www.bhel.com on "**supplier registration page**".).

1.5 QUALIFICATION OF TENDERERS

i) Only tenderers who have previous experience in the work of the nature and description detailed in the Notice Inviting Tender and/or tender specification are expected to quote for this work duly detailing their experience along with offer.

ii) Offers from tenderers who do not have proven and established experience in the field shall not be considered.

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

iv) Offers from tenderers who do not comply with the latest guidelines of Ministry/Commissions of Govt. of India shall not be considered.

1.6. EVALUATION OF BIDS

i) Technical Bids submitted by the tenderer will be opened first and evaluated for fulfilling the Pre-Qualification criteria and other conditions in NIT/Tender documents, based on documentary evidences submitted along with the offer

ii) In case the same qualifying experience is claimed by more than one agency, then the agency who has executed the work as per documentary evidence submitted shall only be qualified. Scope of qualifying work should be totally with the agency who has executed and in case it is only labour and consumables without T&P, then the responsibility of execution is assigned to the first agency and not to the agency who has executed only as labour supply contractor. Further, BHEL reserves the right to ask for further proofs including submission of TDS certificates for the said job.

iii) In case the qualifying experience is claimed by private organizations based on Work Order and completion certificates from another private organization, BHEL reserves the right to ask for further proofs like TDS certificates, labour license, etc. for the said job.

iv) Assessing Bidder's Capacity for executing the current tender shall be as per Notice Inviting Tender.

v) Price Bids of shortlisted bidders shall only be opened either through the conventional/electronic price bid opening with/without Reverse Auction, at the discretion of BHEL. Unless specified otherwise in the tender, the L1 bidder amongst all the shortlisted bidders shall be considered for award. However, the L1 bidder shall have no claim on the award & BHEL reserves the right to award the tender at its sole discretion.

vi) Price Bids of unqualified bidders shall not be opened. Reasons for rejection shall be intimated in due course after issue of LOI/LOA to successful bidder either through system generated e-mail or through letter/e-mail.

vii) Bidders are advised to also refer to clause no 2.9.4 regarding evaluation of their performance in ongoing projects for the current tender.

1.7. DATA TO BE ENCLOSED

Full information shall be given by the tenderer in respect of the following. Non-submission of this information may lead to rejection of the offer.

i) **INCOME TAX PERMANENT ACCOUNT NUMBER**

Certified copies of Permanent Account Numbers as allotted by Income Tax Department for the Company/ Firm/ Bidder/ Individual Partners, etc. shall be furnished along with tender for Indian Bidders and non-Indian bidders should submit their equivalent tax department registration detail.

ii) **ORGANIZATION CHART**

The organization chart of the tenderer's organization, including the names, addresses and contact information of the Directors/Partners shall be furnished along with the offer.

iii) An attested copy of the Power of Attorney, in case the tender is signed by an individual other than the sole proprietor.

iv) **IN CASE OF INDIVIDUAL TENDERER:**

His / her full name, address, PAN and place & nature of business.

v) **IN CASE OF PARTNERSHIP FIRM:**

The names of all the partners and their addresses, A copy of the partnership deed/instrument of partnership dully certified by the Notary Public shall be enclosed.

vi) **IN CASE OF COMPANIES:**

a) Date and place of registration including date of commencement certificate in case of Public Companies (certified copies of Memorandum and articles of Association are also to be furnished).

b) Nature of business carried on by the Company and the provisions of the Memorandum relating thereof.

1.8 AUTHORIZATION AND ATTESTATION

Tenders shall be signed by a person duly authorized/empowered to do so, for which a Power of

Attorney is to be submitted along with the tender offer. For company, a Power of Attorney (as per format in Volume-I D) shall be submitted.

~~**1.9 EARNEST MONEY DEPOSIT**~~

~~1.9.1 Every tender must be accompanied by the prescribed amount of Earnest Money Deposit (EMD) in the manner described herein.~~

~~i) EMD shall be furnished before tender opening / along with the offer in full as per the amount indicated in the NIT.~~

~~ii) The EMD is to be paid only in the following forms:~~

~~a) Cash deposit as permissible under the extant Income Tax Act (before tender opening).~~

~~b) Electronic Fund Transfer credited in BHEL account (before tender opening).~~

~~c) Banker's cheque / Pay order / Demand draft, in favour of 'Bharat Heavy Electricals Limited' and payable at Regional HQ issuing the tender (along with offer).~~

~~d) Fixed Deposit Receipt (FDR) issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL) (along with offer). The Fixed Deposit in such cases shall be valid for at least six months from the due date of tender submission.~~

~~In case EMD amount is more than Rs. Two Lakhs, Tenderer has the option to submit Rs. Two lakhs in the forms described above in clause no. 1.9.1. (a) to (d) and the remaining amount over and above Rs. Two Lakhs in the form of Bank Guarantee from Scheduled Bank (along with the Offer). The Bank Guarantee in such cases shall be valid for at least six months from the due date of tender submission. The Bank Guarantee format for EMD shall be in the prescribed formats.~~

~~iii) No other form of EMD remittance shall be acceptable to BHEL.~~

~~1.9.2 EMD by the Tenderer will be forfeited as per NIT conditions, if:~~

~~i) After opening the tender and within the offer validity period, the tenderer revokes his tender or makes any modification in his tender which is not acceptable to BHEL.~~

~~ii) The Contractor fails to deposit the required Security deposit or commence the work within the period as per LOI/ LOA/ Contract.~~

~~EMD by the tenderer shall be withheld in case any action on the tenderer is envisaged under the provisions of extant "Guidelines on Suspension of business dealings with suppliers/ contractors" and forfeited/ released based on the action as determined under these guidelines.~~

~~1.9.3 EMD shall not carry any interest.~~

~~1.9.4 EMD given by all unsuccessful tenderers shall be refunded normally within fifteen days of award of work.~~

~~1.9.5 Cash portion of EMD of successful tenderer will be retained as part of Security Deposit. EMD submitted in the form of Bank Guarantee/ FDR shall be retained by BHEL until the receipt of at least 50% of the Security Deposit.~~

1.10 SECURITY DEPOSIT

1.10.1 (i) Upon acceptance of Tender, the successful Tenderer should deposit the 5% of the contract value as Security Deposit towards fulfilment of any obligations in terms of the provisions of the contract.

1.10.1 (ii) Bidder agrees to submit performance security required for execution of the contract within the time period mentioned in clause 1.10.2. In case of delay in submission of Security Deposit, interest

(SBI rate + 6%) for the delayed period on the amount of SD due for submission, shall be submitted by the bidder. Further, if performance security is not submitted till such time the first bill becomes due, the amount of performance security due shall be recovered as per terms defined in NIT / contract, from the bills along with due interest as mentioned herein above.

1.10.1 (iii) Bidder agrees to submit the Security Deposit as above for execution of the contract within the time period.

1.10.2 (i) For contracts exceeding Rs 20 lakhs, the security Deposit should be furnished before start of the work by the contractor. If requested by the contractor, cash recovery of initial 50% of the specified Security Deposit, including the retained EMD can be made from bills submitted by contractor. For such delay in submission of initial 50% of the required Security Deposit for execution of the contract, interest shall be levied for the delayed period of submission at (SBI rate + 6%) on the security required to be submitted. Balance 50% Security deposit shall be recovered at the rate of 10% of the gross amount progressively from each of the running bills of the contractor till the total amount of the required security deposit is collected.

1.10.2 (ii) In case of small value contracts not exceeding Rs. 20 lakhs, work can be started before the required Security Deposit is collected.

1.10.2 (iii) Payment can be released only after collection/ recovery of initial 50% Security Deposit.

1.10.3 The balance amount to make up the required Security Deposit of 5% of the contract value may be accepted in the following forms.

i) Cash (as permissible under the extant Income Tax Act).
ii) Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL.
iii) Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL).
iv) Bank Guarantee from Scheduled Banks/ Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format for Security Deposit shall be in the prescribed formats.
v) Fixed Deposit Receipt issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL).
vi) Security deposit can also be recovered at the rate of 10% of the gross amount progressively from each of the running bills of the contractor till the total amount of the required security deposit is collected. However, in such cases at least 50% of the required Security Deposit should be deposited in any form as prescribed before start of the work and the balance 50% may be recovered from the running bills as described above.
vii) Bidder may also deposit required Security Deposit in either INR or NPR. 1 INR = 1.6 NPR

Note: BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith.

1.10.4 The Security Deposit shall not carry any interest.

1.10.5 In case the value of work exceeds the awarded / accepted value, the Security Deposit shall be correspondingly enhanced as given below:
i) The enhanced part of the Security Deposit shall be immediately deposited by the Contractor or

adjusted against payments due to the Contractor.

ii) Contract value for the purpose of operating the increased value of Security Deposit due to Quantity Variation, shall be exclusive of Price Variation Clause, Over Run Compensation and Extra works done on manday rates.

iii) The recoveries made from running bills (cash deduction towards balance SD amount) can be released against submission of equivalent Bank Guarantee in acceptable form, but only once, before completion of work, with the approval of competent authority of BHEL.

1.10.6 The validity of Bank Guarantees towards Security Deposit shall be initially up to the completion period as stipulated in the Letter of Intent/ Award + Guarantee Period + 3 months, and the same shall be kept valid by proper renewal by the contractor till the acceptance of Final Bills of the Contractor by BHEL.

1.10.7 BHEL reserves the right of forfeiture of Security Deposit in addition to other claims and penalties in the event of the Contractor's failure to fulfill any of the contractual obligations or in the event of termination of contract as per terms and conditions of contract. BHEL reserves the right to set off the Security Deposit against any claims of other contracts with BHEL.

1.11 RETURN OF SECURITY DEPOSIT

Security Deposit shall be released to the contractor upon fulfillment of contractual obligations as per terms of the contract including completion of Guarantee Period after deducting all expenses / other amounts due to BHEL under the contract / other contracts entered into with them by BHEL.

1.12 BANK GUARANTEES

Where ever Bank Guarantees are to be furnished/submitted by the contractor, the following shall be complied with

i) Bank Guarantees shall be from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. Bank Guarantees issued by Co-Operative Banks/ Financial Institutions shall not be accepted.

ii) The Bank Guarantees shall be as per prescribed formats.

iii) It is the responsibility of the bidder to get the Bank Guarantees revalidated/extended for the required period as per the advice of BHEL Site Engineer / Construction Manager. BHEL shall not be liable for issue of any reminders regarding expiry of the Bank Guarantees.

iv) In case extension/further extensions of any Bank Guarantees are not required, the bidders shall ensure that the same is explicitly endorsed by the Construction Manager and submitted to the Regional HQ issuing the LOI/LOA.

v) In case the Bank Guarantees are not extended before the expiry date, BHEL reserves the right to invoke the same by informing the concerned Bank in writing, without any advance notice/communication to the concerned bidder.

vi) Bidders to note that any corrections to Bank Guarantees shall be done by the issuing Bank, only through an amendment in an appropriate non judicial stamp paper.

vii) The Original Bank Guarantee shall be submitted to Subcontracting Department of the respective Region of BHEL.

1.13 VALIDITY OF OFFER

The rates in the Tender shall be kept open for acceptance for a minimum period of **SIX MONTHS** from latest due date of offer submission (including extension, if any). In case BHEL (Bharat Heavy Electricals Ltd) calls for negotiations, such negotiations shall not amount to cancellation or withdrawal of the original offer which shall be binding on the tenderers.

1.14 EXECUTION OF CONTRACT AGREEMENT

The successful tenderer's responsibility under this contract commences from the date of issue of the Letter of Intent/ Award by Bharat Heavy Electricals Limited.

The successful tenderer shall be required to execute an agreement in the prescribed form, with BHEL, within a reasonable time after the acceptance of the Letter of Intent/Award, and in any case before releasing the first running bill. The contract agreement shall be signed by a person duly authorized/empowered by the tenderer. The expenses for preparation of agreement document shall be borne by BHEL.

1.15 REJECTION OF TENDER AND OTHER CONDITIONS

1.15.3 The acceptance of tender will rest with BHEL which does not bind itself to accept the lowest tender or any tender and reserves to itself full rights for the following without assigning any reasons whatsoever: -

a. To reject any or all of the tenders.
b. To split up the work amongst two or more tenderers as per NIT.
c. To award the work in part if specified in NIT.
d. In case of either of the contingencies stated in (b) and (c) above, the time for completion as stipulated in the tender shall be applicable.

1.15.4 Conditional tenders, unsolicited tenders, tenders which are incomplete or not in the form specified or defective or have been materially altered or not in accordance with the tender conditions, specifications etc. are liable to be rejected.

1.15.5 Tenders are liable to be rejected in case of unsatisfactory performance of the tenderer with BHEL or tenderer under suspension (hold/banning) by any unit / region / division of BHEL or tenderers who do not comply with the latest guidelines of Ministry/Commissions of Govt of India. BHEL reserves the right to not consider a bidder for further processing of tender in case it is observed that they are overloaded and may not be in a position to execute this job as per the required schedule in line with clause no. 9.0 of the 'NIT'. The decision of BHEL will be final in this regard.

1.15.6 If a tenderer who is a proprietor expires after the submission of his tender or after the acceptance of his tender, BHEL may at their discretion, cancel such tender. If a partner of a firm expires after the submission of tender or after the acceptance of the tender, BHEL may then cancel such tender at their discretion, unless the firm retains its character.

1.15.7 BHEL will not be bound by any Power of Attorney granted by changes in the composition of the firm made subsequent to the execution of the contract. BHEL may, however, recognize such power of Attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the contractor concerned.

1.15.8 If the tenderer deliberately gives wrong information in his tender, BHEL reserves the right to reject such tender at any stage or to cancel the contract if awarded and forfeit the Earnest Money/Security Deposit/any other money due.

1.15.9 Canvassing in any form in connection with the tenders submitted by the Tenderer shall make his offer liable to rejection.

1.15.10 In case the Proprietor, Partner or Director of the Company/Firm submitting the Tender, has any relative or relation employed in BHEL, the authority inviting the Tender shall be informed of the fact as per specified format, along with the Offer. Failing to do so, BHEL may, at its sole discretion, reject the tender or cancel the contract and forfeit the Earnest Money/Security Deposit.

1.15.11 The successful tenderer should not sub-contract part or complete work detailed in the tender specification undertaken by him without written permission of BHEL's Construction Manager/Site in charge. The tenderer is solely responsible to BHEL for the work awarded to him.

1.15.12 The Tender submitted by a techno commercially qualified tenderer shall become the property of BHEL who shall be under no obligation to return the same to the bidder. However unopened price bids and late tenders shall be returned to the bidders, in case of Conventional/ Paper bid.

1.15.13 Unsolicited discount received after the due date and time of Bid Submission shall not be considered for evaluation. However, if the party who has submitted the unsolicited discount/rebate becomes the L-1 party, then the awarded price i.e. contract value shall be worked out after considering the discount so offered.

1.15.14 BHEL shall not be liable for any expenses incurred by the bidder in the preparation of the tender irrespective of whether the tender is accepted or not.

1.16 INTIMATION OF CHANGE OF NAME/RE-CONSTITUTION OF THE ORGANIZATION

In the event of the organization (Proprietorship/Partnership/Company) undergoing any change of name or reconstitution, prior intimation of the same shall be given to BHEL. Upon such changes coming into effect, the same is to be intimated to BHEL immediately with supporting documents as applicable.
Further, the new entity has to intimate BHEL in writing that they will honor all the earlier commitments in respect of the subject contract.

CHAPTER-2

2.1 **DEFINITION:** The following terms shall have the meaning hereby assigned to them except where the context otherwise requires

i) BHEL shall mean Bharat Heavy Electricals Limited (of the respective Power Sector Region inviting the Tender), a company registered under Indian Companies Act 1956, with its Registered Office at BHEL HOUSE, SIRI FORT, NEW DELHI – 110 049, or its Power Sector Regional Offices or its Authorized Officers or its Site Engineers or other employees authorized to deal with any matters with which these persons are concerned on its behalf.

ii) "EXECUTIVE DIRECTOR" or "GENERAL MANAGER (In- charge)" or "GENERAL MANAGER" shall mean the Officer in Administrative charge of the respective Power Sector Region.

iii) "COMPETENT AUTHORITY" shall mean BHEL Officers who are empowered to act on behalf of BHEL.

iv) "ENGINEER" or "ENGINEER IN CHARGE" shall mean an Officer of BHEL as may be duly appointed and authorized by BHEL to act as "Engineer" on his behalf for the purpose of the Contract, to perform the duty set forth in this General Conditions of Contract and other Contract documents. The term also includes 'CONSTRUCTION MANAGER' or 'SITE INCHARGE' as well as Officers at Site or at the Headquarters of the respective Power Sector Regions.

v) "SITE" shall mean the places or place at which the plants/equipments are to be erected and services are to be performed as per the specification of this Tender.

vi) "CLIENT OF BHEL" or "CUSTOMER" shall mean the project authorities with whom BHEL has entered into a contract for supply of equipments or provision of services.

vii) "CONTRACTOR" shall mean the successful Bidder/Tenderer who is awarded the Contract and shall include the Contractor's successors, heirs, executors, administrators and permitted assigns.

viii) "CONTRACT" or "CONTRACT DOCUMENT" shall mean and include the Agreement of Work Order, the accepted appendices of Rates, Schedules, Quantities if any, Offer submitted by contractor including acceptance to General Conditions of Contract, Special Conditions of Contract, Instructions to the Tenderers, Drawings, Technical Specifications, the Special Specifications if any, the Tender documents, subsequent amendments /corrigendum to Tender mutually agreed upon and the Letter of Intent/Award/Acceptance issued by BHEL. Any conditions or terms stipulated by the contractor in the tender documents or subsequent letters shall not form part of the contract unless, specifically accepted in writing by BHEL in the Letter of Intent/Award and incorporated in the agreement or amendment thereof.

ix) "GENERAL CONDITIONS OF CONTRACT" shall mean the 'Instructions to Tenderers' and 'General Conditions of Contract' pertaining to the work for which above tenders have been called for.

x)	"TENDER SPECIFICATION" or "TENDER" or "TENDER DOCUMENTS" shall mean General Conditions, Common Conditions, Special Conditions, Price Bid, Rate Schedule, Technical Specifications, Appendices, Annexures, Corrigendums, Amendments, Forms, Procedures, Site information etc. and drawings/documents pertaining to the work for which the tenderers are required to submit their offers. Individual specification number will be assigned to each Tender Specification.
xi)	"LETTER OF INTENT/ AWARD" shall mean the intimation by a Letter/Fax/email to the tenderer that the tender has been accepted in accordance with provisions contained in the letter. The responsibility of the contractor commences from the date of issue of this letter and all terms and conditions of the contract are applicable from this date.
xii)	"COMPLETION TIME" shall mean the period by 'date/month' specified in the 'Letter of Intent/Award' or date mutually agreed upon for handing over of the intended scope of work, the erected equipment/plant which are found acceptable by the Engineer, being of required standard and conforming to the specifications of the Contract.
xiii)	"PLANT" shall mean and connote the entire assembly of the plant and equipments covered by the contract.
xiv)	"EQUIPMENT" shall mean equipment, machineries, materials, structural, electricals and other components of the plant covered by the contract.
xv)	"TESTS" shall mean and include such test or tests to be carried out on the part of the contractor as are prescribed in the contract or considered necessary by BHEL in order to ascertain the quality, workmanship, performance and efficiency of the contractor or part thereof.
xvi)	"APPROVED", "DIRECTED" or "INSTRUCTED" shall mean approved, directed or instructed by BHEL.
xvii)	"WORK or CONTRACT WORK" shall mean and include supply of all categories of labour, specified consumables, tools and tackles and Plants required for complete and satisfactory site transportation, handling, stacking, storing, erecting, testing and commissioning of the equipments to the entire satisfaction of BHEL.
xviii)	"SINGULAR AND PLURALS ETC" words carrying singular number shall also include plural and vice versa, where the context so requires. Words imparting the masculine Gender shall be taken to include the feminine Gender and words imparting persons shall include any Company or Associations or Body of Individuals, whether incorporated or not.
xix)	"HEADING" – The heading in these General Conditions are solely for the purpose of facilitating reference and shall not be deemed to be part thereof or be taken as instructions thereof or of the contract.
xx)	"MONTH" shall mean calendar month unless otherwise specified in the Tender.
xxi)	'Day' or 'Days' unless herein otherwise expressly defined shall mean calendar day or days of twenty-four (24) hours each. A Week shall mean continuous period of seven (7) days.

xxii)	"COMMISSIONING" shall mean the synchronization testing and achieving functional operation of the Equipment with associated system after all initial adjustments, trials, cleaning, re-assembly required at site if any, have been completed and Equipment with associated system is ready for taking into service.
xxiii)	"WRITING" shall include any manuscript type written or hand written or printed statement or electronically transmitted messages, under the signature or seal or transmittal of BHEL.
xxiv)	"TEMPORARY WORK" shall mean all temporary works for every kind required in or for the execution, completion, maintenance of the work.
xxv)	'CONTRACT PRICE' or 'CONTRACT VALUE' shall mean the sum mentioned in the LOI/LOA/Contract Agreement subject to such additions thereto or deductions there from as may be made under provisions hereinafter contained.
xxvi)	'EXECUTED CONTRACT VALUE' shall mean actual value of works executed by the contractor and certified by BHEL. This value shall not include PVC, ORC, Extra Works and Taxes.
xxvii)	"COMMENCEMENT DATE" or "START DATE" shall mean the commencement/start of work at Site as per terms defined in the Tender.
xxviii)	"SHORT CLOSING" or "FORE CLOSING" of Contract shall mean the premature closing of Contract, for reasons not attributable to the contractor and mutually agreed between BHEL and the contractor.
xxix)	"TERMINATION" of Contract shall mean the pre mature closing of contract due to reasons as mentioned in the contract.
xxx)	"DE MOBILIZATION" shall mean the temporary winding up of Site establishment by Contractor leading to suspension of works temporarily for reasons not attributable to the contractor.
xxxi)	"RE MOBILIZATION" shall mean the resumption of work with all resources required for the work after demobilization.

2.2 LAW GOVERNING THE CONTRACT AND COURT JURISDICTION

The contract shall be governed by the Law for the time being in force in the Republic of India. Subject to clause 2.21.1.1 of this contract, the Civil Court having original Civil Jurisdiction at Delhi for PSNR, at Kolkata for PSER, at Nagpur for PSWR and at Chennai for PSSR, shall alone have exclusive jurisdiction in regard to all matters in respect of the Contract.

2.3 ISSUE OF NOTICE

2.3.1 <u>Service of notice on Contractor</u>

Any notice to be given to the Contractor under the terms of the contract shall be served by sending the same by **Registered Post/Speed Post to or leaving the same at** the Contractor's last known address of the principal place of business (or in the event of the contractor being a company, to or at its Registered Office). In case of change of address, the notice shall be served at changed address as notified in writing by the Contractor to BHEL. Such posting or leaving of the notice shall be deemed to be good service of such notice and the time mentioned to the condition for doing any act after notice shall be reckoned from the date so mentioned in such notice.

2.3.2 **Service of notice on BHEL**

Any notice to be given to BHEL in-charge/Region under the terms of the Contract shall be served by sending the same by post to or leaving the same at BHEL address or changed address as notified in writing by BHEL to the Contractor.

2.4 USE OF LAND

No land belonging to BHEL or their Customer under temporary possession of BHEL shall be occupied by the contractor without written permission of BHEL.

2.5 COMMENCEMENT OF WORK

2.5.1 The contractor shall commence the work as per the time indicated in the Letter of Intent/Award from BHEL and shall proceed with the same with due expedition without delay.

2.5.2 If the contractor fails to start the work within stipulated time as per LOI/ LOA or as intimated by BHEL, then BHEL at its sole discretion will have the right to cancel the contract. The Earnest Money and/or Security Deposit with BHEL will stand forfeited without any further reference to him without prejudice to any and all of BHEL's other rights and remedies in this regard.

2.5.3 All the work shall be carried out under the direction and to the satisfaction of BHEL.

2.6 MEASUREMENT OF WORK AND MODE OF PAYMENT:

2.6.1 All payments due to the contractors shall be made by e mode only, unless otherwise found operationally difficult for reasons to be recorded in writing.

2.6.2 For progress running bill payments: - The Contractor shall present detailed measurement sheets in triplicate, duly indicating all relevant details based on technical documents and connected drawings for work done during the month/period under various categories in line with terms of payment as per contract. The basis of arriving at the quantities, weights shall be relevant documents and drawings released by BHEL. These measurement sheets shall be prepared jointly with BHEL Engineers and signed by both the parties.

2.6.3 These measurement sheets will be checked by BHEL Engineer and quantities and percentage eligible for payment under various groups shall be decided by BHEL Engineer. The abstract of quantities and percentage so arrived at based on the terms of payment shall be entered in Measurement Book and signed by both the parties.

2.6.4 Based on the above quantities, contractor shall prepare the bills, along with statutory documents, in prescribed format and work out the financial value. These will be entered in Measurement Book and signed by both the parties. Payment shall be made by BHEL after effecting the recoveries due from the contractor.

2.6.5 All recoveries due from the contractor for the month/period shall be effected in full from the corresponding running bills unless specific approval from the competent authorities is obtained to the contrary.

2.6.6 Measurement shall be restricted to that portion of work for which it is required to ascertain the financial liability of BHEL under this contract.

2.6.7 The measurement shall be taken jointly by persons duly authorized on the part of BHEL and by the Contractor.

2.6.8 The Contractor shall bear the expenditure involved if any, in making the measurements and testing of materials to be used/ used in the work. The contractor shall, without extra charges, provide all the assistance with appliances and other things necessary for measurement.

2.6.9 If at any time due to any reason whatsoever, it becomes necessary to re-measure the work done in full or in part, the expenses towards such re measurements shall be borne by the contractor unless such re measurements are warranted solely for reasons not attributable to contractor.

2.6.10 Passing of bills covered by such measurements does not amount to acceptance of the completion of the work measured. Any left out work has to be completed, if pointed out at a later date by BHEL.

2.6.11 Final measurement bill shall be prepared in the final bill format prescribed for the purpose based on the certificate issued by BHEL Engineer that entire works as stipulated in tender specification has been completed in all respects to the entire satisfaction of BHEL. Contractor shall give unqualified "No Claim" Certificate. All the tools and tackles loaned to him should be returned in satisfactory condition to BHEL. The abstract of final quantities and financial values shall also be entered in the Measurement Books and signed by both parties to the contract. The Final Bill shall be prepared and paid within a reasonable time after completion of work.

2.7 RIGHTS OF BHEL

BHEL reserves the following rights in respect of this contract during the original contract period or its extensions if any, as per the provisions of the contract, without entitling the contractor for any compensation.

2.7.1 To withdraw any portion of work and/or to restrict/alter quantum of work as indicated in the contract during the progress of work and get it done through other agencies to suit BHEL's commitment to its customer or in case BHEL decides to advance the date of completion due to other emergent reasons/ BHEL's obligation to its customer.

In case of inadequate manpower deployed by the contractor, BHEL reserves the right to deploy additional manpower through any other agency for expediting activities in the interest of the project. Supplied manpower shall be put on job by the contractor and payments and other statutory compliances related to manpower shall be the contractor's responsibility. In case of contractor's failure to fulfill his obligations in respect of such manpower, BHEL reserves the right to take necessary action as per contract conditions.

2.7.2.1 To terminate the contract or withdraw portion of work and get it done through other agency, at the risk and cost of the contractor after due notice of a period of 14 days' (this period can be reduced in case of urgency or increased otherwise) by BHEL in any of the following cases:

i). Contractor's poor progress of the work vis-à-vis execution timeline as stipulated in the Contract, backlog attributable to contractor including unexecuted portion of work does not appear to be executable within balance available period considering its performance of execution.

ii). Withdrawal from or abandonment of the work by contractor before completion of the work as per contract.

iii). Non-completion of work by the Contractor within scheduled completion period as per Contract or as extended from time to time, for the reasons attributable to the contractor.

iv). Termination of Contract on account of any other reason (s) attributable to Contractor.
v). Assignment, transfer, subletting of Contract without BHEL's written permission.
vi). Non-compliance to any contractual condition or any other default attributable to Contractor.

Risk & Cost Amount against Balance Work:

Risk & Cost amount against balance work shall be calculated as follows:

Risk & Cost Amount= [(A-B) + (A x H/100)]

Where,

A= Value of Balance scope of Work (*) as per rates of new contract

B= Value of Balance scope of Work (*) as per rates of old contract being paid to the contractor at the time of termination of contract i.e. inclusive of PVC & ORC, if any.

H = Overhead Factor to be taken as 5

In case (A-B) is less than 0 (zero), value of (A-B) shall be taken as 0 (zero).

* Balance scope of work (in case of termination of contract):

Difference of Contract Quantities and Executed Quantities as on the date of issue of Letter for 'Termination of Contract', shall be taken as balance scope of Work for calculating risk & cost amount.

Contract quantities are the quantities as per original contract. If, Contract has been amended, quantities as per amended Contract shall be considered as Contract Quantities.

Items for which total quantities to be executed have exceeded the Contract Quantities based on drawings issued to contractor from time to time till issue of Termination letter, then for these items total Quantities as per issued drawings would be deemed to be contract quantities.

Substitute/ extra items whose rates have already been approved would form part of contract quantities for this purpose. Substitute/ extra items which have been executed but rates have not been approved, would also form part of contract quantities for this purpose and rates of such items shall be determined in line with contractual provisions.

However, increase in quantities on account of additional scope in new tender shall not be considered for this purpose.

NOTE: Incase portion of work is being withdrawn at risk & cost of contractor instead of termination of contract, contract quantities pertaining to portion of work withdrawn shall be considered as 'Balance scope of work' for calculating Risk & Cost amount.

LD against delay in executed work in case of Termination of Contract:

LD against delay in executed work shall be calculated in line with LD clause no. 2.7.9 of GCC, for the delay attributable to contractor. For limiting the maximum value of LD, contract value shall be taken as Executed Value of work till termination of contract.

Method for calculation of "LD against delay in executed work in case of termination of contract" is given below.

i). Let the time period from scheduled date of start of work till termination of contract excluding the period of Hold (if any) not attributable to contractor = T1
ii). Let the value of executed work till the time of termination of contract= X
iii). Let the Total Executable Value of work for which inputs/fronts were made available to contractor and were planned for execution till termination of contract = Y
iv). Delay in executed work attributable to contractor i.e. T2=[1-(X/Y)] x T1
v). LD shall be calculated in line with LD clause (clause 2.7.9) of the Contract for the delay attributable to contractor taking "X" as Contract Value and "T2" as period of delay attributable to contractor.

2.7.2.2 In case Contractor fails to deploy the resources as per requirement, BHEL can deploy own/hired/otherwise arranged resources at the risk and cost of the contractor and recover the expenses incurred from the dues payable to contractor. Recoveries shall be actual expenses incurred plus 5% overheads or as defined in TCC.

2.7.3 **Recoveries arising out of Risk & Cost and LD or any other recoveries due from Contractor**

Following sequence shall be applicable for recoveries from contractor:

a) Dues available in the form of Bills payable to contractor, SD, BGs against the same contract.
b) Demand notice for deposit of balance recovery amount shall be sent to contractor, if funds are insufficient to effect complete recovery against dues indicated in (a) above.
c) If contractor fails to deposit the balance amount to be recovered within the period as prescribed in demand notice, following action shall be taken for balance recovery:
   i) Dues payable to contractor against other contracts in the same Region shall be considered for recovery.
   ii) If recovery cannot be made out of dues payable to the contractor as above, balance amount to be recovered, shall be informed to other Regions/Units for making recovery from the Unpaid Bills/Running Bills/SD/BGs/Final Bills of contractor.
   iii) In-case recoveries are not possible with any of the above available options, Legal action shall be initiated for recovery against contractor.

2.7.4 To terminate the contract or to restrict the quantum of work and pay for the portion of work executed in case BHEL's contract with their customer are terminated for any reason, as per mutual agreement.

2.7.5 To effect recovery from any amounts due to the contractor under this or any other contract or in any other form, the moneys BHEL is statutorily forced to pay to anybody, due to contractor's failure to fulfill any of his obligations. BHEL shall levy overheads of 5% on all such payments along with interest as defined elsewhere in the GCC.

2.7.6 While every endeavor will be made by BHEL to this end, they (BHEL) cannot guarantee uninterrupted work due to conditions beyond their control. The Contractor will not be normally entitled for any compensation/extra payment on this account unless otherwise specified elsewhere in the contract.

2.7.7 BHEL may permit or direct contractor to demobilize and remobilize at a future date as intimated by BHEL in case of following situations for reasons other than Force majeure conditions and not attributable to contractor:

i) suspension of work(s) at a Project either by BHEL or Customer,
   or
ii) where work comes to a complete halt or reaches a stage wherein worthwhile works cannot be executed and there is no possibility of commencement of work for a period of not less than three months

In such cases, charges towards demobilization and remobilization shall be as decided by BHEL after successful remobilization by contractor at site, and decision of BHEL shall be final and binding on the contractor. After remobilization, all conditions as per contract shall become applicable. In case Contractor does not remobilize with adequate resources or does not start the work within the period as intimated, then BHEL reserves the right to get the balance works done at the Risk & Cost of the Contractor. Duration of the contract/time extension shall be revised suitably. In case of any conflict, BHEL decision in this regard shall be final and binding on the contractor.

2.7.8 In the unforeseen event of inordinate delay in receipt of materials, drawings, fronts etc. due to which inordinate discontinuity of work is anticipated, BHEL on its own or contractor's request at its discretion may consider to short close the contract in any of the following cases:

a) The balance works (including but not limited to Trial Operation, PG Test etc.) are minor vis a vis the scope of work envisaged as per the contract.
b) There has been no significant work in past 6 months OR no significant work is expected in next 6 months (example in Hydro projects or in projects where work has stopped due to reasons beyond the control of BHEL).
c) The balance works cannot be done within a reasonable period of time as they are dependent on unit shut down or on other facilities of customer or any other such reasons not attributable to the contractor.

At the point of requesting for short closure, contractor shall establish that he has completed all works possible of completion and he is not able to proceed with the balance works due to constraints beyond his control. In such a case, the estimated value of the unexecuted portion of work (or estimated value of services to be provided for carrying out milestone/stage payments like Trial Operation/PG Test etc.) as decided by BHEL, shall however be reduced from the final contract value.

Note: The Contractor shall not be eligible for any compensation on account of Quantity Variation arising out of short-closure of contract as per clause no. 2.7.8 (b) above.

2.7.9 LIQUIDATED DAMAGES/PENALTY

At the end of total work completion as certified by BHEL Engineer, and upon analysis of the total delay, the portion of time extensions attributable to (i) Contractor alone, (ii) Force majeure conditions, and (iii) BHEL, shall be worked out. The total period of time extensions shall be the sum of (i), (ii) and (iii) above and shall be equal to period between the scheduled date of completion and the actual date of completion of contract. LD shall be imposed/levied for the portion of time extensions solely attributable to contractor and recoverable from the dues payable to the contractor.

If the contractor fails to maintain the required progress of work which results in delay in the completion of the work as per the contractual completion period, BHEL shall have the right to impose Liquidated Damage/Penalty at the rate of 0.05% of the contract value, per day of delay or part thereof subject to a maximum of 10% of the contract value. For this purpose, the period for which LD is applicable shall be worked out based on portion of time extension granted solely attributable to contractor at the end of the contract. Contract Value for this purpose, shall be the final executed value exclusive of ORC, Extra Works executed on Manday rate basis, Supplementary/ Additional Items and PVC.

In case of LD recovery, the applicable taxes shall also be recovered from contractor.

2.8 RESPONSIBILITIES OF THE CONTRACTOR IN RESPECT OF LOCAL LAWS, EMPLOYMENT OF WORKERS ETC.

The following are the responsibilities of the contractor in respect of observance of local laws, employment of personnel, payment of taxes etc. The subcontractor shall fully indemnify BHEL against any claims of whatsoever nature arising due to the failure of the contractor in discharging any of his responsibilities hereunder:

2.8.1 As far as possible, Unskilled Workers shall be engaged from the local areas in which the work is being executed.

2.8.2 The contractor at all times during the continuance of this contract shall, in all his dealings with local labour for the time being employed on or in connection with the work, have due regard to all local festivals and religious and other customs.

2.8.3 Not Applicable

2.8.4 Not Applicable.

2.8.5 The contractor shall pay and bear all taxes, fees, license charges, Cess, duties, deposits, tolls, royalties, commission or other charges which may be leviable on account of his operations in executing the contract.

2.8.6 While BHEL would pay the inspection fees and Registration fees of Boiler/Electrical Inspectorate, all other arrangements for site visits periodically by the Inspectorate to site, Inspection certificate etc. will have to be made by contractor. However, BHEL will not make any payment to the Inspectorate in connection with contractor's Welders/Electricians qualification tests etc.

2.8.7 Not Applicable

2.8.8 The contractor shall be responsible for proper accommodation including adequate medical facilities for personnel employed by him.

2.8.9 The contractor shall be responsible for the proper behavior and observance of all regulations by the staff employed by him.

2.8.10 The contractor shall ensure that no damage is caused to any person/property of other parties working at site. If any such damage is caused, it is responsibility of the contractor to make good the losses or compensate for the same.

2.8.11 All the properties/equipments/components of BHEL/their Client loaned with or without deposit to the contractor in connection with the contract shall remain properties of BHEL/their Client.

2.8.12 The contractor shall use such properties for the purpose of execution of this contract. All such properties/equipments/components shall be deemed to be in good condition when received by the contractor unless he notifies within 48 hours to the contrary. The contractor shall return them in good condition as and when required by BHEL/their Client. In case of non-return, loss, damage, repairs etc. the cost thereof as may be fixed by BHEL Engineer will be recovered from the contractor.

2.8.13 In case the contractor is required to undertake any work outside the scope of this contract, the rates payable shall be those mutually agreed upon if the item rates are not mentioned in existing contract.

2.8.14 Any delay in completion of works/or non-achievement of periodical targets due to the reasons attributable to the contractor, the same may have to be compensated by the contractor either by

increasing manpower and resources or by working extra hours and/or by working more than one shift. All these are to be carried out by the contractor at no extra cost.

2.8.15 The contractor shall arrange, coordinate his work in such a manner as to cause no hindrance to other agencies working in the same premises.

2.8.16 All safety rules and codes applied by the Client/BHEL at site shall be observed by the contractor without exception. The contractor shall be responsible for the safety of the equipment/material and works to be performed by him and shall maintain all light, fencing guards, slings etc. or other protection necessary for the purpose. Contractor shall also take such additional precautions as may be indicated from time to time by the Engineer with a view to prevent pilferage, accidents, fire hazards. Due precautions shall be taken against fire hazards and atmospheric conditions. Suitable number of Clerical staff, watch and ward, store keepers to take care of equipment/materials and construction tools and tackles shall be posted at site by the contractor till the completion of work under this contract.

The contractor shall arrange for such safety devices as are necessary for such type of work and carry out the requisite site tests of handling equipment, lifting tools, tackles etc. as per prescribed standards and practices.

Contractor has to ensure the implementation of Health, Safety and Environment (HSE) requirements as per directions given by BHEL/Customer. The contractor has to assist in HSE audit by BHEL/Customer and submit compliance Report. The contractor has to generate and submit record/reports as per HSE plan/activities as per instruction of BHEL/Customer.

2.8.17 The contractor will be directly responsible for payment of wages to his workmen. A pay roll sheet giving all the payments given to the workers and duly signed by the contractor's representative should be furnished to BHEL site for record purpose, if so called for.
Contractor shall create awareness amongst their workforce by helping & encouraging in opening bank accounts and to encourage them to adopt digital mode of transactions. While releasing wages/ salary to their workers/ supervisors/ staff, Contractor shall comply with the GOI's guidelines for maximizing such transactions through Non-Cash / digital means.

2.8.18 In case of any class of work for which there is no such specification as laid down in the contract, such work shall be carried out in accordance with the instructions and requirements of the Engineer.

2.8.19 Also, no idle charges will be admissible in the event of any stoppage caused in the work resulting in contractor's labour and Tools & Plants being rendered idle due to any reason at any time.

2.8.20 The contractor shall take all reasonable care to protect the materials and work till such time the plant/equipment has been taken over by BHEL or their Client whichever is earlier.

2.8.21 The contractor shall not stop the work or abandon the site for whatsoever reason of dispute, excepting force majeure conditions. All such problems/disputes shall be separately discussed and settled without affecting the progress of work. Such stoppage or abandonment shall be treated as breach of contract and dealt with accordingly.

2.8.22 The contractor shall keep the area of work clean and shall remove the debris etc. while executing day-to-day work. Upon completion of work, the contractor shall remove from the vicinity of work,

all scrap, packing materials, rubbish, unused and other materials and deposit them in places specified by the Engineer. The contractor will also demolish all the hutments, sheds, offices etc. constructed and used by him and shall clean the debris. In the event of his failure to do so, the same will be arranged to be done by the Engineer and the expenses recovered from the contractor.

2.8.23 The contractor shall execute the work in the most substantial and workman like manner in the stipulated time. Accuracy of work and timely execution shall be the essence of this contract. The contractor shall be responsible to ensure that the quality, assembly and workmanship conform to the dimensions and clearance given in the drawings and/ or as per the instructions of the Engineer.

2.8.24 The Contractor to note that some of BHEL's T&Ps/MMDs may not be insured. The Contractor will take necessary precautions and due care to protect the same while in his custody from any damage/ loss till the same is handed over back to BHEL. In case the damage / loss is due to carelessness/ negligence on the part of the contractor, the Contractor is liable to get them repair/ replaced immediately and in case of his failure to do so within a reasonable time, BHEL will reserve the right to recover the loss from the contractor.

2.8.25 For all works having contract value of Rs. 5,00,000/- or above, BHEL shall recover the amount of compensation paid to victim(s) by BHEL towards loss of life/ permanent disability due to an accident which is attributable to the negligence of contractor, agency or firm or any of its employees as detailed below.

a) Victim: Any person who suffers permanent disablement or dies in an accident as defined below.

b) Accident: Any death or permanent disability resulting solely and directly from any unintended and unforeseen injurious occurrence caused during the manufacturing/ operation and works incidental thereto at BHEL factories/ offices and precincts thereof, project execution, erection and commissioning, services, repairs and maintenance, trouble shooting, serving, overhaul, renovation and retrofitting, trial operation, performance guarantee testing undertaken by the company or during any works/ during working at BHEL Units/ Offices/ townships and premises/ Project Sites.

c) Compensation in respect of each of the victims:

i. In the event of death or permanent disability resulting from Loss of both limbs:
Rs. 10,00,000/- (Rs. Ten Lakh).
ii. In the event of other permanent disability: Rs.7,00,000/- (Rs. Seven Lakh)

d) Permanent Disablement: A disablement that is classified as a permanent total disablement under the proviso to section 2 (I) of the Employee's Compensation Act, 1923.

2.8.26 Contractor shall be fully responsible for their T&Ps and other material mobilized at site. In any case, BHEL shall not be liable for any damage/loss/misuse of any item(s) belong to the contractor.

2.9 EXECUTION PLAN, PROGRESS MONITORING, MONTHLY REVIEW AND PERFORMANCE EVALUATION

2.9.1 A tentative plan/ programme for completion of the contractual scope of work as per the time schedule given in the contract shall be made jointly by BHEL and Contractor, before commencement of work. The above programme shall be supported by month wise deployment of resources viz Manpower, T&P, Consumables, etc. Progress will be reviewed periodically (Daily/Weekly/Monthly) vis-à-vis this jointly agreed programme.
Subsequently, every month, quarterly rolling plan will be made by BHEL based on budgeted targets. Monthly plan in F-14 format shall be drawn from this Quarterly plan. Monthly plan shall necessarily include activities required for achieving targets/ milestones unless inputs/ fronts are not available. While planning and arriving on asking rate all available inputs shall be taken into consideration.
Vendor will be required to execute the monthly plan in that month in addition to make full efforts to minimize the cumulative shortfall attributable to him up to the month.
BHEL may require monthly work plan up to one and half times of average monthly value and demand matching manpower.
Where, Average Monthly Value = Total Contract Value (as per latest revision) / Period of Contract (in months)
Provided, this requirement is reflected in the rolling quarterly plan two months in advance.

If the Contractor refuses to sign the F-14 format, those F-14 formats requiring Contractor's signature shall be deemed to have been signed and accepted by the Contractor, if communicated to the Contractor through email or any other mode as stated in clause 2.3.1.

The Contractor shall submit periodical progress reports (Daily/Weekly/Monthly) and other reports/information including manpower, consumables, T&P mobilization etc. as desired by BHEL.

2.9.2 Monthly progress review between BHEL and Contractor shall be based on the agreed programme as above, availability of inputs/fronts etc., and constraints if any, as per prescribed formats (i.e. Form F-14). Manpower, T&P and consumable reports as per prescribed formats shall be submitted by contractor every month. Release of RA Bills shall be contingent upon certification by BHEL Site Engineer of the availability of the above prescribed formats duly filled in and signed.

2.9.3 The burden of proof that the causes leading to any shortfall is not due to any reasons attributable to the contractor is on the contractor himself. The monthly progress review shall record shortfalls attributable to (i) Contractor, (ii) Force Majeure Conditions, and (iii) BHEL

2.9.4 Performance of the Contractor shall be assessed as per prescribed formats and shall form the basis for 'Assessment of Capacity of Bidder' for Tenders where the Contractor is a bidder. BHEL reserves the right to revise the evaluation formats during the course of execution of the works.

2.10 TIME OF COMPLETION

2.10.2 The time schedule shall be as prescribed in the Contract. The time for completion shall be reckoned from the date of commencement of work at Site as certified by BHEL Engineers.

2.10.3 Time being the essence of the contract, the entire work shall be completed by the contractor within the time schedule or within such extended periods of time as may be allowed by BHEL under clause 2.11.

2.11 EXTENSION OF TIME FOR COMPLETION

2.11.1 If the completion of work as detailed in the scope of work gets delayed beyond the contract period,

the contractor shall request for an extension of the contract and BHEL at its discretion may extend the Contract.

2.11.2 Based on the F-14 formats, the works balance at the end of original contract period less the backlog attributable to the contractor shall be quantified, and the number of months of 'Time extension' required for completion of the same shall be jointly worked out. Within this period of 'Time extension', the contractor is bound to complete the portion of backlog attributable to the contractor. Any further 'Time extension' or 'Time extensions' at the end of the previous extension shall be worked out similarly.

2.11.3 However, if any 'Time extension' is granted to the contractor to facilitate continuation of work and completion of contract, due to backlog attributable to the contractor alone, then it shall be without prejudice to the rights of BHEL to impose penalty/LD for the delays attributable to the contractor, in addition to any other actions BHEL may wish to take at the risk and cost of contractor.

2.11.4 Planning, progress monitoring, monthly review and performance monitoring shall be carried out as per clause 2.9 of GCC.

2.12 OVERRUN COMPENSATION

2.12.1 ORC during original contract period: No ORC shall be applicable during the original contract period.

2.12.2 ORC during extended period for the reasons solely attributable to contractor: No ORC shall be applicable during the extended period granted for the reasons solely attributable to contractor and work executed during this period shall be paid as per original contract rates.

2.12.3 ORC during extended period for the reasons not attributable to contractor: ORC shall be payable as per following procedure:

2.12.3.1 For initial period of twelve months of extended period, ORC rate applicable over executed value shall be 5%. For every subsequent period of twelve months, ORC rate shall be further increased by 5% over the previous rate. For example, ORC rates applicable for initial period of 12 months and subsequent period of 12 months are given below.

Sl. No.	Extended Period for the reasons attributable to BHEL	ORC rate applicable over executed value
1	First 12 months	5%
2	13th-24th month and so on	10.25% {[(1.05 x 1.05)-1] x 100}

This process of increasing ORC rate for each subsequent period of 12 months shall continue till applicability of ORC.

2.12.3.2 On completion of original contract period as well as on completion of each subsequent period of twelve months i.e. at the time of change in applicable ORC rate, Delay Analysis shall be carried out and percentage shortfall attributable to both BHEL & Contractor shall be calculated.

2.12.3.3 For the purpose of calculation of ORC, executed value of work in the month shall be divided in Part-1 and Part-2 in proportion of percentage shortfall attributable to BHEL and contractor respectively, based on the last delay analysis as worked out in 2.12.3.2.

ORC shall be payable only on Part-1 and no ORC shall be payable on Part-2.

Value of Part-1 shall be further limited to the value of actual inputs provided by BHEL i.e. "Plan - Shortfall attributable to BHEL" for the month, as per Form-14 for calculation of ORC.

2.12.3.4 Payment of ORC amount shall be further regulated as follows:

(i) 50% of the ORC is allocated for deployment of matching resources (with weightages) agreed as per the joint programme drawn vide 2.11.4. ORC Payment against resources shall be calculated in proportion to percentage of resources actually deployed w.r.t. planned resources, as per Form-14.

(ii) 50% of ORC is allocated for achieving of planned progress agreed as per the joint programme drawn vide 2.11.4. ORC Payment shall be reduced in proportion to percentage shortfall attributable to contractor w.r.t.-"Plan - Shortfall attributable to BHEL" for the month, as per Form-14.

2.12.3.5 The maximum amount of ORC payable for the month shall be limited to Rs. 5,00,000/-.

2.12.3.6 In case, there is no shortfall attributable to contractor for the month and also contractor has deployed the resources as agreed in Form-14 but ORC amount payable for the month worked out as per procedure mentioned in clause 2.12.3.3, 2.12.3.4 and 2.12.3.5, is less than Rs.1,00,000/-, then ORC amount payable for the month shall be Rs.1,00,000/- otherwise ORC amount payable for the month shall remain same.

2.12.3.7 In case execution is on **HOLD** (Other than Force Majeure), ORC shall be payable as per following:

i). Contractor has not been permitted by BHEL to de-mobilize

a) ORC amount of Rs. 1,00,000/- per month shall be applicable during the period of HOLD provided resources as planned are deployed (not demobilised) during the period of hold.

b) Subsequent to lifting of HOLD, Period of HOLD shall not be excluded in calculation of period for deciding applicable ORC rate as per clause 2.12.3.1.

ii). Contractor has been permitted to demobilize and to remobilize after lifting of HOLD

a) No ORC shall be payable to contractor for the period of HOLD.

b) Subsequent to lifting of HOLD, Period of HOLD shall not be excluded in calculation of period for deciding applicable ORC rate as per clause 2.12.3.1.

2.12.3.8 In case **Force Majeure** is invoked:

i). No ORC shall be applicable during the period of Force Majeure.

ii). Subsequent to revocation of Force Majeure, period of Force Majeure shall be excluded in calculation of period for deciding applicable ORC rate as per clause 2.12.3.1.

2.12.4 Applicability of ORC: ORC shall not be applicable for following activities.

i). Area cleaning, removal of temporary structures and return of scrap.

ii). Punch list points / pending points liquidation pending due to reasons attributable to contractor

iii). Submission of "As built Drawing"

iv). Material Reconciliation

v). Completion of Contract Closure formalities like HR Clearance/ No dues from various dept./ Statutory Authorities etc.

2.12.5 Total Over Run Compensation shall be limited to 10% of the cumulatively executed contract value till the month (excluding Taxes and Duties if payable extra). For this purpose, executed contract value excludes PVC, ORC and Extra/Supplementary Works.

2.13 INTEREST BEARING RECOVERABLE ADVANCES

2.13.1 MOBILIZATION ADVANCE: Normally no advance is payable to the contractor. However, mobilization advance payment in exceptional circumstances shall be interest bearing and secured

through a Bank Guarantee and shall be limited to a maximum of 5% of contract value. This 'Interest Bearing Recoverable Advance' shall be payable in not less than two installments with any of the installment not exceeding 60% of the total eligible advance.

2.13.2 ADDITIONAL INTERIM ADVANCE: In exceptional circumstances, with due justification, Competent Authority of BHEL is empowered to approve proposals for payment of additional interim interest bearing advance against Bank Guarantee, for resource augmentation towards expediting work for project implementation.

2.13.3 Bank Guarantee towards 'Interest Bearing Recoverable Advance' shall be at least 110% of the advance so as to enable recovery of not only principle amount but also the interest portion, if so required.

2.13.4 Contractor shall establish the utilization of advance drawn before the release of next installment.

2.13.5 Payment and recovery of Interest Bearing Recoverable advance shall be at the sole discretion of BHEL and shall not be a subject matter of arbitration.

2.13.6 The rate of interest applicable for the above advances shall be the base rate of State Bank of India prevailing on the date of release of advance plus 6%, and such rate will remain fixed till the total advance amount is recovered.

2.13.7 Unadjusted amount of advances paid shall not exceed 5% of the total contract value at any point of time. Recovery of advances shall be made from the Running Bills progressively such that the advance amounts paid along with the interest is fully recovered by the time the contractor's billing reaches 90% of contract value.

2.13.8 Recovery rate per month shall be the sum of:

i) Not less than 10% of Running Bill amount

ii) Simple interest up to the date of RA Bill on the outstanding Principle amount/amounts

2.13.9 Contractor to submit Bank Guarantee as per prescribed formats for each of the advance and shall be valid for at least one year or the recovery duration whichever is earlier. In case the recovery of dues does not get completed within the aforesaid BG period, the contractor shall renew the BG or submit fresh BG for the outstanding amount, valid for at least one year or the remaining recovery duration whichever is earlier.

2.13.10 BHEL is entitled to make recovery of the entire outstanding amount in case the contractor fails to comply with the BG requirement.

2.14 QUANTITY VARIATION

2.14.1 Variation in Final Executed Contract Value

The quantities given in the contract are tentative and may change to any extent (both in plus side and minus side). No compensation becomes payable in case the variation of the final executed contract value is within the limits of Minus (-) 15% of awarded contract value. Also, no compensation becomes payable in case the contract gets partially executed/ short closed/ terminated/ work withdrawn under Rights of BHEL mentioned in Clause 2.7 of GCC. In case of work terminated/ short closed under clause 2.7.4 of GCC, compensation may be considered only if

BHEL receives compensation from customer.

Compensation due to variation of final executed contract value in excess of the limits defined in clause above, shall be as follows:

i) In case the finally executed contract value reduces below the lower limit of awarded Contract Value due to quantity variation specified above, the Contractor will be eligible for compensation @ 15% of the difference between the lower limit of the awarded contract value and the actual executed contract value.

ii) In case the finally executed contract value increases above the awarded Contract Value due to quantity variation, the Contractor is not eligible for any compensation.

2.14.2 Variation in Individual Quantities of BOQ Item(s)

The quantities given in the contract are tentative and may change to any extent (both in plus side and minus side). No compensation becomes payable in case the variation of the quantity of individual BOQ item(s) is within the limits of Plus (+) 100% of the quantity in the original price schedule.

In case executed quantity for a particular BOQ item(s) exceeds two times the quantity in the original price schedule (100% increase), then the revision in rates for such BOQ item(s) for the quantity in excess of two times the quantity in the original price schedule including any subsequent increase in quantity, may be considered based on request from the Contractor, however, BHEL decision in this regard shall be final. Revised rates for subject BOQ item(s) shall be worked out on the basis of prevailing market rates mutually agreed between BHEL and Contractor. PVC/ ORC will not be applicable for these revised rates.

BHEL, however, retains the right to arrange the excess quantity through any other source for expediting activities in the interest of the Project.

Note: (a) Revision in rates under clause 2.14.2 will remain admissible in those cases also, where, the Contractor is eligible for compensation under clause 2.14.1 i).

(b) The value of work executed at revised rates due to variation in Individual Quantities of BOQ Item(s) shall be included while calculating the finally executed contract value in clause no. 2.14.1 above.

2.15 EXTRA WORKS

2.15.1 All rectifications/modifications, revamping and reworks required for any reasons not due to the fault of the contractor, or needed due to any change in deviation from drawings and design of equipments, operation/maintenance requirements, mismatching or due to damages in transit, storage and erection/commissioning and other allied works which are not very specifically indicated in the drawings, but are found essential for satisfactory completion of the work, will be considered as extra works.

2.15.2 Extra works arising on account of the contractor's fault, irrespective of time consumed in rectification of the damage/loss, will have to be carried out by the contractor free of cost. Under such circumstances, any material and consumable required for this purpose will also have to be arranged by the contractor at his cost.

2.15.3 All the extra work should be carried out by a separately identifiable gang, without affecting routine activities. Daily log sheets in the pro-forma prescribed by BHEL should be maintained and shall be

signed by the contractor's representative and BHEL engineer. No claim for extra work will be considered/entertained in the absence of the said supporting documents i.e. daily log sheets. Signing of log sheets by BHEL engineer does not necessarily mean the acceptance of such works as extra works.

2.15.4 BHEL retains the right to award or not to award any of the major repair/ rework/modification/rectification/fabrication works to the contractor, at their discretion without assigning any reason for the same.

2.15.5 After eligibility of extra works is established and finally accepted by BHEL engineer/designer, payment will be released on competent authority's approval at the following rate.

MAN-HOUR RATE FOR ELIGIBLE EXTRA WORKS: Single composite average labour man-hour rate, including overtime if any, supervision, use of tools and tackles and other site expenses and incidentals, consumables for carrying out any major rework/ repairs/ rectification/ modification/ fabrication as certified by site as may arise during the course of erection, testing, commissioning or extra works arising out of transit, storage and erection damages, payment, if found due will be at NPR 172.8/- per man hour.

2.15.6 The above composite labour man hour rate towards extra works shall remain firm and not subject to any variation during execution of the work. PVC will not be applicable for extra works. Rate revision, Over Run Charges/compensation etc. will not be applicable due to on extra works.

2.15.7 Not Applicable

2.16 SUPPLEMENTARY ITEMS

2.16.1 For NON Civil Works

Supplementary items are items/works required for completion of entire work but not specified in the scope of work. Subject to certification of such items/works as supplementary items by BHEL Engineer, rates shall be derived on the basis of any one of the following on mutual agreement:

i) Based on percentage breakup/rates indicated for similar/nearby items.

ii) In case (i) above does not exist, then BHEL/site may derive the percentage breakup/rates to suit the type of work.

2.16.2 For Civil Works

i) Rates for Supplementary Works/Additional Works arising out due to additions/alterations in the original scope of works as per contract subject to certification of BHEL Engineer shall be worked out as under:

a) Item rates which are available in existing BOQ (Rate Schedule) shall be operated with applicable escalation derived from All India Consumer Price Index for Whole Sale Commodities

b) Items of works which are not available in existing BOQ shall be operated as an 'Extra Works' and rate shall be derived as per clause no 2.15.7

ii) Execution of Supplementary Works/Additional Works through the Contractor shall be at the sole discretion of BHEL, and shall be considered as part of executed contract value for the purpose of Quantity Variation as per clause 2.14

iii) BHEL Engineer's decision regarding fixing the rate as above is final and binding on the contractor.

iv) PVC and ORC will not be applicable for (i) above.

2.17 PRICE VARIATION COMPENSATION

2.17.1 In order to take care of variation in cost of execution of work on either side, due to variation in the

index of LABOUR, HIGH SPEED DIESEL OIL, WELDING ROD, CEMENT, STEEL, MATERIALS, Price Variation Formula as described herein shall be applicable.

2.17.2 85% component of Contract Value shall be considered for PVC calculations and remaining 15% shall be treated as fixed component. The basis for calculation of price variation in each category, their component, Base Index, shall be as under:

Sl No	Category	Base Index	Percentage Component ('K') for Electrical, C&I, Material Management/ Handling and other labour oriented packages
i)	Labour (All Categories)	Nepali field labour index namely "National salary & wage index for construction labours (Base: 2004-05 = 100) issued by Nepal Rastra Bank"	85

2.17.3 #

2.17.4 Payment/recovery due to variation in index shall be determined on the basis of the following notional formula in respect of the identified COMPONENT ('K') viz LABOUR

$$P = K \times R \times \frac{(X_N - Xo)}{Xo}$$

Where,

P = Amount to be paid/recovered due to variation in the Index for Labour.
K = Percentage COMPONENT ('K') applicable for Labour.
R = Value of work done for the billing month (Excluding Taxes and Duties if payable extra)
X_N = Index of Nepali field labour for the billing month under consideration.
Xo = Index of Nepali field labour as on Base date.

2.17.5 PVC shall not be payable for the ORC amount, Supplementary/Additional Items, Extra works. However, PVC will be payable for items executed under quantity variation of BOQ items under originally awarded contract.

2.17.6 Base date shall be calendar month of the 'last date of submission of Tender'.

2.17.7 The contractor shall furnish necessary monthly bulletins in support of the requisite indices from the relevant websites along with his Bills.

2.17.8 The contractor will be required to raise the bills for price variation payments on a monthly basis along with the running bills irrespective of the fact whether any increase/decrease in the index for relevant categories has taken place or not. In case there is delay in publication of bulletins (final figure), the provisional values as published can be considered for payments and arrears shall be paid/recovered on getting the final values.

2.17.9 PVC shall be applicable for the entire original contract period plus the extended period, i.e. for the complete execution period, as follows:

For PVC computation of the n^{th} month:

Let the cumulative delay attributable to the Contractor is D_n in the n^{th} month as per Form-14.

Considering R_n as the billing value for the n^{th} month, PVC for the n^{th} month shall be calculated as follows:

a) PVC for the portion of R_n for an amount of $D_{(n-1)}$ shall be payable as per indices for the $(n-1)^{th}$ month.
b) PVC for the balance portion of R_n shall be payable as per indices for the n^{th} month

In case $D_{(n-1)}$ is greater than R_n, then entire R_n shall be payable as per indices for the $(n-1)^{th}$ month and the balance portion of $D_{(n-1)}$ shall be adjusted from $R_{(n+1)}$ of the $(n+1)^{th}$ month and will be payable as per indices for the $(n-1)^{th}$ month. The above process shall be continued for subsequent month(s) also till full $D_{(n-1)}$ is consumed.

i) For milestones mentioned in the contract, PVC shall be applicable as per average of the indices from the month of base date till the month of execution of milestone.

ii) PVC shall not be applicable for time extension provided for the delays solely attributable to the contractor. No PVC is payable during the period of Provisional Time Extension till grant of final time extension. Applicability of PVC will be decided at the time of grant of final time extension.

iii) The total amount of PVC shall not exceed 15% of the cumulatively executed contract value. Executed contract value for this purpose is exclusive of PVC, ORC, Supplementary/Additional Items and Extra works except items due to quantity variation.

Note: Work Planning in F-14 format to be meticulously done as per Clause 2.9 of this GCC.

2.18 INSURANCE

2.18.1 BHEL/their customer shall arrange for insuring the materials/properties of BHEL/customer covering the risks during transit, storage, erection and commissioning.

2.18.2 It is the sole responsibility of the contractor to insure his materials, equipment, workmen etc. against accidents and injury while at work and to pay compensation, if any, to workmen as per Workmen's compensation Act. The work will be carried out in a protected area and all the rules and regulations of the client /BHEL in the area of project which are in force from time to time will have to be followed by the contractor.

2.18.3 If due to negligence and or non-observation of safety and other precautions by the contractors, any accident/injury occurs to the property / manpower belong to third party, the contractor shall have to pay necessary compensation and other expense, if so decided by the appropriate authorities.

2.18.4 The contractor will take necessary precautions and due care to protect the material, while in his custody from any damage/ loss due to theft or otherwise till the same is taken over by BHEL or customer. For lodging / processing of insurance claim, the contractor will submit necessary

documents. BHEL will recover the loss including the deductible franchise from the contractor, in case the damage / loss is due to carelessness / negligence on the part of the contractor. In case of any theft of material under contractor's custody, matter shall be reported to Police by the contractor immediately and copy of FIR and subsequently police investigation report shall be submitted to BHEL for taking up with insurance. However, this will not relieve the contractor of his contractual obligation for the material in his custody.

2.18.5 The Contractor shall effect and maintain insurance against liability for claims, damages, losses and expenses (including legal fees and expenses) arising from injury, sickness, disease or death of any person employed by the Contractor or any other of the Contractor's Personnel.
The benefits payable under the Contractor's insurance policy shall recognize local cultural and economic conditions, and in addition to death and other benefits, will make specific provisions for repatriation and funeral costs. The terms of this policy shall be made known to the Contractor's Personnel or to their recognized representatives.

2.19 STRIKES & LOCKOUT

2.19.1 The contractor will be fully responsible for all disputes and other issues connected with his labour. In the event of the contractor's labour resorting to strike or the Contractor resorting to lockout and if the strike or lockout declared is not settled within a period of one month, BHEL shall have the right to get the work executed through any other agencies at risk and cost of contractor under Clause 2.7.

2.19.2 For all purposes whatsoever, the employees of the contractor shall not be deemed to be in the employment of BHEL.

2.20 FORCE MAJEURE

2.20.1 "Force Majeure" shall mean circumstance which is: a) beyond a party's control, b) The party could not reasonably have provided against before entering into the contract, c) Having arisen, such party could not reasonably have avoided or overcome, and d) Is not substantially attributable to the other party. Such circumstances include but not limited to

i) Exceptionally adverse climatic conditions at the site which are unforeseeable having regard to climate data available or published in the country for the geographical location of the site.
ii) War, hostilities (whether war be declared or not), invasion, act of foreign enemies.
iii) Rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war.
iv) Riot, commotion or disorder by persons other than the contractor's personnel and other employees of the contractor and sub-contractors.
v) Strike or lockout not solely involving the contractor's personnel and other employees of the contractor and sub-contractors.
vi) Encountering munitions of war, explosive materials, ionizing radiation or contamination by radio-activity, except as may be attributable to the contractor's use of such munitions, explosives, radiation or radio- activity.
vii) Natural catastrophes such as earthquake, tsunami, volcanic activity, hurricane or typhoon, flood, fire, cyclones etc.

2.20.2 The following events are explicitly excluded from Force Majeure and are solely the responsibilities of the non-performing party: a) any strike, work-to-rule action, go-slow or similar labour difficulty (b) late delivery of equipment or material (unless caused by Force Majeure event) and (c) economic hardship.

2.20.3 If either party is prevented, hindered or delayed from or in performing any of its obligations under

the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances thereof within fourteen (14) days after the occurrence of such event.

2.20.4 The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such party's performance is prevented, hindered or delayed. The Time for Completion shall be extended by a period of time equal to period of delay caused due to such Force Majeure event.

2.20.5 Delay or non-performance by either party hereto caused by the occurrence of any event of Force Majeure shall not

i) Constitute a default or breach of the Contract.

ii) Give rise to any claim for damages or additional cost expense occasioned thereby, if and to the extent that such delay or non-performance is caused by the occurrence of an event of Force Majeure.

2.20.6 BHEL at its discretion may consider short closure of contract after 1 year of imposition of Force Majeure in line with extant guidelines. In any case, Contractor cannot consider deemed short-closure after 1 year of imposition of Force Majeure.

2.21 ARBITRATION & CONCILIATION

2.21.1 ARBITRATION:

2.21.1.1 Except as provided elsewhere in this Contract, in case Parties are unable to reach amicable settlement (whether by Conciliation to be conducted as provided in Clause 2.21.2 herein below or otherwise) in respect of any dispute or difference; arising out of the formation, breach, termination, validity or execution of the Contract; or, the respective rights and liabilities of the Parties; or, in relation to interpretation of any provision of the Contract; or. in any manner touching upon the Contract (hereinafter referred to as the 'Dispute'), then, either Party may, commence arbitration in respect of such Dispute by issuance of a notice in terms of section 21 of the Arbitration & Conciliation Act, 1996 (hereinafter referred to as the 'Notice'). The Notice shall be addressed to the Head of the Power Sector Region issuing the Contract and shall contain the particulars of all claims to be referred to arbitration in sufficient detail and shall also indicate the monetary amount of such claim. Within 60 days of receipt of the complete Notice, the Head of the BHEL Power Sector Region issuing the Contract shall offer names of three proposed Arbitrators to the invoking Party advising to choose any one of the three names to be appointed as Sole Arbitrator. On getting confirmation from the invoking Party regarding the Arbitrator chosen from among the names so offered, the Head of the BHEL Power Sector Region issuing the Contract, shall appoint such chosen person as the Sole Arbitrator for conducting the arbitration. The language of arbitration shall be English.

The Arbitrator shall pass a reasoned award.

Subject as aforesaid, the provisions of Arbitration and Conciliation Act 1996 (India) or statutory modifications or re-enactments thereof and the rules made thereunder as in force from time to time shall apply to the arbitration proceedings under this clause. The seat of arbitration shall be _____ (the place from where the contract is Issued). The Contract shall be governed by and be construed as per provisions of the laws of India. Subject to this provision 2.21.1.1 regarding ARBITRATION, the principal civil court exercising ordinary civil jurisdiction over the area where the seat of arbitration is located shall have exclusive jurisdiction over any DISPUTE to the

exclusion of any other court.

2.21.1.2 In case of Contract with Public Sector Enterprise (PSE) or a Government Department, the following shall be applicable:

In the event of any dispute or difference relating to the interpretation and application of the provisions of commercial contract(s) between Central Public Sector Enterprises (CPSEs)/ Port Trusts inter se and also between CPSEs and Government Departments/Organizations (excluding disputes concerning Railways, Income Tax, Customs & Excise Departments), such dispute or difference shall be taken up by either party for resolution through AMRCD (Administrative Mechanism for Resolution of CPSEs Disputes) as mentioned in DPE OM No. 4(1)/2013-DPE(GM)/FTS-1835 dated 22-05-2018 as amended from time to time.

2.21.1.3 The cost of arbitration shall initially be borne equally by the Parties subject to the final allocation thereof as per the award/order passed by the Arbitrator.

2.21.1.4 Notwithstanding the existence of any dispute or differences and/or reference for the arbitration, the Contractor shall proceed with and continue without hindrance the performance of its obligations under this Contract with due diligence and expedition in a professional manner unless the dispute inter-alia relates to cancellation, termination or short-closure of the Contract by BHEL.

2.21.2 **CONCILIATION**:

If at any time (whether before, during or after the arbitral or judicial proceedings), any Disputes (which term shall mean and include any dispute, difference, question or disagreement arising in connection with construction, meaning, operation, effect, interpretation or breach of the agreement, contract), which the Parties are unable to settle mutually, arise inter-se the Parties, the same may, be referred by either party to Conciliation to be conducted through Independent Experts Committee (IEC) to be appointed by competent authority of BHEL from the BHEL Panel of Conciliators.

Notes:

1. No serving or a retired employee of BHEL/Administrative Ministry of BHEL shall be included in the BHEL Panel of Conciliators.

2. Any other person(s) can be appointed as Conciliator(s) who is/are mutually agreeable to both the parties from outside the BHEL Panel of Conciliators.

The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided in Procedure 2.3 to this GCC. The Procedure 2.3 together with its Formats will be treated as if the same is part and parcel hereof and shall be as effectual as if set out herein in this GCC.

The Contractor hereby agrees that BHEL may make any amendments or modifications to the provisions stipulated in the Procedure 2.3 to this GCC from time to time and confirms that it shall be bound by such amended or modified provisions of the Procedure 2.3 with effect from the date as intimated by BHEL to it.

2.21.3 **No Interest payable to Contractor**

Notwithstanding anything to the contrary contained in any other document comprising in the Contract, no interest shall be payable by BHEL to Contractor on any moneys or balances including but not limited to the Security Deposit, EMD, Retention Money, RA Bills or the Final

Bill, or any amount withheld and/or appropriated by BHEL etc., which becomes or as the case may be, is adjudged to be due from BHEL to Contractor whether under the Contract or otherwise.

2.22 RETENTION AMOUNT

2.22.1 Retention Amount shall be 5% of executed contract value and shall be recovered at the rate of 5% from each Running Bill admitted, including PVC Bills. Alternatively, BG, in line with clause 1.12 of GCC, equivalent to 5% of Contract Value against Retention Amount can also be submitted before payment of first RA Bill. The validity of the said BG shall be initially for the contract period & shall be extended, if so required, up to acceptance of final bill. In case of increase in contract value, additional BG for 5% of differential amount shall be submitted by Contractor before payment of next RA Bill due. In case, contractor opts cash deduction from RA bills in the beginning & subsequently offers to submit BG later on, then refund of deducted retention amount may be permitted against submission of equivalent BG only once during the contract period.

2.22.2 Refund of Retention Amount shall be as follows:

100% of Retention Amount/ BG against Retention Amount shall be released along with Final Bill after deduction all expenses/ other amounts due to BHEL under the contract/ other contracts entered into with them (contractor) by BHEL.

2.23 PAYMENTS

Payments to Contractors are made in any one of the following forms: -

2.23.1 **Running Account Bills (RA Bills)**

i) These are for interim payments when the contracts are in progress. The bills for such interim payments are to be prepared by Contractor in prescribed formats (RA Bill forms).

ii) Payments shall be made according to the extent of work done as per measurements taken up to the end of the calendar month and in line with the terms of payments described in the Tender documents.

iii) Recoveries on account of electricity, water, statutory deductions etc. are made as per terms of contract.

iv) Full rates for the work done shall be allowed only if the quantum of work has been done as per the specifications stipulated in the contract. If the work is not executed as per the stipulated specifications, BHEL may ask the contractor to redo the work according to the required specifications, without any extra cost. However, where this is not considered necessary 'OR' where the part work is done due to factors like non-availability of material to be supplied by BHEL 'OR' non availability of fronts 'OR' non availability of drawings, fraction payment against full rate, as is considered reasonable, may be allowed with due regard for the work remaining to be done. BHEL decision in this regard will be final and binding on the contractor.

v) In order to facilitate part payment, BHEL at its discretion may further split the contracted rates/percentages to suit site conditions, cash flow requirements according to the progress of work, subject to following:

a) Provided no 'part' payment is recommended till 25% of work in the item rate is executed.

b) Payment of item rate to be made in not more than three instalments, last stage payment to be not lower than 20% of the item rate.

2.23.2 **Final Bill**

Final Bill' is used for final payment on closing of Running Account for works or for single payment

after completion of works. 'Final Bill' shall be submitted as per prescribed format after completion of works as per scope and upon material reconciliation, along with the following:

i) 'No Claim Certificate' by Contractor
ii) Clearance certificates where ever applicable viz. Clearance Certificates from Customer, various Statutory Authorities like Labour department, PF Authorities, Commercial Tax Department etc.
iii) Indemnity Bond as per prescribed format.

BHEL shall settle the final bills after deducting all liabilities of Contractor to BHEL.

2.24 PERFORMANCE GUARANTEE FOR WORKMANSHIP

2.24.1 Even though the work will be carried out under the supervision of BHEL Engineers the Contractor will be responsible for the quality of the workmanship and shall guarantee the work done for a period of **Twenty Four months (24) months from the date of completion of the facilities (or any part thereof)** as defined in Technical Conditions of Contract, for good workmanship and shall rectify free of cost all defects due to faulty erection detected during the guarantee period. In the event of the Contractor failing to repair the defective works within the time specified by the Engineer, BHEL may proceed to undertake the repairs of such defective works at the Contractor's risk and cost, without prejudice to any other rights and recover the same from the Security Deposit..

2.24.2 BHEL shall release the Security Deposit subject to the following

i) Contractor has submitted 'Final Bill'
ii) Guarantee period as per contract has expired
iii) Contractor has furnished 'No Claim Certificate' in specified format
iv) BHEL Site Engineer/Construction Manager has furnished the 'No Demand Certificate' in specified format
v) Contractor has carried out the works required to be carried out by him during the period of Guarantee and all expenses incurred by BHEL on carrying out such works is included for adjustment from the Security Deposit refundable.

2.25 CLOSING OF CONTRACTS

The Contract shall be considered completed and closed upon completion of contractual obligations and settlement of Final Bill or completion of Guarantee period whichever is later. Upon closing of Contract, BHEL shall issue a performance/ experience certificate as per standard format, based on specific request of Contractor as per extant BHEL guidelines.

2.26 SUSPENSION OF BUSINESS DEALINGS

BHEL reserves the right to take action against Contractors who either fail to perform or Tenderers/Contractor who indulge in malpractices, by suspending business dealings with them in line with BHEL guidelines issued from time to time.

2.27 LIMITATION ON LIABILITY:

Notwithstanding anything to the contrary in this Agreement or the Work Order or any other mutually agreed document between the parties, the maximum liability, for damages, of the contractor, its servants or agents, shall under no circumstances exceed an amount equal to the Price of the Agreement or the Work Order. The Supplier shall not in any case be liable for loss of profit or special, punitive, exemplary, indirect or consequential losses whatsoever. This shall not be applicable on the recoveries arising out of Risk and Cost, recoveries made by Customer from BHEL on account of

Contractor, any other type of recoveries for workmanship, material, T&P etc. due from the contractor.

2.28 OTHER ISSUES

2.28.1 Value of Non judicial Stamp Paper for Bank Guarantees and for Contract Agreement shall be not less than Rs 100/- unless otherwise required under relevant statutes.

2.28.2 In case of any conflict between the General Conditions of Contract and Special Conditions of Contract, provisions contained in the Special Conditions of Contract shall prevail.

2.28.3 Unless otherwise specified in NIT, offers from consortium/ JVs shall not be considered.

2.28.4 BHEL may not insist for signing of Contract Agreements in respect of low value and short time period contracts like providing services for Hot water flushing, Chemical Cleaning, Transportation, Geo-Technical works, Hiring of T&Ps/ Vehicles/ Equipments etc. and work shall be executed as per the terms of LOI/LOA/Work Order. BHEL may not insist for signing of Contract Agreements in respect of works costing upto Rs. 2 lakhs (upto Rs. 5 lakhs in case scheduled completion period is not more than 3 months**).**

Rev 01

1st June 2012

FORMS & PROCEDURES

(Document No. PS:MSX:F&P)

BHARAT HEAVY ELECTRICALS LIMITED

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: will be released later

OFFER FORWARDING LETTER / TENDER SUBMISSION LETTER

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

Offer Reference No:…… Date:……

To,

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

Dear Sir,

Sub : Submission of Offer against Tender Specification No: ……

I/We hereby offer to carry out the work detailed in the Tender Specification issued by Bharat Heavy Electricals Limited, Power Sector-……., in accordance with the terms and conditions thereof.

I/We have carefully perused the following listed documents connected with the above work and agree to abide by the same.

1. Amendments/Clarifications/Corrigenda/Errata/etc issued in respect of the Tender documents by BHEL
2. Notice Inviting Tender (NIT)
3. Price Bid
4. Technical Conditions of Contract
5. Special Conditions of Contract
6. General Conditions of Contract
7. Forms and Procedures

Should our Offer be accepted by BHEL for Award, I/we further agree to furnish 'Security Deposit' for the work as provided for in the Tender Conditions within the stipulated time as may be indicated by BHEL.

I/We further agree to execute all the works referred to in the said Tender documents upon the terms and conditions contained or referred to therein and as detailed in the appendices annexed thereto.

I/We have deposited/depositing herewith the requisite Earnest Money Deposit (EMD) as per details furnished in the Check List.

Authorised Representative of Bidder
Signature :
Name :
Address :

Place:
Date:

DECLARATION BY AUTHORISED SIGNATORY OF BIDDER

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

To,

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

Dear Sir,

Sub : **Declaration by Authorised Signatory**

Ref : 1) NIT/Tender Specification No: ……,

2) All other pertinent issues till date

I/We, hereby certify that all the information and data furnished by me with regard to the above Tender Specification are true and complete to the best of my knowledge. I have gone through the specifications, conditions, stipulations and all other pertinent issues till date, and agree to comply with the requirements and Intent of the specification.

I further certify that I am authorised to represent on behalf of my Company/Firm for the above mentioned tender and a valid Power of Attorney to this effect is also enclosed.

Yours faithfully,

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

Date:

Enclosed : Power of Attorney

DECLARATION BY AUTHORISED SIGNATORY OF BIDDER

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

To,

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

Dear Sir,

Sub : **Declaration by Authorised Signatory regarding Authenticity of submitted documents.**

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

I/We, hereby certify that all the documents submitted by us in support of possession of "Qualifying Requirements" are true copies of the original and are fully compliant required for qualifying / applying in the bid and shall produce the original of same as and when required by Bharat Heavy Electricals Limited.

I / We hereby further confirm that no tampering is done with documents submitted in support of our qualification as bidder. I / We understand that at any stage (during bidding process or while executing the awarded works) if it is found that fake / false / forged bid qualifying / supporting documents / certificates were submitted, it would lead to summarily rejection of our bid / termination of contract. BHEL shall be at liberty to initiate other appropriate actions as per the terms of the Bid / Contract and other extant policies of Bharat Heavy Electricals Limited.

Yours faithfully,

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

Date:

NO DEVIATION CERTIFICATE

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

To,

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

Dear Sir,

Sub : **No Deviation Certificate**

Ref : 1) NIT/Tender Specification No: ……,

2) All other pertinent issues till date

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

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

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

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

Thanking you,

Yours faithfully,

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

DECLARATION CONFIRMING KNOWLEDGE ABOUT SITE CONDITIONS

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

To,

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

Dear Sir,

Sub : **Declaration confirming knowledge about Site conditions**

Ref : 1) NIT/Tender Specification No: ……,

2) All other pertinent issues till date

I/We, _____ hereby declare and confirm that we have visited the Project Site as referred in BHEL Tender Specifications and acquired full knowledge and information about the Site conditions including Wage structure, Industrial Climate, the Law & Order and other conditions prevalent at and around the Site. We further confirm that the above information is true and correct and we shall not raise any claim of any nature due to lack of knowledge of Site conditions.

I/We, hereby offer to carry out work as detailed in above mentioned Tender Specification, in accordance with Terms & Conditions thereof.

Yours faithfully,

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

Date :

Place:

DECLARATION FOR RELATION IN BHEL

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

To,

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

Dear Sir,

Sub : **Declaration for relation in BHEL**
Ref : 1) NIT/Tender Specification No: ……,

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

Tick(√) any one as applicable:

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

OR

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

   (i)

   (ii)

Signature of the Authorised Signatory

Note:

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

NON DISCLOSURE CERTIFICATE

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

NON DISCLOSURE CERTIFICATE

I/We understand that BHEL PS __ is committed to Information Security Management System as per their Information Security Policy.

Hence, I/We M/s…….
who are submitting offer for providing services to BHEL PS __ against Tender Specification No:_____,
hereby undertake to comply with the following in line with Information Security Policy of BHEL PS ___, _____

- To maintain confidentiality of documents & information which shall be used during the execution of the Contract.
- The documents & information shall not be revealed to or shared with third party which shall not be in the business interest of BHEL PS__.

(Signature, date & seal of Authorized Signatory of the bidder)

Date:

BANK ACCOUNT DETAILS FOR E-PAYMENT

(To be given on Letter head of the Company /Firm of Bidder, and **ENDORSED (SIGNED & STAMPED) BY THE BANK** to enable BHEL release payments through Electronic Fund Transfer (EFT/RTGS)

---

1. Beneficiary Name :
2. Beneficiary Account No. :
3. Bank Name & Branch :
4. City/Place :
5. 9 digit M ICR Code of Bank Branch :
6. IFSC Code of Bank Branch :
7. Beneficiary E-mail ID (for payment confirmation) :

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

FORMAT FOR SEEKING CLARIFICATION

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

To,

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

Dear Sir,

Sub : **Request for Clarification**

Ref : 1) NIT/Tender Specification No: ……,

2) All other pertinent issues till date

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

Yours faithfully,

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

Form No: F-09 (Rev 00)

CAPACITY EVALUATION OF BIDDERS FOR CURRENT TENDER

SL NO.	DESCRIPTION OF WORK (Similar to Tendered Scope)	WORK ORDER REF & DATE	CONTRACT VALUE (Rs. LACS)	CUSTOMER NAME & ADDRESS	CURRENT STATUS OF THE JOB ALONG WITH LATEST MILE STONE COMPLETED	%AGE OF WORK COMPLETED	VALUE OF BALANCE WORK (Rs. Lacs)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

NOTES:

1. BIDDERS ARE REQUIRED TO FURNISH ALL THE JOBS OF SIMILAR NATURE WHICH THEY ARE EXECUTING (IN PROGRESS) AT THE TIME OF SUBMISSION OF TENDER, AS PER ABOVE FORMAT.

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

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

Signature

DATE :
PLACE:

Name, Designation & Seal of Bidder

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector – …… Region
……..
……

CONTRACT AGREEMENT

AGREEMENT NO._____ _____

NAME OF WORK	
NAME OF THE CONTRACTOR WITH FULL ADDRESS	
VALUE OF WORK AWARDED	
LETTER OF AWARD NO.	
TIME ALLOTTED FOR COMPLETING THE WORK (DATE OF COMPLETION)	

_____ _____
SIGNATURE OF CONTRACTOR (SIGNATURE OF BHEL OFFICER)

CONTRACT AGREEMENT

THIS AGREEMENT MADE THIS _____DAY OF_____ between BHARAT HEAVY ELECTRICALS LIMITED (A Government of India Enterprise) a Company incorporated under the Companies Act, 1956, having its Registered Office at BHEL House, Siri Fort New Delhi-110049 (herein after called BHEL) of the ONE PART.

AND

M/S _____ _____ (hereinafter called the `Contractor') of the SECOND PART.

WHEREAS M/s ----------state that they have acquired and possess extensive experience in the field of ----------

And Whereas in response to an Invitation to Tender No. ---------- issued by BHEL for execution of ---------- the contractor submitted their offer No.----------dated ----------And whereas BHEL has accepted the offer of the Contractor on terms and conditions specified in the Letter of Award No.----------dated ----------read with the references cited therein.

THIS AGREEMENT WITNESSES AND it is hereby agreed by and between the parties as follows:

1. That the contractor shall execute the work of ----------and more particularly described in Tender Specification No ----------including Drawings and Specifications (hereinafter called the said works) in accordance with and subject to terms and conditions contained in these presents, instructions to Tenderers, General Conditions of Contract, Special Conditions, Annexures, Letter of Award dated ---------- and such other instructions, Drawings, Specifications given to him from time to time by BHEL.

2. The Contractor is required to furnish to BHEL Security deposit in the form of cash/ approved securities/ Bank Guarantee valid upto ---------- for a sum of Rs.---------- towards satisfactory performance and completion of the Contract.

3. The Contractor has furnished a Bank Guarantee bearing no.----------dated ----------for a sum of Rs.----------executed by ---------- in favour of BHEL towards Security Deposit valid upto ---------

OR

The Contractor has furnished to BHEL an initial Security Deposit of Rs.----------in the form of cash / approved Securities/ B.G No.---------- dated ---------- for Rs.----------executed by ---------- in favour of BHEL valid upto ---------- and has agreed for recovery of the balance security deposit by BHEL @ 10% of the value of work done from each running bill till the entire Security Deposit is recovered.

OR

The contractor has furnished to BHEL an initial Security Deposit of Rs.-----(Rs.---------- vide Bank draft No.----------dated ----------and by adjusting EMD of Rs.---------- submitted vide Bank draft No.---------- dt.---------) and has agreed for recovery of balance Security Deposit by BHEL @ 10% of the value of work done from each running bill till the entire security deposit is recovered.

4. The Contractor hereby agrees to extend the validity of the Bank Guarantee for such further period or periods as may be required by BHEL and if the Contractor fails to obtain such extension(s) from the Bank, the Contractor, shall pay forthwith or accept recovery of Rs.---------- from the bills in one installment and the contractor further agrees that failure to extend the validity of the Bank Guarantee or failure to pay the aforesaid amount in the manner specified above shall constitute breach of contract. In addition to above, BHEL shall be entitled to take such action as deemed fit and proper for recovering the said sum of Rs.----------

OR

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

5. That in consideration of the payments to be made to the Contractor by BHEL in accordance with this Agreement the Contractor hereby covenants and undertakes with BHEL that they shall execute, construct, complete the works in conformity, in all respects, with the terms and conditions specified in this Agreement and the documents governing the same.

6. That the Contractor shall be deemed to have carefully examined this Agreement and the documents governing the same and also to have satisfied himself as to the nature and character of the Works to be executed by him.

7. That the Contractor shall carry out and complete the execution of the said works to the entire satisfaction of the Engineer or such other officer authorised by BHEL, within the agreed time schedule.

8. That BHEL shall, after proper scrutiny of the bills submitted by the Contractor; pay to him during the progress of the said works such sum as determined by BHEL in accordance with this Agreement.

9. That this Agreement shall be deemed to have come into force from -------- the date on which the letter of Award has been issued to the Contractor.

10. That whenever under this contract or otherwise, any sum of money shall be recoverable from or payable by the Contractor, the same may be deducted in the manner as set out in the General Conditions of Contract or other conditions governing this Agreement.

11. That all charges on account of Octroi, Terminal and other taxes including sales tax or other duties on material obtained for execution of the said works shall be borne and paid by the Contractor.

12. That BHEL shall be entitled to deduct from the Contractor's running bills or otherwise Income Tax as per prevailing Income Tax Act.

13. That BHEL shall be further entitled to recover from the running bills of the Contractor or otherwise such sum as may be determined by BHEL from time to time in respect of

consumables supplied by BHEL, hire charges for tools and plants issued (Where applicable) and any other dues owed by the Contractor.

14. That it is hereby agreed by and between the parties that non- exercise, forbearance or omission of any of the powers conferred on BHEL and /or any of its authorities will not in any manner constitute waiver of the conditions hereto contained in these presents and the liability of the Contractor with respect to compensation payable to BHEL or Contractor's obligations shall remain unaffected.

15. It is clearly understood by and between the parties that in the event of any conflict between the Letter of Award and other documents governing this Agreement, the provisions in the Letter of Award shall prevail.

16. The following documents

1. Invitation to Tender No----------
   and the documents specified therein.
2. Contractor's Offer No----------
   dated----------.
3. _____
4. _____
5. _____
6. Letter of Award No._____ dated_____.
7. _____

shall also form part of and govern this Agreement.

IN WITNESS HEREOF, the parties hereto have respectively set their signatures in the presence of

WITNESS

1.

2.

(CONTRACTOR)
(to be signed by a person holding a valid Power of Attorney)

WITNESS

1.

2.

(For and on behalf of BHEL)

PROFORMA OF BANK GUARANTEE (in lieu of SECURITY DEPOSIT)

In consideration of Bharat Heavy Electricals Limited (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at BHEL House, Siri Fort, Asiad, New Delhi – 110049 through its Unit at Bharat Heavy Electricals Limited, Power Sector Northern Region, HRDI & PSNR Complex, Plot no. 25, Sector – 16 A, Noida - 201301 having agreed to exempt (Name of the Vendor / Contractor / Supplier) with its registered office at_____ [1](hereinafter called the said "Contractor" which term includes supplier), from demand under the terms and conditions of the Contract reference No._____dated _____ [2] valued at Rs……..... [3] (Rupees ----------)[3] (hereinafter called the said Contract), of Security Deposit for the due fulfilment by the said Contractor of the terms and conditions contained in the said Contract, on production of a Bank Guarantee for Rs._____ [4] (Rupees _____only),

We _____(indicate the name and address of the Bank) having its Head Office at _____(address of the head Office) (hereinafter referred to as the Bank), at the request of _____[Contractor(s)], being the Guarantor under this Guarantee, do hereby irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer, an amount not exceeding Rs._____ without any demur, immediately on demand from the Employer and without any reservation, protest, and recourse and without the Employer needing to prove or demonstrate reasons for its such demand.

Any such demand made on the bank, shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs._____.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) in any suit or proceeding pending before any Court or Tribunal or Arbitrator or any other authority, our liability under this present being absolute and unequivocal.

The payment so made by us under this guarantee shall be a valid discharge of our liability for payment hereunder and the Contractor(s) shall have no claim against us for making such payment.

We, further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied & the Employer certifies that the terms and conditions of the said Contract have been fully and properly carried out by the said contractor(s) or acceptance of the final bill or discharge of this guarantee by the Employer, whichever is earlier. This guarantee shall initially remain in force upto and including _____[5] and shall be extended from time to time for such period as may be desired by the Employer. Unless a demand or claim under this guarantee is made on us in writing on or before the _____[6], we shall be discharged from all the liability under this guarantee thereafter.

We, ____(indicate the name of the Bank)____ further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said contractor(s) from time to time or to postpone for any time or

PROFORMA OF BANK GUARANTEE (in lieu of SECURITY DEPOSIT)

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

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

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Contractor but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).

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

Notwithstanding anything to the contrary contained hereinabove:

a) The liability of the Bank under this Guarantee shall not exceed…… [4]

b) This Guarantee shall be valid up to ……[5]

c) Unless the Bank is served a written claim or demand on or before _____[6] all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

Date _____ Day of _____

for____(indicate the name of the Bank)__

(Signature of Authorised signatory)

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

PROFORMA OF BANK GUARANTEE (in lieu of SECURITY DEPOSIT)

Note:

1. Bidders are advised that expiry of claim period may be kept 3-6 months after validity date..

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

3. In Case of Bank Guarantees submitted by Foreign Vendors.

a. From Nationalized/ Public Sector/ Private Sector/ Foreign Banks (BG issued by Branches in India) can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/ city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.

b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)

b.1 In such cases, Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank's (BHEL's Consortium Bank) branch in India. All charges for issuance of Bank Guarantee/ counter-Guarantee should be borne by the Foreign Vendor.

b.2 In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at **sl.no. b.1** will required to be followed.

b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time).

BANK GUARANTEE FOR INTEREST BEARING REFUNDABLE ADVANCE

B.G. No. Date

This deed of Guarantee made this _____day of_____two thousand_____by **< Name and Address of Bank>** hereinafter called the "The Guarantor" (which expression shall unless repugnant to the context or meaning thereof be deemed to include its successors and assigns) in favour of M/S Bharat Heavy Electricals Limited a Company incorporated under the Companies Act, 1956, having its registered office at BHEL House, Siri Fort, New Delhi - 110049 through its unit at Bharat Heavy Electricals Limited, Power Sector Northern Region, HRDI & PSNR Complex, Plot no. 25, Sector – 16 A, Noida - 201301, hereinafter called "The Company" (which expression shall unless repugnant to the context or meaning thereof be deemed to include its successors and assigns).

WHEREAS M/s. _____(hereinafter referred to as the Contractor) have entered into a Contract arising out of Letter of Intent no._____dtd_____(hereinafter referred to as "the Contract") for the **< Name of work >** with the Company.

AND WHEREAS the Contract inter-alia provides that the Company will pay to the Contractor interest bearing advance of Rs._____ (Rupees_____ only) on certain terms and conditions specified in the Contract subject to the Contractor furnishing a Bank Guarantee for Rs._____ (Rupees_____ only) in favour of the Company.

AND WHEREAS the Company has agreed to accept a Bank Guarantee from a Bank to cover the said advance.

AND WHEREAS the Contractor has approached the Guarantor and in consideration of the arrangement arrived at between the Contractor and the Guarantor, the Guarantor has agreed to give the Guarantee as hereinafter mentioned in favour of the Company.

NOW THIS DEED WITNESSES AS FOLLOWS:-

(1) In consideration of the Company having agreed to advance a sum of Rs._____(Rupees_____only) to the Contractor, the Guarantor do hereby guarantee the due recovery by the Company of the said advance with interest thereon as provided according to the terms and conditions of the Contract. If the said Contractor fails to utilise the said advance for the purpose of the Contract and /or the said advance together with interest as aforesaid is not fully recovered by the Company the Guarantor do hereby unconditionally and irrevocably undertake to pay to the Company without demur and merely on a demand, to the extent of the said sum of Rs._____ (Rupees_____ only) any claim made by the Company on them for the loss or damage caused to or suffered by the Company by reasons of the Company not being able to recover in full the advance with interest as aforesaid.

BANK GUARANTEE FOR INTEREST BEARING REFUNDABLE ADVANCE

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(2) The decision of the Company whether the Contractor has failed to utilise the said advance or any part thereof for the purpose of the Contract and / or as to the extent of loss or damage caused to or suffered by the Company by reason of the Company not being able to recover in full the said sum of Rs._____ with interest if any shall be final and binding on the Guarantor, irrespective of the fact whether the Contractor admits or denies the default or questions the correctness of any demand made by the Company in any Court Tribunal or Arbitration proceedings or before any other Authority.

(3) The Company shall have the fullest liberty without affecting in any way the liability of the Guarantor under this Guarantee, from time to time to vary any of the terms and conditions of the Contract or extend time of performance by the Contractor or to postpone for any time and from time to time any of the powers exercisable by it against the Contractor and either enforce or forebear from enforcing any of the terms and conditions governing the Contract or securities available to the Company and the Guarantor shall not be released from its liability under these presents by any exercise by the Company of the liberty with reference to the matters aforesaid or by reasons of time being given to the Contractor or any other forbearance, act or commission on the part of the Company or any indulgence by the Company to the Contractor or of any other matter or thing whatsoever which under the law relating to sureties would, but for this provision have the effect of so releasing the Guarantor from its liability under this guarantee.

(4) The Guarantor further agrees that the Guarantee herein contained shall remain in full force and effect during the period till the Company discharges this Guarantee, subject to however, that the Company shall have no claim under this Guarantee after_____ i.e. (the present date of validity of Bank Guarantee unless the date of validity of this Bank Guarantee is further extended from time to time, as the case may be) unless a notice of the claim under this Guarantee has been served on the Guarantor before the expiry of the said period in which case the same shall be enforceable against the Guarantor not withstanding the fact that the same is enforced after the expiry of the said period.

(5) The Guarantor undertakes not to revoke this Guarantee during the period it is in force except with the previous consent of the Company in writing and agrees that any liquidation or winding up or insolvency or dissolution or any change in the constitution of the Contractor or the Guarantor shall not discharge the Guarantor's liability hereunder.

(6) It shall not be necessary for the Company to proceed against the Contractor before proceeding against the Guarantor and the Guarantee herein contained shall be enforceable against them notwithstanding any security which the Company may have obtained or obtain from the Contractor shall at the time when proceedings are taken against the Guarantor hereunder be outstanding or unrealised.

(7) Notwithstanding anything contained herein before, our liability under the Guarantee is restricted to Rs._____(Rupees_____). Our guarantee shall remain in force until _____, i.e. the present date of validity of Bank Guarantee unless the date of validity of this Bank Guarantee is further extended from time to time. Unless a claim or demand under this guarantee is made against us on or before---------, we shall be discharged from our liabilities under this Guarantee thereafter.

BANK GUARANTEE FOR INTEREST BEARING REFUNDABLE ADVANCE

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(8) Any claim or dispute arising under the terms of this document shall only be enforced or settled in the courts at New Delhi/ Delhi only.

(9) The Guarantor hereby declares that it has power to execute this Guarantee under its Memorandum and Articles of Association and the executant has full powers to do so on its behalf under the Power of Attorney dated_____ (To be incorporated by the Bank) granted to him by the proper authorities of the Guarantor.

IN WITNESS whereof the _____(Bank) has hereunto set and subscribed its hand the day, month and year first, above written.

(Name of the Bank)

Signed for and on behalf of the Bank
(Designation of the Authorized Person Signing the Guarantee)

(Signatory No.----------)

DATED:

SEAL

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Notes :

1. The BG shall be executed on non-judicial stamp papers of adequate value procured in the name of the Bank in the State where the Bank is located.

2. The BG is required to be sent by the executing Bank directly to BHEL at the address where tender is submitted / accepted, under sealed cover.

FORM for EXTENSION OF VALIDITY OF BANK GUARANTEE

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

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BANK GUARANTEE No:
Date:……..

To

(Write Designation and Address of Officer of BHEL inviting the Tender)

Dear Sir

Sub : Validity of Bank Guarantee No:……. Dated ……. for ……. Rs …… in favour of yourself, expiry date ……., on account of M/s …… in respect of Contract Number..……., (herein after called the Original bank Guarantee)

At the request of M/s……., we …….. Bank, having its branch Office at …….. and having Head office at ……, do hereby extend our liability under the above mentioned Bank Guarantee number…….. dated …… for a further period of ……..Months/years from …… to expire on ……..

Except as provided above, all other terms and conditions of the Original Bank Guarantee No ……. Dated…… shall remain unaltered and binding on us.

Kindly treat this extension as an integral part of the original Bank Guarantee to which it would be attached.

Yours faithfully

Signature…….
Name & Designation……..
Power of Attorney/Signing Power No
Seal of Bank

PS-	MONTHLY PLAN & REVIEW WITH CONTRACTOR	

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

PART- A: PLAN/ REVIEW OF WORK FOR THE MONTH OF ……..…….. Date of Plan/ Review……

SN.	Description of Work	Unit of Measur-ement	Unit Rate	Planned (QTY Planned for the month as per Part –C of last month)		Cumulative Shortfall attributable to contractor upto last month (Refer Note 1)		Achieved		Shortfall attributable to BHEL w.r.t Plan (as per Col. 3 of Part-D)		Cumulative Shortfall attributable to Contractor upto & including this month		REMARKS (Reasons for Shortfall attributable to Contractor. Supporting documents to be kept as record.)
(a)	(b)	(c)	(d)	A		B		C		D		E=A+B-C-D		
				Phy.	Financial	Phy	Financial	Phy.	Financial	Phy.	Financial	Phy.	Financial	
	Value of Other Items not mentioned above but planned to be executed in this month													
Total					ΣA		ΣB		ΣC		ΣD		ΣE	

BHEL
(Sign with name, designation and date)

CONTRACTOR
(Sign with name, designation and date)

PS-	MONTHLY PLAN & REVIEW WITH CONTRACTOR	Page **2** of **6**

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

PART- A: Contd…….

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

Note 2: Percentage Shortfall attributable to contractor w.r.t. **"**Plan - Shortfall attributable to BHEL**"** for the month = [(ΣE-ΣB)/(ΣA-ΣD)]x100
In case, (ΣE-ΣB) is negative, then it shall be treated as zero percent."

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

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

BHEL
(Sign with name, designation and date)

CONTRACTOR
(Sign with name, designation and date)

PS-	MONTHLY PLAN & REVIEW WITH CONTRACTOR	Page **3** of **6**

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

PART – B-1: PLAN/REVIEW OF DEPLOYMENT OF MAJOR T&Ps FOR THE MONTH OF ……..…….. Date of Plan/ Review……

CONTRACTOR'S SCOPE: -

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

Note: In case, E>B, it shall be considered as E=B. Similarly, in case D>A, it shall be considered as D=A.
Percentage of T&P Deployed = ΣF x 100

BHEL SCOPE: -

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

BHEL
(Sign with name, designation and date)

CONTRACTOR
(Sign with name, designation and date)

PS-	MONTHLY PLAN & REVIEW WITH CONTRACTOR	Page **4** of **6**

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

PART – B-2: PLAN/ REVIEW OF DEPLOYMENT OF MANPOWER FOR THE MONTH OF ……..…….. Date of Plan/ Review……

CONTRACTOR'S SCOPE: -

SN.	Area of Work	Category of Labour	No. of Labour required as per category	Deployment Period (in days)	No. of Labour actually deployed	Actual Deployment Period (in days)	REMARKS (Works affected due to non-availability of labour)
			A	B	C	D	

Percentage of Manpower Deployed=100 x Σ(CxD)/Σ(AxB)

BHEL
(Sign with name, designation and date)

CONTRACTOR
(Sign with name, designation and date)

PS-	MONTHLY PLAN & REVIEW WITH CONTRACTOR	Page **5** of **6**

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

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

SN.	Description of work	Original Planned Quantity	Planned Quantity (excluding shortfalls attributable to contractor till date)	Unit of Measu-rement	T&Ps Required				Manpower Required		REMARKS (Reasons for difference in Original Planned Quantity w.r.t. Planned quantity to be given)
					Contractor Scope		BHEL Scope		Category of Labour	No. of Labour required as per Category	
					Major T&P to be deployed as per work planned for the month	Quantity	Major T&P to be deployed as per work planned for the month	Quantity			

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

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

BHEL
(Sign with name, designation and date)

CONTRACTOR
(Sign with name, designation and date)

PS-	MONTHLY PLAN & REVIEW WITH CONTRACTOR	Page **6** of **6**

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

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

SN.	Description of Work (from Part-A)	Quantities Affected		Reasons for Shortfall attributable to BHEL	Agency responsible for reasons for Shortfall	Remarks (Supporting Documents in respect of agency responsible)
		(Physical Quantity)	Unit of Measu-rement			
1	2	3	4	5	6	7

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

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

BHEL
(Sign with name, designation and date)

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

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

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

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

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

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

Note:

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

Annexure-AA to Form F-15

Monthly Safety Performance Evaluation of Contractor

SL	Parameter for Measurement	M/O	Wt	Supporting Documents
1a	Induction training for new workers conducted through audio-visual medium & documented ?	M	1	Induction Training Records
1b	Tool box talk conducted regularly as per plan, and documented?	M	1	Toolbox Talk Records
1c	Contractor in charge and safety in charge attended safety meetings?	M	2	Minutes of Meeting
1d	Whether observations in safety meetings are complied before next meeting?	M	2	-do-
1e	Preparation and submission of Monthly HSE report within stipulated time	M	1	Report submission date
1f	Preparation and submission of Incident/near-miss report and RCA Report (as applicable) within stipulated time	M	1	Incident/ Near Miss Records
1g	Carrying out Inspections and submission of Inspection reports within stipulated time	M	1	Inspection Records
1h	Regular Job Specific Training ensured for High Risk Workers (through audio-visual medium) as per plan	M	1	Training & Attendance Records
2a	Whether the contractor is registered under BOCW	M	2	BOCW Registration Certificate
2b	Availability of Qualified safety officer (1 for every 500 labour)	M	2	Safety Officer qualification & experience records
2c	Availability of Qualified safety supervisor (1 for every 100 labour)	M	2	Safety Officer qualification & experience records
2d	All the workers are provided and using safety helmets and safety shoes/gum boots	M	2	PPE Issue Records, Inspection/ non-conformity records
2e	Housekeeping done on regular basis and scrap removal at site	M	1	Housekeeping records, Inspection/ non-conformity records
2f	Usage of Goggles/Face shields and Hand gloves for gas cutter and grinders		1	PPE Issue Records, Inspection/ non-conformity records
2g	Wall openings & floor openings are guarded?		1	Inspection/ non-conformity records
2h	Adequate illumination provided in all working area?		1	Inspection/ non-conformity records
2i	Safety posters, sign boards and emergency contact numbers in all prominent location are displayed?		1	Inspection/ non-conformity records
2j	Availability of automatic reverse horns, Main horn, hook latches for Vehicles, mobile cranes, Hydras		1	Inspection/ non-conformity records
2k	Ban of carrying mobile phones to work place is implemented for workers		1	Inspection/ non-conformity records
2l	Availability of Tags & Inspection Certificates for Cranes of all capacities		1	Master T&P List with internal & external test details
2l.2	Availability of Tags & Inspection Certificates for Winches of all capacities		1	Master T&P List with internal & external test details
2l.3	Availability of Tags & Inspection Certificates, colour coding for Chain pulley blocks		1	Master T&P List with internal & external test details
2l.4	Availability of Tags & Inspection Certificates for Vehicles - Trailers, Dozers, Dumpers, Excavators, Mixers etc.		1	Master T&P List with internal & external test details
2l.5	Availability of Tags & Inspection Certificates for Welding machines, grinders, Drilling machines, etc.		1	Master T&P List with internal & external test details

2l.6	Availability of Tags & Inspection Certificates, colour coding for Wire rope slings etc.		1	Master T&P List with internal & external test details
2l.7	Availability of Tags & Inspection Certificates for Batching plants		1	Master T&P List with internal & external test details
2m.1	Use of Lifting Permit as per requirement		1	Permit Records
2m.2	Use of Height Permit as per requirement		1	Permit Records
2m.3	Use of Hot Work Permit as per requirement		1	Permit Records
2m.4	Use of Excavation permit as per requirement		1	Permit Records
2m.5	Use of Confined space work permit as per requirement		1	Permit Records
2m.6	Use of Grating removal and safety net removal permit as per requirement		1	Permit Records
2m.7	Use of Lockout-Tag out permit as per requirement		1	Permit Records
2m.8	Use of Radiography permit as per requirement		1	Permit Records
2m.9	Use of Night/ Holiday Work Permit as per requirement		1	Permit Records
2m.10	Use of Any other Applicable Permit as per requirement		1	Permit Records
3a	Material safety data sheet(MSDS) available for all chemicals and displayed in usage and storage area?		1	Inspection/ non-conformity records
3b	Spillages of oil/concrete and other chemical is controlled and cleaned by proper method in case of spill?		1	Inspection/ non-conformity records
3c	Availability of adequate number of urinals in workplace and in elevations and maintained	**M**	1	
3d	Availability of rest rooms for workers at site	**M**	1	
3e	Availability of Drinking water facility at work spot		1	
3f	Hygienic Labour colony is provided for workers.		1	
4a	Is heavy/complex critical lifting permit obtained for heavy, complex materials before handling/erection activity?		1	Work Permit records
4b	Whether area below lifting activities barricaded		1	Inspection/ non-conformity records
4c	Availability of experienced rigging foreman		1	Experience details of rigging foreman
4d	Is agency is following proper storage and handling procedure as per manufacturer standard for all hazardous material?		1	Procedure for storage & handling
4e	Are oxygen and acetylene cylinders are transported to work place from storage area in trolleys		1	
5a	Whether all deep excavation has been protected by barrier		1	Inspection/ non-conformity records
5b	Sloping/benching & shoring provided for excavation as per requirement?		1	-do-
5c	Proper access and egress provided for excavations?		1	-do-
5d	Blasting is done in controlled manner?		2	-do-
6a	Whether Electrical booth is equipped with Co_2 fire extinguishers and fire buckets filled with sand?		2	Inspection/ non-conformity records
6b	Availability of Illumination lamp in electric booth?		1	-do-
6c	whether Caution Boards have been displayed?		1	-do-
6d	Usage of Metal Plug top for all hand power tools ?		1	-do-
6e	Usage of Insulated welding cables.		1	-do-
6f	Electrical Booth/Distribution Board to be covered by proper Canopy.		1	-do-
6g	Availability of functional & individual 30ma ELCB / RCCB and MCB for protection and conducting periodical check-up?		1	-do-
6h	Double earthing for panel boards and all machinery & proper earth pit with regular inspection available?		1	-do-
6i	Whether Electrician is qualified and experienced		1	Qualification & Experience records of electrician
6j	Availability and usage of Rubber hand gloves by electrician?		1	Inspection/ non-conformity records

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

Note:

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

MILESTONE COMPLETION CERTIFICATE
(issued by BHEL on the specific request of Contractor)

Ref :
Date:

To,

(Name & address of Contractor)

Dear Sir,

References
1. Contract No:
2. Job Description:

This is to hereby confirm that the following Milestone Activity has been achieved in respect of the Contract /Job under reference

Sl No	Milestone Activity	Remarks

This certificate is issued as per your request vide letter no …… without any prejudice to the rights of BHEL in line with the terms and conditions of the above referred Contract

Yours faithfully,

For and on behalf of Bharat Heavy Electricals Limited

Construction Manager/Head (Subcontracts)

CONTRACT COMPLETION CERTIFICATE
(Issued by BHEL/HQ on the specific request of Contractor)

Ref :
Date:

To Whom so ever it may concern

1	DESCRIPTION OF WORK	
2	NAME AND ADDRESS OF THE CONTRACTOR	
3	CONTRACT NO	
4	CONTRACT VALUE	
5	LETTER OF INTENT/ AWARD NO. & DATE	
6	CONTRACT PERIOD//CONTRACT DURATION	
7	DATE OF START/COMPLETION	
8	FINAL EXECUTED VALUE	
9	PERFORMANCE	GOOD SATISFACTORY UNSATISFACTORY

This certificate is issued as per your request vide letter no ……
without any prejudice to the rights of BHEL to use this certificate for evaluation of your offers for future tenders

Yours faithfully,

For and on behalf of Bharat Heavy Electricals Limited

Head (Subcontracts)

INDEMNITY BOND

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

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

And whereas the Company has entered into a Contract with M/s xxxxxxxxx, the executants of this Deed (hereinafter referred to as the Contractor) as its contractor in respect of the work of "xxxxxxxxxxxxxxxxxxxxxxxxx".

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

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

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

INDEMNITY BOND

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

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

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

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

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

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

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

Signed for and on behalf of
M/s xxxxxxxxxxxxxx

Witness:
1
2

CONSORTIUM AGREEMENT

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

THIS AGREEMENT is made and executed on this _____ day of _____, by and between (1) M/s _____ , (The First Party, i.e, the Bidder) a company incorporated under the Company's Act 1956, having its registered office at _____(herein after called the "Bidder", which expression shall include its' successors, administrators, executors and permitted assigns) and (2) M/s _____, (The Second Party, i.e, the associates), a company incorporated under the Company's Act 1956, having its registered office at _____ (herein after called the " Associates", which expression shall include its' successors, administrators, executors and permitted assigns).

WHEAEAS the Owner, Bharat Heavy Electricals Ltd, a Government of India Undertaking, proposes to issue / issued an NIT (herein after referred to as the said NIT) inviting bids from the individual Bidders for undertaking the work of _____, at _____ (herein after referred to as the said works).

WHEREAS the said NIT enables submission of a bid by a Consortium subject to fulfillment of the stipulations specified in the said NIT.

AND WHEREAS M/s _____ (The First Party, i.e, the Bidder) will submit its proposal in response to the aforesaid invitation to bid by the Owner for _____ as detailed in the Bid doc. no. < TENDER REF-------->

AND WHEREAS M/s _____ (The First Party, i.e the Bidder) itself is meeting all the qualifying requirements except the qualifying requirements of _____ (as detailed in the NIT) and in order to fully meet the qualifying requirements of NIT, this tie-up agreement is being entered into with M/s _____ (The Second Party, the Associates) , who fully meet the balance part of the said works (_____).

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

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

CONSORTIUM AGREEMENT

NOW THEREFORE THIS AGREEMENT WITNESSETH AS FOLLOWS :

1. First and Second parties hereby constitute themselves into a Consortium for the purpose of bidding and undertaking the said works pursuant to the said NIT as hereinafter stated.

2. The First Party will be the leader (Lead Partner) and will be responsible for the entire works.

CONSORTIUM AGREEMENT

3. The First Party shall undertake the following part(s) of work detailed in the NIT namely _____
_____

4. The Second Party shall undertake the following part(s) of work detailed in the said NIT namely _____
_____

5. The parties hereby declare and confirm that each of them will fulfill the required minimum qualifying requirements as prescribed in the said NIT for the works agreed to be undertaken by them as stated here-in-above.

6. It is also agreed between the parties hereto that all of them shall be individually and severally responsible for the completion of the said works as per the schedule. Further, if the Employer/Owner sustains any loss or damage on account of any breach of the Contracts, we the, Consortium partners individually and severally undertake to promptly indemnify and pay such losses / damages caused to the Employer/Owner on its written demand without any demur, reservation, contest or protest in any manner whatsoever.

7. The parties hereby agree and undertake that they shall provide adequate finances, suitable Tools, Plants, Tractors, Trailers, other transportation equipment, other Tools & Plants, Measuring & Monitoring Equipments (MMEs), Men and Machinery etc. for the proper and effective execution of the works to be undertaken by them as specified here-in-above.

8. It is agreed interse between the parties hereto that all the consequences liabilities etc., arising out of any default in the due execution of the said works shall be borne by the party in default, that is by party in whose area of works default has occurred, provided however, so far as M/s Bharat Heavy Electricals Limited is concerned, all the parties shall be liable jointly and severally.

CONSORTIUM AGREEMENT

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

WITNESS For

1. NAME (FIRST PARTY)
2. OFFICIAL ADDRESS

WITNESS For

1. NAME (SECOND PARTY)
2. OFFICIAL ADDRESS

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

Form WAM 10

BHARAT HEAVY ELECTRICALS LIMITED
DIVISION……..
Claim for Refund of Security Deposit
(Para 4.7.4 of Works Accounts Manual)

Ref No.: Date:

1 Name and address of the contractor
2 Contract Agreement/Work Order No.
3 Date of contract agreement/work order
4 Name of the work undertaken
5 Date of commencement of the work
6 Date of completion of the work
7 Period of Maintenance
8 Date on which the final bill was paid
9 Last date of making good the defect, if any, during maintenance period
10 Expenditure incurred by BHEL during maintenance period, if any, recoverable
11 Date on which security deposit refund falls due as per contract
12 Amount deposited/recovered

Details	Mode	Amount

13 LESS amounts recoverable (with details)

(i) Amount spent by BHEL on maintenance :

(ii) Payments made on behalf of contractor :

(iii) Court dues / penalties / compensation :

(iv) Other recoveries for services etc. :

(v) Security deposit released with final bill (%) :

14 Net amount recommended for release (12-13)

Details	Mode	Amount

Date: **Signature of Engineer in Charge**

Form WAM 10 (Contd.)

CERTIFICATE TO BE FURNISHED BY THE CONTRACTOR

I/We have no claim or demand outstanding against BHEL ……..for the work done or for labor or material supplied or any other account arising out of or connected with the contract agreement/work order (No……..dated ……) and the payment of this bill shall be in full and final

Date: **Signature of Contractor**

CERTIFICATE TO BE FURNISHED BY SENIOR ENGINEER

Certified that

– The payment recommended for release is in order and there are no demands other than those included in the claim outstanding from the contractor;

– The maintenance period as per the contract agreement is over and the contractor has carried out the works required to be carried out by him during the period of maintenance to our satisfaction, and all expenses incurred by the company on carrying out such works have been included for adjustment;

– All the objections raised so far have been settled;

– A note of refund of security deposit has been made in the measurement book and contract agreement/work order.

Date: **Signature of Senior Engineer**

FOR USE IN FINANCE DEPARTMENT

Passed for
Rs……..(Rupees……
…….only)

Accountant **Accounts Officer**

REFUND OF GUARANTEE MONEY

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR, _____ REGION

Ref No: Date:

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

Signature of BHEL Engineer

Date: _____

REFUND OF GUARANTEE MONEY

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR, _____ REGION

CERTIFICATE TO BE FURNISHED BY THE CONTRACTOR

I/We have no claim or demand outstanding against BHEL_____, for the work done or for labour or material supplied or any other account arising out of or connected with the Contract Agreement/LOI/ LOA (No_____ dated _____) and the payment of this bill shall be in full and final settlement of all my/our claims and demands including the 'Deposits' of the Contract Agreement/LOI/ LOA referred to.

Signature of Contractor

Date:

CERTIFICATE TO BE FURNISHED BY SENIOR ENGINEER/CONSTRUCTION MANAGER

1. Certified that
    a. The payment recommended for release is in order and there are no demands other than those included in the claim outstanding from the Contractor
    b. Maintenance period (Contract Guarantee period) is over and the Contractor has carried out the works required to be carried out by him during the period of maintenance (Guarantee) to our satisfaction, and all expenses incurred by the Company on carrying out such works have been included for adjustment
    c. All objections raised so far have been settled
    d. A note for refund of Guarantee Amount has been made in the Measurement Book and Contract Agreement/Work Order

Signature of BHEL Engineer

Construction Manager

Date:----------

FOR USE IN ACCOUNTS DEPARTMENT

Passed for Rs_____ (Rupees _____ only)

Accountant Accounts Officer

ACKNOWLEDGE BY THE CONTRACTOR

Received Rs _____ in full and final settlement of my/our claim

Signature of Contractor

Date:

POWER OF ATTORNEY for SUBMISSION OF TENDER/SIGNING CONTRACT AGREEMENT (To be typed on non-judicial stamp paper of minimum Rs. 100/- and Notarized)

KNOW ALL MEN BY THESE PRESENTS, that I/We do hereby make, nominate, constitute and appoint Mr …….. , whose signature given below herewith to be true and lawful Attorney of M/s……. hereinafter called 'Company', for submitting Tender/entering into Contract and inter alia, sign, execute all papers and to do necessary lawful acts on behalf of Company with M/s Bharat Heavy Electricals Ltd, Power Sector _____ Region, _____, in connection with …… …… …… vide Tender Specification No : _____, dated _____.

And the Company do hereby agree to ratify and confirm all acts, deeds, things or proceedings as may be lawfully done by the said attorney and by or on behalf of the company and in the name of the company, by virtue of the powers conferred herein and the same shall be binding on the company and shall have full force and effect.

IN WITNESS WHEREOF the common seal of the company has been hereunto affixed in the manner hereinafter appearing on the document.

Dated at _____, this _____ day of _____

Director/CMD/Partner/Proprietor

Signature of Mr……(Attorney)

Attested by: Director/CMD/Partner/Proprietor

Witness

Notary Public

ANALYSIS OF UNIT RATES QUOTED

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

Offer Reference No:…… Date:……

To,

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

Dear Sir,

Sub : Analysis of Unit Rates Quoted
Ref : Tender Specification No: ……

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

SN	DESCRIPTION	% OF QUOTED RATE	REMARKS
01	SITE FACILITIES VIZ., ELECTRICITY, WATER OTHER INFRASTRUCTURE.		
02	SALARY AND WAGES + RETRENCHMENT BENEFITS		
03	CONSUMABLES		
04	T&P DEPRECIATION & MAINTENANCE		
05	ESTABLISHMENT & ADMINISTRATIVE EXPENSES		
06	OVERHEADS		
07	PROFIT		
	TOTAL	100%	

Yours faithfully,

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

Form WAM 6

BHARAT HEAVY ELECTRICALS LIMITED
DIVISION……..
Running Account Bill
(Para 4.3.1 of Works Accounts Manual)

Departmental Bill No.

Name of the Contractor — Date:

Name of the Work: — Division: — Sub-Division:

Sanctioned Estimate: — Date of written order to commence the Work: — Period of work covered in this bill:

Code No.: — Date of commencement of work:

Contract Agreement No.: — Dated: — Due date of completion as per agreement

Date of approval of Competent Authority for time extension as applicable (copy to be enclosed).

I. ACCOUNT OF WORK EXECUTED

Adhoc payment for work not previously measured **			Item No. of work	Description of work	Quantity as per agreement	Quantity executed upto date	Rate	Unit	Payment on the basis of actual measurement upto date	Quantity executed since last RA bill	Payment on the basis of actual measurement since last running account bill	Remarks
Total as per last running account bill	Since last running account bill	Total upto date										
1	2	3	4	5	6	7	8	9	10	11	12	13

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

2. Whenever there is an entry in column 12 on the basis of actual measurement, the whole of the amount previously paid without detailed measurement should be adjusted by a minus entry in column 2 equivalent to the amount shown in column 1, so that the total upto date in column 3 may become nil.

Total value of work done upto date (A) -------

Deduct value of work shown on the last Running Account Bill (B) -------

Net value of work done since last Running Account Bill (C) -------

Rupees (in words) ..... Only

Note :
Wherever adhoc payments to contractors against running bills are made in accordance with the extant Works Policy, the amount so paid shall be adjusted.

II. MEMORANDUM OF PAYMENTS

			I	II
1.	Total value of work actually measured as per Account No. I, Column 10	(A)	----------	----------
2.	Total upto date adhoc payment for work covered by approximate or plan measurements as per Account I, Col. 3	(B)	----------	----------
4.	Total upto date payments [(A)+(B)]	(C)	----------	----------
5.	Total amount of payments already made as per entry (D) of last Running Account Bill No. …… dated …… forwarded to the Accounts Department on ……	(D)		----------
6.	Balance [(C) - (D)]			----------
7.	Payments now to be made:		----------	
	a) by cash / cheque		----------	
	b) by deduction for value of materials supplied by BHEL vide Annexure A attached		----------	
	c) by deduction for hire of tools and plant vide Annexure B attached		----------	
	d) by deduction for other charges vide Annexure C attached		----------	
	e) by deduction on account of security deposit		----------	
	f) by deduction on account of Income Tax			----------

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

III. CERTIFICATE OF THE ENGINEER IN CHARGE

1	The measurements on which the entries in column 7 to 12 of Part I of this Bill (Account of work executed) are based were made by ---------- and are reorded at pages - ---------- of Measurement Book No. ---------- (Name and Designation)
2	Certified that the methods of measurement are correct and the work has been carried out in accordance with the terms and conditions, schedules, specifications and drawings etc. forming part of the contract agreement, subject to deviations included in the deviation statement (Annexure D)
3	Certified that in addition to and quite apart from the quantities of work actually executed as shown in column 10 of Part I, some work has actually been done in connection with several items and the value of the such work is, in no case, less than the adhoc payments as per column 3 of Part I, made or proposed to be made, for the convenience of the contractor in anticipation of, and subject to the results of, detailed measurement which will be made as soon as possible.
4	Certified that measurements by Engineer-incharge and test check of prescribed percentage of measurements by the concerned superior authorities has been carried out.
5	Certified that there are no pending recoveries from the contractor on account of chargeable items (e.g T&P, consumables, material, etc.) issued either by BHEL or by the customer and other recoveries like power, water, quarter, tax liability towards declaration forms etc.
6	Certified that with regard to the free issues, regular reconciliation is being done, completed upto ---------- and there are no recoveries pending from the contractor on account of such issues in excess of requirement for execution of work as per contract.
7	Certified that there is no pending recovery for damaged material issued free of cost.
8	Certified that the contractor has fulfilled all the requirements as per contract with reference to statutory obligations (PF, ESI, Minimum Wages, BOCW, Insurance etc.), support services such as service manpower, computer system , T&P etc

Signature of Contractor

Date:

Signature of Engineer in Charge

Designation:

Date:

IV. CERTIFICATE OF THE SENIOR ENGINEER

1	Certified that the measurements have been check measured to the prescribed extent by .... at site and also by the undersigned and the relevant entries have been initialed in the Measurement Book. (vide pages .....) (Name and Designation)
2	Certified that all the measurements recorded in the measurement book have been correctly billed for
3	Certified that all recoverable amounts in respect of materials tools and plant etc. and other charges have been correctly made vide annexures A to C attached.

Certified for payment * of Rs. ..... (Rupees ..... only)

*** Here specify the net amount payable.**

Date:

Signature of Senior Engineer

V. ENTRIES TO BE MADE IN THE FINANCE DEPARTMENT

Code No.:

Accounts Bill No. ---------- dated ----------

Entered in Journal Book vide entry No. ---------- dated ----------

Passed for ---------- Rs.----------

Less Deductions ---------- Rs.----------

Net amount payable ---------- Rs.----------

(Rupees ---------- only)

Payable to Shri / M/s ---------- by cheque / cash

Entered in Contractors ledger No. ---------- Page ----------

ALLOCATION

Estimate No :

Name of Work :

Account code head

	Debit (Gross amount)	Credit (Deductions)
Total		

Assistant
Date:

Accountant
Date:

Finance Executive
Date:

Form WAM 6 (Contd.)

ANNEXURE A

Statement showing details of materials issued to the contractor Shri / M/S..... in respect of Contract Agreement / Work Order No.....Dated..... and covered by the agreement

Sl.No.	Stores Issue Voucher No. and date	Issue voucher No. and date allotted by stores to the SIV	Description of material issued issued to the contractor	Quantity issued		Quantity actually incorporated in the work	Balance quantity with contractor		If recoverable from the contractor				
				Free	Chargeable		Free	Chargeabl	Rate at which recoverable	Amount recoverable	Amount recovered upto previous bill	Balance now recovered	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14
							Total						

Certified that …….. (balance quantity of free issue material as per Col. 8 above) is physically available with the Contractor.

Signature of Contractor
Date:

Signature of Engineer in Charge
Date:

Signature of Senior Engineer
Date:

ANNEXURE B

Statement showing tools and plant issued to the contractor Shri/M/s..... in respect of Contract Agreement No.....Dated.....

Sl. No.	Description of Tools and Plant Issued	Period for which issued	Rate at which recovery is to be made	Amount recoverable	Amount recovered upto previous bill	Balance Recovered now	Remarks
1	2	3	4	5	6	7	8
			TOTAL				

Signature of Contractor
Date :

Signature of Engineer in Charge
Date :

Signature of Senior Engineer
Date:

Form WAM 6 (Contd.)

ANNEXURE C

Statement showing details of other recoveries to be made from the contractor Shri/M/s----------in respect of contract Agreement No. ……Dated ……

S. No.	Particulars	Unit	Quantity	Rate	Amount recoverable	Amount recovered up to previous bill	Amount now recovered	Remarks
1	2	3	4	5	6	7	8	9
1	Water charges							
2	Electricity charges							
3	Seignorage charges							
4	Medical charges							
5	Cost of empty gunny bags and empty containers not returned							
6								
7								
8								
				TOTAL				

Signature of Contractor
Date :

Signature of Engineer in Charge
Date :

Signature of Senior Engineer
Date:

ANNEXURE D
DEVIATION STATEMENT

Name of the Contractor:

Contract Agreement No

Name of Work:

Date:

S. No.	Description of Item	Unit	Quantity as per agreement	Quantity as executed	Quantity further anticipated	Total quantity anticipated on completion	Rate as per agreement	Rate as executed	Amount as per agreement	Amount as executed	Amount further anticipated	Total Amount anticipated on completion	Difference		Reason for deviation with authority, if any
													Excess	Savings	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Signature of Engineer in Charge
Date :

Signature of Senior Engineer
Date :

Form WAM 7

BHARAT HEAVY ELECTRICALS LIMITED
DIVISION.....
.....And Final Bill
(Para 4.3.2 of Works Accounts Manual)

Departmental Bill No:
Date:
Name of the Contractor: Division: Sub-Division:
Name of the Work: Date of Written order to commence the work:

Sanctioned Estimate: Date of commencement of the Work:
Contract Agreement/ Work Order No: Dated: Due date of completion as per Agreement:
Date of actual completion of the work:

I. ACCOUNT OF WORK EXECUTED

Adhoc payment for work not previously measured **			Item no. of the agreement / work order	Description of work	Quantity as per agreement	Quantity executed upto date	Rate	Unit	Payment on the basis of actual measurement upto date	Quantity since last running account bill	Payment on t he basis of actual measurement since last running account bill	Remarks
Total as per last running account bill	Since last running account bill	Total upto date										
1	2	3	4	5	6	7	8	9	10	11	12	13

** Whenever there is an entry in column 12 on the basis of actual measurement, the whole of the amount previously paid without detailed measurement should be adjusted by a minus entry in column 2 equivalent to the amount shown in column 1, so that the total upto date in column 3 may become nil.

Total value of work done upto date	(A)	-------
Deduct value of work shown on the last Running Account Bill	(B)	-------
Net value of work done since last Running Account Bill	(C)	-------

Rupees (in words) ..... Only

Form WAM 7 (Contd.)

II. MEMORANDUM OF PAYMENTS

1	Total value of work actually measured as per Account No. I column 10		(A)	----------
2	Deduct amount of payments already made as per last running account bill No. ..... dated		(B)	----------
3	Payment now to be made [(A) - (B)]		(C)	----------
4	Deduct amounts recoverable from the contractor on account of :			
	a) Materials supplied by BHEL vide Annexure A attached	----------		
	b) Hire of tools and plant vide Annexure B attached	----------		
	c) Other charges vide Annexure C attached	----------		
	d) Income Tax	----------		
	Total Deductions			----------
5	Balance			----------
6	Refunds of Security Deposit			----------
7	Net amount to be paid to the contractor			----------

Net value Rupees (in words) ..... Only

I/ We hereby certify that I/We have performed the work as per the terms and conditions of Contract Agreement/Work Order No.....Dated.....for which payment is claimed as above and that I/We have no further claim under this agreement/work order.

Signature of the Contractor

Date:

III CERTIFICATE OF THE ENGINEER IN CHARGE

1. The measurements on which the entries in columns 7 to 11 of Part I of this bill (Account of work executed) are based were made by.....
.....are recorded at pages.....of measurement book No..... (Name and Designation)
2. A statement showing the quantities of stores issued to the contractor (whether free or on recovery basis) and their disposal is attached.

Date:

Signature of Engineer incharge

Designation:

Form WAM 7 (Contd.)

IV CERTIFICATE OF THE SENIOR ENGINEER

1. Certified that I have personally inspected the work and that the work has been physically completed on the due date in accordance with the terms and conditions, schedules, specifications and drawings etc., forming part of the contract agreement, subject to the deviations noted in Deviation Statement (Annexure D).
2. Certified that the measurements have been check measured to the prescribed extent by…… …… and by the undersigned at site and the relevant entries have been initiated in the measurement book (vide pages……) (Name and Designation)
3. Certified that the methods of measurement are correct.
4. Certified that the measurements have been technically checked with reference to contract drawings, deviations etc.
5. Certified that the measurements recorded in the measurement book have been correctly billed for at the contract rates or approved rates.
6. Certified that all recoverable amounts in respect of stores, tools and plant, water, electricity charges etc. have been correctly made vide Annexures A to C and that there are no other demands outstanding against the contractor on this contract.
7. Certified that the issues of all stores as per statement attached (whether charged to the contractor or direct to the work) have been technically checked and represent fair and reasonable issues for the items of work executed vide Annexure E.
8. Certified that all statutory requirements including PF, ESI, Minimum wages, Insurance, GST, BOCW, etc. are complied with by the Contractor. This should be duly backed by the relevant documents.

Certified for payment of * Rs……(Rupees……only).

***Here specify the net amount payable**

Signature of Senior Engineer

Date

IV ENTRIES TO BE MADE IN THE FINANCE DEPARTMENT

Account code head	Debit (Gross Amount)	Credit (Deductions)
TOTAL		

Passed for……Rs……
Less Deductions……Rs……
Net Amount Payable……Rs……
(Rupees……only)

Assistant

Date:

Accountant

Date:

Finance Executive

Date:

Form WAM 7 (Contd.)

ANNEXURE A
Part I

Statement showing details of materials issued to the contractor Shri / M/S.....in respect of Contract Agreement / Work Order No.....Dated..... and covered by the agreement.

Sl.No.	Stores Issue Voucher No. and date	Issue voucher No. and date allotted by stores to the SIV	Description of material issued issued to the contractor	Quantity issued	Quantity actually incorporated in the work	Whether recoverable from the contractor or supplied free	If recoverable from t he Contractor				
							Rate at which recoverable	Amount recoverable	Amount recovered upto previous bill	Balance now recovered	Remarks
1	2	3	4	5	6	7	8	9	10	11	12
						Total					

Signature of Contractor
Date:

Signature of Engineer in Charge
Date:

Signature of Senior Engineer
Date:

ANNEXURE A
Part II

Statement showing details of materials issued to the contractor Shri / M/S..... in respect of Contract Agreement / Work Order No.....Dated..... and not covered by the agreement

Sl.No	Stores Issue Voucher No.and Date	Issue Voucher No. and date allotted by stores to the SIV	Description of material issued to the contractor	Quantity issued	Quantity actually incorporated in the work	Issue Rate	Amount recoverable	Amount recovered upto previous bill	Balance now recovered	Remarks
1	2	3	4	5	6	7	8	9	10	11

TOTAL
Add Departmental Charges
Add GST (Wherever applicable)
GRAND TOTAL

Signature of Contractor
Date:

Signature of Engineer-in-Charge
Date:

Signature of Senior Engineer
Date:

Note: Cost of materials recovered in this bill should be shown against item 4 (a) of the memorandum of payments. The amounts of taxes and departmental charges recovered in this bill should be incorporated in Annexure C.

Form WAM 7 (Contd.)

ANNEXURE B

Statement showing tools and plant issued to the contractor Shri /M/S.....in respect of contract Agreement / Work Order No.....Dated.....

Sl.No.	Description of Tools and Plant Issued	Period for which issued	Rate at which recovery is to be made	Amount recoverable	Amount recovered upto previous bill	Balance now recovered	Remarks
1	2	3	4	5	6	7	8
			TOTAL				

Signature of Contractor
Date

Signature of Engineer-in-Charge
Date

Signature of Senior Engineer
Date

ANNEXURE C

Statement showing details of other recoveries to be made from the contractor Shri/M/s..... In respect of Contract Agreement / Work Order No.....Dated.....

Sl.No.	Particulars	Unit	Quantity	Rate	Amount recoverable	Amount recovered upto previous bill	Amount now recovered	Remarks
1	2	3	4	5	6	7	8	9
1	Water charges							
2	Electricity charges							
3	Medical charges							
4	Cost of empty gunny bags and empty containers not returned							
5								
6								
7								
			TOTAL					

Signature of Contractor
Date

Signature of Engineer in Charge
Date

Signature of Senior Engineer
Date

ANNEXURE D
DEVIATION STATEMENT

Name of the Contractor: Contract Agreement/Work Order No.
Name of the Work: Date:

SL. No.	Description of Item	Unit	Quantity as per agreement	Quantity as executed	Rate as per agreement	Rate as executed	Amount as per agreement	Amount as executed	Difference		Reason for the deviation with authority, if any
									Excess	Savings	
1	2	3	4	5	6	7	8	9	10	11	12

Signature of Engineer in Charge
Date:

Signature of Senior Engineer
Date:

ANNEXURE E

Statement showing the consumption of materials issued to the contractor Shri/M/s…… in respect of Contract Agreement / Work Order No……Dated……

Name of the Work:

ON RECOVERY BASIS

SL. No.	Description of material	Unit	Quantity actually issued	Quantity actually incorporated in the work	Balance	Particulars of disposal of balance	Quantity to be issued as per approved data for work actually done	Variation in consumption (difference between colum 5 & 8)		Rate chargeable for excess/short consumption, if any	Amount Recoverable for excess/short consumption, including materials not returned, if any	Remarks
								More	Less			
1	Cement											
2	Bricks											
3	Wood											
4	Asbestos Sheet											
5	Iron Material											
6												
7												

Signature of Contractor
Date:

Signature of Engineer in Charge
Date:

Signature of Senior Engineer
Date:

Note

1. The quantities shown in columns 4 and 5 above should tally with those shown in columns 5 & 6 respectively of Annexure A (Part I and II)
2. Data statement of theoretical consumption should be attached in support of quantity specified in column 8.

Form WAM 7 (Contd.)

ANNEXURE F

Statement showing details of materials issued to the contractor Shri/M/s..... in respect of Contract Agreement / Work Order No.....dated.....

Name of the Work:

FREE OF COST

Sl.No	Stores Issue Voucher No.	Description of material	Unit	Quantity issued	Quantity required as per data	Quantity consumed in the work	Balance (if any)	Nature of disposal for the balance	Rate chargeable for material not returned	Amount recoverable for material not returned	Remarks
1	2	3	4	5	6	7	8	9	10	11	12

Signature of Contractor
Date:

Signature of Engineer in Charge
Date:

Signature of Senior Engineer
Date:

ANNEXURE G

QUESTIONNAIRE TO BE ANSWERED BY THE ENGINEER IN CHARGE AND SENIOR ENGINEER

(Correct particulars and answers to be recorded)

1. Name of the Work:
2. Name of the Contractor:
3. Date of commencement of the Work:
4. Contract agreement /Work Order No. and date:
5. Reference to the supplementary Agreement No. if any:
6. Whether administrative approval and technical sanction has been accorded by the competent authority? If so, cite reference?
7. Whether sanction of the competent authority and financial concurrence of the Finance Department for award of the work has been accorded? If so, cite reference.
8. Whether the work has been completed in time? If not whether penalty has been levied or sanction of the competent authority for extension of time granted and communicated to the Finance Department with reasons for grant of extension? (Due and actual date of completion of the work and reference to letter No. and date granting the extension of time should be given).
9. (a) Whether the rates allowed in the bill have been checked with the contract agreement?

   (b) Whether the rates for extra/supplemental items have been approved by the competent authority and the sanction communicated to the Finance Department together with rate analysis? If so, cite reference
10. Whether deviations have been approved by the competent authority? If yes, give reference to the approval; if not, give reasons.
11. Whether the rates of recovery of stores issued to the contractor which are not provided for in the contract agreement have been settled in consultation with Finance?
12. Whether discrepancies pointed out by the Finance department in the stores statement have been reconciled and accepted by the Finance Department?
13. Whether materials issued to the contractor in excess of the theoretical requirements have been returned to the Stores department and the No. and date of such returned stores vouchers have been shown in Stores statement? If not, whether the cost of such excess materials has been recovered at the prescribed rate? Whether consumption statements in respect of materials chargeable to the work have been attached to the bill?
14. Whether consumption of materials shown has been technically checked by Senior Engineer?
15. Whether materials issued and used in the work is not less than that required for consumption in work according to our specifications? If consumption is less, whether necessary recovery has been made in the bill?
16. Whether measurements have been checked by the Engineer and Senior Engineer to the extent required and certificates of check recorded in the measurement books?
17. Whether contractor has signed the bill and the measurement books without reservations? If not, whether reasons have been intimated to the Finance Department?
18. Whether arithmetical calculations have been checked and certificate recorded in the measurement books by a person other than the one who calculated initially?
19. Whether any work was done at the risk and cost of the contractor and whether such cost has been recovered from him? Give particulars.
20. Whether all advance payments on running accounts have been recovered?
21. Whether all the recoveries due for services given to the contractor like rent of accommodation, water charges, electricity charges have been recovered and whether payments made by the company on behalf of the contractor have been adjusted?
22. Whether the files containing abstracts from measurement books/standard measurement books have been completed/updated?
23. Whether hire charges for tools & plant have been recovered and the statement of hire charges with full details attached?
24. Whether the certificate of workmanship and completion of work according to specifications, drawings etc. is recorded by Engineer Incharge/Senior Engineer and whether recoveries have been made for defective works, if any?
25. Whether all corrections in the bill/measurement books etc. have been neatly made and attested and there are no overwriting?
26. Whether final measurements have been taken as soon as possible after completion of the work and the certificate of completion issued? If not, whether reasons for delay have been recorded and communicated to finance department?
27. In respect of quantities reduced in the final bill as compared to the running payment, whether adequate reasons have been recorded and communicated to finance department?
28. Whether the expenditure has been classified correctly according to heads of account recorded in the sanctioned estimate?
29. Whether the work has been completed within the estimated cost? If not, what is the percentage of excess over the sanctioned estimate/ administrative approval? In case the excess is beyond the competency of the Senior Engineer, what action has been taken for obtaining the approval of the authority competent to sanction the excess?
30. (a) If the contractor has furnished bank guarantee in lieu of cash security deposit towards proper execution of works and guarantee against defects during the maintenance period, whether the period of currency of the bank guarantee covers the entire maintenance period?

    (b) If not whether security deposit has been proposed to be recovered from the final bill?
31. Whether all the previous audit objections raised on running account bills have been settled? If so, cite references.

Signature of Engineer in Charge
Date:

Signature of Senior Engineer
Date:

PROFORMA OF BANK GUARANTEE (in lieu of EARNEST MONEY)
(On non-Judicial stamp paper of appropriate value)

Bank Guarantee No……
Date……

To

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR NORTHERN REGION,
HRDI & PSNR COMPLEX, PLOT NO. 25,
SECTOR – 16 A, NOIDA – 201301, U.P.

Dear Sirs,

In accordance with the terms and conditions of Invitation for Bids/ Notice Inviting Tender No……[1] (Tender Conditions),M/s. ……. having its registered office at ……[2] (hereinafter referred to as the 'Tenderer'), is submitting its bid for the work of……[3] invited by M/s Bharat Heavy Electricals Limited (A Govt. of India Undertaking) a company incorporated under the Companies Act, 1956, having its registered office at BHEL House, Siri Fort, Asiad, New Delhi – 110049 through its Unit at Bharat Heavy Electricals Limited, Power Sector Northern Region, HRDI & PSNR Complex, Plot no. 25, Sector – 16 A, Noida – 201301, U.P.

The Tender Conditions provide that the Tenderer shall pay a sum of Rs ……. as Earnest Money Deposit in the form therein mentioned. The form of payment of Earnest Money Deposit includes Bank Guarantee executed by a Scheduled Bank.

In lieu of the stipulations contained in the aforesaid Tender Conditions that an irrevocable and unconditional Bank Guarantee against Earnest Money Deposit for an amount of .....[4] ..... is required to be submitted by the Tenderer as a condition precedent for participation in the said Tender and the Tenderer having approached us for giving the said Guarantee,

we, the .....[Name & address of the Bank] having our Registered Office at ……(hereinafter referred to as the Bank) being the Guarantor under this Guarantee, hereby irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer without any demur, merely on your first demand any sum or sums of Rs. [4] .....(in words Rupees.....) without any reservation, protest, and recourse and without the beneficiary needing to prove or demonstrate reasons for its such demand.

Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____.

PROFORMA OF BANK GUARANTEE (in lieu of EARNEST MONEY)
(On non-Judicial stamp paper of appropriate value)

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Vendor/ Contractor/ Supplier in any suit or proceeding pending before any Court or Tribunal, Arbitrator or any other authority, our liability under this present being absolute and unequivocal.

The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment hereunder and the Tenderer shall have no claim against us for making such payment.

We …….. Bank further agree that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Tender or to extend the time of submission of from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said Tenderer and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Tenderer or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Tenderer or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

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

This Guarantee shall be irrevocable and shall remain in force upto and including……[5] and shall be extended from time to time for such period as may be desired by the Employer.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Tenderer but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms hereof. However, unless a demand or claim under this Guarantee is made on us in writing on or before the ……. [6] we shall be discharged from all liabilities under this Guarantee.

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

Notwithstanding anything to the contrary contained hereinabove:

a) The liability of the Bank under this Guarantee shall not exceed……[4]…..

b) This Guarantee shall be valid up to ……[5]

c) Unless the Bank is served a written claim or demand on or before _____[6] all rights under this guarantee shall be forfeited and the Bank shall be relieved and

PROFORMA OF BANK GUARANTEE (in lieu of EARNEST MONEY)
(On non-Judicial stamp paper of appropriate value)

discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of
(Name of the Bank)

Date…….
Place of Issue…….

[1] Details of the Invitation to Bid/ Notice Inviting Tender
[2] Name and Address of the Tenderer
[3] Details of the Work
[4] BG Amount in words and Figures
[5] Validity Date
[6] Date of Expiry of Claim Period

Note:

1. Bidders are advised that expiry of claim period may be kept 3-6 months after validity date..

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

3. In Case of Bank Guarantees submitted by Foreign Vendors.

a. From Nationalized/ Public Sector/ Private Sector/ Foreign Banks (BG issued by Branches in India) can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/ city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.

b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)

b.1 In such cases, Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank's (BHEL's Consortium Bank) branch in India. All charges for issuance of Bank Guarantee/ counter-Guarantee should be borne by the Foreign Vendor.

PROFORMA OF BANK GUARANTEE (in lieu of EARNEST MONEY)
(On non-Judicial stamp paper of appropriate value)

b.2 In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at **sl.no. b.1** will required to be followed.

b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time).

PROFORMA OF BANK GUARANTEE (in lieu of RETENTION AMOUNT)

B.G. NO. Date

In consideration of Bharat Heavy Electricals Limited (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at _____[1] through its Unit at……..(name of the Unit) having agreed to exempt (Name of the Vendor / Contractor / Supplier) with its registered office at_____ [2] (hereinafter called the said "Contractor" which term includes supplier), from demand under the terms and conditions of the Contract reference No._____ dated _____ [3] valued at Rs……[4] (Rupees ----------)[4] (hereinafter called the said Contract), of Retention Amount for the due fulfilment by the said Contractor of the terms and conditions contained in the said Contract, on production of a Bank Guarantee for Rs._____ 5 (Rupees _____ _____ only),

We ____(indicate the name and address of the Bank) having its Head Office at _____(address of the head Office) (hereinafter referred to as the Bank), at the request of _____ [Contractor(s)], being the Guarantor under this Guarantee, do hereby irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer, an amount not exceeding Rs._____ without any demur, immediately on demand from the Employer and without any reservation, protest, and recourse and without the Employer needing to prove or demonstrate reasons for its such demand.

Any such demand made on the bank, shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs._____.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) in any suit or proceeding pending before any Court or Tribunal or Arbitrator or any other authority, our liability under this present being absolute and unequivocal.

The payment so made by us under this guarantee shall be a valid discharge of our liability for payment hereunder and the Contractor(s) shall have no claim against us for making such payment.

We, further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied & the Employer certifies that the terms and conditions of the said Contract have been fully and properly carried out by the said contractor(s) or acceptance of the final bill or discharge of this guarantee by the Employer, whichever is earlier. This guarantee shall initially remain in force upto and including _____[6] and shall be extended from time to time for such period as may be desired by the Employer. Unless a demand or claim under this guarantee is made on us in writing on or before the _____7, we shall be discharged from all the liability under this guarantee thereafter.

PROFORMA OF BANK GUARANTEE (in lieu of RETENTION AMOUNT)

We, ____(indicate the name of the Bank)____ further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by any reason of any such variation or extension being granted to the said contractor(s) or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

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

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Contractor but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).

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

Notwithstanding anything to the contrary contained hereinabove:

a) The liability of the Bank under this Guarantee shall not exceed…… [5]

b) This Guarantee shall be valid up to ……[6]

c) Unless the Bank is served a written claim or demand on or before _____[7] all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

Date _____ Day of _____

for____(indicate the name of the Bank)__

(Signature of Authorized signatory)

PROFORMA OF BANK GUARANTEE (in lieu of RETENTION AMOUNT)

[1] ADDRESS OF THE EMPLOYER. i.e. Bharat Heavy Electricals Limited

[2] ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER.

[3] DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

[4] CONTRACT VALUE

[5] BG AMOUNT IN FIGURES AND WORDS

[6] VALIDITY DATE

[7] DATE OF EXPIRY OF CLAIM PERIOD

Note:

1. Units are advised that expiry of claim period may be kept 3-6 months after validity date. It may be ensured that the same is in line with the agreement/ contract entered with the Vendor.

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

3. In line with the GCC, SCC or contractual terms, Unit may carry out minor modifications in the Standard BG Formats. If required, such modifications may be carried out after taking up appropriately with the Unit/Region's Law Deptt.

4. In Case of Bank Guarantees submitted by Foreign Vendors-

a. From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India) can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.

b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor Country's Bank)

b.1 In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank's (BHEL's Consortium Bank) branch in India. It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements.

b.2 In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at **sl.no. b.1** will required to be followed.

b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time). The BG Format provided to them should clearly specify the same.

FORMAT-29

STATEMENT OF CLAIMS/COUNTER CLAIMS TO BE SUBMITTED TO THE IEC BY BOTH THE PARTIES

1. Chronology of the Disputes

2. Brief of the Contract/MoU/Agreement/LOI/LOA

3. Brief history of the Disputes:

4. Issues:

5. Details of Clam(s)/Counter Claim(s):

Sl. No.	**Description of claim(s)/Counter Claim**	**Amount (in INR)Or currency applicable in the contract**	**Relevant contract clause**

6. Basis/Ground of claim(s)/counter claim(s) (along with relevant clause of contract)

Note– *The Statement of Claims/ Counter Claims may ideally be restricted to maximum limit of 20 pages. Relevant documents may be compiled and submitted along with the statement of Claims/ Counter Claims. The statement of Claims/ Counter Claims is to be submitted to all IEC members and to the other party by post as well as by email.*

FORMAT-30

FORMAT FOR NOTICE INVOKING CONCILIATION CLAUSE BY BHEL FOR REFERRING THE DISPUTES TO CONCILIATION THROUGH IEC

To,

M/s. (Stakeholder's name)

Subject: **NOTICE FOR INVOCATION OF THE CONCILIATION CLAUSE OF THE CONTRACT BY BHEL**

Ref: Contract No/MoU/Agreement/LOI/LOA& date _____.

Dear Sir/Madam,

As you are aware, with reference to above referred Contract/MoU/Agreement/LOI/LOA, certain disputes have arisen, which, in-spite of several rounds of mutual discussions and various correspondences have remained unresolved. The brief particulars of our claims which arise out of the above- referred Contract/MoU/Agreement/LOI/LOA are reproduced hereunder:

Sl. No.	Claim description	Amount involved

As you are aware, there is a provision in the captioned Contract/MoU/Agreement/LOI/ LOA for referring disputes to conciliation.

In terms of Clause ---------of Procedure i.e., Annexure ------ to the Contract/MoU /Agreement / LOI / LOA, we hereby seek your consent to refer the matter to Conciliation by Independent Experts Committee to be appointed by BHEL. You are invited to provide your consent in writing to proceed with conciliation into the above mentioned disputes within a period of 30 days from the date of this letter along with details of counter-claims, if any, which you might have with regard to the subject Contract/ MoU/ Agreement/ LOI/ LOA.

Please note that upon receipt of your consent in writing within 30 days of the date of receipt of this letter by you, BHEL shall appoint suitable person(s) from the BHEL Panel of Conciliators.

This letter is being issued without prejudice to our rights and contentions available under the contract and law.

Thanking you
Yours faithfully

Representative of BHEL

Note: The Format may be suitably modified, as required, based on facts and circumstances of the case.

FORMAT-31

FORMAT FOR NOTICE INVOKING CONCILIATION CLAUSE BY A STAKEHOLDER FOR REFERRING THE DISPUTES TO CONCILIATION THROUGH IEC

To,
BHEL (Head of the Unit/Division/Region/Business Group)

Subject: **NOTICE FOR INVOCATION OF THE CONCILIATION CLAUSE OF THE CONTRACT BY A STAKEHOLDER**

Ref: Contract No/MoU/Agreement/LOI/LOA& date _____.

Dear Sir/Madam,

As you are aware, with reference to above referred Contract/MoU/Agreement/LOI/LOA, certain disputes have arisen, which, in-spite of several rounds of mutual discussions and various correspondences have remained unresolved. The brief particulars of our claims which have arisen out of the above-referred Contract/MoU/Agreement/LOI/LOA are enumerated hereunder:

Sl. No.	Claim description	Amount involved

As you are aware, there is a provision in the captioned Contract/MoU/Agreement/LOI/ LOA for referring inter-se disputes of the Parties to conciliation.

We wish to refer the above-said disputes to Conciliation as per the said Clause of the captioned Contract/MoU/Agreement/LOI/ LOA. In terms of Clause ---------of Procedure i.e., Annexure ------ to the Contract/MoU /Agreement / LOI / LOA, we hereby invite BHEL to provide its consent in writing to proceed with conciliation into the above mentioned disputes within a period of 30 days from the date of this letter along with details of counter-claims, if any, which it might have with regard to the subject Contract/ MoU/ Agreement/ LOI/ LOA and to appoint suitable person(s) as Conciliator(s) from the BHEL Panel of Conciliators.

This letter is being issued without prejudice to our rights and contentions available under the contract and law.

Thanking you
Yours faithfully

Representative of the Stakeholder

Note: The Format may be suitably modified, as required, based on facts and circumstances of the case.

FORMAT-32

FORMAT FOR INTIMATION TO THE STAKEHOLDER ABOUT APPOINTMENT OF CONCILIATOR/IEC

To,

M/s. (Stakeholder's name)

Subject: **INTIMATION BY BHEL TO THE STAKEHOLDER AND CONCILIATOR(S) ABOUT APPOINTMENT OF CONCILIATOR/IEC**

Ref: Contract No/MoU/Agreement/LOI/LOA& date _____.

Sir,

This is with reference to letter dated ---------- regarding reference of the disputes arising in connection with the subject Contract No /MoU/Agreement/LOI/LOA to conciliation and appointment of Conciliator(s).

In pursuance of the said letter, the said disputes are assigned to conciliation and the following persons are nominated as Conciliator(s) for conciliating and assisting the Parties to amicably resolve the disputes in terms of the Arbitration & Conciliation Act, 1996 and the Procedure ---- to the subject Contract ...../MoU/Agreement/LOI/LOA, if possible.

Name and contact details of Conciliator(s)

a) .....

b) .....

c) .....

You are requested to submit the Statement of Claims or Counter-Claims (strike off whichever is inapplicable) before the Conciliator(s) in Format 29 (enclosed herewith) as per the time limit as prescribed by the Conciliator(s).

Yours faithfully,

Representative of BHEL

CC: To Conciliator(s)… for Kind Information please.
Encl: As above

Note: The Format may be suitably modified, as required, based on facts and circumstances of the case.

Procedure-2.3

PROCEDURE FOR CONDUCT OF CONCILIATION PROCEEDINGS

1. The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided herein:

2. The party desirous of resorting to Conciliation shall send an invitation/notice in writing to the other party to conciliate specifying all points of Disputes with details of the amount claimed. The party concerned shall not raise any new issue thereafter. Parties shall also not claim any interest on claims/counter-claims from the date of notice invoking Conciliation till the conclusion of the Conciliation proceedings. If BHEL is to initiate Conciliation, then, the invitation to Conciliate shall be extended to the concerned Stakeholder in **Format-30** hereto. Where the stakeholder is to initiate the Conciliation, the notice for initiation of Conciliation shall be sent in **Format-31** hereto.

3. The party receiving the invitation/notice for Conciliation shall within 30 days of receipt of the notice of Conciliation intimate its consent for Conciliation along with its counter-claims, if any.

4. The Conciliation in a matter involving claim or counter-claim (whichever is higher) up to Rs 5 crores shall be carried out by sole Conciliator nominated by BHEL while in a matter involving claim or counter-claim (whichever is higher) of more than Rs 5 crores Conciliation shall be carried out by 3 Conciliators nominated by BHEL. The appointment of Conciliator(s) shall be completed and communicated by the concerned Department/Group of BHEL Unit/Division/Region/Business Group to the other party and the Conciliator(s) within 30 days from the date of acceptance of the invitation to conciliate by the concerned party in the **Format-32**. The details of the Claim, and counter-claim, if any, shall be intimated to the Conciliator(s) simultaneously in **Format-29**.

5. The Parties shall be represented by only their duly authorized in-house executives/officers and neither Party shall be represented by a Lawyer.

6. The first meeting of the IEC shall be convened by the IEC by sending appropriate communication/notice to both the parties as soon as possible but not later than 30 days from the date of his/their appointment. The hearings in the Conciliation proceeding shall ordinarily be concluded within two (2) months and, in exceptional cases where parties have expressed willingness to settle the matter or there exists possibility of settlement in the matter, the proceedings may be extended by the IEC by a maximum of further 2 months with the consent of the Parties subject to cogent reasons being recorded in writing.

7. The IEC shall thereafter formulate recommendations for settlement of the Disputes supported by reasons at the earliest but in any case within 15 days from the date of conclusion of the last hearing. The recommendations so formulated along with the reasons shall be furnished by the IEC to both the Parties at the earliest but in any case within 1 month from the date of conclusion of the last hearing.

8. Response/modifications/suggestions of the Parties on the recommendations of the IEC are to be submitted to the IEC within time limit stipulated by the IEC but not more than 15 days from the date of receipt of the recommendations from the IEC.

9. In the event, upon consideration, further review of the recommendations is considered necessary, whether by BHEL or by the other Party, then, the matter can be remitted back to the IEC with request to reconsider the same in light of the issues projected by either/both the Parties and to submit its recommendations thereon within the following 15 days from the date of remitting of the case by either of the Parties.

10. Upon the recommendations by the Parties, with or without modifications, as considered necessary, the IEC shall be called upon to draw up the Draft Settlement Agreement in terms of the recommendations.

11. When a consensus can be arrived at between the parties only in regard to any one or some of the issues referred for Conciliation the draft Settlement Agreement shall be accordingly formulated in regard to the said Issue(s), and the said Settlement Agreement, if signed, by the parties, shall be valid only for the said issues. As regards the balance issues not settled, the parties may seek to resolve them further as per terms and conditions provided in the contract.

12. In case no settlement can be reached between the parties, the IEC shall by a written declaration, pronounce that the Conciliation between the parties has failed and is accordingly terminated.

13. Unless the Conciliation proceedings are terminated in terms of para 22 (b), (c) & (d) herein below, the IEC shall forward his/its recommendations as to possible terms of settlement within one (1) month from the date of last hearing. The date of first hearing of Conciliation shall be the starting date for calculating the period of 2 months.

14. In case of 3 members IEC, 2 members of IEC present will constitute a valid quorum for IEC and meeting can take place to proceed in the matter after

seeking consent from the member who is not available. If necessary, videoconferencing may be arranged for facilitating participation of the members. However, the IEC recommendations will be signed by all members. Where there is more than one (1) Conciliator, as a general rule they shall act jointly. In the event of differences between the Members of IEC, the decision/recommendations of the majority of the Members of IEC shall prevail and be construed as the recommendation of the IEC.

15. The Draft Settlement Agreement prepared by the IEC in terms of the consensus arrived at during the Conciliation proceedings between the Parties shall be given by the IEC to both the parties for putting up for approval of their respective Competent Authority.

16. Before submitting the draft settlement agreement to BHEL's Competent Authority viz. the Board Level Committee on Alternative Dispute Resolution (BLCADR) for approval, concurrence of the other party's Competent Authority to the draft settlement agreement shall be obtained by the other party and informed to BHEL within 15 days of receipt of the final draft settlement agreement by it. Upon approval by the Competent Authority, the Settlement Agreement would thereafter be signed by the authorized representatives of both the Parties and authenticated by the members of the IEC.

17. In case the Draft Settlement Agreement is rejected by the Competent Authority of BHEL or the other Party, the Conciliation proceedings would stand terminated.

18. A Settlement Agreement shall contain a statement to the effect that each of the person(s) signing thereto (i) is fully authorized by the respective Party(ies) he/she represents, (ii) has fully understood the contents of the same and (iii) is signing on the same out of complete freewill and consent, without any pressure, undue influence.

19. The Settlement Agreement shall thereafter have the same legal status and effect as an arbitration award on agreed terms on the substance of the dispute rendered by an arbitral tribunal passed under section 30 of the Arbitration and Conciliation Act, 1996.

20. Acceptance of the Draft Settlement Agreement/recommendations of the Conciliator and/or signing of the Settlement Agreement by BHEL shall however, be subject to withdrawal/closure of any arbitral and/or judicial proceedings initiated by the concerned Party in regard to such settled issues.

21. Unless otherwise provided for in the agreement, contract or the Memorandum of Understanding, as the case may be, in the event of likelihood of prolonged

absence of the Conciliator or any member of IEC, for any reason/incapacity, the Competent Authority/Head of Unit/Division/Region/Business Group of BHEL may substitute the Conciliator or such member at any stage of the proceedings. Upon appointment of the substitute Conciliator(s), such reconstituted IEC may, with the consent of the Parties, proceed with further Conciliation into the matter either de-novo or from the stage already reached by the previous IEC before the substitution.

22. The proceedings of Conciliation under this Scheme may be terminated as follows:

a. On the date of signing of the Settlement agreement by the Parties; or,

b. By a written declaration of the IEC, after consultation with the parties, to the effect that further efforts at conciliation are no longer justified, on the date of the declaration; or,

c. By a written declaration of the Parties addressed to the IEC to the effect that the Conciliation proceedings are terminated, on the date of the declaration; or,

d. By a written declaration of a Party to the other Party and the IEC, if appointed, to the effect that the Conciliation proceedings are terminated, on the date of the declaration; or,

e. On rejection of the Draft Settlement Agreement by the Competent Authority of BHEL or the other Party.

23. The Conciliator(s) shall be entitled to following fees and facilities:

Sl No	**Particulars**	**Amount**
1	Sitting fees	Each Member shall be paid a Lump Sum fee of Rs 75,000/- for the whole case payable in terms of paragraph No. 27 herein below.
2	Towards drafting of settlement agreement	In cases involving claim and/or counter-claim of up to Rs 5crores. Rs 50,000/- (Sole Conciliator) In cases involving claim and/or counter-claim of exceeding Rs 5 crores but less than Rs 10 crores. Rs 75,000 (per Conciliator)

Sl No	Particulars	Amount
		In cases involving claim and/or counter-claim of more than Rs 10 crores. Rs 1,00,000/- (per Conciliator) Note: The aforesaid fees for the drafting of the Settlement Agreement shall be paid on the, Signing of the Settlement Agreement after approval of the Competent Authority or Rejection of the proposed Settlement Agreement by the Competent Authority of BHEL.
3	Secretarial expenses	Rs 10,000/- (one time) for the whole case for Conciliation by a Sole Member IEC. Where Conciliation is by multi member Conciliators –Rs 30,000/- (one time)- to be paid to the IEC
4	Travel and transportation and stay at outstation Retired Senior Officials of other Public Sector Undertakings (pay scale wise equivalent to or more than E-8 level of BHEL)	As per entitlement of the equivalent officer (pay scale wise) in BHEL.
	Others	As per the extant entitlement of whole time Functional Directors in BHEL. Ordinarily, the IEC Member(s) would be entitled to travel by air Economy Class.
5	Venue for meeting	Unless otherwise agreed in the agreement, contract or the Memorandum of Understanding, as the case may be, the venue/seat of proceedings shall be the location of the concerned Unit / Division / Region /

Sl No	Particulars	Amount
		Business Group of BHEL. Without prejudice to the seat/venue of the Conciliation being at the location of concerned BHEL Unit / Division / Region / Business Group, the IEC after consulting the Parties may decide to hold the proceedings at any other place/venue to facilitate the proceedings. Unless, Parties agree to conduct Conciliation at BHEL premises, the venue is to be arranged by either Party alternately.

24. The parties will bear their own costs including cost of presenting their cases/evidence/witness(es)/expert(s) on their behalf. The parties agree to rely upon documentary evidence in support of their claims and not to bring any oral evidence in IEC proceedings.

25. If any witness(es) or expert(s) is/are, with the consent of the parties, called upon to appear at the instance of the IEC in connection with the matter, then, the costs towards such witness(es)/expert(s) shall be determined by the IEC with the consent of the Parties and the cost so determined shall be borne equally by the Parties.

26. The other expenditures/costs in connection with the Conciliation proceedings as well as the IEC's fees and expenses shall be shared by the Parties equally.

27. Out of the lump sum fees of Rs 75,000/- for Sitting Fees, 50% shall be payable after the first meeting of the IEC and the remaining 50% of the Sitting Fees shall be payable only after termination of the conciliation proceedings in terms of para 22 hereinabove.

28. The travelling, transportation and stay at outstation shall be arranged by concerned Unit as per entitlements as per Serial No. 4 of the Table at para 23 above, and in case such arrangements are not made by the BHEL Unit, the same shall be reimbursed to the IEC on actuals limited to their entitlement as per Serial No. 4 of the Table at Para 23 above against supporting documents. The IEC Member(s) shall submit necessary invoice for claiming the fees/reimbursements.

29. The Parties shall keep confidential all matters relating to the conciliation proceedings. Confidentiality shall extend also to the settlement agreement,

except where its disclosure is necessary for purposes of its implementation and enforcement or as required by or under a law or as per directions of a Court/Governmental authority/ regulatory body, as the case may be.

30. The Parties shall not rely upon or introduce as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the Disputes that is the subject of the Conciliation proceedings:

a. Views expressed or suggestions made by the other party in respect of a possible settlement of the Disputes;

b. admissions made by the other party in the course of the Conciliator proceedings;

c. proposals made by the Conciliator;

d. The fact that the other Party had indicated his willingness to accept a proposal for settlement made by the Conciliator.

31. The Parties shall not present the Conciliator(s) as witness in any Alternative Dispute Resolution or Judicial proceedings in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.

32. None of the Conciliators shall act as an arbitrator or as a representative or counsel of a Party in any arbitral or judicial proceeding in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.

33. The Parties shall not initiate, during the Conciliation proceedings, any arbitral or judicial proceedings in respect of a Disputes that is the subject matter of the Conciliation proceedings except that a Party may initiate arbitral or judicial proceedings where, in his opinion, such proceedings are necessary for preserving his rights including for preventing expiry of period of limitation. Unless terminated as per the provisions of this Scheme, the Conciliation proceedings shall continue notwithstanding the commencement of the arbitral or judicial proceedings and the arbitral or judicial proceedings shall be primarily for the purpose of preserving rights including preventing expiry of period of limitation.

34. The official language of Conciliation proceedings under this Scheme shall be English unless the Parties agree to some other language.