



भारत हेवी इलेक्ट्रिकल्स लिमिटेड

(भारत सरकार का उपक्रम)

BHARAT HEAVY ELECTRICALS LIMITED

(A Govt. of India Undertaking)

Ref: MSTPP: MISC-2: KLN-C

Date: 22-04-2021

NOTICE INVITING TENDER

NOTE: INTENDING BIDDER TO PARTICIPATE MAY DOWNLOAD FROM WEB SITES

Sealed offers in two part bid system are invited from reputed & experienced bidders meeting PRE QUALIFICATION CRITERIA as mentioned in Annexure-1 through hard copy mode, for the subject job by the undersigned on the behalf of BHARAT HEAVY ELECTRICALS LIMITED as per the tender document. Issue/ forwarding intimation regarding tender to any bidder shall not construe that the bidder is considered to be qualified. Consideration of their offer is subject to CUSTOMER APPROVAL & compliance of loading criteria as per clause no. 8.0 of NIT etc. specified below. 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	MSTPP:MISC-2:KLN-C
ii	Broad Scope of job	PACKAGE MISC-2: MISCELLANEOUS CIVIL WORKS IN SUBSTRUCTURE AND SUPERSTRUCTURE WORKS FOR DIFFERENT STRUCTURES FOR 2X660 MW MAITREE RAMPAL PROJECT, BANGLADESH.
iii	DETAILS OF TENDER DOCUMENT	
a	Volume-IA	General conditions of contract (Supply) Not Applicable.
b	Volume-IB	General conditions of contract (Service) Applicable.
c	Volume-IC	Special conditions of contract (Supply) Not Applicable.
d	Volume-ID	Special conditions of contract (Service) Applicable.
e	Volume-IE	Forms and Procedures etc. Applicable.
f	Volume-IF	Technical Conditions of Contract (TCC) (CML, TS, DRG, FQP) Applicable.
g	Volume-III	Price Schedule (Absolute value) – Rev-00 Applicable.
iv	ISSUE OF TENDER DOCUMENTS	1. <u>Sale from BHEL MSTPP Site office:</u> Start: 22-04-2021 Close: 02-05-2021 2. <u>Hard copy From BHEL MSTPP Site office, Rampal, Bangladesh.</u> Applicable.
v	DUE DATE & TIME OF OFFER SUBMISSION	Date: -02-05-2021, Time: 15-00 Hrs. The bidder may respond by submitting their offer through hard copy mode. Offers are invited in two-parts only. Applicable.
vi	OPENING OF TENDER	Date: 02-05-2021 1 hours after the latest due date and time of Offer submission Notes: (1) In case the due date of opening of tender becomes a non-working day, tenders shall be opened on next working day at the same time. (2) Bidder may depute representative to witness the opening of tender. Applicable.
vii	EMD AMOUNT	USD 17310 OR Equivalent BDT Applicable.

BHARAT HEAVY ELECTRICALS LIMITED
2x660MW,MSTPP,RAMPAL,BAGERHAT,BANGLADESH

viii	COST OF TENDER	USD 23 OR Equivalent BDT	Applicable.
ix	LAST DATE FOR SEEKING CLARIFICATION	Date: 29-04-2021 Along with soft version also, addressing to undersigned & to others as per contact address given below	Applicable.
x	SCHEDULE OF Pre-Bid Discussion (PBD)	Shall be notified--	Not Applicable (In case BHEL decides to conduct PBD, date, time & venue of PBD will be intimated suitably thru TCN.)
xi	INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)	IEM DETAILS: Refer Clause No 34.0 below.	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 site office. Bidders to keep themselves updated with all such information.	Shall be intimated to bidder.

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 and stamped (digitally signed & stamped in case of e mode of bidding) on each page, as part of offer. **Rates/Price including discounts/rebates, if any, mentioned anywhere/ in any form in the techno-commercial offer other than the Price Bid, shall not be entertained.**

3.0 **Procedure for Submission of Tenders:** The Tenderers must submit their Tenders as detailed below:

FOR HARD COPY SUBMISSION OF OFFER

- PART-I consisting of 'PART-I A (Techno Commercial Bid)' & '(ENVELOPE-I)
- PART-II (Price Bid) – in sealed and superscribed envelope (ENVELOPE-II)
One set of tender documents shall be retained by the bidder for their reference
- Two additional copies of Techno-commercial bid, along with original shall be submitted.

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

Sl no	Description	Remarks
	Part-I A	
	<u>ENVELOPE – I superscribed as:</u> PART-I (TECHNO COMMERCIAL BID) TENDER NO: NAME OF WORK: PROJECT:	

	DUE DATE OF SUBMISSION:	
	CONTAINING THE FOLLOWING: -	
i.	Covering letter/Offer forwarding letter of Tenderer.	
ii.	Duly filled-in 'No Deviation Certificate' as per prescribed format to be placed after document under sl no (i) above. Note: a. In case of any deviation, the same should be submitted separately for technical & commercial parts, indicating respective clauses of tender against which deviation is taken by bidder. The list of such deviation shall be placed after document under sl no (i) above. It shall be specifically noted that deviation recorded elsewhere shall not be entertained. b. BHEL reserves the right to accept/reject the deviations without assigning any reasons, and BHEL decision is final and binding. i). In case of acceptance of the deviations, appropriate loading shall be done by BHEL ii). In case of unacceptable deviations, BHEL reserves the right to reject the tender	
iii.	Supporting documents/ annexures / schedules/ drawing etc as required in line with Pre-Qualification criteria. It shall be specifically noted that all documents as per above shall be indexed properly and credential certificates issued by clients shall distinctly bear the name of organization, contact ph no, FAX no, etc.	
iv.	All Amendments/Correspondences/Corrigenda/Clarifications/Changes/ Errata etc pertinent to this NIT.	
v.	Integrity Pact Agreement (Duly signed by the authorized signatory)	Applicable.
vi.	Duly filled-in annexures, formats etc as required under this Tender Specification/NIT	
vii.	Notice inviting Tender (NIT)	
viii.	Volume – I F : Technical Conditions of Contract (TCC)	
ix.	Volume – I D : Special Conditions of Contract (SCC)-Service	
x.	Volume - I B : General Conditions of Contract (GCC)-Service	
xi.	Volume – I E : Forms & Procedures etc.	
xii.	Volume – III- (UNPRICED – without disclosing rates/price, but mentioning only 'QUOTED' or 'UNQUOTED' against each item.	
xiii.	Any other details preferred by bidder with proper indexing.	

	PART-II	
	PRICE BID consisting of the following shall be enclosed	
	ENVELOPE-III superscribed as: PART-II- (PRICE BID) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION:	
	CONTAINING THE FOLLOWING:-	
i	Covering letter/Offer forwarding letter of Tenderer enclosed in Part-I	
ii	Volume III – PRICE BID (Duly Filled in Schedule of Rates – rate/price to be entered in words as well as figures)	

	OUTER COVER	

	ENVELOPE-IV (MAIN ENVELOPE / OUTER ENVELOPE) superscribed as: TECHNO-COMMERCIAL BID, PRICE BID & EMD TENDER NO: NAME OF WORK: PROJECT: DUE DATE OF SUBMISSION:	
	CONTAINING THE FOLLOWING:	
i	- o Envelopes I - o Envelopes II - o Envelopes III	

FOR SUBMISSION OF OFFER THROUGH E-PROCUREMENT SITE (<https://bhel.abcpurchase.com>)

DOCUMENTS TO BE UPLOADED & MODALITY OF UPLOADING

Sl no	Description	Remarks
PART-I A	(TECHNO COMMERCIAL BID)	
	CONTAINING THE FOLLOWING:-	
i.	Covering letter/Offer forwarding letter of Tenderer. (To be attached in relevant Attachment section)	
ii.	Duly filled-in 'No Deviation Certificate' as per prescribed format. (To be attached in relevant Attachment section) Note: a. In case of any deviation, the same should be submitted separately for technical & commercial parts, indicating respective clauses of tender against which deviation is taken by bidder. The list of such deviation shall be attached in relevant attachment section of the e –procurement portal. It shall be specifically noted that deviation recorded elsewhere shall not be entertained. b. BHEL reserves the right to accept/reject the deviations without assigning any reasons, and BHEL decision is final and binding. - i). In case of acceptance of the deviations, appropriate loading shall be done by BHEL - ii). In case of unacceptable deviations, BHEL reserves the right to reject the tender	
iii.	Supporting documents/ annexures / schedules/ drawing etc as required in line with Pre-Qualification criteria. It shall be specifically noted that all documents as per above shall be attached in relevant attachment section and credential certificates issued by clients shall distinctly bear the name of organization, contact ph no, FAX no, etc.	
iv.	All Amendments/Correspondences/Corrigenda/Clarifications/Changes/ Errata etc pertinent to this NIT. (To be attached in relevant Attachment section)	
v.	Integrity Pact Agreement (Duly signed by the authorized signatory)	Applicable.
vi.	Duly filled-in annexures, formats etc as required under this Tender Specification/NIT (To be attached in relevant Attachment section)	

vii.	Notice inviting Tender (NIT) (To be attached in relevant Attachment section)	
viii.	Volume – I F : Technical Conditions of Contract (TCC) (To be attached in relevant Attachment section)	
ix.	Volume – I D : Special Conditions of Contract (SCC)-Service (To be attached in relevant Attachment section)	
xi.	Volume – I B : General Conditions of Contract (GCC)-Service (To be attached in relevant Attachment section)	
xii.	Volume – I E : Forms & Procedures etc. (To be attached in relevant Attachment section)	
xiii.	Volume–III - (UNPRICED – without disclosing rates/price, but mentioning only 'QUOTED' or 'UNQUOTED' against each item. (To be attached in Unpriced Bid Attachment section)	
xiv.	Any other details preferred by bidder with proper indexing. (To be attached in relevant Attachment section)	

PART-II	PRICE BID (TO BE ATTACHED IN PRICE BID ATTACHMENT SECTION)	
	CONTAINING THE FOLLOWING:-	
i	Covering letter/Offer forwarding letter of Tenderer enclosed in Part-I	
ii	Volume III – PRICE BID (Duly Filled in Schedule of Rates – rate/price to be entered in words as well as figures) Any other document uploaded in the price bid, apart from above tender format, shall not be taken into cognizance for evaluation of offer.	

SPECIAL NOTE:

- A) Your offer & documents submitted along with offer shall be (digitally signed in case of submission of offer through BHEL's e-procurement site) signed & stamped in each page by your authorised representative. No overwriting/ correction in tender documents by bidders shall be allowed. However, if correction is unavoidable, the same may be signed by authorized signatory.
- B) The credentials/ documents submitted towards compliance of Pre-qualification requirement shall be physically signed by the authorized signatory & stamped before uploading/submission of offer.
- C) **All documents/ annexures submitted with the offer shall be properly annexed** and placed in respective places of the offer as per enclosure list mentioned in the covering letter **(or attached in the respective sections** in case of submission of offer through BHEL's e-procurement site). BHEL shall not be responsible for any missing documents.

- 4.0 No Deviation with respect to tender clauses and no additional clauses/ suggestions/ in Techno-commercial bid/ Price bid shall normally be considered by BHEL. Bidders are requested to positively comply with the same.
- 5.0 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).
- 6.0 Bidders shall submit Integrity Pact Agreement (Duly signed by authorized signatory who signs in the offer), **along** with techno - commercial bid. This pact shall be considered as a preliminary qualification for further participation. **The names and other details of Independent External Monitor (IEM) for the subject tender is as given at point (xi) of 1 above.**
- 7.0 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-1 (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.

- 8.0 In case BHEL decides on a 'Public Opening', the date & time of opening of the PRICE BID shall be intimated to the qualified bidders.
- 9.0 Validity of the offer shall be for 6- **months** from the latest due date of offer submission (including extension, if any) unless specified otherwise.

10.0 **Integrity Pact (IP) –**

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

SI	IEM	Address	Phone & Email
1.	Shri D.R.S Chaudhary, IAS (Retd.)	E-1/164, Arera Colony, Bhopal 462016 (M.P.)	dilip.chaudhary@icloud.com
2.	Mrs. Pravin Tripathi, IA & AS (Retd.)	D-243, Anupam Gardens, Lane IB, Neb Sarai, New Delhi - 110068	pravin.tripathi@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 provided below:

Details of contact person(s):

Name	Rajib Nath
Dept	SCT Dept, BHEL MSTPP,BANGLADESH
Address	2x660MW,MSTPP,RAMPAL
Phone	01700766664
Email	rajibnath@bhel.in

- 11.0 BHEL reserves the right to split the order between L1 and other qualified bidders excluding the H1 (except in the case of two qualified bidders) bidder. Splitting shall be on around 60:40 basis after getting L2/L3/L4 but except H1 (except in the case of two qualified bidders) bidders acceptance of the counter offered L1 price. Sequence of counter offer shall be as per their respective ranking.
12. It may please be noted that Bid should be free from correction, overwriting, using corrective fluid, etc. Any interlineation, cutting, erasure or overwriting shall be valid only if they are attested under full signature(s) of person(s) signing the bid, else bid shall be liable for rejection.

All overwriting/ cutting, etc. will be numbered by bid opening officials and announced during bid opening.

12.0 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-Volume-III
- d. Technical Conditions of Contract (TCC) -- Volume-IF
- e. Special Conditions of Contract (SCC) — Volume-ID
- f. General Conditions of Contract (GCC) — Volume-IB
- g. Forms and Procedures —Volume-IE

for BHARAT HEAVY ELECTRICALS LTD

DGM (SCT)

Agency	Contact details	
BHEL, MSTPP, RAMPAL, BANGLADESH	Address	2x660 MW MSTPP,BAGERHAT,RAMPAL,BANGLADESH
	Phone no	017007 -66664
	E-mail	rajibnath@bhel.in

Enclosure

01. Annexure-1: Pre Qualification Criteria.
02. Annexure-2: Format for No deviation Certificate.
03. Annexure-3: Format for seeking clarification.
04. Annexure-4: Check List.
05. Annexure-5: Conditions for consortium/tie up.
06. Annexure –A- Amendment to GCC/SCC.
07. Annexure -B- Terms & conditions of Reverse Auction.
08. Annexure –C- CA certificate Format.
09. Annexure-E – Guidelines/ rules for Bank Guarantee submission by Foreign vendor.
10. Annexure– CPP-GST/I.
11. Integrity Pact Agreement Format (Separate).
12. Form 10F (Separate).
13. Currency Matrix (Separate)
14. Other Tender documents as per this NIT.

ANNEXURE - 1**PRE QUALIFICATION CRITERIA**

JOB	PACKAGE MISC-2: MISCELLANEOUS CIVIL SUBSTRUCTURE AND SUPERSTRUCTURE WORKS FOR DIFFERENT STRUCTURES FOR 2X660 MW MAITREE RAMPAL PROJECT, BANGLADESH.
TENDER NO	MSTPP:MISC-2:KLN-C

SL NO	CRITERIA
1.0	FINANCIAL CRITERIA
1.0 (a)	BIDDER SHOULD HAVE AVERAGE MINIMUM ANNUAL FINANCIAL TURNOVER OF USD 0.26 MILLION OR EQUIVALENT DURING THE LAST 3 (THREE) YEARS, ENDING ON 30-06-2019 OR CORRESPONDING FINANCIAL YEAR FOLLOWED BY THE BIDDER AND HAVING POSITIVE NET WORTH AS ON LATEST AUDITED ACCOUNTS AS SUBMITTED FOR PARA 1(C).
(b)	BIDDER MUST HAVE EARNED PROFIT IN ANY ONE OF THE LAST THREE FINANCIAL YEARS ENDING ON 30-06-2019 OR CORRESPONDING FINANCIAL YEAR FOLLOWED BY THE BIDDER. AUDITED BALANCE SHEET AND PROFIT & LOSS ACCOUNT OF THE COMPANY FOR LAST 3 (THREE) FINANCIAL YEARS, ENDING ON 30-06-2019 OR CORRESPONDING FINANCIAL YEAR FOLLOWED BY THE BIDDER NEED TO BE SUBMITTED IN SUPPORT OF ABOVE.
(c)	IN CASE AUDITED BALANCE SHEET AND PROFIT AND LOSS ACCOUNT HAS NOT BEEN SUBMITTED FOR ALL THREE YEARS INDICATED ABOVE THEN THE APPLICABLE FINANCIAL AUDITED STATEMENTS SUBMITTED BY THE BIDDERS AGAINST THE REQUISITE THREE YEARS WILL BE AVERAGED FOR THREE YEARS.
(d)	IF FINANCIAL STATEMENTS ARE NOT REQUIRED TO BE AUDITED STATUTORILY, THEN INSTEAD OF AUDITED FINANCIAL STATEMENTS, FINANCIAL STATEMENTS ARE REQUIRED TO BE CERTIFIED BY CHARTERED ACCOUNTANT.
2.0	TECHNICAL CRITERIA
2.1	GENERAL TECHNICAL CRITERIA (B1)
2.1.1	BIDDER SHOULD HAVE EXECUTED 'CIVIL WORKS' OR 'CIVIL AND ARCHITECTURAL WORKS' FOR ANY ONE OF THE FOLLOWING IN THE LAST 7 (SEVEN) YEARS, FROM LATEST DATE OF BID SUBMISSION. RELEVANT DOCUMENT IN SUPPORT OF ABOVE SHALL BE SUBMITTED.
2.1.2	1 (SINGLE) WORK OF VALUE NOT LESS THAN USD 0.70 MILLION OR EQUIVALENT AMOUNT.
	OR
2.1.3	2 (TWO) WORKS EACH OF VALUE NOT LESS THAN USD 0.44 MILLION OR EQUIVALENT AMOUNT.
	OR
2.1.4	3 (THREE) WORKS EACH OF VALUE NOT LESS THAN USD 0.35 MILLION OR EQUIVALENT AMOUNT.
2.2	SPECIALIZED CRITERIA (B2)
A	AT LEAST 60% OF ANNUALIZED RCC QUANTITIES WITHIN A COMMON PERIOD OF TWELVE CONSECUTIVE MONTHS IN CUMULATIVE OF TWO RUNNING/COMPLETED CONTRACTS.
	OR
B	AT LEAST 40% OF ANNUALIZED RCC QUANTITIES WITHIN A PERIOD OF TWELVE CONSECUTIVE MONTHS IN ONE RUNNING/COMPLETED CONTRACT.
C	TENDERED RCC QUANTITY = 7150 CUM HENCE, ANNUALIZED QUANTITY = (7150 X 12)/ TIME ALLOCATED (12 MONTHS) = 7150 CUM
2.3	THE BIDDER SHOULD HAVE VALID TIN NO , BIN & TRADE LICENSE OF BANGLADESH. RELEVANT COPY OF DOCUMENT TO BE SUBMITTED.
3.0	GENERAL
A	CONSORTIUM BIDDING IS NOT ALLOWED.
B	IN CASE THE JOB IS UNDER EXECUTION/ ONGOING JOB, THE VALUE OF EXECUTED PORTION OF THE JOB SHALL BE AT LEAST CORRESPOND TO THE RESPECTIVE VALUES SPECIFIED ABOVE EVEN IF THE CONTRACT HAS NOT BEEN COMPLETED OR CLOSED.
C	THE VENDOR SHOULD HAVE ACHIEVED THE CRITERIA SPECIFIED IN THE PRE-QUALIFICATION CRITERIA, EVEN IF THE CONTRACT HAS NOT BEEN COMPLETED OR CLOSED.
D	AFTER SATISFACTORY FULFILLMENT OF ALL ABOVE CRITERIA, OFFER SHALL BE CONSIDERED FOR FURTHER EVALUATION & PARTICIPATION AS PER NIT & ALL OTHER TERMS OF TENDER, ALONG WITH ACCEPTANCE/ APPROVAL OF BIDDER BY CUSTOMER.

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ANNEXURE - 2**FORMAT FOR NO DEVIATION CERTIFICATE**
(To be submitted in the bidder's letter head)

BHARAT HEAVY ELECTRICALS LIMITED,
2x660 MW MSTPP,
Rampal, Bagerhat,
Bangladesh

Sub	No Deviation Certificate.	
Job	PACKAGE MISC-2: MISCELLANEOUS CIVIL SUBSTRUCTURE AND SUPERSTRUCTURE WORKS FOR DIFFERENT STRUCTURES FOR 2X660 MW MAITREE RAMPAL PROJECT, BANGLADESH..	
Ref	1.0	Tender no MSTPP:MISC-2:KLN-C
	2.0	BHEL's NIT, vide reference no MSTPP:MISC-2:KLN-C Date: 22-04-2021.
	3.0	All other pertinent issues till date.

Dear Sirs,

With reference to above, this is to confirm that as per tender conditions, we have visited site before submission of our offer and noted the job content & site conditions etc. We also confirm that we have not changed/ modified the tender documents as appeared in the website/ issued by you and in case of such observance at any stage, it shall be treated as null and void.

We hereby confirm that we have not taken any deviation from tender clauses together with other references as enumerated in the above referred NIT. We hereby confirm our unqualified acceptance to all terms & conditions, unqualified compliance to technical specification, integrity pact (if applicable) and acceptance to reverse auctioning process.

In the event of observance of any deviation in any part of our offer at a later date whether implicit or explicit, the deviations shall stand null & void.

We confirm to have submitted/uploaded offer/documents in accordance with tender instructions with acceptance of the terms & conditions of the tender by us and as per aforesaid references.

Thanking you,

Yours faithfully,

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

BHARAT HEAVY ELECTRICALS LIMITED
2x660MW, MSTPP, RAMPAL, BAGHERHAT, BANGLADESH

ANNEXURE - 3**FORMAT FOR SEEKING CLARIFICATION**

JOB	PACKAGE MISC-2: MISCELLANEOUS CIVIL SUBSTRUCTURE AND SUPERSTRUCTURE WORKS FOR DIFFERENT STRUCTURES FOR 2X660 MW MAITREE RAMPAL PROJECT, BANGLADESH..
TENDER NO	MSTPP:MISC-2:KLN-C.

Sl no	Reference clause of tender document	Existing provision	Bidder's query	BHEL's clarification

ANNEXURE - 4**CHECK LIST****NOTE:- Tenderers are required to fill in the following details and no column should be left blank**

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

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

DATE :

AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

BHARAT HEAVY ELECTRICALS LIMITED
2x660MW, MSTPP, RAMPAL, BAGERHAT, BANGLADESH

Annexure - A**Amendment to GCC/SCC (Vol-IB/Vol-ID)****1. Introduction of Clause No 1.15.13 in GCC as below:**

Clause No 1.15.13: Additional security deposit (SD) has to be submitted by the successful bidder with value as follows:

"If the final price of successful bidder is lesser by 'more than 20%' of BHEL's estimate - 'Additional Security Deposit' will be required to be submitted by the successful bidder with value as follows:

Additional Security Deposit = 30 % of (A-B) limited to a maximum of 10% of the 'Total Price/Contract Value', where,

A = 80% of BHEL estimate

B = The final offered price of successful bidder through RA (In case of RA)

OR

Sealed paper price bid of successful bidder (in case of paper bid)

This 'Additional Security Deposit' shall have the same validity as that of the 'Security Deposit' and shall be revalidated/released in the manner as spelt out for the 'Security Deposit' as per relevant clause of GCC.

The BHEL's estimated value shall be disclosed to the successful bidder (on their request) at appropriate juncture in case 'Additional Security Deposit' is applicable."

2. Clause no. 1.10.1 of GCC shall be read as below:

The total amount of Security Deposit will be 5% of the contract value. EMD of the successful tenderer shall be converted and adjusted towards the required amount of Security Deposit.

3. Clause no. 1.10.2 of GCC shall be read as below:

At least 50% of the required Security Deposit, including the EMD, should be furnished before start of the work. Balance of the Security Deposit can be deposited by deducting 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.

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 authorities.

Alternatively at discretion of Engineer I/C initial security deposit (50% value) can be recovered from the 1st two running bills

4. Clause no. 1.10.3 of GCC shall be read as below:

The balance amount to make up the required Security Deposit of 5% of the contract value may be accepted in the following forms:

- a) Cash (as permissible under the extant Income Tax Act)
- b) Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL

- c) Bank Guarantee from Scheduled Banks/ Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format should have the approval of BHEL
- d) 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)
- e) 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)

(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)

5. Introduction of Clause No. 1.10.8 in GCC as below:

Clause No 1.10.8: SDBG to be furnished by the vendor before start of work. No payment will be released till SDBG is submitted by the vendor.

If requested by the vendor, cash recovery equivalent to SDBG value to be made from bills submitted by the vendor.

Also recovery of interest calculated @SBI PLR +2% on amount equivalent to SDBG / PBG value to be made for the gap period (difference between date of start of work and date of submission of BG / cash recovery).

In case of delay in extension of SDBG, in case of validity expiry, SDBG shall be invoked. However if the vendor submits a new BG after invocation of the previous BG then, it shall be refunded and recovery for the gap period, i.e. the duration for which BG is not available shall be made as stated above.

6. Clause no. 1.11 of GCC shall be read as below:

Security Deposit shall be refunded/Bank Guarantee(s) released to the Contractor along with the 'Final Bill' after deducting all expenses / other amounts due to BHEL under the contract / other contracts entered into with them by BHEL upon fulfilment of contractual obligations as per terms of the contract.

7. Clause no. 2.8.3, 2.8.4 and 2.8.5 of GCC shall be read as below:

Clause no. 2.8.3: The contractor shall comply with all applicable Laws, Statutory Rules, Regulations, Notifications, etc. such as Payment of Wages Act, Minimum Wages Act, Workmen Compensation Act, Employer's Liability Act, Industrial Disputes Act, Employers Provident Act, Employees State Insurance Scheme, Contract Labour (Regulation and Abolition) Act, Payment of Bonus & Gratuity Act, Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, or any other Acts, Rules, and Regulations for labour/workers or governing execution of the work as may be enacted by the Bangladesh Government during the tenure of the Contract and having force or jurisdiction at Site. The Contractor shall also comply with provisions of and give all such notices to the local Governing Body, Police and other relevant Authorities as may be required by the Law of the land.

Clause no. 2.8.4: The Contractor shall obtain independent License if applicable in Bangladesh for engaging contract labour/workers as required from the concerned Authorities issued by the Principal Employer/Customer/Statutory Bodies as per the prevailing Act or Rules/Regulations of Bangladesh

Clause no. 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.

8. Clause 2.12 of GCC (Overrun Compensation) of GCC stands revised as follows:

2.12 OVERRUN COMPENSATION (ORC)

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 OR BHEL :** No ORC shall be applicable.

2.12.3.1 In case **Force Majeure** is invoked:

(i) No ORC shall be applicable during the period of Force Majeure.

9. Clause 2.14 of GCC (Quantity Variation)

a) Existing Clause 2.14.1 of GCC stands revised as follows:

"The quantities given in the contract are tentative and may change to any extent (both in plus side and minus side). The quoted rates for individual items shall remain firm irrespective of any variations in the individual quantities. No compensation becomes payable in case the variation of the final executed contract value is within the limit of Minus (-) 30 % of awarded contract value"

b) Existing Clause 2.14.2 ii). of GCC stands revised as follows:

"In case the finally executed contract value increases above the awarded Contract Value due to quantity variation, there will be no upward revision in the rates for the individual items and also contractor is not eligible for any compensation."

10. Clause 2.17 of GCC (Price Variation Compensation) stands revised as follows:

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 contain the particulars of all claims to be referred to arbitration in sufficient detail and shall also indicate the monetary amount of such claim. The arbitration shall be conducted by a sole arbitrator to be appointed by the Head of the BHEL Power Sector Region issuing the Contract within 60 days of receipt of the complete Notice. 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 Kolkata (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.

2.21.3 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.

11. Clause no. 2.7.2 and 2.7.3 of Volume-IB-GCC shall be revised as follows:

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' by BHEL in any of the following cases:

- i). Contractor's poor progress of the work vis-à-vis execution timeline as stipulated in the Contract, backlog attributable to contractor including unexecuted portion of work does not appear to be executable within balance available period considering its performance of execution.
- ii). Withdrawal from or abandonment of the work by contractor before completion of the work as per contract.
- iii). Non-completion of work by the Contractor within scheduled completion period as per Contract or as extended from time to time, for the reasons attributable to the contractor.
- iv). Termination of Contract on account of any other reason (s) attributable to Contractor.
- v). Assignment, transfer, subletting of Contract without BHEL's written permission.
- vi). Non-compliance to any contractual condition or any other default attributable to Contractor.

Risk & Cost Amount against Balance Work:

Risk & Cost amount against balance work shall be calculated as follows: Risk

& Cost Amount= $[(A-B) + (A \times H/100)]$

Where,

A= Value of Balance scope of Work (*) as per rates of new contract

B= Value of Balance scope of Work (*) as per rates of old contract being paid to the contractor at the time of termination of contract i.e. inclusive of PVC & ORC, if any.

H = Overhead Factor to be taken as 5

In case (A-B) is less than 0 (zero), value of (A-B) shall be taken as 0 (zero).

* Balance scope of work (in case of termination of contract):

Difference of Contract Quantities and Executed Quantities as on the date of issue of Letter for 'Termination of Contract', shall be taken as balance scope of Work for calculating risk & cost amount. Contract quantities are the quantities as per original contract. If, Contract has been amended, quantities as per amended Contract shall be considered as Contract Quantities.

Items for which total quantities to be executed have exceeded the Contract Quantities based on drawings issued to contractor from time to time till issue of Termination letter, then for these items total Quantities as per issued drawings would be deemed to be contract quantities.

Substitute/ extra items whose rates have already been approved would form part of contract quantities for this purpose. Substitute/ extra items which have been executed but rates have not been approved, would also form part of contract quantities for this purpose and rates of such items shall be determined in line with contractual provisions.

However, increase in quantities on account of additional scope in new tender shall not be considered for this purpose.

NOTE: Incase portion of work is being withdrawn at risk & cost of contractor instead of termination of contract, contract quantities pertaining to portion of work withdrawn shall be considered as 'Balance scope of work' for calculating Risk & Cost amount.

LD against delay in executed work in case of Termination of Contract:

LD against delay in executed work shall be calculated in line with LD clause no. 2.7.9 of GCC, for the delay attributable to contractor. For limiting the maximum value of LD, contract value shall be taken as Executed Value of work till termination of contract.

Method for calculation of "LD against delay in executed work in case of termination of contract" is given below.

- i). Let the time period from scheduled date of start of work till termination of contract excluding the period of Hold (if any) not attributable to contractor = T_1
- 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. $T_2 = [1 - (X/Y)] \times T_1$
- 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 " T_2 " 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.

12. Clause 2.24 of GCC (Performance Guarantee for Workmanship)

Term "**Special** Conditions of Contract" appearing in 3rd line of the current clause 2.24.1, is replaced by "**Technical** Conditions of Contract"

13. Clause 4.2.1.7 of Special Condition of Contract (SCC)

At the end of Clause 4.2.1.7 (i.e. after the line "Decision of BHEL shall be final and binding on the contractor") following para is to be added

"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 installment."

14. Clause 9.61 of SCC (NON-COMPLIANCE)

Under NON-COMPLIANCE, at the end of Clause 9.61 (i.e. **after the line** "Also the amount will be spent for purchasing the safety appliances and supporting the safety activity at site.") following para is to be added:

"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"

15. Clause 9.1 & 9.2 to 9.62 of SCC (HSE & OHSAS Obligations)

Cl. no. 9.0	No change
Cl. no. 9.1	HSE (Health, safety & Environment): Contractor will comply with HSE (Health, safety & Environment) requirements of BHEL as per "HSE Plan for Site Operations by Sub-contractors" (Document no. HSEP:14, Rev.00) attached with this tender.
Cl. no. 9.2 to 9.62	Deleted

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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.** 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 returned 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 shall be sent by 'REGISTERED POST ACKNOWLEDGEMENT DUE / by COURIER' and shall be posted 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 Fax/Email/Internet shall be considered as per terms of NIT.

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- 1.2.3 Tenders shall be opened by authorised Officer of BHEL at his office at the time and date as specified in the NIT, in the presence of such of those tenderers or their authorised representatives who may be present
- 1.2.4 Tenderers whose bids are found techno commercially qualified shall be informed 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. 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.
- 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. 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 **Conventional (Manual) Price Bid opening :** In the case of price bid opening without resorting to Reverse Auction, if there are differences between the rates given by the tenderer in words and figures or in amount worked out by him, the following procedure for evaluation and award shall be followed:
- When there is a difference between the rates in figures and in words, the rates which corresponds to the amounts worked out by the contractor, shall be taken as correct
 - When the amount of an item is not worked out by the contractor or it does not correspond with the rate written either in figure or in words, then the rate quoted by the contractor in words shall be taken as correct
 - When the rate quoted by the contractor in figures and words tallies but the amount is not worked out correctly, the rate quoted by the contractor shall be taken as correct and not the amount.
 - In case of lumpsum price, 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.
 - In case of omission in quoting any rate for one or more items, the evaluation shall be done considering the highest quoted rate obtained against the respective items by other tenderers for the subject tender. If the tenderer becomes L-1, the notional rates for the omission items shall be the lowest rates quoted for the respective items by the other tenderers against the respective omission items for the subject job and the 'Total quoted price (loaded for omissions)' shall be arrived at. However the overall price remaining the same as quoted originally, the rates for all the items in the 'Total quoted price (loaded for omissions)' shall be reduced item wise in proportion to the ratio of 'Original' total price and the 'Total quoted price (loaded for omissions)'.
 - The 'Final Total Amount' shall be arrived at after considering the amounts worked out in line with 'i' to 'iv' above.
- 1.4.2 **Reverse Auction:** In case of Reverse Auction, the successful bidder shall undertake to execute

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the work as per overall price offered by him during the Reverse Auction process. In case of omission of rates, the procedure shall be as per 'Guidelines for Reverse Auction' enclosed.

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) .Offers from tenderers who are under suspension (banned) by any Unit/Region/Division of BHEL shall not be considered.
- 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+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 including submission of TDS certificates for the said job
- iv) Assessing Bidder 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 price bid opening or through electronic Reverse Auction, at the discretion of BHEL
- 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 and receipt of unqualified acceptance from the successful bidder
- vii) Bidders are advised to also refer to clause no 2.9.4 regarding evaluation of their performance in ongoing projects for the current tender

1.7. DATA TO BE ENCLOSED

Full information shall be given by the tenderer in respect of the following. Non-submission of this information may lead to rejection of the offer.

i) INCOME TAX PERMANENT ACCOUNT NUMBER

Certified copies of Permanent Account Numbers as allotted by Income Tax Department for the Company/Firm/Individual Partners, etc. shall be furnished along with tender.

ii) ORGANIZATION CHART

The organization chart of the tenderer's organization, including the names, addresses and contact

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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 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 duly 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 **AUTHORISATION AND ATTESTATION**

Tenders shall be signed by a person duly authorized/empowered to do so. An attested copy of the Power of Attorney, in case the tender is signed by an individual other than the sole proprietor shall be submitted along with the tenders

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 along with the offer in full as per the amount indicated in the Special Conditions of Contract / NIT
- ii) EMD is to be paid in cash (as permissible under Income Tax Act), Pay order or Demand Draft in favour of 'Bharat Heavy Electricals Limited' and payable at Regional HQ issuing the tender.
- iii) No other form of EMD remittance shall be acceptable to BHEL
- iv) Bidder may opt to deposit "One Time EMD" of Rs. 2.0 lakhs (Rupees Two lakhs only) with BHEL:Power Sector Region HQ issuing the tender, which will enable them to participate in all the future tender enquiries in respect of Erection and Commissioning services issued from the respective office. Interested bidders may clearly send their consent for converting the present EMD into a "One Time EMD" in their offer.
 - Note : The 'One Time EMD' cannot be withdrawn by the tenderers within 3 years from the date of deposit, under any circumstances. The Tenderer who wishes to withdraw after three years will not be allowed to submit 'One Time EMD' again.
- v) Bidders who have already deposited such "One Time EMD" of Rs. 2.00 lakh are exempted from submission of EMD for this tender. However a copy of 'One Time EMD' certificate issued by BHEL Regional HQ issuing the tender shall be enclosed along with the offer.

1.9.2 EMD by the bidder will be forfeited as per Tender Documents if

- i) After opening the tender, the bidder revokes his tender within the validity period or increases his

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earlier quoted rates.

- ii) The bidder does not commence the work within the period as per LOI/Contract. In case the LOI / contract is silent in this regard then within 15 days after award of contract.

1.9.3 EMD shall not carry any interest.

1.9.4 In the case of unsuccessful bidders, the Earnest Money will be refunded to them within a reasonable time after acceptance of award by successful tenderer.

1.10 SECURITY DEPOSIT

1.10.1 Upon acceptance of Tender, the successful Tenderer should deposit the required amount of Security Deposit for satisfactory completion of work, as per the rates given below:

SN	Contract Value	Security Deposit Amount
1	Up to Rs. 10 lakhs	10% of Contract Value
2	Above Rs. 10 lakhs upto Rs.50 lakhs	1 lakh + 7.5% of the Contract Value exceeding Rs. 10 lakhs.
3	Above Rs. 50 lakhs	Rs 4 lakhs + 5% of the Contract Value exceeding Rs. 50 lakhs.

1.10.2 The security Deposit should be furnished before start of the work by the contractor.

1.10.3 Security Deposit may be furnished in any one of the following forms

- i) Cash (as permissible under the Income Tax Act)
- ii) Pay Order / Demand Draft in favour of BHEL.
- iii) Local cheques of scheduled banks, subject to realization.
- iv) Securities available from Post Offices such as National Savings Certificates, Kisan Vikas Patras etc. (Certificates should be held in the name of Contractor furnishing the security and duly pledged in favour of BHEL and discharged on the back).
- v) 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
- vi) Fixed Deposit Receipt issued by Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The FDR should be in the name of the contractor, A/C BHEL, duly discharged on the back.
- vii) Security deposit can also be recovered at the rate of 10% from the running bills. However in such cases at least 50% of the 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.
- viii) EMD of the successful bidder can be converted and adjusted against the cash portion of Security Deposit excepting for such bidders who have remitted One Time EMD.

NOTE: Acceptance of Security Deposit against Sl. No. (iv) and (vi) above will be subject to hypothecation or endorsement on the documents in favour of BHEL. However, 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.

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1.10.5 In case the value of work exceeds / reduces from the awarded / accepted value, the Security Deposit shall be correspondingly enhanced / reduced 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) There will be no reduction in Security Deposit value in case of variation in contract value upto the lower limit specified in Quantity variation clause. In case of reduction of contract value beyond the lower limit specified in Quantity Variation clause, then the Security Deposit shall be re adjusted in proportion.
- iii) In case of reduction, the reduced Contract value shall be certified by BHEL Construction Manager after ascertaining / freezing of BOQ / Drawings from the Design / Engineering Centre. The reduced Security Deposit value can only be considered after taking into account the adequacy of the securities held by BHEL to meet the liabilities of the contractor for the contract, and the performance of the contract in general. **In such cases, the revised value of Security Deposit shall be worked out only after execution of not less than the lower limit of the revised scope of work/contract value as per quantity variation clause, and as certified by Construction Manager. This reduction in value of Security Deposit shall not entitle the contractor to any amendment of Contract and shall be operated at the discretion of BHEL**
- iv) Contract value for the purpose of operating the reduced/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.

1.10.6 The validity of Bank Guarantees towards Security Deposit shall be initially upto the completion period as stipulated in the Letter of Intent/Award + 3 months, and the same shall be kept valid by proper renewal 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 refunded/Bank Guarantee(s) released to the Contractor along with the 'Final Bill' 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.
- 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 (subject to a minimum period of six months), as per the advice of BHEL Site Engineer / Construction Manager. BHEL shall not be liable for issue of any reminders regarding expiry of the

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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 sent directly by the Bank to BHEL under Registered Post (Acknowledgement Due), addressed to the Subcontracting Department of the respective Region.

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 by Bharat Heavy Electricals Limited. The Tenderer shall submit an unqualified acceptance to the Letter of Intent/Award within the period stipulated therein.

The successful tenderer shall be required to execute an agreement in the prescribed form, with BHEL, within a reasonable time after the acceptance of the Letter of Intent/Award, and in any case before releasing the first running bill. The contract agreement shall be signed by a person duly authorized/empowered by the tenderer. The expenses for preparation of agreement document shall be borne by BHEL.

1.15 REJECTION OF TENDER AND OTHER CONDITIONS

1.15.1 The acceptance of tender will rest with BHEL which does not bind itself to accept the lowest tender or any tender and reserves to itself full rights for the following without assigning any reasons whatsoever:-

- a. To reject any or all of the tenders.
- b. To split up the work amongst two or more tenderers as per NIT
- c. To award the work in part if specified in NIT
- d. In case of either of the contingencies stated in (b) and (c) above, the time for completion as stipulated in the tender shall be applicable.

1.15.2 Conditional tenders, unsolicited tenders, tenders which are incomplete or not in the form specified or defective or have been materially altered or not in accordance with the tender

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conditions, specifications etc., are liable to be rejected.

- 1.15.3 Tenders are liable to be rejected in case of unsatisfactory performance of the tenderer with BHEL, or tenderer under suspension (hold/banning /delisted) 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 reject a bidder in case it is observed that they are overloaded and may not be in a position to execute this job as per the required schedule in line with clause no. 9.0 of the 'NIT'. The decision of BHEL will be final in this regard.
- 1.15.4 If a tenderer who is a proprietor expires after the submission of his tender or after the acceptance of his tender, BHEL may at their discretion, cancel such tender. If a partner of a firm expires after the submission of tender or after the acceptance of the tender, BHEL may then cancel such tender at their discretion, unless the firm retains its character.
- 1.15.5 BHEL will not be bound by any Power of Attorney granted by changes in the composition of the firm made subsequent to the execution of the contract. They may, however, recognise such power of Attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the contractor concerned.
- 1.15.6 If the tenderer deliberately gives wrong information in his tender, BHEL reserves the right to reject such tender at any stage or to cancel the contract if awarded and forfeit the Earnest Money/Security Deposit/any other money due.
- 1.15.7 Canvassing in any form in connection with the tenders submitted by the Tenderer shall make his offer liable to rejection.
- 1.15.8 In case the Proprietor, Partner or Director of the Company/Firm submitting the Tender, has any relative or relation employed in BHEL, the authority inviting the Tender shall be informed of the fact as per specified format, along with the Offer. Failing to do so, BHEL may, at its sole discretion, reject the tender or cancel the contract and forfeit the Earnest Money/Security Deposit.
- 1.15.9 The successful tenderer should not sub-contract part or complete work detailed in the tender specification undertaken by him without written permission of BHEL's Construction Manager/Site Incharge. The tenderer is solely responsible to BHEL for the work awarded to him.
- 1.15.10 The Tender submitted by a techno commercially qualified tenderer shall become the property of BHEL who shall be under no obligation to return the same to the bidder. However unopened price bids and late tenders shall be returned to the bidders
- 1.15.11 Unsolicited discount received after the due date and time of Bid Submission shall not be considered for evaluation. However, if the party who has submitted the unsolicited discount/rebate becomes the L-I party, then the awarded price i.e contract value shall be worked out after considering the discount so offered.
- 1.15.12 BHEL shall not be liable for any expenses incurred by the bidder in the preparation of the tender irrespective of whether the tender is accepted or not.

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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 Authorised Officers or its Site Engineers or other employees authorised to deal with any matters with which these persons are concerned on its behalf.
ii)	“EXECUTIVE DIRECTOR” or ‘GROUP GENERAL MANAGER’ or “GENERAL MANAGER (Incharge)” or “GENERAL MANAGER” shall mean the Officer in Administrative charge of the respective Power Sector Region.
iii)	“COMPETENT AUTHORITY” shall mean Executive Director or Group General Manager or General Manager (Incharge) or General Manager or BHEL Officers who are empowered to act on behalf of the Executive Director or General Manager (Incharge) or General Manager 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, 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 mutually agreed upon and the Letter of Intent/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.
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.

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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” 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.

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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 synchronisation 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)	"COMMENCEMENT DATE" or "START DATE" shall mean the commencement/start of work at Site as per terms defined in the Tender
xxvii)	"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
xxviii)	"TERMINATION" of Contract shall mean the pre mature closing of contract due to reasons as mentioned in the contract
xxix)	"DE MOBILISATION" shall mean the temporary winding up of Site establishment by Contractor leading to suspension of works temporarily for reasons not attributable to the contractor
xxx)	"RE MOBILISATION" 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. 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 claims in respect of the Contract. No other Civil Court shall have jurisdiction in case of any dispute, under this 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 <u>Service of notice on BHEL</u>

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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 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 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 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.

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- 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.
- 2.7.2 To terminate the contract or get any part of the work done through other agency or deploy BHEL's own/hired/otherwise arranged resources , at the risk and cost of the contractor after due notice of a period of two weeks by BHEL, in the event of:-
- i) Contractor's continued poor progress
 - ii) Withdrawal from or abandonment of the work before completion of the work
 - iii) Contractor's inability to progress the work for completion as stipulated in the contract
 - iv) Poor quality of work
 - v) Corrupt act of Contractor
 - vi) Insolvency of the Contractor
 - vii) Persistent disregard to the instructions of BHEL
 - viii) Assignment, transfer, sub-letting of contract without BHEL's written permission
 - ix) Non fulfillment of any contractual obligations
 - x) In the opinion of BHEL, the contractor is overloaded and is not in a position to execute the job as per required schedule

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- 2.7.3 To meet the expenses including BHEL overheads on the differential cost at 5%, over and above the Liquidated damages/penalties arising out of "Risk & Cost" as explained above under SI.No. 2.7.2. BHEL shall recover the amount from any money due from Contractor, or from any money due to the Contractor including Security Deposit, or by forfeiting any T&P or material of the contractor under this contract or any other contract of BHEL or by any other means or any combination thereof
- 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 endeavour will be made by BHEL to this end, they 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 In case the execution of works 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 two months, due to reasons not attributable to the contractor and other than Force Majeure conditions, BHEL may consider permitting the contractor to de mobilize forthwith and re mobilize at an agreed future date. Cost of such demobilization/remobilization shall be mutually agreed. ORC in such cases shall not be applicable for the period between the period of demobilization and re mobilisation. The duration of contract/time extension shall accordingly get modified 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 at its discretion may consider contractor's request to short close the contract in following cases:
- 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.
 - 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)
 - The balance works cannot be done within a reasonable period of time as they are dependent on unit shutdown or on other facilities of customer or any other 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

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Trial Operation/PG Test, etc) as mutually agreed, shall however be reduced from the final contract value.

2.7.9 LIQUIDATED DAMAGES/PENALTY

If the contractor fails to maintain the required progress of work which results in delay in the completion of the work as per the contractual completion period, BHEL shall have the right to impose Liquidated Damage/Penalty at the rate of 0. 5% of the contract value, per week of delay or part thereof subject to a maximum of 10% of the contract value. For this purpose, the period of delay shall be the delay attributable to the Contractor for the completion of work as per 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.

2.8 RESPONSIBILITIES OF THE CONTRACTOR IN RESPECT OF LOCAL LAWS, EMPLOYMENT OF WORKERS ETC.

The following are the responsibilities of the contractor in respect of observance of local laws, employment of personnel, payment of taxes etc. The subcontractor shall fully indemnify BHEL against any claims of whatsoever nature arising due to the failure of the contractor in discharging any of his responsibilities hereunder:

- 2.8.1 As far as possible, Unskilled Workers shall be engaged from the local areas in which the work is being executed.
- 2.8.2 The contractor at all times during the continuance of this contract shall, in all his dealings with local labour for the time being employed on or in connection with the work, have due regard to all local festivals and religious and other customs.
- 2.8.3 The contractor shall comply with all applicable State and Central Laws, Statutory Rules, Regulations etc. such as Payment of Wages Act, Minimum Wages Act, Workmen Compensation Act, Employer's Liability Act, Industrial Disputes Act, Employers Provident Act, Employees State Insurance Scheme, Contract Labour (Regulation and Abolition) Act 1970, Payment of Bonus & Gratuity Act and other Acts, Rules and Regulations for labour as may be enacted by the Government during the tenure of the Contract and having force or jurisdiction at Site. The Contractor shall also give to the local Governing Body, Police and other relevant Authorities all such notices as may be required by the Law.
- 2.8.4 The contractor shall obtain independent License under the Contract Labour (Regulations and Abolition Act, 1970)as required from the concerned Authorities based on the certificate (Form-V) issued by the Principal Employer/Customer
- 2.8.5 The contractor shall pay all taxes, fees, license charges, deposits, duties, 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,

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	all other arrangements for site visits periodically by the Inspectorate to site, Inspection certificate etc. will have to be made by contractor. However, BHEL will not make any payment to the Inspectorate in connection with contractor's Welders/Electricians qualification tests etc.
2.8.7	Contractor shall be responsible for provision of Health and Sanitary arrangements (more particularly described in Contract Labour Regulation & Abolition Act), Safety precautions etc. as may be required for safe and satisfactory execution of contract.
2.8.8	The contractor shall be responsible for proper accommodation including adequate medical facilities for personnel employed by him.
2.8.9	The contractor shall be responsible for the proper behavior and observance of all regulations by the staff employed by him.
2.8.10	The contractor shall ensure that no damage is caused to any person/property of other parties working at site. If any such damage is caused, it is responsibility of the contractor to make good the losses or compensate for the same.
2.8.11	All the properties/equipments/components of BHEL/their Client loaned with or without deposit to the contractor in connection with the contract shall remain properties of BHEL/their Client.
2.8.12	The contractor shall use such properties for the purpose of execution of this contract. All such properties/equipments/components shall be deemed to be in good condition when received by the contractor unless he notifies within 48 hours to the contrary. The contractor shall return them in good condition as and when required by BHEL/their Client. In case of non-return, loss, damage, repairs etc, the cost thereof as may be fixed by BHEL Engineer will be recovered from the contractor
2.8.13	In case the contractor is required to undertake any work outside the scope of this contract, the rates payable shall be those mutually agreed upon if the item rates are not mentioned in existing contract
2.8.14	Any delay in completion of works/or non achievement of periodical targets due to the reasons attributable to the contractor, the same may have to be compensated by the contractor either by increasing manpower and resources or by working extra hours and/or by working more than one shift. All these are to be carried out by the contractor at no extra cost.
2.8.15	The contractor shall arrange, coordinate his work in such a manner as to cause no hindrance to other agencies working in the same premises.
2.8.16	All safety rules and codes applied by the Client/BHEL at site shall be observed by the contractor without exception. The contractor shall be responsible for the safety of the equipment/material and works to be performed by him and shall maintain all light, fencing guards, slings etc. or other protection necessary for the purpose. Contractor shall also take such additional precautions as may be indicated from time to time by the Engineer with a view to prevent pilferage, accidents, fire hazards. Due precautions shall be taken against fire hazards and atmospheric conditions. Suitable number of Clerical staff, watch and ward, store keepers to take care of equipment/materials and construction tools and tackles shall be posted at site by the contractor till the completion of work

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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.
- 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/

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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.

2.9 PROGRESS MONITORING, MONTHLY REVIEW AND PERFORMANCE EVALUATION

- 2.9.1 A detailed plan/programme for completion of the contractual scope of work as per the time schedule given in the contract shall be jointly agreed between BHEL and Contractor, before commencement of work . The above programme shall be supported by monthwise deployment of resources viz Manpower, T&P, Consumables, etc. Progress will be reviewed periodically (Daily/Weekly/Monthly) vis a vis this jointly agreed programme. 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. 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 'Annual/Overall Performance Evaluation' of the Contractor and also for 'Assessment of Capacity of Bidder' for Tenders where the Contractor is a bidder. BHEL reserves the right to revise the evaluation formats during the course of execution of the works

2.10 TIME OF COMPLETION

- 2.10.1 The time schedule shall be as prescribed in the Contract. The time for completion shall be reckoned from the date of commencement of work at Site as certified by BHEL Engineers
- 2.10.2 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 monthly reviews jointly signed, 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 A joint programme shall be drawn for the balance amount of work to be completed during the period of 'Time Extension', along with matching resources (with weightages) to be deployed by the contractor as per specified format. Review of the programme and record of shortfall shall be done

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every month of the 'Time extension' period in the same manner as is done for the regular contract period.	
2.11.5	During the period of 'Time extension', contractor shall maintain their resources as per mutually agreed program
2.11.6	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, (ii) Force majeure conditions, and (iii) BHEL, shall be worked out and shall be considered to be exhausted in the same order. 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 attributable to contractor and recoverable from the dues payable to the contractor.
2.12	OVERRUN COMPENSATION
2.12.1	Over Run Compensation (ORC) is payable for works done during the extension period, by way of rate revisions for periods beyond original contract period subject to the following terms and conditions.
2.12.2	Rates shall be increased by 10% for the first twelve months of one or more extensions beyond original contract period. For the next twelve months of further extensions if any, rates shall be increased as above by 10% over the previous twelve months, and similarly for each subsequent twelve months extension.
2.12.3	The amount of increase payable per month due to rate revisions is subject to a minimum of Rs 1,00,000/- per month and a maximum of Rs 10,00,000/- per month.
2.12.4	Should there be any 'Time extension' for reasons attributable only to the contractor, then the work shall be executed by the contractor at the rates applicable for the period the work was planned
2.12.5	Payment of ORC shall be regulated as follows: i) Contractor is entitled to Over Run Compensation (ORC) only for the portion of backlog attributable to BHEL. ii) 50% of the compensation as per clause 2.12.3 is allocated for deployment of resources agreed as per the joint programme drawn vide 2.11.4. Payment shall however be based on the actual deployment of resources for the month as certified by BHEL, as per weightages assigned therein iii) 50% of the compensation as per clause 2.12.3, is allocated for achieving of planned progress agreed as per the joint programme drawn vide 2.11.4. Payment shall be on pro rata basis for actual achieved quantities iv) Total Over Run Compensation shall be limited to 10% of the executed contract value as certified in Final Bill. For this purpose executed contract value excludes PVC, ORC, Supplementary/Additional Items and Extra Works done on Manday rate basis
2.12.6	Contractor shall not be entitled for any Over Run Compensation (ORC) for the portion of backlog attributable to the contractor. Such works shall be executed at the rates applicable for the period the work was planned
2.13	INTEREST BEARING RECOVERABLE ADVANCES
2.13.1	Normally no advance is payable to the contractor. However, 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

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payable in not less than two installments with any of the installment not exceeding 60% of the total eligible advance.	
2.13.2	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 atleast 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 prime lending rate of State Bank of India prevailing at the time of disbursement of the advance + 2%, 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 progressively from each Running Bill such that the advance amounts paid along with the interest is fully recovered by the time the contractor's billing reaches 80% of contract value.
2.13.8	Recovery rate per month shall be the sum of: a. Not less than 10% of Running Bill amount b. 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 or the balance contract period which ever is later. 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 and the remaining recovery period.
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	The quoted rates shall remain firm irrespective of any variations in the individual quantities. No compensation becomes payable in case the variation of the final executed contract value is within the limits of Plus (+) or Minus (-) 15% of awarded contract value
2.14.2	Compensation due to variation of final executed 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 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 contract value and the actual executed value. ii) In case the finally executed contract value increases above the upper limit of Contract Value

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due to quantity variation specified above, there will be no revision in the rates within the contract period.

2.15 EXTRA WORKS

- 2.15.1 All rectifications/modifications, revamping, and reworks required for any reasons not due to the fault of the contractor, or needed due to any change in deviation from drawings and design of equipments, operation/maintenance requirements, mismatching, or due to damages in transit, storage and erection/commissioning, and other allied works which are not very specifically indicated in the drawings, but are found essential for satisfactory completion of the work, will be considered as extra works.
- 2.15.2 Extra works arising on account of the contractor's fault, irrespective of time consumed in rectification of the damage/loss, will have to be carried out by the contractor free of cost. Under such circumstances, any material and consumable required for this purpose will also have to be arranged by the contractor at his cost.
- 2.15.3 All the extra work should be carried out by a separately identifiable gang, without affecting routine activities. Daily log sheets in the pro-forma prescribed by BHEL should be maintained and shall be signed by the contractor's representative and BHEL engineer. No claim for extra work will be considered/entertained in the absence of the said supporting documents i.e. daily log sheets. Signing of log sheets by BHEL engineer does not necessarily mean the acceptance of such works as extra works.
- 2.15.4 BHEL retains the right to award or not to award any of the major repair/rework/modification/rectification/fabrication works to the contractor, at their discretion without assigning any reason for the same
- 2.15.5 After eligibility of extra works is established and finally accepted by BHEL engineer/designer, payment will be released on competent authority's approval at the following rate.

MAN-HOUR RATE FOR ELIGIBLE EXTRA WORKS: Single composite average labour man-hour rate, including overtime if any, supervision, use of tools and tackles and other site expenses and incidentals, consumables for carrying out any major rework/ repairs/ rectification/ modification/ fabrication as certified by site as may arise during the course of erection, testing, commissioning or extra works arising out of transit, storage and erection damages, payment, if found due will be at Rs 60/- 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 extra works.

- 2.15.7 **Extra Works for Civil Packages** shall be regulated as follows

- i) Rates for Extra Works arising due to (1) non availability of BOQ (Rate Schedule), OR (2) change in Specifications of materials/works (3) rectification/modification/dismantling & re erecting etc due to no fault of Contractor, shall be in the order of the following:

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- a) Item rates are to be derived from similar nature of items in the BOQ (Rate Schedule).
- b) Item rates are to be worked out on the basis of prevailing market rates mutually agreed between BHEL and Contractor, plus 15% towards Contractor's overheads and profit.
- ii) PVC and ORC will not applicable be for (i) above.

2.16 SUPPLEMENTARY ITEMS

2.16.1 For NON Civil Works

Supplementary items are items/works required for completion of entire work but not specified in the scope of work. Subject to certification of such items/works as supplementary items by BHEL Engineer, rates shall be derived on the basis of any one of the following on mutual agreement:

- i) Based on percentage breakup/rates indicated for similar/nearby items
- ii) In case (i) above does not exist, then BHEL/site may derive the percentage breakup/rates to suit the type of work

2.16.2 For Civil Works

- i) Rates for Supplementary Works/Additional Works arising out due to additions/alterations in the original scope of works as per contract subject to certification of BHEL Engineer shall be worked out as under:
 - a) Item rates which are available in existing BOQ (Rate Schedule) shall be operated with applicable escalation derived from All India Consumer Price Index for Whole Sale Commodities
 - b) Items of works which are not available in existing BOQ shall be operated as an 'Extra Works' and rate shall be derived as per clause no 2.15.7
- ii) Execution of Supplementary Works/Additional Works through the Contractor shall be at the sole discretion of BHEL, and shall be considered as part of executed contract value for the purpose of Quantity Variation as per clause 2.14
- iii) BHEL Engineer's decision regarding fixing the rate as above is final and binding on the contractor.
- iv) PVC and ORC will not be applicable for (i) above.

2.17 PRICE VARIATION COMPENSATION

2.17.1 In order to take care of variation in cost of execution of work on either side, due to variation in the index of LABOUR, HIGH SPEED DIESEL OIL, WELDING ROD, CEMENT, STEEL, MATERIALS, Price Variation Formula as described herein shall be applicable

2.17.2 85% component of Contract Value shall be permitted to be adjusted for variation in various relevant indices during execution of work. The remaining 15% shall be treated as fixed component

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

SL NO.	CATEGORY	BASE INDEX	COMPONENT ('K')				
			CIVIL PACKAGES (See Note A/B/C)			MECHANICAL PACKAGES	LABOUR ORIENTED PACKAGES (See Note D)
			A	B**	C		
i)	LABOUR	'MONTHLY ALL-INDIA AVERAGE CONSUMER PRICE INDEX NUMBERS	40	25	30	65	80

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	(ALL CATEGORIES)	FOR INDUSTRIAL WORKERS' published by Labour Bureau, Ministry of Labour and Employment, Government of India. (Website: labourbureau.nic.in)					
ii)	HIGH SPEED DIESEL OIL	Name of Commodity : HSD OIL. Type : INDIVIDUAL COMMODITY (See Note F)	5	3	5	5	5
iii)	WELDING ROD	Name of Commodity : WELDING ROD Type: INDIVIDUAL COMMODITY (See Note F)				15	
iv)	CEMENT	Name of Commodity : GREY CEMENT Type: INDIVIDUAL COMMODITY (See Note F)		20	30		
v)	STEEL (Structural and Reinforcement Steel)	Name of Commodity : a1. IRON & SEMIS Type: GROUP ITEM (See Note F)		25			
vi)	MATERIALS (Other than Cement & Steel)	Name of Commodity: ALL COMMODITIES Type: GROUP ITEM (See Note F)	40	12	20		

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

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

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

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

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

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

2.17.4 Payment/recovery due to variation in index shall be determined on the basis of the following notional formula without any initial absorption, in respect of the identified components viz LABOUR, HIGH SPEED DIESEL OIL, WELDING ROD, CEMENT, STEEL, MATERIALS

$$P = K \times R \times \frac{(X_N - X_0)}{X_0}$$

Where

P = Amount to be paid/recovered due to variation in the Index for Labour, High Speed Diesel Oil, Welding Rod, Cement, Steel and Materials

K = Percentage component applicable for Labour, High Speed Diesel Oil, Welding Rod, Cement, Steel and Materials

R = Value of work done for the billing month (Excluding Taxes and Duties if payable extra)

XN = Revised Index No for Labour, High Speed Diesel Oil, Welding Rod, Cement, Steel and Materials for the billing month under consideration

Xo = Index no for Labour, High Speed Diesel Oil, Welding Rod, Cement, Steel and Materials as on the Base date.

2.17.5 Base date shall be calendar month of the latest date of submission of Tender.

2.17.6 PVC shall not be payable for the ORC amount, Supplementary/Additional Items, Extra works.

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2.17.7 The contractor shall furnish necessary monthly bulletins for the necessary 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. However the Total Quantum of Price Variation amount payable/recoverable shall be regulated as follows:

- i) For the portion of backlog attributable to the contractor, the PVC will be based on the average of the indices for the period of the original contract period.
- ii) For the period of Force Majeure, the PVC will be limited to the indices applicable at the beginning of the force majeure period.
- iii) For the portion of backlog attributable to BHEL, the PVC will be as per the indices applicable for the respective months
- iv) The total amount of PVC shall not exceed 20% of the cumulatively executed contract value. Executed contract value for this purpose is exclusive of PVC, ORC, Supplementary/Additional Items and Extra works.

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, equipments, workmen, etc. against accidents and injury while at work and to pay compensation, if any, to workmen as per Workmen's compensation Act. The work will be carried out in a protected area and all the rules and regulations of the client /BHEL in the area of project which are in force from time to time will have to be followed by the contractor.

2.18.3 If due to negligence and or non-observation of safety and other precautions by the contractors, any accident/injury occurs to the property / manpower belong to third party, the contractor shall have to pay necessary compensation and other expense, if so decided by the appropriate authorities.

2.18.4 The contractor will take necessary precautions and due care to protect the material, while in his custody from any damage/ loss due to theft or otherwise till the same is taken over by BHEL or customer. For lodging / processing of insurance claim the contractor will submit necessary documents. BHEL will recover the loss including the deductible franchise from the contractor, in case the damage / loss is due to carelessness / negligence on the part of the contractor. In case of any theft of material under contractor's custody, matter shall be reported to police by the contractor immediately and copy of FIR and subsequently police investigation report shall be submitted to BHEL for taking up with insurance. However this will not relieve the contractor of his contractual obligation for the material in his custody.

2.19 **STRIKES & LOCKOUT**

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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 and the cost so incurred by BHEL shall be deducted from the Contractor's bills.

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**

The following shall amount to Force Majeure:-

2.20.1 Acts of God, act of any Government, War, Sabotage, Riots, Civil commotion, Police action, Revolution, Flood, Fire, Cyclones, Earth quake and Epidemic and other similar causes over which the contractor has no control.

2.20.2 If the contractor suffers delay in the due execution of the contractual obligation due to delays caused by force majeure as defined above, the agreed time of completion of the job covered by this contract or the obligations of the contractor shall be extended by a period of time equal to period of delay, provided that on the occurrence of any such contingency, the contractor immediately reports to BHEL in writing the causes of delay and the contractor shall not be eligible for any compensation.

2.21 **ARBITRATION & RECONCILIATION**

2.21.1 In case amicable settlement is not reached in the event of any dispute or difference arising out of the execution of the Contract or the respective rights and liabilities of the parties or in relation to interpretation of any provision by the Contractor in any manner touching upon the Contract, such dispute or difference shall (except as to any matters, the decision of which is specifically provided for therein) be referred to the sole arbitration of the arbitrator appointed by BHEL/In charge(Region).

The award of the Arbitrator shall be binding upon the parties to the dispute

Subject as aforesaid, the provisions of Arbitration and Reconciliation Act 1996 (India) or statutory modifications or re enactments thereof and the rules made there under and for the time being in force shall apply to the arbitration proceedings under this clause. The venue of the arbitration shall be the place from which the contract is issued or such other place as the Arbitrator at his discretion may determine

2.21.2 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 the Contract, such dispute or difference shall be referred to by either party to the arbitration of one of the arbitrators in the department of public enterprises. The award of the

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arbitrator shall be binding upon the parties to the dispute, provided, however, any party aggrieved by such award may make further reference for setting aside or revision of the award to the Law Secretary, Department of Legal Affairs, Ministry of Law and Justice, Government of India. Upon such reference the dispute shall be decided by the Law Secretary or the Special Secretary or Additional Secretary when so authorized by the Law Secretary, whose decision shall bind the parties hereto finally and conclusively.

2.21.3 The cost of arbitration shall be borne equally by the parties.

2.21.4 Work under the contract shall be continued during the arbitration proceedings

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.

2.22.2 Refund of Retention Amount shall be as follows:

- i) 50% of retention amount along with 'Final Bill'
- ii) Balance 50% of retention amount shall be retained towards 'Performance Guarantee for Workmanship' and shall become refundable after expiry of Guarantee period, provided all the defects noticed during the guarantee period have been rectified to the satisfaction of BHEL Site Engineer/BHEL Construction Manager, and after deducting all expenses/other amounts due to BHEL under the contract/other contracts entered into by BHEL with them. This portion of the retention amount can be released on commencement of the Guarantee period, on submission of equivalent Bank Guarantee.

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 re do 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 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

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2.23.2 **Final Bill**

Final Bill' is used for final payment on closing of Running Account for works or for single payment after completion of works. 'Final Bill' shall be submitted as per prescribed format after completion of works as per scope and upon material reconciliation, along with the following.

- i) 'No Claim Certificate' by contractor
- ii) Clearance certificates where ever applicable viz Clearance Certificates from Customer, various Statutory Authorities like Labour department, PF Authorities, Commercial Tax Department, etc
- iii) Indemnity bond as per prescribed format

BHEL shall settle the final bills after deducting all liabilities of Contractor to BHEL

2.24 **PERFORMANCE GUARANTEE FOR WORKMANSHIP**

2.24.1 Even though the work will be carried out under the supervision of BHEL Engineers the Contractor will be responsible for the quality of the workmanship and shall guarantee the work done for a period of twelve months from the date of commencement of guarantee period as defined in Special 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 Guarantee money.

2.24.2 BHEL shall release the guarantee money 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 Guarantee money refundable.

2.25 **CLOSING OF CONTRACTS**

The Contract shall be considered completed and closed upon completion of all contractual obligations and settlement of Final Bill or completion of Guarantee period whichever is later. Upon closing of Contract, BHEL shall issue a completion certificate as per standard format, based on specific request of Contractor.

2.26 **REVERSE AUCTION:**

Not applicable.

2.27 **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.

2.28 **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.

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| <p>2.28.3 Unless otherwise specified in NIT, offers from consortium/JVs shall not be considered.</p> <p>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, etc</p> |
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Chapter - I : General Intent of Specifications

1.0	INTENT OF THE SPECIFICATION
1.1	The intent of this erection specification is to provide services for execution of the project according to most modern and proven techniques and codes. The omission of specific reference to any method, equipment or material necessary for the proper and efficient services towards installation of the plant shall not relieve the contractor of the responsibility of providing such services / facilities to complete the work or portion of work awarded to him. The quoted / accepted rates / price shall deem to be inclusive of all such contingencies.
1.2	The work shall conform to dimensions and tolerances given in various drawings and documents that will be provided during erection. If any portion of works is found to be defective in workmanship and not conforming to drawings / documents or other stipulations, the contractor shall dismantle and re-do the work duly replacing the defective materials at their own cost, failing which recoveries, as determined by BHEL, shall be effected from contractor's bills.
1.3	It is not the intent of this specification to specify herein all the details of erection and commissioning. However, the system shall conform in all respects to high standards of quality and workmanship for performing the required duties in a manner acceptable to purchaser who will interpret the meaning of drawings and specifications and shall be entitled to reject any work or material, which in his judgments is not in full accordance herewith.
1.4	The omission of specific reference to any fabrication / erection or other method, equipment or material necessary for proper and efficient working of the plant shall not relieve the tenderer of the responsibility of providing such facilities to complete the work at quoted rates. Any mismatch/ defect found due to mistake in fabrication / erection shall have to be rectified by the vendor free of cost. Inspection by BHEL/Customer does not relieve vendor of his responsibility of executing quality erection.
1.5	The work covered under this specification is of highly sophisticated nature, requiring the best quality workmanship, supervision, engineering and construction management. The contractor should ensure proper planning and successful and timely completion of the work to meet the overall project schedule. The contractor must deploy adequate quantity of tools & plants, modern / latest construction aids etc. He must also deploy adequate trained, qualified and experienced supervisory staff and skilled personnel.

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Chapter - I : General Intent of Specifications

1.6	Contractor shall erect and commission all the equipments and auxiliaries as per the sequence & methodology prescribed by BHEL depending upon the technical requirements. Availability of materials and fronts will decide this. BHEL Engineer's decision regarding correctness of the work and method of working shall be final and binding on the contractor. No claims for extra payment from the contractor will be entertained on the ground of deviation from the methods / sequence adopted in erection of similar sets elsewhere.
1.7	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.

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Chapter - IV : Obligations of Contractor

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 be 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 other wise.
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.

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Chapter - IV : Obligations of Contractor

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.

SPECIAL CONDITIONS OF CONTRACT (SCC)

Chapter - IV : Obligations of Contractor

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	<u>TIG Filler wire for Boiler and Filler wires for Electrodes for P91/T91 piping:</u> These shall be supplied by BHEL free of cost as supplied by BHEL Manufacturing Units as part of regular supply. Required quantity as arrived at by calculation / standards will only be supplied. It would be the contractors' responsibility to account for the consumption of these filler wires. Additional consumption beyond standard / calculated quantity will be at cost recovery basis only unless and otherwise accounted for. Surplus quantity of TIG filler wire, if any, shall be properly stored and returned to BHEL stores.
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

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	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

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Chapter - IV : Obligations of Contractor

	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
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.

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	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

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Chapter - IV : Obligations of Contractor

	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 toolingsie Guns, chuck jaws etc are to be arranged by contractor.
4.2.2.7	void

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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

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	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 contractor. 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

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	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 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.

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**Chapter – V : Responsibilities of Contractor in respect of Labour,
Supervisory Staff, etc.**

5.0	RESPONSIBILITIES OF CONTRACTOR IN RESPECT OF LABOUR, SUPERVISORY STAFF, ETC.
5.1	Refer relevant clauses of General Conditions of Contract (GCC) also in this regard
5.2	The contractor shall deploy all the necessary skilled/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	Contractor shall deduct the necessary amount towards Provident Fund and contribute equal amount as per Government of India laws. This amount will be deposited regularly to the provident Fund Commissioner. BHEL/Customer may insist for submission of the account code duly certified by PF Commissioner
5.8	Contractor may also be required to comply with provisions of ESI Act in vogue if applicable and submit evidence to BHEL.
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

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Chapter – V : Responsibilities of Contractor in respect of Labour, Supervisory Staff, etc.

	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.

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Chapter – VI: Material Handling, Storage & preservation

6.0	MATERIAL HANDLING, STORAGE AND PRESERVATION ETC
6.1	MATERIAL HANDLING AND STORAGE
6.1.1	All the equipments/materials furnished under this contract shall be received from the project stores, sheds / storage yards and transported to 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

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Chapter – VI: Material Handling, Storage & preservation

	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

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Chapter – VI: Material Handling, Storage & preservation

	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

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	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.

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Chapter – VII: Drawings and documents

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.

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Chapter – VIII: Inspection and Quality

8.0	INSPECTION AND QUALITY
8.1	Inspection, Quality Assurance, Quality Control
8.1.1	Preparation of quality assurance log sheets and protocols with 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

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	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 i.e. repeat the readings taken by that instrument, failing which BHEL may deploy MME and retake the readings at Contractor's cost.

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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 authority connected to this project work

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	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	Contractor should be qualified to execute pressure parts & piping work coming under the purview of IBR, for which he should register himself with CIB of state concerned. contractor also should be aware of the latest IBR regulations and Electricity Act, including the amendments thereof.
8.3.3	Contractor shall comply with 'Qualification Tests for welders engaged in welding of Boilers and Steam Pipes under Construction, Erection and Fabrication at Site in India and in repairing Boilers and steam pipes by welding' in line with Chapter XIII of Indian Boiler Regulations-1950, for testing his welders / men / workers, including all associated fees, procedures, required instruments and equipments and their calibration there of. It shall be contractor's responsibility to obtain approval of Statutory Authorities, wherever applicable, for the conducting of any work which comes under the purview of these authorities, at his cost.
8.3.4	The following fees shall be excluded from scope of Contractor: 1. Registration Fee as per Regulation 385 of Chapter IX of Indian Boiler Regulations-1950 2. Fees for inspection of Boiler at the site of Construction as per Regulation 395 A, sl no 4 of Chapter IX of Indian Boiler Regulations-1950 However all other fees like visit fees charged by the Boiler Inspector and other arrangements for his visit or visits till satisfactory completion of work, shall be included in scope of Contractor
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

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	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 nonconformities 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.

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Chapter - IX: HSE & OHSAS

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. HSE requirements in brief, are given below :-
9.1.1	Contractor will nominate one of their qualified and experienced employees as Safety Officer, who will be responsible for all HSE related issues of contractors work area. Safety Officer will have authority to stop any activity, in case he observes that the activity is not being carried out in safe manner. He will conduct surprise inspection as well as periodic inspection/drill (at least once in a month) and submit such reports to BHEL. He will conduct periodic meetings with supervisors of different working groups and explain HSE issues and use of PPEs to them. Reports of such meetings will be submitted to BHEL. Contractor will develop suitable work procedures based upon HSE guidelines and OCPs and implement it. Such work procedures will consist of Area of work, T&P Details, Work Procedure, PPE requirements etc. Please refer Schedule VIII of BOCW Rules for number of safety officers, qualification, duties etc. Contractor should highlight the requirement of safety to staff and labour through daily tool box meeting before start of the days job. Contractor to also submit monthly safety reports as per the format/procedure of BHEL.
9.1.2	The contractor shall arrange induction and regular health check of their employees as per schedule VII of BOCW rules by aregistered medical practitioner. The contractor 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
9.1.3	Following personnel protective equipments (PPEs), in adequate numbers, will

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	be made available at site & their regular use by all concerned will be ensured :-
	- HELMET
	- SAFETY GOGGLES & WELDING FACE SHIELDS
	- SAFETY BELTS AND PROTECTIVE NET FOR WORKING AT HEIGHT
	- SAFETY SHOES
	- EAR PLUG
	- ANY OTHER SAFETY EQUIPMENT REQUIRED FOR SAFE COMPLETION OF THE WORK
	Contractor to also submit monthly reports on above as per the format/procedure of BHEL.
9.1.4	Providing appropriate First Aid facilities for prompt treatment of injuries and illness at work place. Arranging training to contractor workmen/ employees for giving first aid.
9.1.5	Arranging ambulance in case of any emergency situation .
9.1.6	Identification of nearest hospital and health check-up of workmen/employees
9.1.7	Providing filtered drinking water at work place in cool container.
9.1.8	Providing Canteen, Rest Room, Washing facilities to the contracted employees as per provisions of Contract Labour Regulation Act 1970 (Chapter V).
9.1.9	Providing appropriate fire fighting equipment at designated work place and nominate a fire officer/warden adequately trained for his job.
9.1.10	Identification of nearest fire station and display contact telephone nos. / person's name around work places for cases of emergencies .
9.1.11	Providing adequate no. of 24 V sources and ensure that no hand lamps are operating at voltage level above 24 Volts.
9.1.12	Fulfilling safety requirements at all power tapping points.
9.1.13	Red & White caution tape of proper width(1.5 to 2 inch) to be used for cordoning unsafe area such as open trench, excavation area etc.
9.1.14	Providing contractors company logo on cloths /uniform/ proper identity cards with photographs, for correct identification of people working at project site .
9.1.15	High/ Low pressure welders to be identified with separate colourclothings. No welders will be deployed without passing appropriate tests and holding valid welding certificates. Approved welding procedure should be displayed at work place.
9.1.16	Displaying safe handling procedures for all chemicals such as lube oil, acid, alkali, sealing compounds etc , at work place .

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9.1.17	All scaffolding/ platforms should be made from materials of appropriate quality/grade so that these are safe for use. It should be certified/declared safe for use by an experienced contractor person, before any scaffolding/platform is used. Please refer IS:3696 part 1&2 and 4014 part 1 & 2
9.1.18	All T&Ps/ MMEs should be of reputed brand/appropriate quality & must have valid test/calibration certificates bearing endorsement from competent authority of BHEL.. Contractor to also submit monthly reports of T&Ps deployed and validity test certificates to BHEL safety Officer as per the format/procedure of BHEL.
9.1.19	Ensure that the regulatory requirement of excessive weight limit (to carry/lift/ move weights beyond prescribed limits) for male and female workers are complied with.
9.1.20	Safety slogan, Safety/ Caution boards , wherever required to be displayed in consultation with BHEL.
9.1.21	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. Ensure proper cleanliness of work place, housekeeping and waste management (including proper waste disposal) on daily basis.
9.1.22	It is imperative on the part of the contractor 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.
9.1.23	The contractor shall carry out periodic air and water quality check and illumination level checking in his area of work place and take suitable control measure.
9.1.24	The Contractor is required to provide proper safety net systems (IS-11057) where ever the hazard of fall from height is present as per instruction of BHEL Engineer. The safety nets shall be fire resistant, duly tested and shall be of ISI Mark 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.
9.1.25	All applicable OCPs (Operational control procedures) will be followed by contractor 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

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	be applicable during the execution of work at site, then contractor will follow this as well, within quoted rate. These OCPs (applicable ones) will be made available to contractor 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 contractor, if they so desire.
■	OCP for safe handling of chemicals
■	OCP for Electrical safety
■	OCP for energy conservation
■	OCP for safe welding and gas cutting operation
■	OCP for fire safety
■	OCP for safety in use of hand tools
■	OCP for first aid
■	OCP for food safety at canteen
■	OCP for safety in use of cranes
■	OCP for storage and handing of gas cylinders
■	OCP for manual arc welding
■	OCP for safe use of helmets
■	OCP for good house keeping
■	OCP for working at height
■	OCP for safe excavation
■	OCP for safe filling of Hydrogen in cylinder
■	OCP for illumination
■	OCP for handling and erection of heavy metals
■	OCP for safe acid cleaning
■	OCP for safe alkali boil out
■	OCP for safe oil flushing
■	OCP for steam blowing
■	OCP for safe working in confined area
■	OCP for safe operation of passenger lift, material hoists & cages
■	OCP for Vehicle maintenance
■	OCP for safe radiography
■	OCP for waste disposal
■	OCP for working at night
■	OCP for blasting
■	OCP for DG Set
■	OCP for handling & storage of mineral wool

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	■ OCP for drilling, reaming and grinding(machining) etc.
	■ OCP for hydraulic test
	■ OCP for spray insulation
	■ OCP for trial run of rotary equipment
	■ OCP for stress relieving
	■ OCP for material preservation
	■ OCP for cable laying/tray work
	■ OCP for electrical maintenance
	■ OCP for transformer charging
	■ OCP for safe handling of battery system
	■ OCP for computer operation
	■ OCP for storage in open yard
	■ OCP for sanitary maintenance
	■ OCP for batching
	■ OCP for piling rig operation
	■ OCP for gas distribution test
	■ OCP for cleaning of hotwell / deaerator
	■ OCP for electro-resistance heating
	■ OCP for compressor operation
	■ OCP for O&M of control of AC plant & system
	■ OCP for air compressor
	■ OCP for passivation
	■ OCP for Safe EDTA Cleaning
	■ OCP for Safe Chemical cleaning of Pre boiler system
	■ OCP for Safe Boiler Light up
	■ OCP for Safe Rolling and Synchronisation
	■ OCP for Safe Loading of Unit
9.2	SAFETY AND CLEANLINESS : The contractor shall take all necessary safety precautions and arrange for appropriate appliances as per discretion of BHEL or its authorised officials (Site Construction Manager) to prevent loss of human lives, injuries, to personnel engaged and damage to property. Before commencing the work, the contractor shall submit a "Safety Plan" to the above authorised BHEL official and obtain approval on the same. The safety plan shall indicate in detail the measures that would be taken by the contractor to ensure safety of men, equipment, materials and environment during execution of the work. This will also include an organization structure, role and responsibilities of the concerned key

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	personnel, the safety practices that will be followed, PPEs deployed, plan for handling critical activities and emergencies.
9.3	If the contractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instructions issued by the authorised BHEL official, BHEL shall have the right to take corrective steps at the risk and cost of the contractor.
9.4	During the course of construction, alternation or repairs, scrap with protruding nail, sharp edge etc and all other debris shall be kept clean from working areas, passage, ways and stairs in and around site.
9.5	Combustible scrap and debris shall be removed at regular intervals during the course of execution. Safe means shall be provided to facilitate such removal. The combustible scrap should be stored in safe place away from the plant materials to avoid fire accidents. The area shall be chosen in consultation with the Engineer and to be cordoned off.
9.6	Rigging equipment for materials handling shall be inspected prior to use in each shift and as necessary during its use to ensure that it is safe. Defective rigging equipment will be removed from service.
9.7	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.
9.8	Contractor 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 contractor 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.
9.9	Where it is necessary to provide and/or store petroleum products or petroleum mixture & explosives, the contractor 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 contractor shall be responsible for obtaining

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	the same.
9.10	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.
9.11	When cylinders are transported by powered vehicle they shall be secured in a vertical position.
9.12	All workmen of the contractor working on construction area shall wear safety shoes, hand gloves, safety helmets and safety belt as applicable. The contractor shall provide to its workforce and ensure the use of following personnel protective equipment as found necessary and as directed by BHEL.
9.12.1	Safety Helmets conforming to IS-2925 : 1984
9.12.2	Safety Belts conforming to IS-3521:1983
9.12.3	Safety Shoes conforming to IS-1989 : 1978
9.12.4	Eye and face protection devices conforming to IS – 1179:1967, IS 5983:1980, IS 8521 Part 1:1977, IS 8521 Part 2: 1994.
9.12.5	Hand and body protection devices conforming to IS 4770:1991 and IS- 6994 : Part 1: 1973, IS – 8619 : 1977
9.12.6	Ear protection IS-9167:1979
9.12.7	Respiratory Protective Devices as per IS-9473:2002, i4746:1999 and 14166:1994
9.13	The contractor shall insure his workmen against all accidents and the policy shall be presented to BHEL Engineer on demand. Other wise, BHEL will arrange the same and the expenditure towards this will be debited to the contractor. In case of a fatal or disabling injury accident to any person at construction site due to lapses by the contractor, the victim and/or his/her dependants shall be compensated by the contractor as per statutory requirements. However, if considered necessary BHEL shall have the right to impose appropriate financial penalty on contractor and recover the same from payments due to the contractor for suitably compensating the victim and/or his/her dependence before imposing any such penalty. Appropriate enquiry shall be held by BHEL giving opportunity to the contractor for presenting his case. Above safety conditions are not exhaustive but gives an idea for the contractor and contractor shall adhere to all safety precaution given by the

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	Engineer at site.
9.14	The contractor 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 during night hours at the work spot as well as at the pre-assembly area.
9.15	The contractor shall be responsible for provision of all the safety notices and safety equipment as enjoined on him by the application of relevant statutory regulation / provisions and/or as called upon by BHEL from time to time. He shall be held responsible for any violation of statutory regulations (local, state or central) and BHEL instruction that may endanger safety of men, equipment and material.
9.16	The contractor shall provide temporary fencing wherever required as a safety measure against accident and damage to properties. Suitable caution notices shall be displayed where access to any part is found to be unsafe and hazardous.
9.17	Contractor shall ensure safety of all the workmen, material and equipment either belonging to him or to others working at site. He shall observe safety rules and codes applied by BHEL without exception.
9.18	It will be the responsibility of the contractor to ensure safe lifting of the equipment, taking due precaution to avoid any accident and damage to other equipment and personnel. All requisite tests and inspection of handling equipment, tools & tackle shall be periodically done by the contractor 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.
9.19	The contractor shall provide necessary first aid facilities as per schedule III. In addition, ambulance facilities, OHC and CMO as per schedule IV, V, X and XI of BOCW Rules as applicable for all his employees, representatives and workmen at site and BHEL shall have no obligation in this regard. 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 contractor should conduct periodical first –aid classes to keep his supervisor and Engineers properly trained for attending to any emergency.
9.20	Training

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9.20.1	The contractor shall arrange induction safety training for all employees before assigning work. In addition, awareness programme, mock drill at regular intervals and daily tool box meetings shall be arranged. Monthly report of the above to be given to BHEL safety Officer as per prescribed BHEL formats
9.20.2	All the contractor'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. Contractor should nominate his supervisor to coordinate and implement the safety measures.
9.21	Contractor shall provide enough fire protecting equipment of the types and numbers at his office, stores, temporary structure in labour 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 contractor of any of his responsibility and liabilities to fire accident occurring either to his materials or equipment or those of others. Emergency contacts nos must be displayed at prominent locations
9.22	The contractor shall at his cost, remove from vicinity of work at least once each day all combustible waste, scrap, painting materials, rubbish, unused or other materials and deposit them in places specified by BHEL to keep the work site clear and tidy. Use of undercoated canvas paper, corrugated paper, fabricated carton, plastic or other flammable materials shall be restricted to the minimum and promptly removed.
9.23	The contractor 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.
9.24	All portable electric tools used by the contractor 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 contractor to carry out all types of electrical works. Details of earth resource and their test date to be given to BHEL safety officer as per the prescribed formats of BHEL
9.25	In case of any delay in completion of a job due to mishaps attributable to lapses by the contractor, BHEL shall have the right to recover cost of such delay from

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	the payments due to the contractor, after notifying the contractor suitably.
9.26	Valve protection caps shall be kept in place and secured.
9.27	The contractor shall be responsible for the safe storage and handling of his radio-active sources as per BARC rules and regulations.
9.28	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.
9.29	If the contractor 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 contractor 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 contractor after giving a notice of not less than 7 days indicating the steps that would be taken by BHEL.
9.30	If the contractor succeeds in carrying out its job in time with out any fatal or disabling injury accident and without any damage to property BHEL may, at its sole discretion, favorably consider to reward the contractor suitably for the performance.
9.31	The contractor shall carefully follow the safety requirement of BHEL/ the purchaser with the regard to voltages used in critical areas.
9.32	The contractor 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 contractor. 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 contractor 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
9.33	The contractor shall arrange adequate number of persons specifically for clearing any debris and for house keeping of the erection area including restacking of components in the erection areas. Housekeeping to be carried out

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	as per BHEL's checklist and report is to be submitted to BHEL safety officer
9.34	In case of any damage to property due to lapses by the contractor, BHEL shall have the right to recover the cost of such damages from the contractor after holding an appropriate enquiry.
9.35	The contractor shall submit report of all accidents, 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. In addition periodic reports on safety shall also be submitted by the contractor to BHEL from time to time as prescribed by the Engineer. Compiled monthly reports of all kinds of accidents, fires and property damage to be submitted to BHEL safety officer as per prescribed formats
9.36	Before commencing the work, the contractor shall appoint/nominate a responsible person to supervise implementation of all safety measures and liaison with his counterpart of BHEL.
9.37	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 than $\frac{1}{4}$ horizontal and 1 vertical.
9.38	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 out side 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 savor, from swaying, from the building or structure.
9.39	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.

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9.40	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.
9.41	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.
9.42	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.
9.43	A sketch of the ladders and scaffolds proposed to be used shall be prepared and approval of the Engineer obtained prior to Construction.
9.44	All personnel of the Contactor working within the plant site shall be provided with safety helmets. All welders shall wear welding goggles while doing welding work and all metal worker shall be provided with safety gloves. Persons employed on metal cutting and grinding shall wear safety glasses.
9.45	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.
9.46	All trenches, four feet or more in depth, shall at all times be supplied with at least one ladder for each 30 m in length or fraction thereof. The ladder shall be extended from bottom of the trench to at least 90 cm above the surface of the ground. Sides of the trenches which are 1.50 m or more in depth shall be stepped back to give suitable slope or securely held by timer bracing, so as to avoid the danger of sides collapsing. The excavated materials shall not be placed within 1.5 m of the edges of the trench or half of the depth of the trench whichever is more. Cutting shall be done from top to bottom. Under no circumstances undermining or undercutting shall be done.
9.47.1	The contractor shall take permission of BHEL prior to risky jobs such as working at height, hot work, liftig activities, etc through permits. No job should be started without permits.
9.47.2	The Contactor shall take all measures at the sites of the work to protect all persons from accidents and shall be bound to bear the expenses of defense of

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	every suit, action or other proceeding at 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 Contractor be paid to compromise any claim by any such person should such claim proceeding be filed against BHEL, the Contractor hereby agrees to indemnify BHEL against the same.
9.48	Before any demolition work is commenced and also during the process of the work the following shall be ensured:
9.48.1	All roads and open areas adjacent to the work site shall either be closed or suitably protected.
9.48.2	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.
9.48.3	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.
9.49	All necessary personnel safety equipment as considered adequate by the Engineer should be kept available for the use of the persons employed in the Site and maintained in a condition suitable for immediate use and the Contractor should take adequate steps to ensure proper use of equipment by those concerned.
9.49.1	Workers employed on mixing asphalted materials, cement and lime mortars shall be provided with protective foot wear and protective goggles.
9.49.2	Those engaged in white washing and mixing or stacking of cement bags or any materials which is injurious to the eyes shall be provided with protective goggles.
9.49.3	Those engaged in welding works shall be provided with welder's protective eyesight lids.
9.49.4	Stone breakers shall be provided with protective goggles and protective clothing and seated sufficient to safe intervals.
9.49.5	Where workers are employed in sewers and manholes, which are in use, the Contractor 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

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	with warning signals or boards to prevent accident to the public.
9.49.6	The Contractor 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, the following precautions should be taken.
9.49.6.1	No paint containing lead or lead products shall be used except in the form of paste or ready made paint.
9.49.6.2	Suitably face masks should be supplied for use by the workers where paints are applied in the form of spray or a surface having lead paint dry rubbed and scrapped.
9.49.6.3	Overalls shall be supplied by the Contractor to the workmen and adequate facilities shall be provided to enable the working painters to wash during the cessation of work.
9.50	When the work is being done near any place where there is risk of drowning all necessary equipment should be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision should be made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.
9.51	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 accidentally displaced. When workers employed on electrical installations which are already energized, insulting 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.
9.52	All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe condition and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near the places of work.
9.53	The contractor 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

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	requirements then the Inspection Agency may withhold inspection, till such time the desired safety requirements are met.
9.54	The Contractor 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 contractor shall adhere to such instructions. BHEL may prohibit the use of any construction machinery, which according to him is unsafe. No claim for compensation due to such prohibition will be entertained by BHEL.
9.55	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.
9.56	.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
9.57	These safety provisions should be brought to the notice of all concerned by display on a notice board at a prominent, place at work spot. The persons responsible for compliance of the safety code shall be named therein by the Contractor
9.58	To ensure effective enforcement of the rules and regulations relating to safety precautions the arrangement made by the contract shall be open to inspection by the Engineer of the Engineer's Representative.
9.59	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 contractor. Such cleanings has to be done by contractor within quoted rate, on daily basis by an identified group. If such activity is not carried out by contractor / BHEL is not satisfied, then BHEL may get it done by other agency and actual cost alongwith BHEL overheads will be deducted from contractor's bill. Such decisions of BHEL shall be binding on the contractor.
9.60	Notwithstanding the above clauses there is nothing to exit the Contractor from the operations of any other Act or Rule in force in area of work in this respect. Provided always that all safety measures apart from those specifically provided in this agreement which are brought to the notice of the Contractor from time to time by the Engineer shall be complied by the Contractor. Provided further that

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	all consequences, damages, or losses arising by reason of any safety code shall be met with by the Contractor.																																																																
9.61	<u>NON COMPLIANCE:-</u> NONCONFORMITY OF SAFETY RULES AND SAFETY APPLIANCES WILL BE VIEWED SERIOUSLY AND BHEL HAS RIGHT TO IMPOSE FINES ON THE CONTRACTOR AS UNDER <u>for every instance of violation noticed:</u> <table border="1"> <thead> <tr> <th>SN</th><th>Violation of Safety Norms</th><th>Fine (in Rs)</th></tr> </thead> <tbody> <tr><td>01</td><td>Not Wearing Safety Helmet</td><td>50/- *</td></tr> <tr><td>02.</td><td>Not wearing Safety Belt or not anchoring life line</td><td>100/-*</td></tr> <tr><td>03</td><td>Not wearing safety shoe</td><td>100/-*</td></tr> <tr><td>04</td><td>Not keeping gas cylinders vertically</td><td>100/-</td></tr> <tr><td>05</td><td>Not using flash back arrestors</td><td>50/-</td></tr> <tr><td>06</td><td>Not wearing gloves</td><td>50/- *</td></tr> <tr><td>07.</td><td>Grinding Without Goggles</td><td>50/- *</td></tr> <tr><td>08.</td><td>Not using 24 V Supply For Internal Work</td><td>500/-</td></tr> <tr><td>09.</td><td>Electrical Plugs Not used for hand Machine</td><td>100/-</td></tr> <tr><td>10.</td><td>Not Slings property</td><td>200/-</td></tr> <tr><td>11.</td><td>Using Damaged Sling</td><td>200/-</td></tr> <tr><td>12.</td><td>Lifting Cylinders Without Cage</td><td>500/-</td></tr> <tr><td>13.</td><td>Not Using Proper Welding Cable With Lot of Joints And Not Insulated Property.</td><td>200/-</td></tr> <tr><td>14.</td><td>Not Removing Small Scrap From Platforms</td><td>200/-</td></tr> <tr><td>15.</td><td>Gas Cutting Without Taking Proper Precaution or Not Using Sheet Below Gas Cutting</td><td>200/-</td></tr> <tr><td>16.</td><td>Not Maintaining Electric Winches Which are Operated Dangerously</td><td>500/-</td></tr> <tr><td>17.</td><td>Improper Earthing Of Electrical T&P</td><td>500/-</td></tr> <tr><td>18</td><td>No or improper barricading</td><td>500/-</td></tr> <tr><td>19.</td><td>Activity carried out without Safety work permit (Height work, Lifting activity, Hot work-each person/case)</td><td>1000/-</td></tr> <tr><td>20.</td><td>Accident Resulting in Partial Loss in Earning Capacity</td><td>25,000/- per victim</td></tr> </tbody> </table>		SN	Violation of Safety Norms	Fine (in Rs)	01	Not Wearing Safety Helmet	50/- *	02.	Not wearing Safety Belt or not anchoring life line	100/-*	03	Not wearing safety shoe	100/-*	04	Not keeping gas cylinders vertically	100/-	05	Not using flash back arrestors	50/-	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 Slings property	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	200/-	15.	Gas Cutting Without Taking Proper Precaution or Not Using Sheet Below Gas Cutting	200/-	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.	Accident Resulting in Partial Loss in Earning Capacity	25,000/- per victim
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	21.	Fatal Accident/Accidents Resulting in total loss in Earning Capacity	1,00,000/- per victim #
	Legend:-*: per head, #: or as deducted by Customer whichever is higher 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 contractor. The amount collected above will be utilized for giving award to the employees who could avoid accident by following safety rules. Also the amount will be spent for purchasing the safety appliances and supporting the safety activity at site.		
9.61	<u>CITATION:-</u>If safety record of the contractor 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 contractor may be considered by BHEL after completion of the job		
9.62	<u>MEMORANDUM OF UNDERSTANDING</u> After Award Of Work, Contractors Are Required To Enter Into A Memorandum Of Understanding As Given Below: <u>Memorandum of Understanding</u> ➤ BHEL, Power Sector _____ Region is committed to Health, Safety and Environment Policy (EHS Policy). ➤ M/s _____ do hereby also commit to the same EHS Policy while executing the Contract Number _____ ➤ M/s _____ shall ensure that safe work practices not limited to the above are followed by all construction workers and supervisors. Spirit and content therein shall be reached to all workers and supervisors for compliance. ➤ BHEL will be carrying out EHS audits twice a year and M/s _____ shall ensure to close any non-conformity observed/reported within fifteen days. Signed by authorized representative of M/s -----		

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	Name : Place & Date:

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Chapter-X: RA Bill Payments

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.

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Chapter-XI : Performance Monitoring

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

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Chapter-XII: Suspension of Business Dealings

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

SPECIAL CONDITIONS OF CONTRACT (SCC)

Chapter-XII: Suspension of Business Dealings

	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



भारत हेवी इलेक्ट्रिकल्स लिमिटेड

(भारत सरकार का उपक्रम)

BHARAT HEAVY ELECTRICALS LIMITED

(A Govt. of India Undertaking)

HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SUB- CONTRACTORS FOR 2X660MW MAITREE SUPER THERMAL POWER PROJECT

DOCUMENT NO; HSEP:14-MAITREE: VENDOR DATE:05.05.16

HSE DEPARTMENT

Plot No. 9/1, Block-DJ, Sector-II, Salt Lake, Kolkata – 700 091

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**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR SITE SUB-CONTRACTORS
(MAITREE PROJECT)**

POWER SECTOR-EASTERN REGION

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SPECIAL NOTES

- ❖ **This document supersedes section-IX of SCC or any such HSE related document in the tender**
 - ❖ This document is a living document and subject to changes as many times as desired by BHEL and customer, BIFCL and project consultant Fichtner GmbH. Any cost implication shall be absorbed by the contractor.
 - ❖ This project is a highly eco-sensitive project. There will be regular assessment of impact of the site activities on ecology. The contractors shall be obligated to take corrective actions, if any, as advised by BHEL/ Customer/ any Statutory body.
 - ❖ The contractor shall ensure that only persons with required competence and sound health are engaged at the site. No deviation shall be allowed. The person and the contractor shall be in possession of relevant documents in support of competence and health condition for producing before BHEL for verification, whenever demanded.
 - ❖ It may take minimum 2 days for finishing health check-up and induction training before a gate-pass/ ID is issued. In a day, maximum 30 persons can be given induction training. Mobilization shall be planned accordingly
 - ❖ Method statement and Job Safety Analysis shall be carried out for all hazardous jobs and critical lifts
 - ❖ As the site is located in an area which is prone to adverse weather condition, the contractors shall have infrastructure for fast evacuation of people
 - ❖ Contractor for Boiler-1, Chimney-1 and Cooling Tower-1 shall provide one double-mounted siren at a height covering a dia of about 2KM for alerting site workers in case of emergency.
 - ❖ The following basic instruments shall be available with contractors HSE team if their job involves:
 - Height work: Binoculars
 - Confined space work: Oxy-meter
 - Night work: Lux meter, Torch light
 - Checking of ELCBs: ELCB tester
 - Checking of earthing: Megger
- Apart from these, DB meter, Alcohol Breath analyzer, and other HSE promotional items shall be made available by the contractors as and when demanded by BHEL.
- ❖ Well-equipped sick room shall be set up and ambulance shall be made available by specific contractors as provided for in the work order of certain packages. However, the operational expenses can be shared by those contractors who will avail services of these facilities.



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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 or EHSS contract requirements must be followed of which the most stringent shall apply
- 1.4 In case the customer has any specific requirement, the same is to be fulfilled.
- 1.5 We will promote and maintain a safe, healthy and environmentally compliant workplace for all employees, contractors, visitors and any others that may be affected by construction activities, and strive for a "GOAL of ZERO REPORTABLE INCIDENTS" on the project.

2.0 SCOPE

The document is applicable for installation and commissioning of 2x660MW SETS as per the relevant contractual obligations, and provides the minimum HSE requirements to be followed at the project site and labour colony. As an item of note, this HSE Plan is considered a living document and will be revised as/if necessary to ensure that contractual and regulatory compliance requirements are met during the performance of work on the project

3.0 OBJECTIVES

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.
- 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 authority.
- 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.



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- 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.

3.1 Goals and Targets -

- To achieve "Zero Fatal Incident at Site"
- 100% compliance of all legal/statutory requirements related to EHS.
- 100% Health, Safety and Environmental Induction training attendance for all employees and sub-contractors.
- 100% High Risk activities to be carried out only after approved Method Statement, HIRA/JSA and Permit to Work are implemented.
- 100% PPEs compliance in high & medium risk activities.
- 100% incident reporting, recording and reviewing for corrective & preventive actions.
- A monthly review shall be scheduled and conducted to assess HSE program compliance and to close any recognized gaps to improve safety management and incident prevention.

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/-

Director (Power)



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5.0 TERMS AND DEFINITIONS

5.1 DEFINITIONS

5.1.1 INCIDENT

Work- related event(s) in which an injury or ill health (regardless of severity) or fatality occurred, or could have occurred.

5.1.2 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".

5.1.3 MAN-HOUR WORKED

The total number of employee 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 workday 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.

5.1.4 FIRST AID CASES

First Aid includes:

- Visit to a physician or a licensed health care professional solely for observation or counselling
- Conduct of diagnostic procedures like X rays, blood test including the prescription medications used solely for diagnostic purposes (e.g. eye drops to dilate eyes)
- Using a non-prescription medicine at non-prescription strength (for medication available in both prescription and non-prescription form as recommendation by a physician or other licensed health care professional to use a non-prescription medication at prescription strength is considered medical treatment for record keeping purposes);
- Administering tetanus immunizations (other immunizations, such as Hepatitis B vaccine or rabies vaccine, are considered medical treatment);
- Cleaning, flushing or soaking wounds on the surface of the skin;
- Using wound coverings such as bandages, Band-Aids TM, gauze pads, etc.; or using butterfly bandages or Steri-StripsTM (other wound closing devices such as sutures, staples, etc., are considered medical treatment);
- Using hot or cold therapy;
- Using any non-rigid means of support, such as elastic bandages, wraps, non-rigid back belts, etc. (devices with rigid stays or other systems designed to immobilize parts of the body are considered medical treatment for record-keeping purposes);
- Using temporary immobilization devices while transporting an accident victim (e.g., splints, slings, neck collars, back boards, etc.).
- Drilling of a fingernail or toenail to relieve pressure, or draining fluid from a blister;
- Using eye patches;
- Removing foreign bodies from the eye using only irrigation or a cotton swab;
- Removing splinters or foreign material from areas other than the eye by irrigation, tweezers, cotton swabs or other simple means;
- Using finger guards;



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- Using massages (physical therapy or chiropractic treatment are considered medical treatment for recordkeeping purposes); or
- Drinking fluids for relief of heat stress.

No other treatments are considered first aid.

5.1.5 INJURY OTHER THAN FIRST-AID: (As per Chapter VII, Rule 69 of Bangladesh Labour Rules, 2015)

Notice to be given of any accident. □ When any accident occurs in an establishment causing loss of life or bodily injury, or an accidental explosion, ignition, outbreak of fire or irruption of water or fumes occurs, the employer shall give notice of the occurrence to the Inspector within following 3 (three) working days [:]

Provided that the factory authority shall, immediately after the occurrence of such incident, inform the matter to the Government, Fire Service, Directorate of Inspection of Factories and Establishments, Police Station, and if required, the nearby hospital or government-private medical service establishment, through telephone, mobile phone, SMS or fax, in order to take immediate necessary action to minimize potential damages or bring the situation under control.]

Fatal incident and Serious Incident:

If the victim dies in the incident, it will be treated as a fatal incident.

In this case the injured person is likely to be disable for more than 20 days to perform his duty, it will be treated as Serious Incident. In these cases, the intimation will be made as described above.

Minor Incident: (As per Chapter VII , Rule 70 of Bangladesh Labour Rules, 2015)

Where an accident mentioned above causes bodily injury resulting the compulsory absence from work of the person injured for a period exceeding 48 (forty-eight) hours, but not exceeding 20days. The management will inform the concerned statutory authority within 7 days in form-27 under rule 69/1/(A), (B) and (C) of Bangladesh Labour Rules, 2015.

6.0 HSE ORGANISATION

Number of HSE officers:

The subcontractor must deploy one HSE officer for every 500 workers or part thereof in each package. If there are more than one HSE officer, one shall be designated as head/HSE. No Of HSE stewards shall be one for every 100 workers deployed

Deployment: The subcontractor should deploy sufficient HSE officers and HSE-steward/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 of HSE Officer will attract a penalty of BNR.40,000/- per man month for the delayed period.

6.1 QUALIFICATION FOR HSE PERSONNEL

Sl.no	Designation	Minimum Qualification	Experience
1	Safety officer (Construction Agency)	Degree or Diploma in Engineering with diploma in Industrial Safety with construction safety as one of the subjects. If Degree/Diploma in safety is from India, it must be recognized by AICTE/SCTE&VT. NEBOSH IGC /IOSH diploma also acceptable	Minimum two years for degree holder and five years for diploma holder in the field of Construction of power plant/ major industries



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6.2 RESPONSIBILITIES

6.2.1 SITE IN -CHARGE OF SUBCONTRACTOR

- Shall engage qualified safety officer(s) as per clause 6.1
- 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 authorities.
- 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, mock drill, 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



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6.2.2 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

7.0 PLANNING BY SUBCONTRACTOR

7.1 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. A documented daily prior to use inspection checklist shall be completed by the end user and periodic inspection shall be arranged by in-house competent authority for acceptance as applicable. All Tools & Plants shall be certified by a third party COMPETENT person before these are put to use [as per Rule 60, 75 and schedule 3 of Bangladesh Labor Rules](#). As far as possible, this certification shall be made available to site HSE function by the contractor before entry into the site. The certification shall be renewed annually, otherwise, the item shall be withdrawn from the work area. [The fitness of T&Ps shall be monitored by site HSE quarterly and alert/ reminder issued to the concerned agency and BHEL package in-charge.](#)
- The machinery and equipment to be embraced for this purpose shall include but not limited to the following:
 - Mobile cranes.



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- Side Booms.
 - Grinding machine.
 - Drilling machine.
 - Air compressors.
 - Welding machine.
 - Generator sets.
 - Dump Trucks.
 - Excavators.
 - Dozers
 - Grit Blasting Equipment.
 - Hand and power 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.

7.2 MOBILISATION OF MANPOWER BY SUBCONTRACTOR

- As a measure to ensure that manpower being mobilized to the construction site is fit and competent for safe working, screening arrangement shall be made by the sub-contractors to fulfill contractual as well as legislative requirement.
- Examination of medical fitness shall be conducted through qualified medical professional for all workers to be deployed (pre-employment). Post-employment medical check-up shall be done for persons engaged in hazardous jobs at a regular interval as per legislations.
- 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.

7.3 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. PPE details shall be maintained as per Form-23
- 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, Apron
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



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8	Painting	Plastic gloves, Respirators (particularly for spray painting)
9	Radiography	As per BARC guidelines

The PPEs and other related safety equipments shall conform to the relevant indian or equivalent European or American standards as below:

BS EN 397:2012	Industrial Safety Helmets.
BS EN 60903:2003	Insulating material gloves for electrical purposes.
BS EN 374-3: 2003	Protective Gloves- Chemical Penetration
BS EN 388:2003	Protective Gloves- Mechanical Risks
BS EN 407: 2004	Protective Gloves- heat and fire
BS EN 420:2003	Gloves- general requirement
BS EN-20345	Industrial safety footwear
BS EN 166:2002	Eye protectors.
BS EN 352-1 & 2:2002	Ear Muff & Ear Plug
BS EN 175:1997	Eye & Face protection during welding
BS EN 361:2002	Fall Arrest Full Body Harness
BS EN 360:2002	Retractable type fall arresters
BS EN 795:2012	Lifeline System
BS EN 358;1999	Work Resistant Harness
BS EN 813:2008	Seat harness
BS EN 1498+ others	Rescue Harness+ other items of a rescue kit
BS EN 353:2002	Detachable fall arrester
BS EN 149: 2001	Filtering Half masks tp protect against particles
BS EN 471:2003	High Visibility Clothing

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
- The visitors shall also use Reflective Vests, Helmet and any other PPEs as deemed appropriate for the area of work.

Colour scheme for Helmets:

- Workmen: Yellow
- Safety staff: Green or white with green band
- Electrician: Red
- Others including visitors: White



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- 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.
- In case, contractor fails to provide PPEs in time, BHEL/Customer may provide the same and the cost as deemed appropriate by BHEL/Customer shall be debited

7.4 ARRANGEMENT OF INFRASTRUCTURE

7.4.1 DRINKING WATER

- Adequate drinking water shall be provided and maintained at suitable places at different elevations.
- Chilled water shall be made available from 1st April to 30th Sep of the year
- Container should be labeled as “ Drinking Water”
- Cleaning of the storage tank shall be ensured at least once in 1 month indicating date of cleaning and next due date. Mild cleaning detergents as used for cleaning vessels shall be applied and scrubbers (3M or equivalent) shall be used for removing scales and deposits on the inside surface. The tank shall be thoroughly cleaned with potable water only before it is refilled.
- Employees should use their own cup for collecting water-no cup shall be shared
- Potability of water should be tested as per standard at least once in every quarter as per Rule 50(5) of Bangladesh Labour Rules, 2015.
- Apart from above, those who are engaged in work producing significant heat , shall be served saline water or Sarbat at the rate of 2litres perday
- Storage of drinking water shall be min 6M away from any toilet and washroom

7.4.2 WASHING FACILITIES (As per Chapter VIII, Rule 86 of Bangladesh Labour Rules, 2015)

- 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.
- If water used for washing is not potable, it shall be marked “Do Not Drink” in English and Bangla

7.4.3 LATRINES AND URINALS (As per Chapter V, Rule 51, Schedule II of Bangladesh Labour Rules, 2015)

- Latrines and urinals shall be provided in every work place based on strength of workmen at the rate of one toilet seat and one urinal for every 50 female workmen and that for every 60 male workmen
- Urinals shall also be provided at different elevations.
- They shall be adequately illuminated and shall be maintained in a clean and hygienic condition at all times, by appointing designated person.
- Separate facilities shall be provided for the use of male and female worker if any.
- Hand-wash facility shall be provided



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7.4.4 PROVISION OF SHELTER DURING REST

Proper Shed & Shelter shall be provided for rest during break::

7.4.5 MEDICAL FACILITIES (Sharing with other sub-contractors at site is permitted)

7.4.5.1 Sick Room (As per rule 77) (As stipulated in the contract)

- A Sick room shall be ensured/identified at site with basic facilities as per subrule 77(5) for handling medical emergencies. The sick room can be run independently or jointly developed on proportionate sharing basis with permission from BHEL. It shall be equipped with one rigid stretcher, one foldable stretcher, one rescue basket stretcher, a wheel chair, at least 2 beds with separator and all basic facilities that a doctor needs for basic health check-up and quick referral including those listed in sub-rule 77(5) of Bangladesh Labour Rules,2015
- A qualified medical professional, not less than a Degree in Medical Science (Allopathy) as recognized in Bangladesh , shall be deployed at the sick room along with sufficient support staff
- Medical waste shall be disposed as per prevailing legislation
- Ambulance, **as stipulated in the contract**, shall be made available at the site along with a trained driver and shall be equipped with at least an Oxygen cylinder along with dispensation system, first-aid box, a portable ABC type fire extinguisher.

7.4.5.2 FIRST AIDER

- Must have a competence certificate in First-aid issued by Bangladesh Red Cross Society/ Bangladesh St Johns Ambulance/ any other agency which is recognised by the Govt of Bangladesh
- Ensure availability of **one** Qualified First-aider throughout the working hours for every 150 workmen engaged as per clause 89 of Bangladesh Labour Law
- 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.

7.4.5.3 FIRST AID BOX (as per rule 76(2) of Bangladesh Labour Rules.2015))

- The subcontractor shall provide necessary first aid facilities. 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.



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7.4.5.4 HEALTH CHECK UP

The persons engaged at the site shall undergo mandatory health checkup from a qualified doctor as per the **format no. HSEP:13-F03 and Health Record 31-A** 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 Gas cutting personnel

7.4.6 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.

7.4.7 PROVISION OF ACCOMODATION/LABOUR COLONY

- The subcontractor shall arrange for the accommodation of workmen at nearby houses or by making a labour colony.
- Regular housekeeping of the labour colony shall be ensured.
- Proper sanitation and hygienic conditions shall be maintained and inspected once in a month.
- Adequate number of toilet facilities with water for workers as per norms to be provided. There must be separate toilet for women workers. Drinking water and electricity to be provided at the labour colony.
- Potable water shall be tested once in six months as per IS10500.
- MSDS of LPG shall be put up prominently. This shall be included in the induction training as well.
- The labour colony shall be appropriately secure so that only authorized persons have access to it.
- First aid facility shall be provided in the labour camp under the administration of trained first aiders.
- Common kitchen facilities to be ensured and cooking inside the room to be avoided. The canteen should be maintained in hygienic condition.
- No. of occupants in room rooms to be as per the standards practice.
- Awareness training shall be organized for the workers regarding fire safety, safe use of LPG, Health & Hygiene, and electrical safety etc. on monthly basis.
- Adequate drainage and approach roads to be done.
- Perimeter fencing, security and main gate entrance shall be established and maintained.
- Monthly inspection to be done to ensure the compliance and for opportunity of improvement.
- Workers shall not be transported in open vehicles i.e. trailers, truck beds etc within project boundaries which includes the labor colony.

7.4.8 PROVISION OF EMERGENCY VEHICLE (in addition to Ambulance)

Generally one vehicle (4 wheeler) is identified by each major package holder (sub-agency). Minor package holders are permitted to have a tie-up with major package holder



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7.4.9 PEST CONTROL

Regular pest control should be carried out at all offices, mainly laboratories, canteen, labour colony and stores

7.4.10 GENERAL DISCIPLINE:

Workmen under influence of liquor or drug or any other intoxication shall not be permitted to work and sent out of the work area. Workmen shall not be permitted to smoke in work area. None shall be permitted to carry any arms or firearms. The workmen shall report to work on time and follow supervisor's instruction. Use of cell phone particularly in hazardous jobs shall be discouraged like height work, crane operation etc. Horseplay, willful violation of rules shall be dealt with suitable disciplinary action including suspension and termination. They shall be subjected to physical frisking or alcohol/drug test at random by security and security shall be authorized to take appropriate disciplinary action against any delinquent employee like throwing out of the gate for the day and so on. If any such employee returns to work, he shall be put through induction training once again.

7.4.11 SCRAPYARD

- In consultation with customer, scrap yard 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.

7.4.12 ILLUMINATION (to be reviewed)

- Adequate and suitable light shall be provided at all work places & their approaches including passage ways as per IS: 3646 (Part-II) or as per Bangladesh standard. 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	300
	rough measurements etc.	
7.	Fine work like precision assembly, precision	700
	measurements etc.	
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



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- 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

8.0 HSE TRAINING& AWARENESS (Trainer, venue and infrastructure shall be decided by site HSE team headed by BHEL site HSE head). Cost shall be borne by respective contractor alone or on sharing basis on case-to-case basis.

8.1 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.

8.2 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



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- Tool box talk to be conducted at least once a week for the specific work.

8.2.1 PRE JOB BRIEFING

- A separate documented daily pre job briefing must be conducted at the actual job/work site location with the supervisor and work crew, to cover working environment/conditions, safe work practices for the activities to be carried out, required PPE and review of the work package, JSA and permit requirements. Each crew member and the supervisor will sign-off on the pre job briefing form, and form will be submitted to the HSE department at the end of each shift

8.3 TRAINING ON HEIGHT WORK

Training on height work (3m and above from ground) shall be imparted to all workers working at height by in-house/external faculty at least twice in a year. Fall protection training must involve as much hands-on activity with the equipment as possible. The training shall include following topics:

- Fall hazards associated with the elevated work.
- Elements of the fall protection systems utilized
- Requirement for 100% tie-off when working at or above 6' or 2m.
- Body Harnesses of at least a five-point configuration shall be used in all fall arrest systems. The harness Dee-ring shall have a minimum tensile strength of 5,000 pounds (22.2 kN).
- Fall protection equipment used. Use of PPEs – Harness proper fit, storage and compulsory tie-off of body harness to a firm support/life-line or anchorage point).
- Anchorage selection used for attachment of personal fall arrest systems shall be capable of supporting at least 5,000 pounds (22.2 kN) per employee attached, determined by a competent person.
- Use of fall arrester (shock absorbing lanyard), retractable fall arrester, life line, safety nets etc.
- Safe climbing through monkey ladders.
- Maintenance and Inspection of PPEs.(Daily/periodical)-color coding
- Medical fitness requirements.
- Mock drill on rescue at height.
- Dos & Don'ts during height work.For the workers & staff passed through the vertigo test, an additional sticker for height pass to be issued. This is applicable for those who are supposed to work or inspecting in BTG area, etc.

8.4 HSE TRAINING DURING PROJECT EXECUTION

- Other HSE training shall be arranged by BHEL/sub-contractor 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
 - T & Ps fitness and operation
 - Electrical safety
 - Welding, NDE & Radiological safety
 - Storage, preservation & material handling.



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- A matrix shall be maintained to keep an up-to-date record of attendance of training sessions carried out.
- Skill labour (like fitter, electrician, rigger, scaffolder, carpenter etc.) will pass through the trade test (written and practical) conducted at site by the respective engineer & EHS officer. A pass sticker of qualified person to be marked on their ID Card/Gate Pass.

8.4.1 HSE Induction for Visitors: No visitors are allowed to visit the construction site without safety induction, mandatory PPEs, and designated escort.

8.4.2 Safety Induction for all (Staff/engineers/sub-Contractors officials/supervisors): It is compulsory to provide safety induction and briefing about the site HSE management systems, requirements and individual's roles & responsibility to carry out the activities in safe manner, before deploying them.

8.5 HSE PROMOTION-SIGNAGE, POSTERS, COMPETITION, AWARDS ETC

8.5.1 Display of HSE posters and banners

- Site shall arrange appropriate posters, banners, slogans in local/Hindi/English languages at work place

8.5.2 Display of HSE signage as per [Safety signages will be as per BS 5378 safety signs & Colors and BS 5499 graphical symbols & signs](#)

- 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

8.5.3 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. Monthly Safety Day shall be celebrated every month preferably on a fixed date or day at the site jointly by all the contractors as a promotional measure on cost sharing basis

9.0 HSE COMMUNICATION

9.1 INCIDENT INVESTIGATION, REPORTING AND RECORDS:

Every incident including near-misses or injury of any kind and at any level of severity shall be immediately reported by the contractor's workmen in their work area to the safety officer/ HSE coordinator, site engineer or RCM. The site HSE co-ordinator shall be the nodal person for this purpose.

For any reportable injury to any employee or to the contractor's workmen, the safety officer/ HSE-coordinator shall report the incident in incident/ incident report, to CUSTOMER

In the case of serious injury requiring hospitalization or fatality, communication shall be made to customer through telecom immediately with submission of incident report within 24 hrs and detail investigation report may be forwarded in INCIDENT INVESTIGATION REPORT FORMAT within seven days.

Investigations into all reportable incidents shall be conducted using accepted Root Cause Analysis (RCA) methodology cause and effect, 5 why's, etc, to determine the Physical, Human and Latent Root Causes for these type accident/incidents. However, it is recommended to conduct preliminary investigations into all other incidents as a proactive measure.



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Every contractor shall maintain record of incidents / incidents at site, and shall be available for inspection by representatives of statutory agencies / officials visiting site from BHEL/customer The Safety Officer/ HSE coordinator shall maintain these records.

26.1 Incident Investigation Procedure:

The purpose of the investigation procedure is to find out root cause of accidents / incidents & not to find out faults, so as to avoid recurrences, in future and share lessons learned.

RCM shall constitute a committee of at-least 2 site engineers within 24 hours of such incidents. The investigation shall aim at finding out the basic unsafe acts / conditions that have caused the incidents. Immediately after all appropriate emergency measures, first aid and damage containment measures have been taken, every effort shall be made by the committee to:

- Preserve physical evidence
- Take photographs
- Take statement from incident victim(s) and eyewitnesses and anyone who may have knowledge of possible cause(s) of incidents

The committee shall also recommend corrective measures to prevent recurrence of similar incidents

25.2 Initial Incident Response:

In the event of an accident/incident, the supervisor and employees at the work site must:

- Stop work and make the work area safe (mitigate or remove the exposure to the hazard)
- Provide first aid and activate "Emergency Medical Services" and other emergency services, e.g. fire or police, as required,
- Ensure the injured worker is transported to "Emergency Medical Services" for medical attention if necessary,
- Secure the site to ensure the protection of employees and the public and to aid with the investigation,
- Report the incident immediately to the local Site In-Charge.

26.3 Incident Investigation Report:

The investigation committee on completion of the all investigations shall prepare and submit the report to the RCM. The report shall also include corrective measures with assigned responsibility to be taken at site to prevent similar incidents in future. The RCM shall forward the copy of the investigation report to BHEL

9.2 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.

10.0 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



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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 hot well / de-aerator
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		

10.1 HSE ACTIVITIES

While planning for any activity the following documents shall be referred for infrastructural requirements to establish control measures: Only specific portion of the following documents may be shared as reference at discretion of BHEL.

- 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

10.2 WORK PERMIT SYSTEM

- The following activities shall come under Work Permit System
- a The following activities shall come under Work Permit System
 - a. Height working
 - b. Hot work in general and at height including handling of hazardous substance viz, Acetylene, Oxygen and LPG
 - c. Confined space



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- d. Radiography
 - e. Hazardous Energy Control (lockout/tagout)
 - f. Excavation and Trenching
 - g. Heavy lifting exceeding 50Metric Tonne
 - h. Handling of Hazardous Substances- Diesel, Caustic Soda, Citric Acid/EDTA, Thinner, Battery Acid, Oil-based paint, Lubricants, Transformer oil.
- Refer Annexure 05 for Work permit formats.
- Permit applicant shall apply for general work permit and other permits as referenced above of particular work activity at particular location before starting of the work with Method Statement and HIRA/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.

10.3 SAFETY DURING WORK EXECUTION

Respective OCPS are to be followed and adherence to the same would be contractually binding

10.3.1 Power supply & upkeep of installation -

- Only persons licensed to Govt of State shall maintain and operate power installations.
- All distribution boxes shall be locked and the key controlled by site management of concerned contractor.
- Electrical appliance shall have proper earthing and for appliances equal to & more than 415V shall have two separate earthing (as per IS-3043-1987)
- All electrical supply shall be provided through ELCB of 30mA sensitivity.
- The working condition and sensitivity of ELCB shall be checked periodically.
- All fuses and fuse wires shall be of standard size and rating.
- All power supplies through cables shall be underground or overhead with height > 3mtrs.

The following guidelines are to be considered the absolute minimum requirements to be supplemented by requirements of all applicable codes and standards for such work; Wiring and Branch Circuits Must be protected by a proper amperage over-current device such as a HRC fuse or circuit breaker. Such installations must be located so as to prevent physical damage to the wire conductors & panels.

- Portable electric lights used in wet or potentially wet locations must be either low voltage type (24 volts or less) or protected by a GFI (ground fault interrupter).
- Must be visually checked before each use and periodically while in use to assure their original integrity is maintained. Cords with cuts, breaks, deep abrasions, etc. shall be taken out of service immediately. Repairs to extension cords shall only be performed by qualified/ licensed electricians.
- Must not be allowed to lie in wet or potentially wet areas.
- Every electric line or cable of unknown origin that is discovered or exposed during a digging, drilling, probing, or similar operation is to be considered as energized and life threatening. The senior company employee on the site will ensure that all necessary safety precautions are taken in order to isolate the line from all workers and the public. Such precautions may include halting the operation if appropriate. The senior company employee on the site is to then contact the proper authorities to have the line identified and either confirmed to be abandoned and/or made safe for continuing the work.



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- Any and all underground lines that are discovered or become severed must be considered energized on both sides, and be treated accordingly.
- In general, equipment or machinery being moved or transported must maintain minimum clearances of 25 ft to all power lines.
- TAG IN/ TAG OUT must be in force in Switch Room and all Distribution Boxes for live power line. The authorized person's name and contact no shall be displayed
- Ensure "double insulated" three - core cables and three pin connectors are used and are properly ground "all insulated" types, all electrical tools and appliances must be manufactured for industrial use.
- All connections shall be electrically and mechanically sound and properly insulated. Taped joints are not permitted. Connections to socket outlets must be made with proper plugs.
- Splices in electrical cords are not permitted. Repairs must be made at the socket connection and retain the same mechanical and dielectric condition of the original connection.
- Damaged or defective electric tools, equipment and extension cords, etc must not be used and shall be tagged out of service, removed from the work area and taken back to stores.
- Only licensed electricians are authorized to repair and work on electrical equipment. Tampering with electric tools or equipment by others could result in termination.
- Temporary electric cabling should be elevated 2.2 meters above the floor/ground or covered for protection. It must be kept clear of walkways and other locations where it may be exposed to damage or create a tripping hazard.
- Energized wiring in junction boxes, circuit breaker panels and similar places must be covered and locked at all times.
- Areas with live high voltage wires or terminals must be barricaded against entry and warning signs posted Danger – High Voltage and Authorized Personnel Only.
- Personnel should never work on energized equipment, deenergizing (lockout/tagout) the equipment is always the first requirement.
- The lockout and tagout procedure will be used when testing or working on, or around, energized installation.
- Working around energized equipment should never be done alone. A second electrician must always be available for assistance.
- If lockout/tagout of the work is infeasible (must be demonstrated), work on energized electrical circuits must be approved by the Site In-charge. All safety precautions necessary must be taken, PPE use must be evaluated per the exposure and used, i.e high/low voltage gloves, insulated shoes, overcoats/aprons, faceshields, and other protective equipment like insulated tools, blankets, mats, etc. must be used.
- The welding machines earth leads shall be properly fixed without loose contacts. The earth cable only has to be used. No steel members shall be used as earth leads.
- Electrical crews must be qualified for the equipment and tools they work on, including being trained in Cardio-Pulmonary Resuscitation (CPR) methods and First Aid for rendering help in the event of electric shock.

10.3.2 Qualified and Unqualified Workers (Electrical Works):

Basic electrical safety knowledge is a major concern. It is critical that only qualified workers be allowed to perform this work. Therefore only those persons that are both qualified and authorized may install, fabricate, repair, test, calibrate or modify electrical or electronic wiring, devices, parts, systems or equipment.

Qualified Person:

One who is trained and wiremen licensed to Govt as per Rule 58(9) of Bangladesh Labor Rules and familiar with the construction, operation and safety hazards of the equipment upon which they are permitted to work.



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- Qualified persons are intended to be only those who are well acquainted/experienced with and thoroughly conversant in the electric equipment and electrical hazards involved with work being performed.
- Only qualified persons may be permitted to work on or near exposed energized parts. Such persons are required to have been trained in three specific areas:
 - Qualified persons must be capable of working safely on energized circuits;
 - Must be familiar with the proper use of special precautionary techniques and procedures based on equipment and exposure; and
 - Must be familiar with required personal protective equipment, insulating and shielding materials, and insulated tools.
- Qualified persons are expected to be able to evaluate unknown situations and adjust their activities in such a way that only safe work practices are used. Such behavior is the responsibility of the qualified person.
- It is possible and likely for an individual to be 'qualified' with regard to certain equipment in the work place, and unqualified on other equipment they must note their limitation and stop work if not qualified on what equipment they were to work on.
- An employee who is undergoing on-the-job training, who, in the course of such training, has demonstrated an ability to perform duties safely at his or her level of training, and who is under the direct supervision of a qualified person is considered to be a qualified person for the performance of those duties. The process must be documented as proof.

11.0 Lifting Operations:

All the cranes and lifting tools & tackles shall be inspected on daily basis and as well as formal monthly by expert and as per the law third party for annual certification. These shall be tested and certificates of fitness shall be obtained from 3rd party govt approved competent agency before deploying at site and later periodically (As per Rule 60 and 75, Schedule 3 of Bangladesh Labour Rules). The last date of Third Party Inspection and the next Due date shall be conspicuously displayed on all cranes. A copy of certificate shall be pasted on operators cabin of all the lifting equipment. The record shall be maintained in Form-24

The manufacturer's instruction for maintenance shall also be followed. All safety measures shall be followed. All tools tackles, lifting appliances; material-handling equipment etc used by the contractor shall be of safe design and construction. The operators, slingers and signalers shall be qualified as per IS 13367 (part-1):2003 "Safe use of cranes- code of practices". There shall be a person responsible for co-ordination

11.1 Personnel Lifts (Man-Basket): (To be treated as a T&P item)

A Personnel Man-Basket permit shall be completed prior to lifting any people, along with a rigging plan. Man-basket shall be used where access through ladders or scaffolding is not feasible. Man-baskets shall be designed and engineered by a manufacturer (job made man-baskets are not allowed, unless designed and tested by a certified engineer), and built robust with MS Angles and flats or plates or channels only. Guard rails top and mid, must be in place and screened-in to avoid material from falling out of basket. The factor of safety shall be 200%. It shall have a door with double latches and shall open inside. Anchor points shall be identified within the man-basket. The man-basket shall be thoroughly inspected and load tested and a trial run performed without personnel before being put to job. It shall be treated as a lifting tool and shall undergo same certification cycle and inspection as other lifting equipments. An additional sling of required lifting capacity shall be fixed to the man-basket main lifting point and attached to the crane above the ball or block. While lifting man-basket, the crane shall maintain a uniform speed of lift without any swing. Once man-basket reaches the destination, the lift brakes shall be locked as long as the basket remains at that point. The same care shall be taken in its descent. As for hanging man-basket, the same shall be hung off a rigid structure with help U-shaped handle welded to man-basket. This shall be tested once in a year by a competent person.



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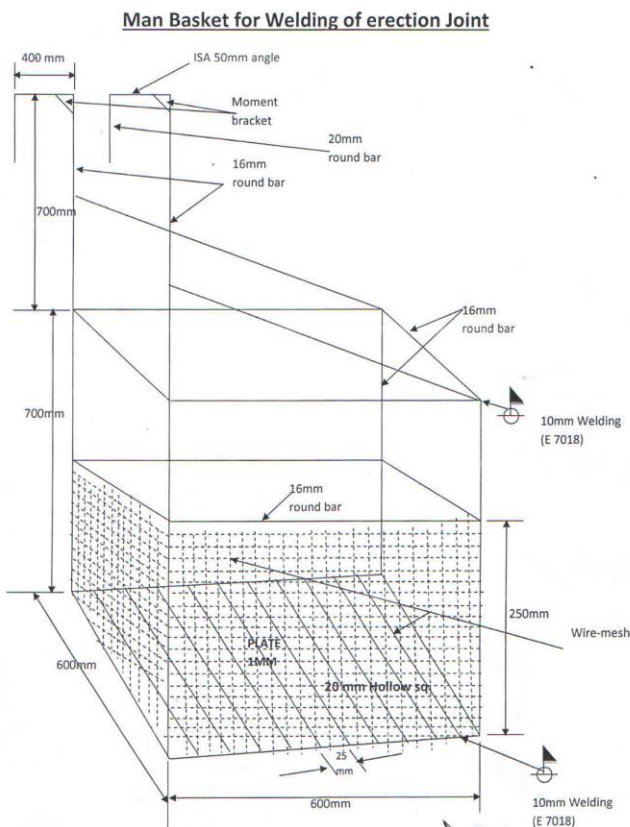
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11.2 CRANES AND HOISTING EQUIPMENTS:

This procedure provides the guidelines to ensure proper rigging and lifting activities are accomplished safely and in accordance with applicable specifications, codes, and regulations.

- On every crane or piece of hoisting equipment notices of all rated load capacities, recommended operating speeds, and any hazard warnings or special instructions shall be conspicuously posted. All instructions and warning shall be visible from the equipment operator's station.
- Cranes shall have an Anti Two-block safety device installed
- All mobile cranes shall have overload and backup alarms
- Load angle indicators and limit switch

All areas within swing radius of cranes that are potentially accessible by pedestrian, vehicular, or equipment movement shall be barricaded to prevent anyone or any vehicle or equipment from being struck by the crane or hoisting equipment, or its load(s).

- No part of the lifting equipment or its load shall be within the distance as specified in the Indian Electricity Act from an energised power line
- Cranes shall have annual certified third party inspection and be inspected before use by the operator. Any defects shall be corrected before use. Logs of crane inspection shall be kept with the crane.
- Make certain that the rigging personnel, material, and equipment have the necessary capabilities for the job and are in safe condition.



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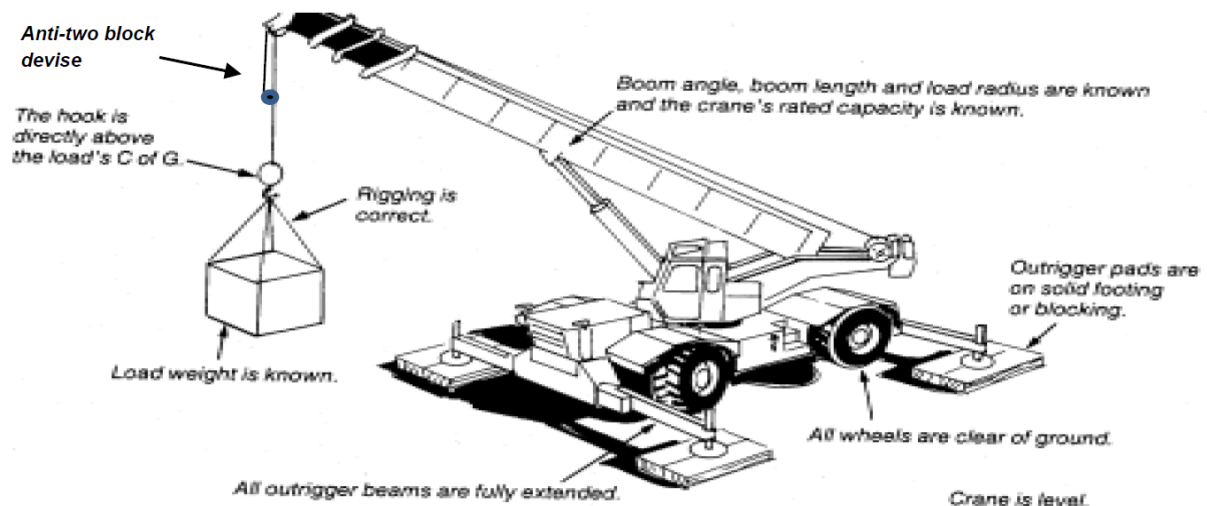
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- Communicate with person(s) directly responsible for accomplishing the work and / or work area to establish requirements/responsibilities and make certain that all preparatory work is complete.
- Mats/Pads must be used on all lifting equipment, equipped with outriggers.
- Pick and carry must have the load secured to the rig in front.
- Proper crane setup:



11..2.1 Safe Rigging Practices:

- Review the planned operation and requirements with the operator and rigging crew.
- Ensure a pre-lift meeting is conducted with crane operator, tagline operator, signal personnel, and Safety Manager.
- Designate a qualified person from the rigging crew to observe clearance of the equipment and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means.
- Clear the lift area of all unnecessary personnel.

11.2.2 The following are rules for safe rigging:

- Use loops, thimbles and corner pads to prevent damage to slings when used around corners or on cutting edges.
- Never allow wire rope to lie on the ground for any length of time or on rusty steel or near solvents, chemicals or corrosive substances.
- Slings must not be pulled from between or under loads with load resting on the sling.
- Keep all rope away from flame cutting or welding operations.
- Never use rope as sling material.
- Never wrap a wire rope completely around a hook.
- Do not bend wire rope near any attached fitting.



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- The sling must be selected to suite the most heavily loaded leg rather than the total weight when using multi-legged sling to lift loads in which one end is heavier than the other.
- When using 3 and 4 legged sling configurations, any two legs must be capable of supporting the entire load.
- Where possible, wire rope choker hitches must include a shackle with the eye around the shackle pin to prevent breaking wires of the choke. The choker hitch must be "snugged down" prior to lifting, not after tension is applied.
- Unless authorized by the hook manufacturer when more than two rope eyes are placed over a hook, install a shackle, pin resting in the hook, and place the rope eyes in the bowl of the shackle.
- Properly rig all loads to prevent dislodgment of any part.
- Use guide ropes or tag lines to prevent the rotation or uncontrolled motion of the load when necessary.
- Loads must be safely landed and properly blocked before being unhooked and unslung. Tag lines must not be used in situations that jeopardize the safety of the lift.
- Lifting beams must be plainly marked with their weight and designed working load and must only be used in the manner for which they were designed.
- The hoist rope or chain must never be wrapped around the load. The load must be attached to the hook by slings or other rigging devices that are adequate for the load being lifted.
- Multiple part lines must not be twisted around each other.
- The hook must be brought over the center of gravity of load before the lift is started.
- If there has been a slack rope condition, determine that the rope is properly seated on the drum and in the sheaves prior to lifting.
- Keep hands away from pinch points as the slack is being taken up.
- Leather gloves are recommended when handling wire rope.
- Avoid impact loading caused by sudden jerking when lifting or lowering. Lift the load gradually until the slack is eliminated.
- Never ride on a load that is suspended.
- Avoid allowing the load to be carried over the heads of any personnel.
- Never work under a suspended load until the load has been adequately supported from the floor and all conditions have been approved by the supervisor in charge of the operation.
- Never leave a load suspended unless emergency evacuation is required.
- Never make temporary repairs to sling.
- The capacity of a sling is determined by its angle, construction, type of hitch and size.
- Never lift loads with one leg of a multi-leg sling until the unused legs are made secure.
- Never point load a hook unless it is especially designed and rated for such use.
- Make certain that the load is broken free before lifting and that all legs are taking the load.
- When using two or more slings on a load make certain all slings are made from the same materials.
- Lower the loads on to adequate blocking to prevent damage to the slings.
- Materials and equipment being hoisted must be loaded and secured to prevent any movement which could create a hazard in transit.
- The weight of the hook, load block and any material handling devices must be included when determining crane capacity.
- Operator must have clear sight of loads being picked up or put down by crane. Tag lines will be used to control the loads. Loads must not be touched by hand while placing/ moving.



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11.2.3 Synthetic Slings

The following are rules for safe use of synthetic slings:

- Synthetic slings must be marked to show the rated capacity for each type of hitch and type of web material.
- Nylon web slings must not be used where fumes, vapors, sprays or mists or liquids of acids or phenolic are present. Web slings with aluminum fittings must apply in this category.

11.2.3.1 Synthetic web slings must be removed from service and destroyed if any of the following conditions are present:

- Acid or caustic burns
- Melting or charring of any part of the sling surface
- Snags, punctures tears or cuts
- Broken stitches
- Distortion of fittings
- Synthetic web slings of polyester or nylon must not be used at or come in contact with temperatures in excess of 82°C
- Polypropylene web slings must not be used at or come in contact with temperatures in excess of 93°C
- Insulated hooks must be tested yearly to insure insulation integrity to at least manufacturer's specifications.

11.2.4 Wire Rope Slings must be removed from service and destroyed if any of the following conditions are present:

- In (10) randomly distributed wires broken in one (1) rope lay, or five (5) broken wires in one (1) strand in one (1) rope lay.
- Wear or scraping of one-third the original diameter of outside wires.
- Kinking, crushing, bird caging or any other damage resulting in distortion of the wire rope structure such as:
- Evidence of heat damage.
- End attachments that are cracked, deformed worn.
- Corrosion of the rope or end attachments.

11.2.5 Metal mesh slings must be immediately removed from service if any of the following conditions are present:

- A broken weld or broken brazed joint along the sling edge.
- Reduction in wire diameter of 25 percent due to abrasion or 15 percent due to corrosion.
- Lack of flexibility due to distortion or corrosion.
- Synthetic web slings must be removed from service and destroyed if any of the following conditions are present:
- Acid or caustic burns
- Melting or charring of any part of the sling service
- Snags, punctures, tears or cuts
- Broken stitches
- Distortion of fittings



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11.2.6 Requirements of Plate Clamps:

- The rated load of the plate clamp must be marked on the main structure.
- Care must be taken to make certain the load is correctly distributed for the plate clamp being used.
- Do not allow load or plate clamp to come into contact with any obstruction.
- The plate clamp must not be used for side pulls or sliding the load.
- When lifting stainless steel or special alloys, ensure plate clamp is designed for use on the specific metal.

11.2.7 Crane operators must follow the followings:

- Pass an annual Operator's Physical examination
- Carry a valid experience certificate from the previous employers

11.2.8 Colour Coding Procedure

- Inspections and tests shall be documented by means of color coding which shall verify that inspections or testing are current and that all receptacles, portable Power tools, Lifting Tools & Tackles have been inspected and tested as required. The color codes used on the project shall be:

GREEN	BLUE	YELLOW	RED
January February March	April May June	July August September	October November December

-
-
- The cycle of colors shall be Quarterly. The color code tape / Sticker shall be clearly visible to designate the period for which the inspections and tests were conducted.
- Following the initial inspection the equipment must be color-coded quarterly as per color-coding instructions that will be issued by the CONTRACTOR.
- Fire extinguisher with the current month color-coding inspection sticker must be provided and secured in the platform.
- All slings shall be regularly inspected in accordance with the requirement of the project for frequent and periodic inspections and removed from the job site if they fail to meet the minimum requirements of the project.
- The CONTRACTOR'S SFO shall ensure that all PPE is inspected prior to its issue. He is to ensure all SUBCONTRACTOR personnel are using safe and proper PPE equipment. Regular inspections on the PPE shall be carried out and personnel not adhering to those inspections shall be removed immediately from the SITE.
- A five (10) day interval period shall be given into each monthly color code change. During this five (10) day period either color shall be acceptable.



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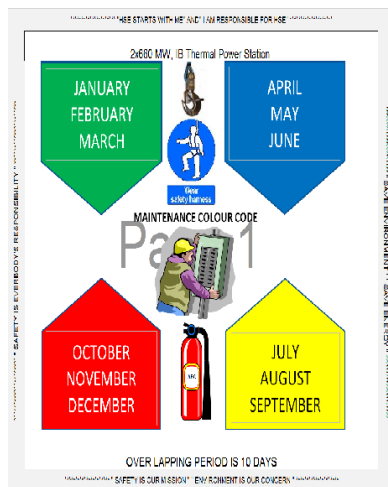
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12.0 Fire prevention, protection & preparedness -

The Fire Prevention, Protection and Preparedness Program is an integral part of the overall HSE Program. Effort and consideration must be given to safety, life and potential for delays in construction schedules and plant startup, as well as protection of property on a given project.

The purpose of which is to prevent -

- Inception of fire
- Loss of life or personal injury
- Loss of Property
- Interruption of operations

Site-in-charge / Safety Officer will make periodical review of the site Fire Protection, Prevention Preparedness Programme, Site conditions and available fire protection equipment. It is very imperative that the Sub-contractors along with BHEL to establish good contact with Local fire station for availability of Fire tender in case of emergencies, in addition to their own fire equipment.

Fire Protection, Prevention and Preparedness Inspections - The Contractor /Sub-Contractor will be required to make frequent fire prevention inspections of his work site and operating facilities. Deficiencies will be corrected at once.

- Area where Hot work activities are carried out (Gas cutting / Welding/ any other spark producing work) above a working spot, a GI / fire-resistant non-asbestos sheet or suitable material shall be placed to prevent the fall of hot sparks. A bucket of water shall be kept nearby while doing hot work
- Hot work shall be preferably carried out in a designated area with a standing Hot Work Permit, to be renewed monthly. The designated area shall have fire extinguishers.
- Any hot work outside designated area shall require a Hot Work permit and fire watch.

No flammable material shall be stored within 35 feet from any fire load.

- Necessary fire extinguishers shall be kept at accessible area as per the chart below:
- The record of Fire safety training and Fire drill shall be maintained in Form-22 and 22(A)



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Fire Extinguisher Chart						
Extinguisher		Type of Fire				
Colour	Type	Solids (wood, paper, cloth, etc)	Flammable Liquids	Flammable Gasses	Electrical Equipment	Cooking Oils & Fats
	Water	✓ Yes	✗ No	✗ No	✗ No	✗ No
	Foam	✓ Yes	✓ Yes	✗ No	✗ No	✓ Yes
	Dry Powder	✓ Yes	✓ Yes	✓ Yes	✓ Yes	✗ No
	Carbon Dioxide (CO2)	✗ No	✓ Yes	✗ No	✓ Yes	✓ Yes

- Emergency telephone number to be displayed at all conspicuous places.

General flammable material storage requirements:

- All flammable material shall be stored in deigned areas and/or in flammable storage cabinets, as necessary.
- Fire extinguishers shall be located near by and have unobstructed access.

13.0 RADIOGRAPHY: Wherever the process requires examination by radiography,

- BHEL /contractor shall use approved radiography contractors for the work on site.
- Site radiography shall be carried out after advance notification to the HSE officer and client personnel. All radiography on the site shall be subject to receipt of client/BHEL work permit and shall normally be performed outside of normal working hours. No ionising radiation sources shall be left unsupervised whilst on site.
- A minimum of 2 qualified persons from the radiography contractor are required for each activity involving ionising radiation. Adequate warning signs shall be posted on barriers and the work area shall be marked off at a safe distance with tape or hard barricades prior to starting radiography by concerned job sub-contractor.
- All personal executing radiography operations shall carry calibrated radiation monitoring devices at all times.
- The storage of radioactive sources on the site is prohibited, they shall be present only for the time required to complete the work. Whilst not in use, radiation sources and their container shall be secured in a safe location with adequate warning signs displayed as per AERB guidelines.

14.0 Confined Space Entry:

A confined space must have an opening of minimum dimension of 40.65cm X 30.65cm if shape is rectangular or oval and dia of 40.65cm if shape is round.



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A hazard assessment must be completed prior to any entry into a confined space. The hazard assessment must identify the sequence of work to be performed in the confined space, the specific hazards known or anticipated, and the control measures to be implemented to eliminate or reduce each of the hazards to an acceptable level. No entry must be permitted until the hazard assessment has been reviewed and discussed by all persons engaged in the activity. Personnel who enter confined spaces must be trained per role e.g. entrant (worker), confined space supervisor & attendant, and must be informed of known or potential hazards associated with the confined spaces to be entered. Number of persons entering shall be kept at minimum. All confined spaces must be inventoried at site and kept on file. Confined spaces must be posted at the entrance with similar type wording "DANGER - Do Not Enter – Confined Space - Permit Required".



Once a hazard assessment is completed the Contractors/Subcontractors requirements are:

- All confined space activities must be reviewed with the Contractor's Safety Manager prior to commencement of the work. Confined space permits are required as part of the entry process.
- Prior to entering the confined space, the area must be completely controlled to prevent the entry of any unauthorized individual, hazardous substances, or materials, which would threaten the safety of the entrants and the stability of the space. All energy sources, including stored or residual energy, must be isolated and/or blanked, and locked out.
- All shall be given a pep-talk by the concerned supervisor giving details of the jobs to be performed, hazards and risks associated and mitigation measures. The persons shall be provided with all necessary PPEs including respiratory masks, if necessary.
- The confined space must be monitored prior to one entering the identified area. Then periodic atmospheric testing must take place throughout the entry, especially after breaks or work interruptions during the entry. Continuous monitoring is preferable, and may be necessary in certain situations. Monitoring results must be documented on the entry permit with the initials of the individual conducting the testing.
- Contractors/Subcontractors must complete a Confined Space Permit before permitting workers to enter the space. This document must be reviewed and approved via a signature by the entry supervisor. The content of the completed permit must be reviewed with the entrants before entering the space and posted at the confined space entrance.
- A proper and accessible means of exit and exit shall be ensured before entry.
- The space shall be illuminated with 24V lamps only
- All gas cylinders/welding machines shall be preferably kept outside the confined space. Even cutting torches/ electrode holders shall be kept outside, when not in use, if possible.
- All electrical equipments shall be connected to ELCB
- The confined space must have an attendant monitoring the activities within the space. This individual must be in constant communication with work crew inside the space. The attendant must know who is inside the space, that must



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be documented. The attendant must not have any other responsibilities than monitoring the space. He/she may not enter the space to perform rescue unless relieved of the duties as an attendant.

- Adequate ventilation must be provided to establish and maintain a stable atmospheric environment. Air circulation shall be ensured. Fumes/dusts generated inside shall be extracted. Ventilation systems must be designed for use in confined spaces.
- Any space 5' or more in depth must have a mechanical retrieval system. This system must be designed for the retrieval of human, and must not be used for equipment purposes. Workers inside the space must wear full body harnesses, and must be connected to the retrieval system.
- Rescue procedures must be established prior to any entry. The local fire department must be contracted prior to entry if they will be the primary source of rescue.
- All individuals involved in the confined space activities must be trained, including hands-on experience with the safety equipment involved. Documentation of the required training must be available prior to the start of any confined space work activities.
- The confined space shall be cleared off all cables, machines, cylinders, materials at the end of the day's work as far as possible.

Once the confined space work has been completed, the entry permit must be cancelled. A copy of the cancelled permit must be given to the HSE Manager

15.0 Welding and Gas Cutting Operations

- When possible, items to be welded, cut, heated, etc. shall be moved to a safe location free of combustible or flammable material. If this is not possible, then all combustibles/flammables that can be removed from the area shall be removed within a 35 foot circumference and a positive means of confining arcs and sparks generated by the process shall be taken and additional person(s) shall be stationed as fire watch for the area(s) still exposed, along with obtaining the Hot Work Permit as applicable.
- Appropriate fire-fighting equipment is to be available in close proximity of any welding and gas cutting operations at all times.
- Drums, tanks, and similar containers that have contained flammable or toxic material shall not be welded, cut, or heated until they have been made safe by water filling, thorough cleansing, or similar accepted practices. The container shall also be ventilated during the welding, cutting, or heating process.
- Proper ventilation is required for any welding or torch operations performed in a confined space.
- Any welding or gas cutting operations performed on metals of toxic compounds or coating such as zinc, stainless steel, lead, cadmium, chromium, and beryllium shall be properly ventilated and/or proper respiratory protection shall be worn by any person that could be exposed to fumes, vapors, and gasses created by the welding and gas cutting processes.
- Wherever it is practical, all arc welding operations shall be shielded to prevent direct light rays or sparks from contacting persons in the vicinity or from reaching areas normally used to travel through or into the vicinity. Where this is not practical, persons who shall be in the area are to use proper eye and skin protection. Other persons who are not participating in the welding or gas cutting operations are not to be allowed into the hazard zone.
- Welders and other employees who are exposed to arc welding radiation shall wear suitable clothing and protective apparel to prevent burns and other types of ultraviolet radiation damage to the skin.
- Arc welding machines shall be shut down when being moved or when they are not in continuous use.
- Electrode holders left unattended shall have electrodes removed and shall not be left where they might contact



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employees or conducting objects.

- Arc welding power supply cable shall be of proper rating and material, e.g. copper.
- Welders shall guard against allowing materials adjacent to or behind them to reflect radiation back toward them or towards others in the area. Reflected radiation can cause skin burns and eye flash burns.
- Compressed gas cylinders shall always be secured from tipping or falling, whether in use, in storage or in transit. The cylinders shall always be secured upright, except during times when actually being hoisted or carried.
- Valve caps shall be in place when cylinders are not in use. Valve caps shall never be used for lifting the cylinder vertically.
- Regulators shall be removed when cylinders are not in use or are in transit, unless the cylinder is firmly secured on a special carrier designed for this purpose.
- Cylinders being transported by a powered vehicle shall be secured in an upright position. Gas cylinders are not allowed to be used in man-basket when occupied.
- Cylinders containing oxygen or fuel gasses shall not be taken into confined spaces.
- Oxygen cylinders shall be stored a minimum of (6) meters from fuel gas cylinders or shall have an approved firewall between them.
- Torches shall only be lit by approved strikers; never with matches, cigarette lighters, or hot work.
- While carrying out job at height, the sparks or molten slag shall be prevented from falling down by putting a fire-resistant (non-asbestos) sheet or even MS Sheet. If such can not be provided, the passage of falling sparks or molten slag shall be barricaded till ground floor and any cable/ tubes/ any other objects interfering in the passage shall either be removed or covered with Fire-resistant sheet or M S Sheet.

16.0 COMPRESSED GAS :

- All cylinder valves shall be closed when any work is finished and when any cylinders are empty or being moved.
- Valve protection caps shall be placed and secured properly before gas cylinders are transported, moved or stored.
- Compressed gas cylinders shall be secured in an upright position with chain or other appropriate means.
- All cylinders shall be kept at a safe distance from welding or cutting operations or shielded from safe.
- All cylinders shall be placed where they cannot become part of the electrical circuit.
- Oxygen and acetylene shall not be stored together.
- Oxygen and fuel gas regulators, hoses and associated equipment shall not be altered and shall be in proper working order while in use.
- Compressed air can be extremely dangerous if allowed to penetrate the skin. As such, the use of compressed air to clean off yourself or other workers shall be strictly prohibited.



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17.0 WORK AT HEIGHT: All work at height above 3meter above ground level without complete platforms, handrails and other related fall protection shall require a work permit in the prescribed form. This shall require approval by the competent authority. The HSE officer of sub-contractors and subsequently BHEL shall follow the checklist religiously by physically verifying the condition of the work area before recommending for approval.

Whenever a fall hazard or other exposure exists for working at heights more than 3m, the nature and scope of work will be evaluated for conditions and environmental factors before selecting the appropriate fall protection system (active, passive or a combination of measures, as appropriate). A personnel fall protection system must include:

- The only permissible personal fall arrest system is an industry approved safety harness. Employees can use positioning belts with two-D ring attachment points as long as they are used in conjunction with a safety harness. Safety harnesses must be secured to an overhead object of substantial capacity capable of supporting five thousand pounds. In order to accomplish this and ensure 100% protection, the worker may need to use two lanyards. The primary lanyard is never unhooked until the secondary lanyard is secure.
- The type of work and the environment conditions determine lanyard and lifeline selection. If welding, chemical cleaning that may damage lanyards, connectors or lifelines, sandblasting, etc., either protect the components or use more appropriate type of system. Lanyards and lifelines must incorporate, or be used with, an appropriate deceleration (shock absorbing) device. Deceleration devices include rope grabs, rip-stitch lanyards, specially woven lanyards, tearing, or deforming lanyards, automatic self-retracting lifelines and lanyards which dissipate or limit the energy imposed on the employee during fall arrest. Once in use, the system's effectiveness is to be monitored. In some cases, a program for cleaning and maintaining the system may be necessary. Lanyard and lifelines must use locking snap hooks only and under no circumstances must two lanyard snap hooks be connected.

Minimum Requirements:

Prior to the start of work at elevation, the HSE Manager involved with the work must meet with the work supervisor to review the scope of work, and must review all the possible fall hazards and effective safety responses. The evaluation/analysis must be documented and kept on file and on site by the HSE Manager.

The procedures for the safety response to identified fall hazards developed and rescue plans by must be reviewed with all individuals exposed to the hazards.

The HSE Manager must establish an inspection process of fall protection systems. Some equipment requires documented inspections by its manufacture on a regular schedule. This equipment must have evidence of the inspection and re-certification process on it. This information must be reviewed before the equipment is actually used. Individuals must visually inspect the fall protection equipment before each use. Failure to complete this inspection process could result in serious injury or death.

Immediately remove from service any fall protection equipment that is identified as defective, damaged, or has been subjected to an impact. Damaged fall protective equipment must be destroyed to prevent re-use and not be discarded into trash containers, as the worn or damaged equipment could be unintentionally re-used.

Aerial lifting devices, excluding scissors lifts require the use of full body harnesses and lanyards in any elevated position.

All lifelines in general are to be made of min 8mm dia steel rope and tied to columns with 3 clamps at each end. Wherever columns are not available to tie the lifelines, the vertical posts are to be provided after carrying out drop-



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load test initially.

18.0 SCAFFOLDS: (As per IS 3696 or any international standard)

The safe and efficient erection, use, dismantling, and storage of scaffolds, ladders and elevated work platforms are considered important objectives in maintaining a safe work environment. This procedure provides the guidelines for erection, use, dismantlement, and storage of scaffolding and elevated work platforms.

There is no such thing as a temporary scaffold. All scaffolds must be erected and maintained to conformed standard. The Scaffold Tagging defines satisfactory, incomplete or defective scaffolds.

Management must ensure or have each worker who performs work while on a scaffold trained by a person qualified in the subject matter to recognize the hazards associated with the type of scaffold being used and to understand the procedures to control or minimize those hazards.

All employees must be competent for the type of scaffolding work they are undertaking and should have received appropriate training relevant to the system they are working on.

- All scaffolds shall be erected / dismantled by scaffolding crew under direct supervision of **competent scaffolding supervisors**.
- All scaffolds shall be capable of supporting 4 times maximum intended load and erected on sound, rigid footing, capable of carrying the maximum intended load without settling or displacement. Bamboo scaffolding is not permitted for use on site.
- Guard rails and toe boards shall be installed on all open sides and ends of platforms more than (2) meters above ground or floor

Scaffold planks must be at least 5 cm x 25 cm (2" x 10") full thickness lumber scaffold grade or better.

- Scaffold planks shall not span distances greater than 2.5 meters (8 feet).

Scaffold planks shall extend over end supports not less than 6 inches nor more than 12 inches and be secured to the scaffold. Scaffolding and accessories with defective parts shall be immediately repaired or replaced.

- All scaffolding must be a minimum of two planks wide. No one may work from a single plank.
- Scaffold planks must be inspected before use. Planks that have been damaged must be removed from the site.
- Access ladders must be provided for each scaffold. Climbing the end frames is prohibited unless the design incorporates an approved ladder.
- Adequate mudsills or other rigid footing capable of withstanding the maximum intended load must be provided.
- Scaffolds more the 6 meters (20 feet) in height must be tied to the building or structure at intervals which do not exceed 4 meters (13 feet) vertically and 6 meters (20 feet) horizontally.
- Do not overload scaffolds. Material should be brought up as needed. Scaffolding must not be loaded in



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excess of its rated capacity.

- Barrels, boxes, kegs, blocks or similar unstable object must never be used as work platforms or to support scaffold.
- Where persons must work under or pass under a scaffold then a 18 gauge wire mesh screen must be installed between the toe board and guard rail.
- Employees exposed to overhead hazards while working on a scaffold will be protected by 5 cm (2") thick planks.
- Wooden/bamboo ladders shall not be allowed at any cost. Ladder's rungs shall be fitted /welded properly. Before every use the rungs should be checked for safe use.
- The platform should have permanent hand rail and mid rail with Toe board without fail.
- All platforms are to be tightly planked for the full width of the scaffold, except as may be necessary for entrance openings. Platforms shall be secured in place.
- On suspension scaffolds designed for a working load of 500 pounds, no more than two workers are permitted to work on the scaffold simultaneously. On suspension scaffolds with a working load of 750 pounds, no more than three workers are permitted on the scaffold simultaneously. Each employee on the scaffold shall use an approved safety harness attached to an independent lifeline. The lifeline is to be securely attached to substantial members of the structure (not the scaffold itself) or to securely rigged lines, which shall safely suspend a worker in event of a fall.

Suspension Scaffold

- Suspended scaffolds are platforms suspended by ropes, or other non-rigid means, from an overhead structure.
- Requirements for use are to be preapproved by HSE Head, under a specific Permit to Work.

Rolling Scaffolds

- The height of rolling scaffolds shall not exceed three times the minimum base dimension.
- The minimum base dimension of rolling scaffold will be 1.25 meters (4 feet).
- Adequate help must be provided when moving a rolling scaffold.
- Secure or remove all loose materials, equipment and tools before moving a rolling scaffold.
- No one is permitted to ride a rolling scaffold when it is being moved. Castor brakes must be locked - on when the scaffold is not being moved.

Typical Scaffold Designs

Tube & Coupler Scaffold –



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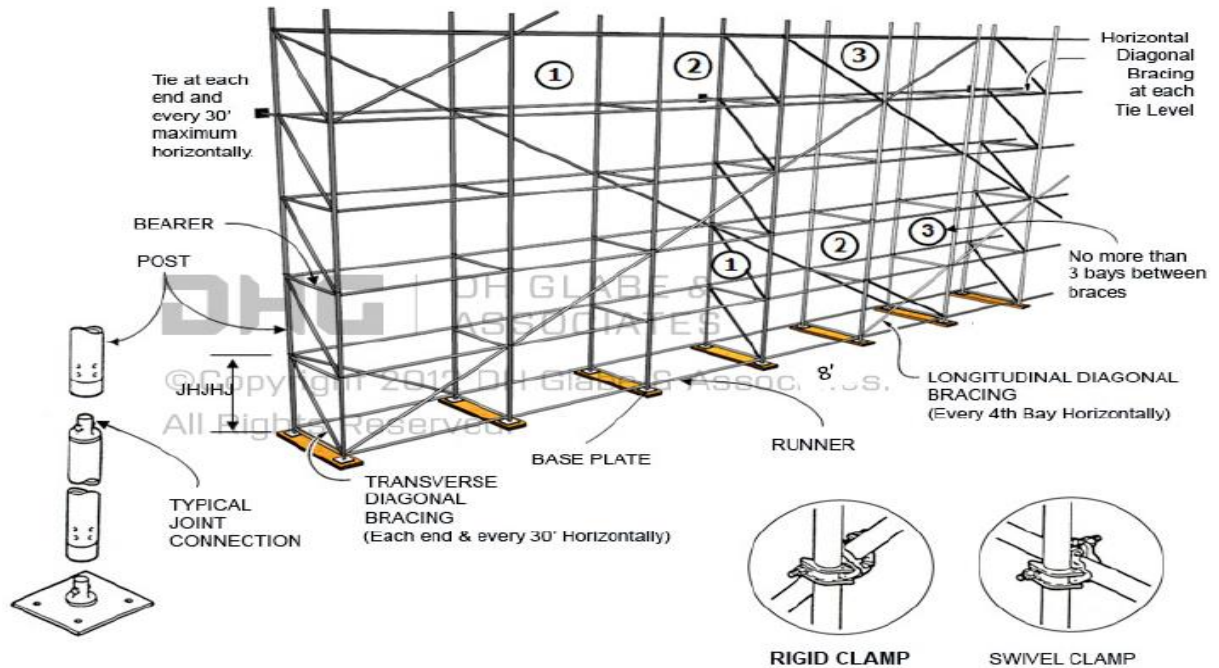
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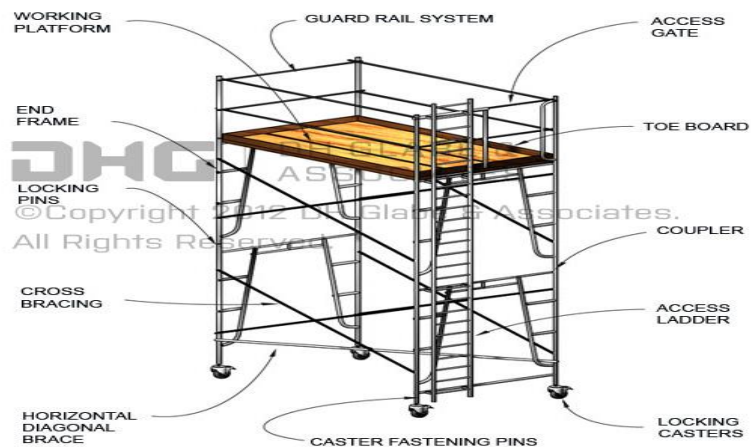
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Rolling Scaffold –



Scaffold Tagging:

Scaffolds being erected, modified or dismantled must be tagged as suitable for use. The scaffolds can only be accessed by those involved with the process.

- GREEN scaffold tag- shall be fixed when scaffold is complete and safe for use, signed and dated by the scaffolding competent person daily.



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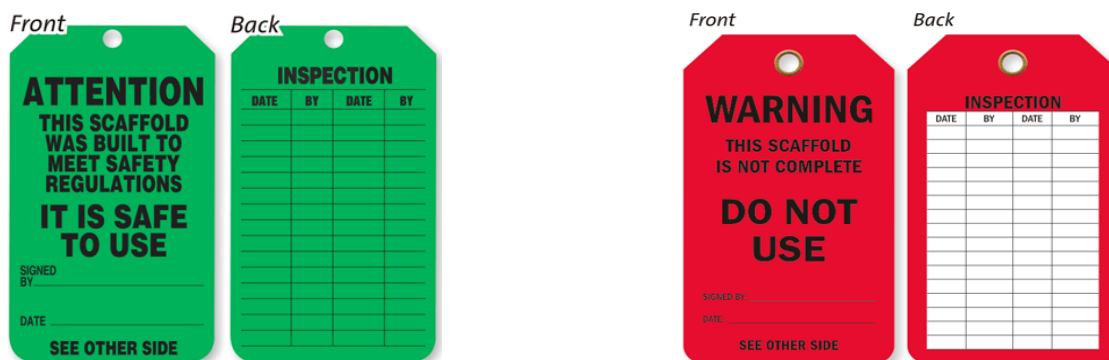
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- RED scaffold tag – to be fixed if scaffold is in some way defective and cannot be used or is still under erection.

Examples of scaffold tags:



18.1SAFE USE OF LADDERS.

- ❖ Fall protection is required when working on a ladder above 2 meters and when climbing above nearby guardrails.
- ❖ Ladders must be inspected prior to use and by a competent person quarterly, with documentation.
- ❖ Use portable ladders for height up to 4 M only
- ❖ Provide fixed ladders for height above 4 M
- ❖ Place the ladder at an angle of 75 degrees (approx) from the horizontal (1:4)
- ❖ Extend ladder at least 1 M above the top landing
- ❖ Secure top and bottom of the ladder firmly to prevent displacement- anti skid lining at the bottom
- ❖ Ensure that the width of the ladder is not less than 300 mm and distance between rungs is not more than 300 mm
- ❖ Provide landings of minimum size 600 x 600 mm at intervals not more than 6 M for fixed ladders. Check the ladders daily for any defects
- ❖ Ensure that the areas around base and top of the ladder are clear. Getting on and off the ladder is more hazardous than using it. Use a mudsill if the ladder is to rest on soft, loose or rough soil
- ❖ Do not use ladders of conducting material near power lines, and only use ladders near powerline or other energize system with exposed parts if they are confirmed locked-out and de-energized.



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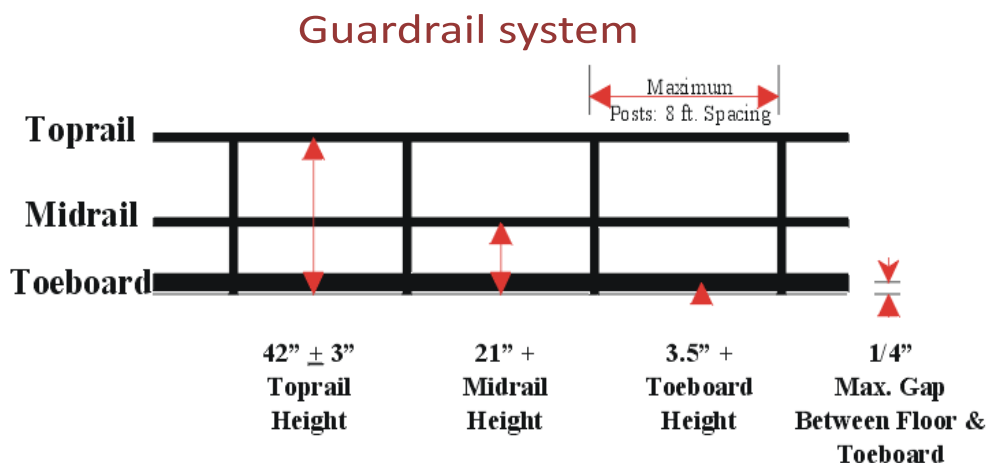
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- ❖ Stand no higher than the fourth rung from the top for carrying out any job standing on a ladder.
- ❖ Never reach out from a ladder to perform work where your belt buckle protrude past the ladder rung.
- ❖ Always face the ladder while climbing up or down
- ❖ Maintain three point contact while climbing up or down a ladder i.e. two hands and one foot or two feet and one hand on the ladder at all the times.
- ❖ Avoid climbing up or down a ladder while carrying anything in hands. Lift tools, equipment and materials with a rope.
- ❖ Work from portable and extension ladders near guarrail where fall expouse exisit over the guardrail regardless of height, and above 2.0 mtr. heights from the working/walking surface will require the use of personal fall arrest equipment.

18.2 Precautions against the fall of materials and persons and collapse of structures

- ❖ Adequate precautions should be taken such as the provision of fencing, or barriers to protect any person who might be injured by the fall of materials, or tools or equipment being raised or lowered. Cradle may be used for lifting materials - however this shall be made of MS angles and flats only and duly certified by the HSE officer. Operators may also use designed containers for lifting small tools.
- ❖ Guardrails (including scaffolding) erected over/adjacent working areas must have the guardrails screened (opening < 0.5), to prevent material from falling outside the platform/decking.
- ❖ Guardrails must be able to withstand a 200 pound force exerted in any one direction.
- ❖ Where necessary to prevent danger, guys, stays or supports should be used or other effective precautions should be taken to prevent the collapse of structures or parts of structures that are being erected, maintained, repaired, dismantled or demolished.
- ❖ All openings through which workers are liable to fall should be kept effectively covered or fenced and indicated in the most appropriate manner.
- ❖ As far as practicable, guard-rails and toe-boards in accordance with Indian laws and regulations as depicted below:





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- ❖ Guardrails shall be provided to protect workers from falling from elevated work places. The rails are generally made of MS pipes of suitable dia. Rebar shall not be used for any handrails, ladder or cover purpose. Wherever the guard-rails and toe-boards cannot be provided:

- (a) adequate safety nets or safety sheets shall be erected and maintained; or
- (b) adequate safety harnesses shall be provided and used and or
- (c) adequate fall arrestor shall be provided and used.

As mentioned under PPE clause, all these PPEs shall be defect free and regularly inspected for any defect. The full body safety harness shall have double lanyard only with max 1.8m length.

The monkey ladders shall have sufficient fall arrestors. Adequate lifelines of 8mm steel wire rope shall be provided across the work area.

The HSE officer shall recommend appropriate PPEs after analysing hazards and risks involved.

18.3 Safety Nets:

- ❖ All safety net systems shall meet the requirements of Indian Standard (IS: 5175)
- ❖ Safety net mesh openings shall have a maximum size of 6 inches x 6 inches and be secured at each crossing to prevent elongation of the opening. All nets must meet IS: 5175 standard.
- ❖ Safety nets must be installed with sufficient clearance to prevent contact with the surface or structures under them
- ❖ Safety nets shall be installed as close as possible to the working level but in no case more than 25 feet below the working level.
- ❖ The safety nets shall extend out at least 8 ft. from the side of the open edge.
- ❖ Material, equipment and other items that fall into the net are to be promptly removed.
- ❖ Safety nets are to be inspected before use and then daily for wear or damage caused by falling materials.
- ❖ Safety net installation shall be inspected by a competent person.
- ❖ Safety nets must be installed below the working decks of the super structure for protection from falls of personnel and material.
- ❖ Safety nets and safety net installations must be drop-tested at the jobsite:
 - After initial installation and before being used.
 - Whenever relocated.
 - After major repair.
 - At 6-month intervals if left in one place.
- ❖ The drop test consists of a 400 pound bag of sand 28-32 inches in diameter dropped into the net from the highest surface at which employees are exposed to fall hazards, but not from less than 42 inches above that level.
- ❖ When the employer can demonstrate that it is unreasonable to perform the drop-test described above, the employer or a designated competent person shall certify that the net and net installation have sufficient clearance and impact absorption by preparing a certification record prior to the net being used as a fall protection system. The certification must include:
 - Identification of the net and net installation.
 - Date that it was determined that the net and net installation were in compliance.
 - Signature of the person making the determination and certification.



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19.0 SAFETY IN JETTY CONSTRUCTION:

A jetty is to be constructed close to the power plant site over a river. The construction activity involves deployment of cranes and other lifting appliances – a few may be mounted on vessels.

Prior to taking up job at the identified space, a HIRA shall be prepared and corrective measures shall be prepared by an expert group. This shall be shared with the subcontractor/gang to be deployed for the job through meeting/TBM as well as proper documentations.

- The safety rules as described in clause 12.0 shall be followed for all safety appliances. However, the operators shall be certified specifically for operating the lifting appliances mounted on the vessels by the owner of the vessels or the lifting supervisor of the agency.
- The lifting appliances on vessels shall be fixed and securely anchored
- Lifting appliances/ mobile plant shall be kept away from dangerous locations such as openings, edges close to water.
- The operation zone shall be clearly demarcated and properly fenced off.

19.1 SAFE USE OF LIFE JACKETS AND BUOYANCY AIDS:

- Lifejackets/buoyancy aids should be provided to and worn by workers with risk of falling into water.
- Lifejackets/buoyancy aids should conform to BS EN ISO 12402-1, 2, 3 or 4, or other equivalent international standards according to working conditions
- Lifejackets should be thoroughly checked by the user before each use.



Efficient state:
Green

Maintenance Record



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- A lifebuoy with sufficient lifeline (not less than 30 meters) shall be provided and the locations of the lifebuoys shall be at less than 50 metre intervals along the edges of places where work is being carried out overside or in exposed position on vessels where there is a reasonably foreseeable risk of falling or being washed overboard. To avoid any delays to rescue operations, lifebuoys shall be tightly tied to the posts.



- The lifejacket/ buoyancy aid shall preferably be provided with a self-activating light (for night work) in order to aid locating the wearer and facilitating rescue.
- The lifejackets /buoyancy aids shall be inspected and checked periodically by a competent person.



- The life jackets/ buoyancy aids shall be properly maintained in a good serviceable condition according to the manufacturer's instructions.
- All inflatable life jackets shall be serviced by an authorized person/agent at least once a year.

19.2 WORKING AT HEIGHT

- Suitable guard-rails and toe-boards shall be installed at edges. Openings shall be properly covered where persons are liable to fall from height, to land surfaces or into water.
- Suitable working platforms, with suitable guard-rails and toe-boards, shall be provided for work at height. Safe means of access and egress shall be provided for the working platform.
- Safety harnesses with continuous and effective anchorage system shall be provided when it is impracticable to provide a suitable working platform, access and egress and safe place of work.
- Access and egress shall be sufficiently illuminated and free from any obstructions, openings, projections in order to avoid any slip, trip and fall.

20.0 NIGHT SHIFT OPERATION:

Night shift operation shall be avoided to the extent possible, so shall be any complicated or heavy job. However, prior administrative approval shall be obtained from BHEL for such operation. The following shall be ensured:

- Adequate illumination along access, work area and egress



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- ii. Supervision
- iii. Issue of strict instruction to workmen not to stray away from the work area and earmarked approach
- iv. Non-deployment of women workforce
- v. Non-deployment of fatigued workforce
- vi. Vacating the area immediately on completion of the job
- vii. informing first-aid facility and ambulance in advance

21.0 CONTROL OF MOVEMENTS AND USE OF HAZARDOUS SUBSTANCES AND CHEMICALS:

- ❖ The hazardous substances and chemicals shall be stored in a cool, well ventilated, dry and covered space with restricted entry only
- ❖ The loading, unloading, issue and use of these materials shall be strictly in accordance with the Material Safety Data Sheet (MSDS) and under strict supervision. Every supply shall accompany a MSDS as per standard purchase order clause.
- ❖ The site HSE team shall maintain MSDS of all these items and the same shall be shared with the stores or the user as and when required.
- ❖ Each container shall be labeled.
- ❖ The stores shall check the expiry date of perishable chemicals while receiving and store in such a fashion so as to follow First-in-first-out queue.
- ❖ There shall be enough space for movement of material and people in the stores.
- ❖ Containment shall be provided so as to arrest spillage from spreading.
- ❖ There shall be sufficient fire extinguishers and sand buckets in the stores and at point of use. In case of any spillage, dry sand shall be put on the spill and soaked sand shall be disposed as per the procedure for hazardous waste.
- ❖ There shall be provision of water preferably flowing one and a face shower at stores and point of use
- ❖ The persons handling these items shall strictly wear appropriate PPEs like leather gloves, apron, shield etc

22.0 CHEMICAL CLEANING: The chemicals have to be handled as instructed in MSDS. Only authorized person(s) shall be engaged for this job under strict supervision. The waste chemicals shall be drained out to a suitable storage provision and disposed off as per the relevant procedure. The area shall be barricaded while carrying out cleaning operation so as to prevent any unauthorized entry. Once the operation is completed, the surplus material along with the containers shall be returned to stores or scrap yard, as the case may be. The users shall use all appropriate PPEs and shall have water and sand for handling any incidental spillage or splash etc. The area shall be left completely clean before removing barricades.

22.1 PAINTING

Requirements provide a detailed procedure to be implemented by all concerned employees and sub-contractors involved in painting activities.

Significant Environmental Hazards:

- Chemical hazard due to inhalation of lead fumes (lead containing paint)
- Chemical hazard due to inhalation of VOC's from painting operations
- VOC's from painting and coating operation
- Disposal of paints and coats drums

Control Procedure for Painting:

- Chemical products used in painting and coating operation shall have proper MSDS sheet in place. Whenever any doubt arise with respect to handling and safety point of view it should be accessed to all concerned.
- Toxic substances and hazards relate the toxic chemicals shall be identified.
- Proper PPE shall be used including plastic gloves appropriate overall etc.,
- Arrangement for cleaning of spillage shall be ensured



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- In case of nauseating feeling by any one immediate action shall be taken
- Only trained workers shall be allowed and proper training should be imparted to the works.
- Exposure limits of the toxic substances shall be checked before starting the work and nobody shall be allowed to carry the work beyond the permissible limit.
- Ventilation or exhaust facility shall be provided at place where painting and coating operations are carried out.
- Overalls shall be supplied by the contractors/subcontractors to the workmen and adequate facilities shall be provided to enable the painters to wash at the cessation of work.
- Smoking, open flames or sources of ignition shall not be allowed in places where paints and other flammable substances are stored.
- A caution board in national /regional language "smoking strictly prohibited" shall be displayed in the vicinity.
- Suitable fire extinguishers/sand buckets shall be kept available at places where flammable paints are stored, handled or used.
- In case of indoor painting or painting in confined spaces, exhaust ventilating shall be provided. If adequate ventilation is not provided a proper respirator shall be provided and used by persons who are trained and fit tested.
- The VOC's from painting and coating operations shall not exceed the permissible level of CPCB/ SPCB norms. The paints and coats must be selected as per the guidelines.
- Workers shall thoroughly wash their hands and feet before leaving the work.

23.0 SAFETY IN THE USE OF HAND TOOLS AND POWER-OPERATED TOOLS

23.1 General provisions

- i. All hands and power tools and similar equipment, shall be maintained in safe condition.
- ii. When power operated tools are designed to accommodate guards, they shall be equipped with such guards, when in use;
- iii. Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains and other reciprocating, rotating or moving parts of the equipment shall be similarly guarded;
- iv. Personnel using hand and power tools and exposed to the hazard of falling, flying, abrasive, and splashing objects, or exposed to harmful dusts, fumes, mists, vapours, or gases shall be provided with the particular personal protective equipment necessary to protect them from the hazards;
- v. All hand-held powered platen sanders, grinders, grinders with wheels of 5 cm or less, routers, planers, laminate trimmers, nibblers, shears, scroll saws and jigsaws with blade shanks of 0.5 cm wide or less shall be equipped with only a positive on-off control.
- vi. All hand-held powered drills, tappers, fastener drivers, horizontal, vertical or angle grinders with wheels greater than 5 cm in diameter, disc sanders, belt sanders, reciprocating saws, saber saws and other operating powered tools shall be equipped with a momentary contact on control provided that turnoff can be accomplished by a single motion of the same finger or fingers that turn it on.

23.2 Hand Tools

- i. The contractor shall not issue or permit the use of unsafe hand tools;
- ii. Wrenches including adjustable pipe end and socket wrenches shall not be used when saws are sprung to the point that slippage occurs;
- iii. Impact tools such as drift pins, wedges and chisels shall be kept free of mushroomed heads;
- iv. The wooden handles of tools shall be kept free of splinters or cracks and shall be kept tight on the tools.

23.3 Power operated tools

- i. Electric power operated tools shall be either of the approved double-insulated type or shall be grounded;
- ii. The use of electric cords for hoisting or lowering loads shall not be permitted;



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- iii. Pneumatic power tools shall be secured to the hose or whip by some positive means to prevent the tool from becoming incidentally disconnected;
- iv. Safety clips or retainers shall be securely installed or maintained on pneumatic impact (percussion) tools to prevent attachments from being incidentally expelled;
- v. All pneumatically riveting machine staplers and other similar equipment provided with automatic fastener feed, which operate at more than 7 kg/cm² pressure at the tool a safety device on the muzzle to prevent the tool from ejecting the fasteners unless the muzzle is in contact with the work surface;
- vi. Compressed air shall not be used for cleaning purposes except when the pressure is reduced to less than 2 kg/cm² and that too with effective chip guarding. The 2 kg/cm² pressure requirement does not apply to concrete form, mill scale and similar cleaning purposes;
- vii. The manufacturer's safe operating for hoses, pipes, valves, filters and other fittings shall not be exceeded;
- viii. Only personnel who has been trained in the operation of the particular tool shall be allowed to operate power-actuated tools;
- ix. The tool shall be tested each day before loading to see that the safety devices are in proper working condition. The method of testing shall be accordance with the manufacturer's recommended procedure;
- x. Any tool found not in proper working order, or that which develops a defect during use, shall be immediately removed from service and not used until properly repaired;
- xi. Tools shall not be loaded until just prior to the intended firing time. Neither loaded nor empty tools are to be pointed at any other person. Hands shall be kept clear of the open barrel end;
- xii. Loaded tools shall not be left unattended;
- xiii. Fasteners shall not be driven into very hard or brittle materials including, but not limited to, cast iron, glazed tiles, surface hardened steel, glass block, live rock, face brick or hollow tiles;
- xiv. Driving into materials that can be easily penetrated shall be avoided unless backed by a
- xv. substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the other side;
- xvi. No fastener shall be driven into a palled area caused by an unsatisfactory fastening;
- xvii. Only non-sparking tools shall be used in an explosive or flammable atmosphere;
- xviii. All tools shall be used with the correct shield, guard or attachment as recommended by thee manufacturer.

23.4 Abrasive wheels and tools

- i. All grinding machines shall be supplied with sufficient power to maintain the spindle speed at safe levels under all conditions of normal operation;
- ii. Grinding machines shall be equipped with suitable safety guards;
- iii. The maximum angular exposure of the grinding wheel periphery and sides shall not be more than 90°, except that when the work requires contact with the wheel below the horizontal plane of the spindle, the angular exposure shall not exceed 120°. In either case, the exposure shall begin not more than 8.650 above the horizontal plane of the spindle. Safety guards shall be strong enough to withstand the bursting of the wheel;
- iv. Floor and bench-mounted grinders shall be work-rests, which shall be rigidly supported and readily adjustable. Such work-rests shall be kept at a distance not to exceed 5 mm from the surface of the wheel;
- v. Cup type wheels used for external grinding shall be protected by either revolving cup guard or a band type guard;
- vi. When safety guards are required, they shall be mounted as to maintain proper alignment with the wheel and the guard and the guard and its fastening shall be adequate strength to retain the fragments of the wheel in case of incidental breakage. The maximum angular exposure of the grinding wheel periphery and sides shall not exceed 180°;
- vii. Portable abrasive wheel used for internal grinding shall be provided with suitable safety flanges;
- viii. When safety flanges are required, they shall be used only with wheels designed to fit the
- ix. flanges. Only safety flanges, of a type and design and properly assembled so as to ensure that the pieces of the wheel will be retained in case of incidental breakage, shall be used;



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- x. All abrasive wheels shall be closely inspected and ring tested before mounting to ensure that they are free from cracks or defects;
- xi. Grinding wheels shall fit freely on the spindle and shall not be forced on. The spindle nut shall be tightened only enough to hold the wheel in place;
- xii. All employees using abrasive wheels shall be protected by suitable eye protection equipment.

23.5 Woodworking tools

- i. All fixed power driven woodworking tools shall be provided with a disconnect switch that can either be locked or tagged in the **off-position**;
- ii. The operating speed shall be attached or otherwise permanently marked on all circular saws over 0.5 m in diameter or operating at over 3000 peripheral rpm. Any saw so marked shall not be operated at a speed other than that marked on the blade. When a marked saw is retensioned for a different speed, the marking shall be corrected to show the new speed;
- iii. Automatic feeding devices shall be installed on machines wherever the nature of the work will permit. Feeder attachments shall have the feed rolls or other moving parts covered or guarded so as to protect the operator from hazardous points;
- iv. All portable power driven circular saws shall be equipped with guards above and below the base plate or shoe. The upper guard shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to the covering position.

23.6 Defective tools to be tagged out for maintenance, as **DEFECTIVE, DO NOT USE**, and sent to tool/store room for repair or to be discarded.

24.0 START UP, COMMISSIONING AND TESTING:

There are various activities involved prior to commissioning- the major ones are -Hydraulic Test, Steam Blowing, Charging of transformers, Boiler Light Up, Rolling and Synchronisation and Full loading of unit.

These activities shall be personally supervised by the site executive along with the commissioning engineer. The readiness of upstream and downstream system shall be ensured before taking up. These shall be handled strictly by the authorised persons only and the team shall be suitably briefed about the activity including hazards & risks involved and control plan by the concerned executive-in-charge before start. Entry of persons to the area of activity shall be suitably restricted and the emergency functions like Ambulance, first aid centre and Fire station shall be intimated about the plan well in advance. Tag-in/ Tag-out shall be in place while charging transformer and whenever necessary. Electricians with valid wiremen license only shall be permitted to work on power lines. The area and the passage shall be adequately illuminated.

25.0 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.



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26.0 EXCAVATION

Wherever there is 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. All safety precautions shall be taken for foundation and other excavation marks as per IS-3764. Any excavation above 2m shall be considered as hazardous job.

27.0 ENVIRONMENTAL CONTROL

Environment protection has always been given prime importance by BHEL. Environmental damage is a major concern of the principal contractor 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 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. BHEL shall use appropriate MSDS for clean-up technique

All contractors shall be responsible for the cleanliness of their own areas and must not pollute the ground, air and water.

BHEL shall ensure that noise levels generated by plant or machinery are as low as reasonably practicable. Where the contractor anticipates the generation of excessive noise levels from his operations the contractor shall inform to Construction manager of BHEL accordingly so that reasonable & practicable precautions can be taken to protect other persons who may be affected.

27.1 Water Supply and Wastewater Discharge Requirement

- Source of water is provided by client from the existing system.
- Wastage of water to be controlled by monitoring the required water for construction & domestic use and actual consumed.
- No contaminated water to be discharged in the storm water drain confirming the standard parameters before discharge. Proper approval to be taken if applicable as per [Bangladesh Environmental Standards](#)

27.2 Storm water runoff Management

- Expansion of existing plant, no existing drainage systems will be disturbed and damaged.
- No construction waste water to be discharged in the existing storm water drain or newly construction storm water drains.

27.3 Noise Mitigation

High noise is harmful to the human health and it can cause impairment if exposed for long duration at regular intervals, and also cause disruption in nearby communities.

- Noise monitoring shall be carried out in all construction locations periodically.
- Use of silent DG is allowed at site during construction.
- Low noise generation equipment's to be preferred
- Acoustic enclosure to be used in case noise level is high for particular equipment or system.
- Work areas where noise levels exceed the 85db shall be posted as hearing protection required.
- Use of PPEs / ear plug/ear muff for personnel entering into high noise area.
- Activities generation High noise will be planned in day shift.



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Noise Level Chart (As per Bangladesh Environmental Standards)

Parameter	Night Noise level dBA	Daytime Noise Level dBA
At 1-meter from each piece of equipment	85	85
At Property boundary	70	70

27.4 Air pollution Control

- Water sprinkling on road for suppression of fugitive dust to be done regularly.
- Startup and commissioning activities to be planned for compliance with contract, regulatory and permit requirements..(As per Bangladesh Environmental Standards)
- Required monitoring to be done in the respective work location as applicable.

27.5 Land and Water Resource Protection

- Only prior approved land by CUSTOMER to be used during construction work.
- Contract clauses to be followed
- All hazardous substances will be stored with proper containment facilities to avoid any release into the water system, causing land/water contamination.

28.0 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
 - ❖ The paint and thinner and other chemical containers (filled, partly used and empty) shall be carefully stored, used and tracked. All empty containers shall be removed after getting punctured/lid removed and deformed to the scrap yard. The partial used one shall either be returned to store or carefully kept at a corner much away from any hot work or source of fire.



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29.0 WASTE MANAGEMENT

There are operations on construction projects that may create hazardous waste, which would require handling, storage, transferring, and transporting. Therefore, hazardous waste guidelines apply for Hazardous Waste Planning:

29.1 Minimum Requirements:

- Contractors must designate a Material Manager who is responsible for checking delivered materials as potential hazardous waste and informing the Contractor's Safety Manager.
- Contractors who create, may be expected to create or could accidentally create a material that could be classified to be hazardous waste must provide Disposal number (or equivalent) and other pertinent information on file.
- All hazardous waste or waste which could be considered hazardous waste, as determined by the methodology and definitions from environmental regulators must be stored and collected in special areas and properly disposed of by the Contractor.
- No waste haulers, disposers, recyclers, or scavengers will be allowed on the site without the permission of the owner. It will be the responsibility of the Contractor to provide copies of all licenses, permits, and authorizations to the.
- No waste may be removed from the site by any person without the authorization of the Contractor. No waste may be brought onto the site and disposed of using the Contractor's systems or facilities.
- Burning of waste, if not used for generating energy, shall be generally prohibited

29.2 General Requirements

- For non-hazardous waste disposal. Receptacles e.g., dumpsters, etc. must be placed around the site for collection of waste materials. No material is to be abandoned on the site.
- Dumpsters will be inspected frequently, and any potentially hazardous material or waste will be removed from the dumpster and placed in the appropriate storage area at the expense of the responsible Contractor.

29.3 Definitions

- Solid Waste - Any garbage, refuse, sludge, or any other waste material which is not an "excluded waste."
 - The following solid wastes are not hazardous wastes unless otherwise designated as such by local authorities:
 - Fly ash waste, bottom ash waste, slag waste, and flue gas emission control waste generated primarily from the combustion of coal or other fossil fuels
 - Drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil, natural gas, or geothermal energy.
- Other Waste Material - Any solid, liquid, semi-solid, or contained gaseous material, resulting from industrial, commercial, mining or agricultural operations which are discarded. This is usually an incidental by-product of the operation. Discarded material must be treated as follows:
 - Disposed of, and not used, reused, reclaimed, or recycled
 - Burned or incinerated, except where the material is being burned as a fuel for the purpose of recovering usable energy
 - Physically, chemically, or biologically treated (other than burned or incinerated) in lieu of or prior to being disposed of.



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- Excluded Waste - Materials that are not solid wastes. The following materials are not solid wastes for the purpose of this part:
 - Domestic sewage ("Domestic sewage" means untreated sanitary wastes that pass through a sewer system.)
 - Any mixture of domestic sewage and other wastes that passes through a sewer system to a publicly-owned treatment works for treatment
 - Industrial wastewater discharges that are point source discharges.

29.4 Treatment - Any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste to neutralize such waste, to recover energy or material resources from the waste, or to render such waste non-hazardous.

29.5 Improper Disposal - The discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into the environment.

29.6 Temporary Storage - The holding of a hazardous waste for a period less than 90 days, at the end of which the hazardous waste is properly disposed of.

29.7 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.

29.8 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.

29.9 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.

29.10 DISPOSAL

- Sufficient containers and scrap disposal area should be allocated.
- All scrap bin and containers should be conveniently located.



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- Provide self-closing containers for flammable/spontaneously combustible material.
- Keep drainage channels free from choking.
- Make schedule for collection and disposal of waste.

29.11 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.

30.0 WORK VEHICLES (Limited to contractual provision)

Work vehicle shall be as safe stable efficient and roadworthy as private vehicles on public roads. Site management shall ensure that drivers are minimum 18 years of age, physically fit, suitably qualified and trained for the equipment they are operating. 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.
- Equipped with backup alarms.
- 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

30.1 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

31.0 EMERGENCY PREPAREDNESS AND RESPONSE Preferably to be maintained jointly by all stake-holders in the project) (A separate document titled "Emergency Preparedness and Response Plan bearing document no HSEP:EPRP:MAITREE is to be read along with this plan)Emergency preparedness and response plan requirements are to protect worker life and health, and to safeguard property used and stored on the project. This plan



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is prepared in anticipation of an emergency to prevent losses to any Incident. This plan describes how the organization identifies, respond to and review emergency situations.

This plan covers fire, medical and other environmental incidents. It aims at controlling the emergency and generally mitigating the adverse effects of a major Incident. This plan is applicable to all activities carried at all BHEL project sites. Determination of hazard potential and identification and assessment of hazards is the first part in emergency planning. This requires systematic study of the site / plant to identify emergencies that can occur.

31.1 Definition:

A major emergency can be defined as an Incident that has potential to cause serious injury or loss of life. It may cause extensive property damage and adversely affect the environment as a whole.

31.2 Emergency scenarios and General Guidelines:

Various scenarios that are anticipated to cause emergency at BGRESL site are discussed in brief along with guidelines.

- **Personal injuries:**

In spite of putting best efforts some technical failure or human error may lead to personal injury at site.

Guidelines are given below when personnel injuries happen:

- Contact medical center over phone/cell/radio;
- Contact security control room over phone/cell/radio;
- Contact HR/Admin department over phone/cell/radio;
- Tell your location nature of injury or near miss incident;
- Inform site safety department;
- Provide First Aid treatment if properly trained person is available, otherwise take the injured person to Medical center if practical; or
- Stay with the injured person until medical assistant arrives.

- **In case of fire:**

- Shout "fire fire";
- Inform the persons nearby. Contact Fire Center and give your location and other details as warranted and act very calmly and swiftly. Then contact security and safety department once in a safe location;
- Try to put out the fire by using available portable fire extinguisher if trained and fire is in incipient stage only, otherwise let firefighting personnel tend to it;
- Do not make any attempt to collect your belonging;
- Get out and away from the area immediately and walk do not run. Follow shortest escape route and assemble at assembly point; and
- Under no circumstance put your precious life at risk.

- Mishaps involving failures of crane, structures, equipment and vehicular incidents, etc., can also lead to an Emergency situation on construction sites. Guidelines for actions to be taken in case of such situations are as:

- Inform immediate authority and also inform security and safety departments.
- Try to assist in rescue personnel involved only if safe to do so;
- Cordon off the area to prevent entry of personnel in affected area;
- Security shall ensure movement in affected area in coordination with Section/Site In-charge.



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- Fire/Security service departments responding to affected area to contain and control the situation;
- All other personnel not involved in mitigation operation shall be directed to assembly point; and
- Contractor/ sub-contractor management shall ensure that their workmen are away from emergency site, not gathering around location of emergency.
- Toxic leakage from nearby live units can also lead to emergency situation at construction site. Guidelines for actions to be taken are as:
 - Inform immediate authority and also inform security and safety departments;
 - Evacuate all the personnel from the area immediately depending upon the wind direction to safest assembly point;
 - Call for help from fire and medical by phone/Cell/radio;
 - Arrange transport for any victims to medical Centre; and
 - Do not panic, act swiftly, do not run and proceed as per advice of emergency services.
- Bomb threat, sabotage, riot etc., also may lead to emergency situation at construction site. Such situation shall be dealt by HR/Admin and security department with the advice of Site In-charge.
 - Notification to the owner and authorizes to follow immediately.
- Natural calamities like earthquake, cyclone, and flood like situation can also lead to emergency situation at construction site. Site In-charge will act with required diligent and directive received from Concerned State Government, Corporate office and Owner.
- High Angle rescue -
 - First arrival. The first arriving HSE Officer should assume command after arriving on the scene;
 - HSE Officer should secure a witness as soon as possible after arriving on scene. This will help in identifying the problem and locating the victim;
 - Locate the victim to determine nature of injuries if any and report to Medical for response as needed.
 - Administer first aid to the victim as necessary;
 - Rescue team to use proper rescue kit / equipment to reach the victim;
 - Personnel manbasket or arial lift may be used to reach the vitim if applicable;
 - Assess the hazards. HSE Officer to identify all potential hazards and assist rescuers.
 - The HSE Officer will be responsible for securing those hazards or making all members aware of those hazards.
 - HSE Officer shall be made aware of the specific emergency action plans once the emergency response team arrives.
 - The HSE Officer shall also be responsible for assuring that all safety procedures are adhered to.

31.3 Communication system

An important key to effective emergency response is an effective communication system. At BHEL, site telephone, mobile and radios will be used for communication during emergency.

- Whosoever is observing any emergency shall inform about emergency to:
 - HR/Admin department
 - HSE-Head /Officers /
 - Medical and Security department
 - Fire department,



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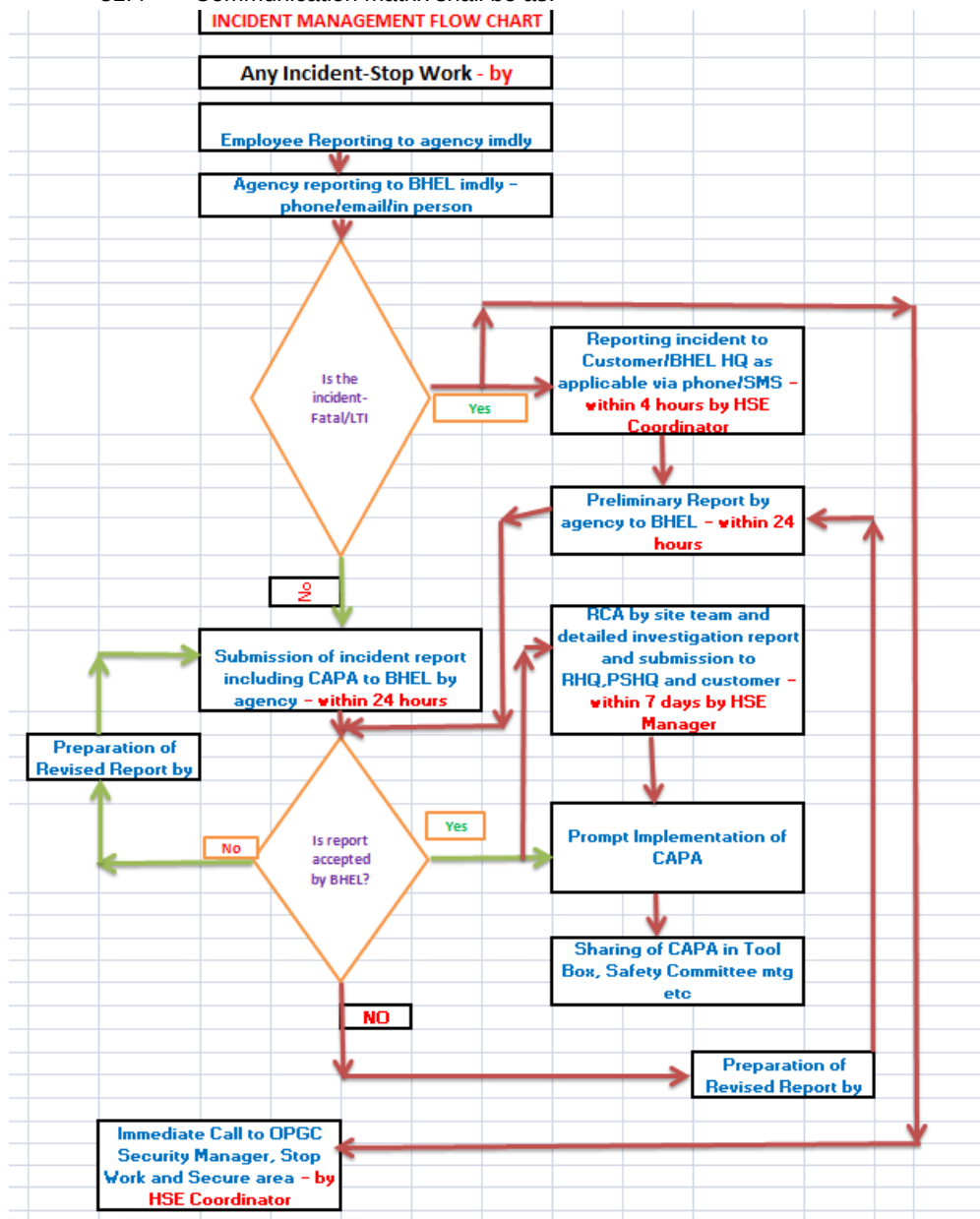
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○ BHEL Site/Section In-charge

- BHEL Section In-charge will confirm the information with emergency services and also inform the Regional Manager as well as sub-contractors Site In-charge.

31.4 Communication matrix shall be as:





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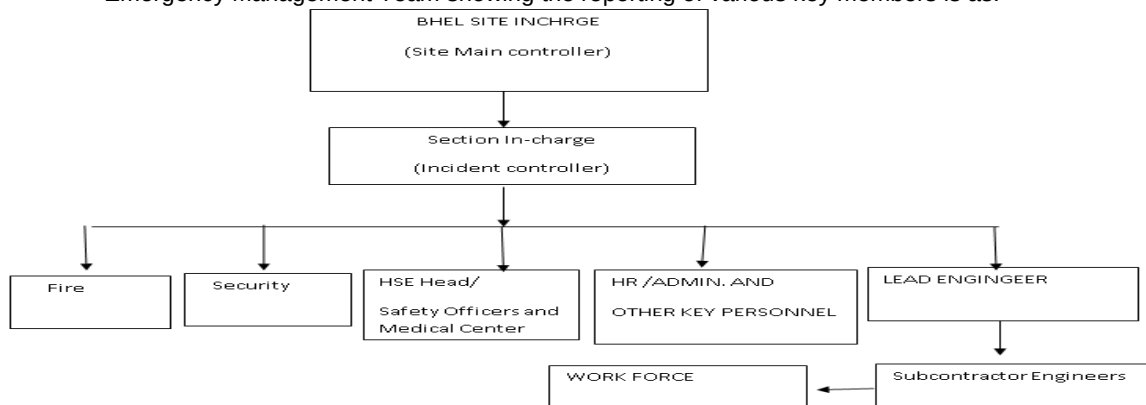
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31.5 Emergency Organization -

An emergency organization establishment is based on nature of emergency at BHEL site. The matrix for the Emergency Management Team showing the reporting of various key members is as:



31.6 List of Key Personnel -

Sl. No.	Name	Designation	Telephone Number	Mobile number

31.7 Emergency Control Center -

For the coordination with emergency situations at BHEL site Site In-charge office shall operate as an Emergency Control Room. Site Main Controller (Site In-charge) will coordinate from this Emergency Control Room. Control Room shall be equipped with all necessary communication devises necessary to manage particular emergencies.

31.8 Emergency Drills -

The site HSE Manager and Emergency and Rescue Teams must participate in regular emergency drills of various types. The intervals between such drills must not exceed three months. The records of the drills must be prepared and kept on site for review by the Owner and site Management. The records must be reviewed during regularly scheduled project HSE Committee meetings.

- After each drill, a formal, documented debriefing must be conducted to discuss areas of improvement and an Action Plan developed with Responsible Person and Anticipated Completion Dates describing improvements to be implemented.



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31.9 Roles & Responsibility -

Responsibility of Site In-charge (Site Main Controller):

- Immediately on receiving message regarding emergency will proceed to their cabin and fill their role as Main Controller and activate the Emergency Control Room and Emergency Management Team.
- Take strategic and technical decisions in line with the incident scenario to mitigate the cause of emergency.
- Provide leadership and guidance to the Emergency Management Team.
- As soon an emergency call is received they shall inform respective Section In-charge.
- Call for available resources Fire, Medical, Security as needed based on emergency situation.
- Stay in contact with Section In-charge for coordination efforts of resources and evacuation of personnel.
- Ensure head count is conducted and received.
- Notify Owner representative of situation and plan.

Responsibility of Section In-charge (Area Controller):

- If not at the location, once notified of an emergency will proceed to the area and act as an incident controller if safe or as appropriate based on the nature of emergency.
- Will be overall in-charge of the area situation in consultation with emergency responding offices and mobilized resources in coordination with Main Controller.
- Will assess the situation and take necessary action to control the emergency and give necessary instruction to site personnel as necessary and appropriate.
- Will evaluate if fire emergency and attempt to extinguish if safe and in incipient stage and assist injured as applicable.
- Shall instruct the sub-contractors and ensure that all non-essential employees are moved to safe assembly point and organize head count.
- Ensure safe exvacuation of site personnel to safe assembly point in coordination with Main Controller.
- Shall keep in contact with Main Controller keep them informed about site situation and seek directives for mitigation of emergency.
- Communicate with shift Fire Officer of fire condition and rescue measures.
- Communicate with shift Security Officer assist in barricading the affected area.
- Communicate with shift Medical for transporting of casualties, if any.

Fire officer /shift Fire in charge:

- Respond to the emergency call with fire crew in first turn out. Report to Incident controller at site of emergency.
- Decide line of control action in consultation with Section In-charge/Incident Controller for firefighting and other control actions including evacuation of trapped personnel.
- Deploy auxiliary fire squad for assisting fire crew.
- Ensure safety of the crew members
- Keep in constant contact with Emergency Control Room and Team.

Security officer / In charge:



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- Instruct and deploy security personnel at security posts/gates and around the affected area.
- Communicate with the auxiliary fire squad at emergency site immediately on receiving emergency call to ensure their mobilization.
- Cordon off the affected area and guide traffic /emergency vehicles and manage crowd control by dispersing unnecessary persons from the area.
- Ensure vigilance at security posts /gates and be in contact with area manager and other members connected with firefighting or rescue operation.
- Mobilize for evacuation of personnel to safe locations/assemble point.

Medical Center:

- Upon receiving notification of an emergency, anticipate the casualties and prepare accordingly as per medical response plan. Inform Medical Staff and nearest Hospital in advance.
- Dispatch ambulance to incident site along with necessary staff.
- Provide medical treatment/first aid as necessary.

HR/Admin and HSE Teams:

- Coordinate with Main Controller and all other Emergency Management Team members and Government agencies as per requirement.
- Identify appropriate Assembly Points at project site, provide directions and marked areas clearly.
- Assist with arrangement of necessary PPE and use of.
- Support the Emergency Management Team as directed and/or necessary based on situation.

31.10 General Requirements:

- 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 sub-contractors
- Assembly point shall be earmarked and access to the same from different location shall be shown in consultation with the owner
- 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.
- Emergency Organization group shall be formed at site.
- Mock drill shall be conducted on different emergencies periodically (every three months) to find out gaps in emergency preparedness and taking necessary corrective action



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31.11 WEATHER SEVERITY PLAN

A. OBJECTIVE AND SCOPE:

considering the over all monsoon and wind speed in the area the emergencies like cyclone and flood shall be considered from safety point of view during project work.

Warning/alerts issued by Bangladesh Meteorological department shall be acted upon by appropriate measures. These alerts are mostly conveyed to District Administration which in turn passes on to the owner of the project i.e. BIFPCL in this case. BIFPCL shall convey such alert to contractors. and coordinate appropriate response. Such alert is transmitted over Radio and TV channels also. However, contractors shall also remain alert to w3eather conditions and share with BHEL and fellow contractors any input received. Contractors shall actively participate in the Emergency Response activities

This safety plan provides procedure to be followed during emergency due to flood and cyclone for the period of entire project work with respect:

- To give clear guidance as to the actions that must be implemented.
- To inform employees what to do in an Emergency Scenario.
- To establish an emergency response and communications procedure.

B. RESPONSIBILITIES

RCM or his assignee shall coordinate with various departments in charge and supervisors, who will execute the alert procedures in their assigned areas. The coordination shall be in line with directives received from the Client/consultants.

C. CYCLONE

In the event of CYCLONE, alert warning is in three parts. The alert will be issued by BHEL Site Manager.

The actions required during cyclone/Rough Weather:

- Check and assist subcontractors in cleanup. Pick up all loose and unused material of respective supervisor's area
- Check tie-down arrangement is proper for all temporary structure, cranes and tall objects etc.
- Tie to secure all gas cylinders to avoid displacement and unsafe conditions which could be due to wind pressure.
- Secure portable electricity generating sets and other equipments, pumps, hoses etc.
- Make preparation for removal of water logging.
- Take review of work activity and make preparation for removal of equipments and material from all areas.
- Isolate/Turn off all electrical power from the main panel/switches. Secure and anchor panels properly.
- Recheck anchorage/tie of all temporary structures/sheds, tall objects, cranes, rigs, scaffolds etc to avoid toppling due to wind force.
- Cranes boom shall be either locked or lowered the booms as reasonably & practicably and rigs to safe position for the safety point of view.
- Group up all trash barrels, wooden pallets, forms; wooden decks etc. and anchor properly.
- Welding machines, air compressors, and such equipments are to be grouped together and secured to the stable objects. Welding leads, electrical cables, hoses are to be rolled up and secured properly.
- Set on site vehicles on high ground in the site area with brakes set firmly.
- Anchor all tanks, vessels, gas cylinders that may be moved by high wind and water.



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- Evacuate job site.

D. PERSONNEL EVACUATION:

Personnel Evacuation will be required if predicted wind speed and storm surge heights are beyond acceptable limits as per the guidelines of BHEL management.

Special cyclone shelter shall be arranged in consultation with BHEL management. This shelter shall be equipped with first aid kit and emergency kit containing torch, sufficient batteries, jackets, emergency treatment manual. The map of escape routes and other site specific instructions of emergency situations shall be prominently displayed in the shelter.

Once the warning received from Client/Consultant, the emergency response team shall evacuate and transport all personnel involved in the project to the cyclone shelter.

Cyclone may followed by the calm "EYE" be aware of it. If the wind suddenly drops, don't assume the cyclone is over. Violent wind may resume from the opposite side direction. Wait for the official "All clear Signal".

After the cyclone do not go outside until officially communicated about safe situation outside. Use recommended routes for returning. Do not panic or rush while returning.

Checking of gas leaks and wellbeing of electrical appliances is essential before leaving the site.

Listen to local radio for official warning and advice. The site manager shall also obtain updates from client/consultants/metrological departments and communicate to the personnel on project site.

E. MONSOON:

During monsoon following precautions needs to be considered.

- **Excavation:** Inspect all excavations and protect from collapsing or subsidence. Clear all excavated material.
- **Storm water drains:** Check all storm water drains ahead of monsoon for any blockage etc. Identify way for draining out water collected in the site. If required, temporary drains should be prepared for draining out accumulated water in site. The sufficient number of dewatering pumps should be available for the purpose and logged water shall be pumped to nearest drain by dewatering pumps.
- **Access Routes:** Identify access routes to the site in case of flood. Sand should be available to spread over slippery surface.
- **Electrical Supply:** Beforehand check earthing of electrical panels and electrical cables for joints, cracks, insulation failure etc. Keep additional stock of electrical cables and plug tops for replacement of damaged one or to energize dewatering pumps. Do not keep electrical cables/welding cables on the ground but route them above head level. Do not use welding / DB sheds as shelters. All electrical equipment shall be equipped with ELCBs/RCCBs.
- **Power Cable route demarking:** cable route shall be demarked by either by temporary or permanent.
- **Scaffolding:** Check all scaffolds for stability after heavy rain/storm.



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- **Work restrictions:** Do not perform any height work, electrical work and rigging activities during rain. Lower the crane boom to avoid striking of lightning.
- **Vehicular movement:** Instruct the vehicle operators about following safety precautions during monsoon in daily tool box meeting, Slippery surface and road conditions, Speed limit, Wind shield wiper, Fog light, break condition is proper, break light is in proper condition & functioning. Not to take vehicle in loose soil.
 - **Lightening protection:** Boiler structure shall be facilitated with thunder protecting equipment.
 - **Workmen shed construction:** workmen rest shed shall be constructed in robust way. RCC pillar shall be used instead of brick pillar. It shall be facilitated with lightning arrestor as per site resource. However if the rest room is nearby high mast light. Lighting arrestor may or may not be provided.
 - **Field Training Programme on Lightening/Thunder: Dos or Dos not.**

F. SAFETY PRECAUTIONS FOR SNAKE MENACE:

Preventive Measures –

- ③ Remove vegetations around the site
- ③ Pour Carbolic acid around site boundaries in regular intervals to keep away poisonous snakes. . In summer and rainy season, frequency will be once a month and in other seasons, it will be once a quarter. It may be noted that as the location of the project is on a sand bed, there is almost no wild growths. Hence, Snake menace may not of significant severity and scale.

Precautions to avoid snake bite –

- ③ Avoid stepping out in the dark, especially during monsoon without safety shoes and torch.
- ③ Before wearing shoes, check inside the shoes for any snake/insect hiding inside. Similarly before lifting any material with hand lying on ground for long time, look for snake/insect handling inside. Wear leather hand gloves. Always check inside gunny bags, cartons, boxes before putting your hand in side or lifting them.
- ③ Be aware of your surroundings at all time. Never sit or step over obstacles without looking carefully. Never go near bushes for natural calls.
- ③ Don't chase snakes as they become aggressive. Never try to hit a snake or try to catch it, where there is one, there are likely others.
- ③ Never handle a snake, even if you think it is dead.

Symptoms of Snake Bite –

- ③ A pair of punctured mark, severe pain, Redness & swelling around bitten area
- ③ Victim gets nausea, vomiting sensation, sweating, disturbed breathing and increased salivation.

Actions required in case of snake bite –

- ③ Reassure the victim
- ③ Immobilize the bitten body part without compression.
- ③ Get the patient to hospital as fast as safely possible



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- ③ Tell the doctor any of the symptoms appearing on the way to the hospital.

Snakebite Emergency: DO's and DON'Ts

Do's:

- ③ Avoid yourself and victim from the risk of second bite.
- ③ Remove tight clothing, shoes, watch or ring near bitten area before swelling starts. Calm the victim. Tell victim that virtually all snakebites are successfully treated. Panic can increase the danger to the victim by inducing rapid heartbeat.
- ③ Clean / disinfect bite area thoroughly, apply hard direct pressure with gauze pad over bite area, soak gauze pad with Betadine if possible before application and strap pad tightly in place with adhesive tape
- ③ Wrap affected extremity with 2" – 3" elastic bandaging as tightly as one would for sprain, keep the affected extremity positioned at or as close to heart level as possible and immobilize affected extremity; use a splint if possible.
- ③ Get medical attention as soon as possible
- ③ Ensure the availability of anti venom serum in the hospital.

Don'ts:

- ③ Do not bleed the wound, cut or increase bite marks or put ice on the bite
- ③ Do not eat or drink anything and engage in strenuous physical activity
- ③ Do not apply oral suction to bite
- ③ Do not take alcoholic beverage or any self medication
- ③ Do not apply cold / hot packs or burn wound
- ③ Do not delay seeking medical attention
- ③ Do not remove dressings/elastic wrap until at hospital

G. EMERGENCY CONTACT LIST:

Following emergency contact numbers shall be available / displayed at site and updated regularly.

Emergency Contact Numbers

(Contact numbers to be filled by Site Management)

Client		
	Project Manager	
	Plant Safety Manager	
	OPGC Fire Services	
	Medical and Ambulance Services	
	ADMIN-OPGC	
	Security- OPGC	



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BHEL		
	RCM	
	Safety Manager	
	HSE COORDINATOR	
	HR-ADMIN	
SUB-CONTRACTOR		
	RCM	
	Project Manager	
	Safety Manager	
	Ambulance	
	HR-ADMIN	
Emergency Services		
	Near Hospital	
	Near Fire Station	
	Ambulance Service	
	Police Station	

32.0 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.

32.1 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:



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- 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.

32.2 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.

32.3 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

32.4 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.

32.5 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



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- Medical fitness of height worker shall be ensured.
- Height working shall not be allowed during adverse weather.

32.6 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.

32.7 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.

32.8 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.

33.0 HSE PERFORMANCE EVALUATION:

HSE performance of the subcontractor shall be monitored as per the following parameters: (For each contract-wise package). PERIODICITY: RA Bill period

Sl. No.	Parameters of measurement	Ref Clauses	Weightage	Actual
1	Availability of safety officers at site – absence up to 15% permissible. Score proportionately gets reduced with higher rate of absence. Availability to be reckoned from start date of manpower mobilisation	7.0,7.1	10	
2	Attendance by the safety officer and site CM (as applicable) in the meeting convened by BHEL	7.2.1 and 7.2.2	5	
3	Level of compliance w.r.t decisions taken in previous meetings/audit/inspection/as reported.	32.0,35.0,36.0	5	
4	Timely submission of monthly report on safety in the prescribed format		3	
5	Timely reporting any incident including near-miss to BHEL /Customer/statutory authority(if required) and submission of investigation report of all LTIs/ Major Property Loss incident and HSE events	10.0	10	



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6	Degree of PPE compliance, Fall protection arrangements and safety net coverage	8.3, 19.2,19.3	15	
7	Level of compliance w.r.t safety rules	11.0 to 26.0	25	
8	Availability of proper first-aid facility , ambulance, hygienic labour colony and other adequate labor welfare initiatives, conducting of health check-up as per BOCW requirements	8.4	6	
9	Conducting induction training ,skill training, tool box meeting, mock-drills, HSE Promotion, Emergency Preparedness and Response. Participation in BHEL training also counted	9.0, 31.0	6	
10	Level of House-keeping, Environmental Control	27.0, 28.0, 29.0	10	
11	Level of general illumination	8.4.11	5	
A	TOTAL Obtained		100	

Penalty score:

- For each fatality: -10
- For each Major Incident: -07

NET TOTAL score will be arrived after deducting penalty score from Total score.

33.1 HSE PENALTIES/ REWARDS (Performance Related)

- Suitable HSE reward system shall be developed at site level to promote HSE compliance amongst workmen.
- 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.

33.2 PENALTIES AGAINST SPECIFIC NON-COMPLIANCE WITH HSE RULES/ INCIDENTS: (To be operated in addition to any other deduction on unsatisfactory HSE performance under relevant clause in the contract)

S. No	Nature of Non - Compliance	Penalty in Rs.	Remarks
1.	Not wearing safety helmet/ safety shoes/ welding shield	250	Per lapse/ Person/ day
2.	Not wearing double lanyard full body harness while working at height (> 2 metres)or not anchoring to lifeline/ not providing fall arrestor/ safety net Using defective or non-standard or uninspected scaffolding/ scaffolding not properly supported Using defective ladders/ drums for work at height	1000	Per Person/ lapse/day or per lapse/day
3.	Not wearing gloves/ goggle/earplug/nose mask/ apron	250	Per lapse/ Person/ day
4.	Not using 24 V supply for lighting in confined spaces	500	Per occasion



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5.	Improper earthing of welding & Other electrical machines and DBs/ no ELCB/ no rubber mat/ not properly covered/ person without valid wireman license/ no Tag in-Tag out	500	Per lapse/ Machine
6.	Electrical plug not used for connection/ loose insertion	200	Per connection
7.	Using damaged slings or not slinging properly/ damaged hooks/ slings without any identification mark/	1000	Per event Per T&P
8.	Use of lifting equipments including cage or man-basket without having valid Test certificate / without SLI display	5000	Per equipment
9.	Using frayed/ broken welding cables / not using double insulation electrical cable	500	Per machine
10.	Non removal of scrap from work areas and shift to scrap yard/ not providing bins/ improper house keeping	1000	Per location
11.	Lifting cylinders without cage or rolling of cylinders	500	Per occasion
12.	Gas cutting without flash back arrestor at both ends	200	Per machine
13.	Gas cutting at height without sheet below/ barricade at level below (Spark falling from height)	500	Per event
14.	Not having valid driving license for the type of vehicle/ T&P/operator identification card/ rash driving or operation/ not having safety devices like reverse horn & light/ overload switch	500	Per driver / operator
15.	Not providing proper barricades / signage/ unauthorized excavation or barricading	500	Per location per day
16.	Not keeping filled gas cylinders vertically/ mix-up of cylinders/ using broken or damaged manifold/ using domestic LPG cylinder	500	Per occasion
17.	Activity carried out without valid safety work permit	1000	Per occasion
18.	Not carrying out mandatory health check up/ not maintaining First aid box/ centre properly	1000	Per occasion
19.	Non reporting of incident in time / completion of CAPA in time	1000	Per occasion
20.	Non-display of emergency numbers/ non-availability of sufficient fire-extinguishers/ insufficient display of safety posters/ insufficient initiative for safety promotion like TBM	1000	Per occasion



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- If principal customer or statutory and regulatory bodies impose penalty on ground of statutory non-compliance or non-compliance of HSE rules by the subcontractor or any incident of any nature including fatality or permanent disability, the same shall be passed on to the subcontractor with appropriate overhead
- The penalty amount shall be recovered from subcontractors from the RA Bill, otherwise Final bill.
- The list of non-compliances is not exhaustive. The site CM has liberty to impose a penalty for any other non-compliance and incidents of any nature including fatality and permanent disability.

340 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.



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35.0 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 mangement
- 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.

36.0 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 In charge of Subcontractors and HSE officer of Subcontractors. MOM on the discussion will be circulated to the concerned for implementation.

37.0 FORMATS USED (Details available in Annexure-04) (subject to revisions any time during the contract)

SL. No.	Format Name	Format No.	Rev No.
01	Inspection of First Aid Box	HSEP:14-F01:MAITREE	00
02	Health Check Up	FORM-26	00
03	HSE Induction Training	HSEP:14-F03	00
04	Tool Box Talk	HSEP:14-F04	00
05	MONTHLY HSE REPORT AND HSE INDICES	HSEP:14-F05	00
06	Inspection of PPE	HSEP:14-F06	00



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07	Inspection of T&Ps	HSEP:14-F07	00
08	Status of T&Ps	FORM-24	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 Performance and Penalty	HSEP:14-F14	00
15	incident / property damage /fire incident report	HSEP:14-F15	00
16	Crane operators Identification cum Authorization	HSEP:14-F16	
17	List of T&P	FORM-24	00
18	WORK PERMIT- EXCAVATION (DEEP)	HSEP:14-F18	00
19	WORK PERMIT- RADIATION	HSEP:14-F19	00
20	WORK PERMIT- CONFINED SPACE	HSEP:14-F20	00
21	WORK PERMIT- WORK-AT-HEIGHT (ABOVE 1.8M)	HSEP:14-F21	00



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36.0 ANNEXURES

ANNEXURE 01

As per Rule 76(2):

(1) The first-aid box shall be distinctively marked with a GREEN Cross 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)	A bottle containing 100 tablets (each of 5 grains) of aspirin
(xviii)	Ointment for burns
(xix)	A bottle of suitable surgical anti-septic solution
(xx)	3 packets of ORS

(2) Adequate arrangement shall be made for immediate recoupment of the equipment when necessary.



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ANNEXURE 02

HSE AUDIT/INSPECTION CHECKLIST CUM COMPLIANCE REPORT

PROJECT: _____

SUBCONTRACTOR: _____

DATE : _____

OWNER : _____

INSPECTION BY: _____

Note : write 'NA' wherever the items is not applicable

Item	Y e s	N o	Remarks	Action
HOUSEKEEPING				
Waste containers provided and used				
Passageways and walkways clear				
General neatness of working area				
Other				
PERSONNEL PROTECTIVE EQUIPMENTS				
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 $\pm 70^\circ$ from horizontal				



HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE SUB-CONTRACTORS (MAITREE PROJECT)

POWER SECTOR-EASTERN REGION

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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				



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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.				



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**Bharat Heavy Electricals Ltd
Power Sector- Eastern Region**

HSEP:13-F04

Date:

PROJECT: _____

(TO BE SUBMITTED IN TRIPLICATES)

EXCAVATION WORK PERMIT

Sl No:

- I. Name of the work:
- II. Name of Contractor:
- III. Exact location of work and item for excavation:
- IV. Duration of work: From _____ to _____
- V. Type of excavation: Manual/ by Excavator
- VI. Dimension of excavation:

The following items have been checked and compliance shall be ensured during the currency of the permit:

item	Done
1. Checked for underground pipe/power cable	
2. Proper illumination provided (for night work)	
3. Plan/drawing available and checked (sloping, shoring provided). Safety of any adjacent structure taken care of.	
4. Access/Egress ensured (in case of manual)	
5. Equipment operator skill checked	



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6. Area cordoned off, signage put up

7. Appropriate PPEs provided

The following persons are permitted to work for the duration mentioned herein:

Date	No of persons allowed	Time Duration	
From	To	From	To

List of persons to be maintained by contractor separately

Sign of Initiator (Sub-contractor)

Sign of Recommender

Sign of Approver

Work completed/stopped/area cleared at _____ on ____

The permit stands closed on _____

Sign of BHEL HSE team



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**Bharat Heavy Electricals Ltd
Power Sector- Eastern Region**

HSEP:13-F05

Date:

**PROJECT: _____
(TO BE SUBMITTED IN TRIPLICATES)**

RADIATION WORK PERMIT

Sl No:

- I. Name of the work:
- II. Name of Contractor:
- III. Exact location of work and item for radiography:
- IV. Duration of work: From _____ to _____
- V. Name of Radiography agency and its authorised supervisor:

The following items have been checked and compliance shall be ensured during the currency of the permit:

item	Done
1. Safety regulations as per BARC/AERB ensured while source in use/transit/stores	
2. Proper illumination provided	
3. Area cordoned off	
4. Appropriate PPEs provided	



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The following persons are permitted to work for the duration mentioned herein:

Date		No of persons allowed	Time Duration	
From	To		From	To

List of persons to be maintained by contractor separately

Sign of Initiator (Sub-contractor)

Sign of Recommender

Sign of Approver

Work completed/stopped/area cleared at _____ on ____

The permit stands closed on _____

Sign of BHEL HSE team



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**Bharat Heavy Electricals Ltd
Power Sector- Eastern Region**

HSEP:13-F06

Date:

**PROJECT: _____
(TO BE SUBMITTED IN TRIPLICATES)**

CONFINED SPACE WORK PERMIT

Sl No:

I. Name of the work:

II. Name of Contractor:

III. Exact location of work:

1. Condition check of target space:

Condition	Y/N	NR
8. Isolated from air/ water/ steam/ gas/ power/radiation source		
9. Thoroughly cleaned/washed		
10. Adequately cooled		
11. Proper illumination provided		
12. Manways open & ventilated		

2. Protection measures:

Measure	Y/N	NR
1. Handlamp is of 24V		
2. Operators wearing recommended PPEs- gloves/ clothing/ear plug/ muff/ safety harness/lifeline/ goggles /face shield		



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3. Operators wearing special devices –
dust/gas/airline mask, communication equipment,
personal gas alarm

4. Attendant with SCBA/Air mask

5. Rescue equipment/ team deployed

6. Fire fighting equipment close-by

The following persons are permitted to enter the confined space to work for the duration mentioned herein:

Date(s)	No of persons allowed	Name of persons allowed	Duration From To

Sign of Initiator (Sub-contractor)

Sign of Recommender

Sign of Approver

Work completed/stopped/area cleared at _____ on _____

The permit stands closed on _____

Sign of BHEL HSE team



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**Bharat Heavy Electricals Ltd
Power Sector- Eastern Region**

HSEP:13-F07

Date:

**PROJECT: _____
(TO BE SUBMITTED IN TRIPLICATES)**

WORK-AT-HEIGHT PERMIT

Sl No:

- I. **Name of the work:**
- II. **Name of Contractor:**
- III. **Exact location of work:**

Sl.	Description of the point to be checked	Pl tick (✓) if it is OK
1.	Whether the manpower of the Gang engaged is having adequate number and skill required for the said activity?	
2.	Whether Supervisor has been engaged for this activity?	
3.	Whether following PPEs have been provided to all workers? Full body Harness, Safety Shoe, Helmet	
4.	Whether Lifelines tied with solid anchorage above 1 M level from the job?	
5.	Whether Tool-Box meeting carried out and Hazard related to the said job and safety precaution to be taken told to workers?	
6.	Whether Fall arrestor fixed where staircase is not available for access to job?	
7.	Whether Scaffold/Platform/Place for job is strong enough, has easy access and is safe for the job? Is the Space sufficient for doing work? Whether Safety Net has been fixed?	
8.	Whether all Lifting T&Ps and Tackles have valid Fitness Certificates? Whether Lubrication is Ok? Whether these are free from any defect when visually checked before use?	
9.	Pl ensure that none of the workers of the Gang has Vertigo or High or Very Low Blood Pressure. (Health register to be referred)	



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The following persons are permitted to work for the duration mentioned herein:

Date	No of persons allowed	Time Duration
From To		From To

List of persons to be maintained by contractor separately

Sign of Initiator (Sub-contractor)

Sign of Recommender

Sign of Approver

Work completed/stopped/area cleared at _____ on ____

The permit stands closed on _____

Sign of BHEL HSE team



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HSEP:13-F09



**Bharat Heavy Electricals Limited
Power Sector Eastern Region**

INCIDENT (PERSONAL INJURY / PROPERTY DAMAGE) REPORT

(This report is to be sent within 24 hours directly to GM/Q &S/PS-HQ, , Noida with copy to MR(HSE)/PSER in respect of all incidents in addition to immediate Fax / Telegraphic intimation of fatalities and major damages including fires.)

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 INCIDENT		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 INCIDENT / INJURY / DAMAGE					
12	PERSON (NAME & DESIGNATION) WITH MOST CONTROL OVER AGENCY (OBJECT / EQUIPMENT / SUBSTANCE) CAUSING INCIDENT INJURY / DAMAGE				
13	DESCRIBE CLEARLY HOW THE INCIDENT OCCURRED AND IF THE VICTIM WAS WEARING THE APPROPRIATE PPEs. (USE ADDITIONAL SHEET, IF REQUIRED).				



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ANALYSIS

14	WHAT ACTS AND / OR CONDITIONS CONTRIBUTED MOST DIRECTLY TO THIS INCIDENT	
15	WHAT ARE THE BASIC REASON FOR THE EXISTENCE OF THESE ACTS AND / OR CONDITION ?	
16	WHAT CORRECTIVE ACTIONS HAVE BEEN TAKEN TO PREVENT INCIDENT RECURRENCE ?	
	DATE :	SIGNATURE OF SITE HSE COORDINATOR
17	COMMENTS OF HEAD / SOX	
	DATE:	SIGNATURE OF HEAD/SOX



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**BHARAT HEAVY ELECTRICALS LIMITED HSEP:13-F10
POWER SECTOR: EASTERN REGION**

INVESTIGATION REPORT FROM PROJECT SITE :

INCIDENT(FATAL/SERIOUS INJURY/PROPERTY DAMAGE/FIRE)

DATE :

Instructions

This report is to be sent within seven days to GM/Q&S/PS-HQ and RHQ Safety Department, in respect of incident requiring investigation by a committee.

Report date	Incident Date	Incident Time	Incident Type	
Name of Site :				
Scope of work :				
Name & Designation of BHEL Package I/C				
Name of Contractor :				
Incident Location :				
Victim(s) Information				
Name	Designation	Age	Sex	Address



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Witness Information

Name

Address

1 Describe, how the incident took place (Attach separate sheets, diagrams, and photographs, if possible.)

2 Description of Injury (Attach medical report as applicable)

3 Describe property and equipment damaged in the incident and extent of damage.

4 Describe any personal protective equipment used and other safety equipment that were in place.

5 Describe any perceived actual or possible safety violations in the area of incident.



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6	Describe events and conditions immediately before the incident.
7	Are these conditions still in existence?
8	Were any unsafe actions performed by the victim or by others or were any safety rules violated that caused/ contributed to the incident.
9	Describe steps taken to secure the area.



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10 Describe measures to be taken to prevent similar recurrences.

11 Any other information

Prepared by

Name

Designation

Signature

Date

Submitted to:

- 1 Construction Manager
- 2 RHQ: Safety Department
- 3 GM/Q&S/PS-HQ



**HEALTH, SAFETY AND ENVIRONMENT
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**POWER SECTOR
TOOL-BOX TALK**

FORMAT NO: HSEP:13-F11

REV NO.: 00

PAGE NO. 01 OF 01

Name of Site :

Sub-Contractors Name :

Date :

Topic:

Attendance Sheet

Name	Signature	Remarks

Signature of Site I/C of Subcontractor :



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RECORD OF REVISION

CLAUSE No.	Rev No.	Brief of Revision	Date
All	00	New plan introduced	05.04.17

INDEX

SN	Description	Form No	Remarks
1.0	Forms		
1.1	Offer forwarding Letter/Submission of Tender	F-1 (Rev 00)	
1.2	Declaration by Authorised Signatory	F-2 (Rev 00)	
1.3	No Deviation Certificate	F-3 (Rev 00)	
1.4	Declaration confirming knowledge about Site Conditions	F-4 (Rev 00)	
1.5	Declaration for relation in BHEL	F-5 (Rev 00)	
1.6	Non Disclosure Certificate	F-6 (Rev 00)	
1.7	Bank Account Details for E-Payment	F-7 (Rev 00)	
1.8	Form for seeking clarifications	F-8 (Rev 00)	
1.9	Capacity Evaluation of Bidder for current Tender	F-9 (Rev 00)	
1.10	Contract Agreement	F-10 (Rev 00)	
1.11	Bank Guarantee for Security Deposit	F-11 (Rev 00)	
1.12	Bank Guarantee for ~~Interest Bearing Refundable~~ Advance	F-12 (Rev 00)	
1.13	Extension of Validity of Bank Guarantee	F-13 (Rev 00)	
1.14	Monthly Plan & Review with Contractors	F-14 (Rev 00)	
1.15	Monthly Performance Evaluation of Contractor	F-15 (Rev 01)	Revised
1.16	~~Evaluation of Contractor Performance (Quarterly)~~	~~F-16 (Rev 00)~~	Deleted
1.17	Evaluation of Contractor Performance (Annual)	F-17 (Rev 01)	Under revision ##
1.18	Evaluation of Contractor Performance for the Contract (Overall)	F-18 (Rev 01)	Under revision ##

SN	Description	Form No	Remarks
1.19	Milestone Completion Certificate	F-19 (Rev 00)	
1.20	Completion Certificate	F-20 (Rev 01)	Revised
1.21	Indemnity Bond	F-21 (Rev 00)	
1.22	Consortium Agreement	F-22 (Rev 00)	
1.23	Refund of Security Deposit	F-23 (Rev 00)	
1.24	Refund of Guarantee Money	F-24 (WAM-11)	
1.25	Power of Attorney for Submission of Tender/Signing Contract Agreement	F-25 (Rev 00)	
1.26	Analysis of Unit Rates Quoted	F-26 (Rev 00)	
1.27	RA Bill Format	WAM-6	
1.28	Final Bill Submission format with No Claim Certificate and No Demand Certificate	WAM-7	
1.29	PROFORMA FOR PERFORMANCE BANK GUARANTEE		
1.30	BANK GUARANTEE FOR SD CUM PBG BOND		
2.0	Procedures		
2.1	Procedure and Business Rules for Reverse Auction	As per Company Policy	
2.2	Integrity Pact	As per Company Policy	
3.0	Customer specific procedures		
3.1			

- BANK GUARANTEE FORMATS FOR "RELEASE OF AMOUNTS WITHED/ LIQUIDATED DAMAGES AMOUNT", "SUPPLY FREE ISSUE MATERIAL" & "EARNEST MONEY" IS ALSO GIVEN.

: will be released later

Form No: F-01 (Rev 00)
OFFER FORWARDING LETTER / TENDER SUBMISSION LETTER
(To be typed and submitted in the Letter Head of the Company/Firm of Bidder)

Offer Reference No:.....

Date:.....

To,

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

Dear Sir,

Sub : Submission of Offer against Tender Specification No:

I/We hereby offer to carry out the work detailed in the Tender Specification issued by Bharat Heavy Electricals Limited, Power Sector-....., 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:

Form No: F-02 (Rev 00)

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

Form No: F-03 (Rev 00)

NO DEVIATION CERTIFICATE

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

To,

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

Dear Sir,

Sub : **No Deviation Certificate**

Ref : 1) NIT/Tender Specification No:,

2) All other pertinent issues till date

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

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

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

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

Thanking you,

Yours faithfully,

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

Form No: F-04 (Rev 00)

**DECLARATION CONFIRMING KNOWLEDGE ABOUT SITE
CONDITIONS**

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

To,

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

Dear Sir,

Sub : **Declaration confirming knowledge about Site conditions**

Ref : 1) NIT/Tender Specification No:..... ,

2) All other pertinent issues till date

I/We, _____ hereby declare 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
Proprietor/Partner(s)/Director(s) employed in BHEL

Tick(✓) any one as applicable:

1. The Proprietor, Partner(s), Director(s) of our Company/Firm DO NOT have any
relation or relatives employed in BHEL
OR
2. The Proprietor, 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 action 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 MICR 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

Form No: F-08 (Rev 00)

FORMAT FOR SEEKING CLARIFICATION

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

To,

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

Dear Sir,

Sub : **Request for Clarification**

Ref : 1) NIT/Tender Specification No:..... ,

2) All other pertinent issues till date

Sl no	Reference clause of Tender Document	Existing provision	Bidder's query	BHEL's clarification
1				
2				
3				

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							

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

CONTRACT AGREEMENT

Form No: F-10 (Rev 00)

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 INTENT 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 t he 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 Intent 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 ex ecute the work of -----and more particularly described in Tender Specificat ion No -----including Drawings and Specifications (hereinafter called the said works) in accord ance with and subject to terms and conditions contained in these presents, instructions to Tenderers, General Conditions of Contract, Special Conditions, Annexures, Letter of Intent 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.----- t owards satisfactory performance and completion of the Contract.
3. The Contractor has furnished a Bank Guarantee bearing no.-----dated ----- --for a sum of Rs.-----e xecuted by -----in favour of BHEL towards Security Deposit valid upto -----

OR

The Contractor has furnished t o 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 t he 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, the time of completion being the essence of the Contract.
8. That BHEL shall, after proper scrutiny of the bills submitted by the Contractor, pay to him during the progress of the said works such sum as determined by BHEL in accordance with this Agreement.
9. That this Agreement shall be deemed to have come into force from ----- the date on which the letter of intent has been issued to the Contractor.

10. That whenever under this contract or otherwise, any sum of money shall be recoverable from or payable by the Contractor, the same may be deducted in the manner as set out in the General Conditions of Contract or other conditions governing this Agreement.
11. That all charges on account of Octroi, Terminal and other taxes including sales tax or other duties on material obtained for execution of the said works shall be borne and paid by the Contractor.
12. That BHEL shall be entitled to deduct from the Contractor's running bills or otherwise Income Tax under Section 194 (C) of the Income Tax Act, 1961.
13. That BHEL shall be further entitled to recover from the running bills of the Contractor or otherwise such sum as may be determined by BHEL from time to time in respect of consumables supplied by BHEL, hire charges for tools and plants issued (Where applicable) and any other dues owed by the Contractor.
14. That it is hereby agreed by and between the parties that non-exercise, forbearance or omission of any of the powers conferred on BHEL and/or any of its authorities will not in any manner constitute waiver of the conditions hereto contained in these presents and the liability of the Contractor with respect to compensation payable to BHEL or Contractor's obligations shall remain unaffected.
15. It is clearly understood by and between the parties that in the event of any conflict between the Letter of Intent and other documents governing this Agreement, the provisions in the Letter of Intent shall prevail.

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 Intent 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

(CONT

RACTOR)

1. (to be signed by a person holding
a valid Power of Attorney)

2.

WITNESS (For and on behalf of BHEL)

1.

2.

PROFORMA OF BANK GUARANTEE (in lieu of SECURITY DEPOSIT)

In consideration of the 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 Eastern Region, BHEL Bhawan, Plot No 9/1, DJ Block, Sector-II, Salt lake City, Kolkata – 700091 having agreed to exempt (Name of the Vendor / Contractor / Supplier) having 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._____² dated _____² valued at Rs.....² (Rupees -----)² for <Nature of the Work>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

_____ [Name of Contractor(s)] do hereby undertake to pay to the Employer an amount not exceeding Rs._____in the event of any breach by the said Contractor(s) of any of the terms and conditions contained in the said Contract.

We,_____(indicate the name of the Bank), do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Employer. 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 relating thereto 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 claim satisfied or discharged or till _____⁵ or till the office/Department/Division of Bharat Heavy Electricals Limited certifies that the terms and conditions of the said Contract have been fully and properly carried out by the said contractor(s) and also including the satisfactory performance of the equipment during guarantee period and accordingly discharges this guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the _____⁶, (3 months more than the present date of validity of Bank Guarantee) we shall be discharged from all the liability under this guarantee thereafter.

We, _____ (indicate the name of the Bank) further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by any reason of any such variation or extension being granted to the said contractor(s) or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

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.....⁷
- b) This Guarantee shall be valid up to.....⁸
- c) Unless the Bank is served a written claim or demand on or before _____⁹ (3 months more than the present date of validity of Bank Guarantee) 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, _____ (indicate the name of the Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Any claim or dispute arising under the terms of this document shall only be enforced or settled in the courts of at Kolkata only.

Date_____Day of _____
for_____ (indicate the name of the Bank)_____

(Signature of Authorised signatory)

¹ NAME AND ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER .

² DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

³ PROJECT/SUPPLY DETAILS

⁴ BG AMOUNT IN FIGURES AND WORDS

⁵ VALIDITY DATE

⁶ DATE OF EXPIRY OF CLAIM PERIOD

⁷ BG AMOUNT IN FIGURES AND WORDS.

⁸ VALIDITY DATE

⁹ DATE OF EXPIRY OF CLAIM PERIOD

Note:

1. Units are advised that expiry of claim period may be kept 2/3 months after validity date.

2. In Case of Bank Guarantees submitted by Foreign Vendors-

- a. **From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India)** can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.
- b. **From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)**
 - b.1 In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank (BHEL's Consortium Bank). 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). In case, of Foreign Vendors, the BG Format provided to them should clearly specify the same.
- b.4** The BG should clearly specify that the demand or other document can be presented in electronic form.

BANK GUARANTEE FOR ADVANCE

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

In consideration of the 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 Eastern Region, BHEL Bhawan, Plot No 9/1, DJ Block, Sector-II, Salt lake City, Kolkata – 700091 having awarded to (Name of the Vendor / Contractor / Supplier) having its registered office at _____¹ (hereinafter called "the Contractor" which expression shall include its successors and permitted assigns) a contract Ref No.....dated ²valued at Rs.....(Rupees -----) for <Nature of Work> ³(hereinafter called the 'Contract')

AND WHEREAS the Employer has agreed to advance to the Contractor, a sum of Rs..... (Rupees..... only), equivalent to - _____% of the said value of the Contract (hereinafter called "the said Advance"), upon the condition, that the said Advance shall be secured by undertaking guarantee for Rs ----- (Rupees -----)⁴ from a Bank as hereinafter appearing.

We, ..., (hereinafter referred to as the Bank), having registered/Head office at and a branch at 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 upto a maximum amount but not exceeding Rs ----- (Rupees -----).

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/ Supplier in any suit or proceeding pending before any Court or Tribunal relating thereto 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 Contractors/Supplier shall have no claim against us for making such payment.

We the Bank 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 or discharged.

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 Contract or to extend time of performance by the said Contractor/Supplier 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/Supplier and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor/Supplier or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Contractor/Supplier 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 remain in force upto and including ⁵ and shall be extended from time to time on the request of the Employer 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 Contractor/Supplier 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 (3 months more than the present date of validity of Bank Guarantee) 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 ⁷
- b) This Guarantee shall be valid up to.....⁸
- c) Unless the Bank is served a written claim or demand on or before.....⁹ (3 months more than the present date of validity of Bank Guarantee) 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.

Any claim or dispute arising under the terms of this document shall only be enforced or settled in the courts of at Kolkata only.

For and on behalf of
(Name of the Bank)

Date.....

Place of Issue.....

¹ NAME OF VENDOR /CONTRACTOR / SUPPLIER

² DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

³ PROJECT/SUPPLY DETAILS

⁴ BG AMOUNT IN FIGURES AND WORDS

⁵ VALIDITY DATE

⁶ DATE OF EXPIRY OF CLAIM PERIOD

⁷ BG AMOUNT IN FIGURES AND WORDS

⁸ VALIDITY DATE

⁹ DATE OF EXPIRY OF CLAIM PERIOD

Note:

1. Units are advised that expiry of claim period may be kept 2/3 months after validity date.
2. In Case of Bank Guarantees submitted by Foreign Vendors-
 - a. **From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India)** can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.
 - b. **From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)**
 - b.1 In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank (BHEL's Consortium Bank). 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). In case, of Foreign Vendors, the BG Format provided to them should clearly specify the same.
 - b.4 The BG should clearly specify that the demand or other document can be presented in electronic form.

Form No: F-13 (Rev 00)

FORM for EXTENSION OF VALIDITY OF BANK GUARANTEE

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

BANK GUARANTEE No:

Date:.....

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

Form No: F-15 (Rev 01)

MONTHLY PERFORMANCE EVALUATION OF CONTRACTOR

Project		Vendor			Package & Unit	
SL	Parameter for Measurement	Classification	Max Score	Score Obtained	Measurement Key/Scheduled date	Supporting Documents
#1.0 1	Cumulative number of days in the month, the nominated Quality Officer or his authorised nominee was not available	QUALITY	0.35		Quality Officer or his authorised nominee should be available for all the days	Daily Log Book entry/Incident Registers/letter references
#1.0 2	Shortfall in number of weekly Quality meetings in the month, not conducted or not attended by Quality officer or his authorised nominee	QUALITY	0.7		Quality meetings to be held every week	Daily Log Book entry/Incident Registers/letter references
#1.0 3	Level of compliance wrt decisions taken in previous Quality meetings	QUALITY	0.35		Number of consolidated issues discussed in Quality meetings	Daily Log Book entry/Incident Registers/letter references
#1.0 4	Number of batches of welding electrodes, cement, sand, aggregate, consumable, Paints etc as applicable for which test certificates not submitted OR MM & MH pkg:) In case of MM & MH package, monthly checks	QUALITY	0.375		Total number of non compliances	Daily Log Book entry/Incident Registers/letter references
#1.0 5	Number of incidences of improper storage of inflammable gases and liquids, fuel etc	QUALITY	0.35		Total number of non compliances	Daily Log Book entry/Incident Registers/letter references
#1.0 6	Total number of complaints in the month on non-preservation of materials under the custody of the contractor / erected in his scope.	QUALITY	0.35		Total number of non compliances	Daily Log Book entry/Incident Registers/letter references
#1.0 7	Cumulative number of days in the month delayed due to poor organisation/planning of works at site.	QUALITY	0.625		Cumulative number of days delayed	Daily Log Book entry/Incident Registers/letter references
#1.0 8	Total number of rework instances in a month necessitated due to improper works/procedures by contractor	QUALITY	0.625		Total number of non compliances	Daily Log Book entry/Incident Registers/letter references
#1.0 9	Total number of complaints received in the month on the quality of finish/aesthetics	QUALITY	0.65		Total number of non compliances	Daily Log Book entry/Incident Registers/letter references
#1.1 0	Total number of instances in the month, House keeping NOT attended to in spite of instructions by BHEL -ie 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	QUALITY	0.625		Total number of non compliances	Daily Log Book entry/Incident Registers/letter references

#2.0 1	Number of times the workplan submitted FOR THE NEXT MONTH is REJECTED for not being supported with proper T&P (major) and Manpower.	PERFORMANCE	3.47		Number of rejections	Daily Log Book entry/Incident Registers/letter references
#2.0 2	Number of times the Work plan (unloading and storage plans in case of MM & MH packages) is not supported by 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 for the works planned	PERFORMANCE	3.47		Total number of non compliances	Daily Log Book entry/Incident Registers/letter references
#2.0 3	Cumulative number of days of delay in submission of plan FOR THE NEXT MONTH supported by deployment plan of Major T&Ps and Manpower (as per C-1 & C-2 of Format F-14)	PERFORMANCE	1.73		Number of days delayed/Scheduled date is first working day of next month	Daily Log Book entry/Incident Registers/letter references
#2.0 4	Percentage of delayed submission of Daily Reports for Progress, Labour etc	PERFORMANCE	1.87		Percentage of daily reports delayed/Scheduled date is each day for the previous day	Daily Log Book entry/Incident Registers/letter references
#2.0 5	Number of days delayed for submission of log sheets / protocols / Monthly Progress reports for the work executed during the month under measurement	PERFORMANCE	0.93		Number of days delayed/Scheduled date is first working day of next month	Daily Log Book entry/Incident Registers/letter references
#2.0 6	Shortfall attributable to contractor as a percentage of what is clearly executable (In line with Terms of payment) by contractor as per the plan (part-A of F-14) for the subject month	PERFORMANCE	20.67		Percentage calculated as per part-A of F-14	Progress review formats
#2.0 7	Cumulative number of days in the month for which feedback/briefing on plans for the day and the progress of previous day was not given to BHEL	PERFORMANCE	2.67		Cumulative number of days for which briefing or feedback not given/each day for the previous day	Daily Log Book entry/Incident Registers/letter references
#2.0 8	Cumulative number of major instances in the month hampering/affecting progress of work due to improper management of labour and T&P at site leading to slowed progress of work or extended the completion of works	PERFORMANCE	3.47		Cumulative number of days lost	Daily Log Book entry/Incident Registers/letter references
#2.0 9	Cumulative number of days of work lost due to interface issues with fellow contractors/customers leading to stoppage / delay in works, attributable to the contractor	PERFORMANCE	1.73		Cumulative number of days lost	Daily Log Book entry/Incident Registers/letter references
#2.1 0	Number of times the commitments on augmentation of resources as per plan for the month have slipped	PERFORMANCE	3.47		Total number of non compliances	Daily Log Book entry/Incident Registers/letter references
#2.1 1	Number of days the submission of Running bills for the month are delayed	PERFORMANCE	0.93		Number of days delayed/Scheduled date is first working day of next month	Daily Log Book entry/Incident Registers/letter references

#2.1 2	Number of days the supporting documents for the Running bills submitted for the month are delayed	PERFORMANCE	0.93		Number of days delayed/Scheduled date is first working day of next month	Daily Log Book entry/Incident Registers/letter references
#2.1 3	Number of times updations were not carried out in maintainance of records in PC in a form approved by BHEL at site (as applicable for respective packages).	PERFORMANCE	1.33		Cumulative number of days updation not carried out/	Daily Log Book entry/Incident Registers/letter references
#2.1 4	Number of times the Top Management of contractor did not respond to critical issues of site, for the month	PERFORMANCE	3.47		Total number of non compliances	Daily Log Book entry/Incident Registers/letter references
#2.1 5	Number of refusals for improvement/remedial measures suggested by BHEL	PERFORMANCE	0.67		Total number of non compliances	Daily Log Book entry/Incident Registers/letter references
#2.1 6	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	2.67		Cumulative number of days lost	Daily Log Book entry/Incident Registers/letter references
#2.1 7	Number of times rework refused	PERFORMANCE	1.73		Total number of non compliances	Daily Log Book entry/Incident Registers/letter references
#2.1 8	Cumulative number of days in the month recording/logging was not done in daily log/ history register / hindrance register maintained at BHEL Site Office	PERFORMANCE	1.33		Cumulative number of days recording or logging was not done/all days of the month	Daily Log Book entry/Incident Registers/letter references
#2.1 9	Erection Agency: Cumulative number of major instances in the month hampering/affecting progress of work due to delayed or non-deployment of separate gang for material handling works OR MM Agency: Cumulative number of major instances in the month hampering/affecting erection work due to not identifying or not locating or not retrieving of materails required by erection agency	PERFORMANCE	3.47		Cumulative number of days lost	Daily Log Book entry/Incident Registers/letter references
#3.0 1	Number of days of delay in submission of PLAN vis a vis ACTUAL deployment of Manpower for the month under review (as per part B-2 off-F-014)	RESOURCES	1.5		Number of days delayed/ Scheduled date is first working day of next month	Daily Log Book entry/Incident Registers/letter references
#3.0 2	Number of days of non-availability of supporting staff at office for submission of required reports/documentation as required for the contract	RESOURCES	1.5		Cumulative number of days supporting staff not available	Daily Log Book entry/Incident Registers/letter references
#3.0 3	Number of days of delay in submission of PLAN vs ACTUAL deployment of major T&P for the month under review (as per B-1 of F-14)	RESOURCES	2.5		Number of days delayed/Scheduled date is first working day of next month	Daily Log Book entry/Incident Registers/letter references
#3.0 4	Cumulative number of major instances in the month hampering/affecting progress of work due to non availability of operator / fuel in contractor's scope for Major T&P and MME	RESOURCES	2.5		Cumulative number of days lost	Daily Log Book entry/Incident Registers/letter references

#3.0 5	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	RESOURCES	2.5		Cumulative number of days lost	Daily Log Book entry/Incident Registers/letter references
#3.0 6	Cumulative number of major instances in the month hampering/affecting progress of work due to non-availability of proper T&P/MME (number, capacity adequacy, and working condition) under the scope of contractor	RESOURCES	2.5		Cumulative number of days lost	Daily Log Book entry/Incident Registers/letter references
#3.0 7	Number of times Contractor's T&P (items common to BHEL and Contractor) was NOT made available before requesting for the same T&P from BHEL	RESOURCES	2.5		Total number of requests from contractor	Daily Log Book entry/Incident Registers/letter references
#3.0 8	Cumulative number of major instances in the month hampering/affecting progress of work due to non-availability of Consumables under the scope of contractor	RESOURCES	2.5		Cumulative number of days lost	Daily Log Book entry/Incident Registers/letter references
#3.0 9	Cumulative number of days in the month lost due to use of improper consumables like electrodes, gases, Cement, sand, etc as applicable	RESOURCES	2		Cumulative number of days lost	Daily Log Book entry/Incident Registers/letter references
#4.0 1	Number of deviations from the site organisation report submitted initially wrt deployment for the current month affecting work progress.	SITE INFRASTRUCTURE & SERVICE	0.94		Total number of non compliances	Daily Log Book entry/Incident Registers/letter references
#4.0 2	Cumulative number of days in the month lost due to delayed renewal in respect of Labour license, Insurance, electrical licence, factory inspector etc as applicable	SITE INFRASTRUCTURE & SERVICE	0.94		Cumulative number of days lost	Daily Log Book entry/Incident Registers/letter references
#4.0 3	Number of non-compliances of Statutory requirements like validity of Labour Licence, Labour Insurance, PF, etc and any other applicable Regulation	SITE INFRASTRUCTURE & SERVICE	0.5		Total number of non compliances	Daily Log Book entry/Incident Registers/letter references
#4.0 4	Cumulative number of days in a month poor illumination is reported at storage area, erection area, pre-assy area and other designated areas by BHEL site.	SITE INFRASTRUCTURE & SERVICE	0.44		Total number of non compliances/random checks	Daily Log Book entry/Incident Registers/letter references
#4.0 5	Number of days of non-availability of well maintained toilets facilities for workers (separate for men and women)	SITE INFRASTRUCTURE & SERVICE	0.44		Total number of non compliances/random checks	Daily Log Book entry/Incident Registers/letter references
#4.0 6	Number of days of non-availability of potable drinking water stations for workers in specified areas.	SITE INFRASTRUCTURE & SERVICE	0.44		Total number of non compliances/random checks	Daily Log Book entry/Incident Registers/letter references

#4.0 7	If applicable as per contract, Provision of Water meter for each point of distribution and cumulative number of days of non-submission of water consumption / non-working of water meter	SITE INFRASTRUCTURE & SERVICE	0.44		Total number of non compliances/random checks	Daily Log Book entry/Incident Registers/letter references
#4.0 8	Provision of Energy meter for each point of distribution and cumulative number of days of non-submission of energy consumption / non-working of energymeter	SITE INFRASTRUCTURE & SERVICE	0.44		Total number of non compliances/random checks	Daily Log Book entry/Incident Registers/letter references
#4.0 9	Commitment of Top Management of Contractor for welfare of labour	SITE INFRASTRUCTURE & SERVICE	0.44		Percentage of welfare activities done	Daily Log Book entry/Incident Registers/letter references
#5.0 1	Number of days delayed in making labour payments of the last month	SITE FINANCE	2.14		Number of days delayed/Scheduled date is 10th day of the month succeeding the month under reference	Daily Log Book entry/Incident Registers/letter references
#5.0 2	Number of complaints from sub supplier for non receipt of payments	SITE FINANCE	1.43		Total number of non compliances	Daily Log Book entry/Incident Registers/letter references
#5.0 3	Number of times the site operations are hampered for want of funds at the disposal of site-in-charge.	SITE FINANCE	1.43		Total number of non compliances	Daily Log Book entry/Incident Registers/letter references
#6.0 1	Cumulative number of days in a month the nominated Safety Officer or his authorised nominee is not available	HSE & SA	0.5		Safety Officer or his authorised nominee should be available for all the days	Daily Log Book entry/Incident Registers/letter references
#6.0 2	Shortfall in number of weekly safety meetings in the month conducted or attended by the Safety Officer or his authorised nominee	HSE & SA	0.25		Safety meetings to be held every week	Copy of Minutes of meeting
#6.0 3	Level of compliance wrt decisions taken in previous Safety meetings	HSE & SA	0.25		Number of consolidated issues discussed in Safety meetings	Daily Log Book entry/Incident Registers/letter references
#6.0 4	Delay in submission of monthly report on safety in the prescribed form	HSE & SA	0.25		Number of days delayed/Scheduled date is first working day of next month	Daily Log Book entry/Incident Registers/letter references
#6.0 5	Number of days taken for lodging FIRs from date of occurrence/notice of incident of theft / accident etc	HSE & SA	0.25		Number of days delayed/Scheduled date is the next date of occurrence/notice of incidence	Copy of FIR lodged by Contractor
#6.0 6	Number of times warnings issued for using scaffoldings other than steel	HSE & SA	0.25		Total number of non compliances	Daily Log Book entry/Incident Registers/letter references

#6.0 7	Number of times punitive fines imposed for not complying with use of PPE	HSE & SA	0.375		Total number of non compliances	Non-compliance intimation documents from BHEL site
#6.0 8	Number of times punitive fines imposed for unsafe practices	HSE & SA	0.345		Total number of non compliances	Copy of fine intimation documents from BHEL site
#6.0 9	Delay in number of days in submission of monthly report on provisions, maintainance and validity of fire extinguishers	HSE & SA	0.25		Number of days delayed/Scheduled date is first working day of next month	Daily Log Book entry/Incident Registers/letter references
#6.1 0	Delay in number of days in submission of monthly report on provisions and maintenance of Electrical Safety for Equipments	HSE & SA	0.25		Number of days delayed/Scheduled date is first working day of next month	copy of report
#6.1 1	Delay in number of days in submission of monthly report on provisions and maintainance of proper ELCBs for Electrical Safety of Personnel.	HSE & SA	0.25		Number of days delayed/Scheduled date is first working day of next month	copy of report
#6.1 2	Number of times the agency has defaulted on display of safety posters / safety slogans / safety barriers/emergency numbers etc in identified areas	HSE & SA	0.25		Total number of non compliances	Non-compliance intimation documents from BHEL site
#6.1 3	Non compliances observed during HSE and Safety Audit	HSE & SA	0.25		Total number of non compliances	Daily Log Book entry/Incident Registers/letter references
#6.1 4	Cumulative number of days in the month, First Aid Kits were not maintained at designated places at site	HSE & SA	0.25		Cumulative number of days	Non-compliance intimation documents from BHEL site
#6.1 5	Cumulative number of days in the month, there was non-availability of Ambulance or Emergency vehicle (whichever applicable) at Site.	HSE & SA	0.25		Cumulative number of days Ambulance or Emergency vehicle not available	Daily Log Book entry/Incident Registers/letter references
#6.1 6	Number of days taken for submission of Root Cause analysis (RCA) for the accident /theft/ incidence from the cut off date intimated by BHEL for submission of RCA NOTE: Occurrences of last month to be accounted for in the evaluating month)	HSE & SA	0.25		Number of days delayed/Scheduled date is 7th day of occurrence or notice of incidence NOTE: Occurrences of last month to be accounted for in the evaluating month)	Daily Log Book entry/Incident Registers/letter references
#6.1 7	Cumulative number of days in the month Women labour were deployed for office or site works during night hours (anytime between 18.00 hrs to 08.00 hrs)	HSE & SA	0.25		Cumulative number of days	Daily Log Book entry/Incident Registers/letter references
#6.1 8	Cumulative number of days in the month children under the age of 18 years were deployed for office or site works	HSE & SA	0.25		Cumulative number of days	Daily Log Book entry/Incident Registers/letter references

Performance Score Summary for the Month	Total score	Score Obtained
QUALITY	5	

PERFORMANCE	60	
RESOURCES	20	
SITE INFRASTRUCTURE & SERVICE	5	
SITE FINANCE	5	
HSE & SA	5	
OTHERS	0	
TOTAL	100	0

Form No: F-19 (Rev 00)

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

SI 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)

Form No: F-20 (Rev 01)

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 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 "xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx".

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 <xxxxxxx>

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.

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 xxxxxxxxxxxxxx these presents on the day, month and year first, above written at xxxxxxxx by the hand of its signatory Mr. xxxxxxxxxxxx.

Signed for and on behalf of
M/s xxxxxxxxxxxxxxxxxxxx

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:

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 t he 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 Hea vy Electricals Limited is concerned, all the parties shall be liable jointly and severally.

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

WITNESS

For

1. NAME (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 No: F-23 (Rev 00)
REFUND OF SECURITY DEPOSIT

To,
The Construction Manager
BHEL Site Office

Dear Sir,

Sub : **Refund of Security Deposit**

Ref : Contract No:..... ,

Work:.....

I/We have submitted Final Bill in respect of the above Contract/Work vide our letter no:.....
dated In line with Tender conditions (GCC clause no 1.11), kindly arrange to
release/refund the Security Deposit along with Final Bill payments.

The details of Security Deposit are as below:

1. Cash Portion :
2. BG Portion :

Thanking You

Date:_____

Authorised representative of Contractor

To be filled up by BHEL

1. Security Deposit to be refunded:
 - a. Cash Portion:
 - b. BG Portion :
2. Less
 - a. Amount spent by BHEL on behalf of Contractor:
 - b. Payments made by BHEL on behalf of Contractor:
 - c. Other recoveries for Services etc
 - d. Any other recoveries
 - e. Total of 'a' to 'd':
3. Net Amount to be released (1-2) :
4. 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. Contract Guarantee period of Months commenced wef: _____
 - c. All objections raised so far have been settled
 - d. A note for refund of Security Deposit has been made in the Measurement Book

Signature of BHEL Engineer

Construction Manager

Date:-----

Form No: F-24 (Rev 00)

REFUND OF GUARANTEE MONEY

**BHARAT HEAVY ELECTRICALS
LIMITED POWER SECTOR, _
_____ REGIO
N**

Ref No:

Date:

1. Name and Address of Contractor :
2. Contract Agreement/LOI No :
3. Date of Contract Agreement/LOI :
4. Name of the Work undertaken :
5. Date of commencement of the Work :
6. Date of Completion of the Work :
7. Period of Maintenance :
(Guarantee Period)
8. Date on which the Final Bill was paid :
9. Last date of making good the defect :
during Maintenance Period
10. Expenditure incurred by BHEL during :
Maintenance Period, if any, recoverable
11. Date on which Guarantee Money refund:
falls due as per Contract
12. Amount of Guarantee Money to be refunded:
13. Less Amounts recoverable (with details)
 - a. Amount spent by BHEL on maintenance :
 - b. Payments made by BHEL on behalf of 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: _____

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 (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 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: _____

Form No: F-25 (Rev 00)

POWER OF ATTORNEY for SUBMISSION OF TENDER/SIGNING CONTRACT
AGREEMENT

(To be typed on non judicial Stamp Papers of appropriate value as applicable and Notarised)

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

Form No: F-26 (Rev 00)

ANALYSIS OF UNIT RATES QUOTED

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

Offer Reference No:.....

Date:.....

To,

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

Dear Sir,

Sub : Analysis of Unit Rates Quoted

Ref : Tender Specification No:

Analysis of 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 4.31.1 of Works Accounts Manual)

Name of the Contractor:

Departmental Bill no:

Date:

Name of the Work:

Division:

Sub-Division:

Sanctioned Estimate:

Date of written order to commence the work :

Code No:

Date of commencement of the Work:

Contract Agreement No:

Dated:

Due date of completion as per Agreement:

1 ACCOUNT OF WORK EXECUTED

On account payment for work not previously previously measured**			Item No of	Description of Work	Quantity as per agree- ment	Quantity executed up to date	Rate	Unit	Payment on the basis of actual measure- ment up to date	Quantity since last running account bill	Payment on the basis of actual measurement since last running account bill	Remarks
Total As per Running account Account bill Rs.	since last running Rs.	Total up to date Rs.										
1	2	3	4	5	6	7	8	9	10	11	12	13

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

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

Form WAM 6 (contd...)

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

Total value of work done up to date (A)...

Running Account Bill Deduct value of work shown on the last (B) ...

Net value of work done since last (C) ...

Rupees (in words)

.....only.

Form WAM 6 (contd...)

II.	MEMORANDUM OF PAYMENTS		I	II
		Rs. P.	Rs. P. — —	Rs. P. — —
1.Total value of work actually measured as per Account No. I. Column 10	(A)	.....		.....
2.Total up to date 'on account' payment for work covered by approximate Or plan measurements as per Account No. I, Column 3	(B)	.....		.....
3.Total upto date secured advances on security of materials as per column 8 Of the enclosed Account (Form WAM 10)	(C)	.....		.....
4.Total up to date payments [(A) + (B) + (C)]	(D)	.....		.....
5.Total amount of payments already made as per Entry (D) of last Running Account Bill No..... Dated..... forward to the Accounts Office on	(E)			
6.Balance [(D)-(E)]		.....		
7.Payments now to be made:				
a) by cash/cheque			.....	
b) by deduction for value of materials supplied				
c) by BHEL vide Annexure A attached			.....	
d) by deduction for hire of tools and plant vide				

Annexure B attached	.....
e) by deduction for other charges vide Annexure C	
Attached	.....
f) by deduction on account of security deposit	.....
h) by deduction on account of Income Tax	.....

Note: Amounts relating to items 4 to 6 above should be 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. CHARGE

CERTIFICATE OF THE ENGINEER IN Form WAM 6 (contd...)

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 recorded at pages... of
(Name and Designation)

Measurement Book No

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 'on account' 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.

Signature of Contractor

Signature of Engineer in charge

Date:

Designation:

Date:

- ## ALLOCATION

The expenditure is chargeable as under and to be included in the accounts for.....20.....

Debit (Gross amount)

Credit (Deductions)

Rs.	P.

Rs.	P.

Total

* Here specify the net amount payable.

Signature of Senior Engineer

Date:

Form WAM 6 (contd...)

V. ENTRIES TO BE MADE IN THE ACCOUNTS OFFICE

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 Contractor's Ledger No.....Page.....

ALLOCATION

Estimate No:

Code no:

Name of the Work:

Debit

Credit

(Gross amount)

(Deductions)

	Rs.	P.
1. 1000000	1000000	1000000
2. 500000	500000	500000
3. 250000	250000	250000
4. 125000	125000	125000
5. 62500	62500	62500
6. 31250	31250	31250
7. 15625	15625	15625
8. 7812	7812	7812
9. 3906	3906	3906
10. 1953	1953	1953
11. 976	976	976
12. 488	488	488
13. 244	244	244
14. 122	122	122
15. 61	61	61
16. 30	30	30
17. 15	15	15
18. 7	7	7
19. 3	3	3
20. 1	1	1
21. 0	0	0
22. 0	0	0
23. 0	0	0
24. 0	0	0
25. 0	0	0
26. 0	0	0
27. 0	0	0
28. 0	0	0
29. 0	0	0
30. 0	0	0
31. 0	0	0
32. 0	0	0
33. 0	0	0
34. 0	0	0
35. 0	0	0
36. 0	0	0
37. 0	0	0
38. 0	0	0
39. 0	0	0
40. 0	0	0
41. 0	0	0
42. 0	0	0
43. 0	0	0
44. 0	0	0
45. 0	0	0
46. 0	0	0
47. 0	0	0
48. 0	0	0
49. 0	0	0
50. 0	0	0
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91. 0	0	0
92. 0	0	0
93. 0	0	0
94. 0	0	0
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96. 0	0	0
97. 0	0	0
98. 0	0	0
99. 0	0	0
100. 0	0	0

	Rs.	P.
1. 1000000	1000000	1000000
2. 500000	500000	500000
3. 250000	250000	250000
4. 125000	125000	125000
5. 62500	62500	62500
6. 31250	31250	31250
7. 15625	15625	15625
8. 7812	7812	7812
9. 3906	3906	3906
10. 1953	1953	1953
11. 976	976	976
12. 488	488	488
13. 244	244	244
14. 122	122	122
15. 61	61	61
16. 30	30	30
17. 15	15	15
18. 7	7	7
19. 3	3	3
20. 1	1	1
21. 0	0	0
22. 0	0	0
23. 0	0	0
24. 0	0	0
25. 0	0	0
26. 0	0	0
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31. 0	0	0
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90. 0	0	0
91. 0	0	0
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93. 0	0	0
94. 0	0	0
95. 0	0	0
96. 0	0	0
97. 0	0	0
98. 0	0	0
99. 0	0	0
100. 0	0	0

Assistant Date:	Accountant Date:	Account Officer Date:	Total	-----	-----

VI.Received Rs.....(Rupees.....only) as per
Memorandum of Payments on account of this work.

Signature of witness Address : Date:	Revenue	Stamp Signature of Contractor Date:

VII. ENTRIES TO BE MADE BY TREASURY SECTION

Cash Book entry No. and date:	Amount paid	Rs.....
	Amount unpaid	Rs.....
	Total	Rs.....
	Signature of Cashier	
	Date:	

Form WAM 6 (contd...)

ANNEXURE A

Statement showing details of materials issued to the contractor Shri/M/s.....

In respect of Contract Agreement No Dated.....

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	Whether recoverable from the contractor or supplied free	If recoverable from the contractor				REMARKS
							Rate at which recoverable	Amount recoverable	Amount recovered up to previous bill	Balance now recovered	
							Rs. P.	Rs. P.	Rs. P.	Rs. P.	
1	2	3	4	5	6	7	8	9	10	11	12
Total											

Signature of contractor

Signature of Engineer in Charge

Signature of Senior Engineer

Date:

Date:

Date:

Form WAM 6 (contd...)

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 recover-able	Amount recovered upto previous bill	Balance now recovered	Remarks
			Rs. P.	Rs. P.	Rs. P.	Rs. P.	
1	2	3	4	5	6	7	8

Total

Signature of contractor

Signature of Engineer in Charge

Signature of Senior Engineer

Date:

Date:

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.....

Sl. No	Particulars	Unit	Quantity	Rate	Amount recover- able	Amount recovered upto pre- vious bill	Amount now recovered	Remarks
				Rs. P.	Rs. P.	Rs. P.	Rs. P.	
1	2	3	4	5	6	7	8	9
1.								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.								
9.								

10.

Total		

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

Form WAM 6 (contd...)

ANNEXURE D

Name of the Contractor:
Name of the Work:

Contract Agreement No:
Date:

Sl. No.	Description of item	Unit	Quantity as per Agreement	Quantity as executed	Quantity further anticipated	Total quantity anticipated on completion	Rate as per agreement Rs. P.
1	2	3	4	5	6	7	8

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

Signature of Engineer in Charge
Date:

Signature of Senior Engineer
Date:

FORMS & PROCEDURES

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

BHARAT HEAVY ELECTRICALS LIMITED,
2x660MW MSTPP, TENDER NO - MSTPP:
MISC-2: KLN-C FORMS & PROCEDURES

BHARAT HEAVY ELECTRICALS LIMITED DIVISION..... And Final bill (Para 4.3.2 Of Works Accounts Manual)												
Name of Contractor						Departmental Bill no				Date		
Name of the Work						Division				Division		
Sanctioned Estimate						Date of written order to commence the work						
Contract Agreement/work Order No						Date of commencement of work						
						Due date of completion as per agreement						
						Date of actual completion of the work						
I. ACCOUNT OF WORK EXECUTED												
On Account payment for the work not previously measured **												
Total as per last running account bill Rs.	Since last running account bill Rs	Total up to date Rs	Item No of the agreement/work order	Description of work	Quantity as per agreement	Quantity executed up to date	Rate Rs. P	Unit	Payment on the basis of actual measurement up to date Rs P	Quantity since last running account bill	Payment on the basis of actual measurement since last running account bill Rs P	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13

BHARAT HEAVY ELECTRICALS LIMITED,
2x660MW MSTPP, TENDER NO - MSTPP:
MISC-2: KLN-C FORMS & PROCEDURES

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

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

Rupees (In Words)..... Only

II MEMORANDUM OF PAYMENT

		Rs.	P
1	Total Value of work actually measured as per Account no I coloumn 10	(A)	
	Deduct amount of paym,ents already made as per last running account bill No Dated.....		
2	Forwarded to the Accounts Office on	(B)	
3	Payments now to be made { (A) - (B)}	(C)	
4	Deduct ammounts recoverable from the contractor on account of :	Rs	P
	a Material suplied by BHEL vide annexure A attached		
	b Hire of Tools & Plants vide Annexure B attached		
	c Other charges vide Annexure C attached		
	d Income Tax		
	Total deduction		
5	Balance		
6	Refund of 50% of security deposite on completion of work		
7	Net amount to be paid to the Contractor		

III. CERTIFICATE OF THE ENGINEER IN CHARGE

The measurement on which the entries in coulms 7 to 12 of Part I of this bill (Account of work executed) are based were made by

- 1 (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 in charge
Designation

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
Cretified that the measurements have been check measured to the prescribed extent by
..... (Name & designation). And by the the undersigned at site and relevent entries have been initiated in the measurement book (vide
2 pages.....)

3 Certified that the methods of measurement are correct

4 Certified that the measurements have been technically checked with reference to contract drawings, deviations etc

5 Certified that all the measurements recorded in the measurement book have been correctly billed for at the contract rates or approved rates.

6 Certified that all the recoverable amounts in respect of stores, tools and pallant, elwater, electricity charges etc, have been correctly made vide Annexures A

7 Certified that the issues of all stores as per statement atytached (whether charged to the contractor or direct to the work) have been technically checked and

Certified for payment of * Rs (Rupees..... (Only). To be paid in
cash/by cheque in the presence of

ALLOCATION

The expenditure as under and to be included in the accounts for..... 19

Ledger Head	Debit (Gross Amount)		Credit (Deduction)	
	Rs.	P	Rs.	P
.....				
Total				

* Here specify the net amount payable

Signature of Senior Engineer
Date

V. ENTRIES TO BE MADE IN THE ACCOUNTS OFFICE

Account Bill no..... Dated

ALLOCATION

Entered in Journal book vide entry No.....Dated.....
Passed for.....Rs.....
Less Deductions.....Rs.....
(Rupees..... Only)
Payable to Shri/M/s..... by cheque/cash
Entered in contractors' Ledger no..... Page

Estimate No: Code No
Name of the Work

Ledger Head	Debit (Gross Amount) Rs P	Credit (Deduction) Rs
.....		
Total		

Assistant Accountant Accounts officer
Date: Date: Date:

VI. Received Rs.....(Rupees..... Only) in full and final settlement of all moneys due under this contract and I / we have no further claims of this contract.

Signature of Witness
Address

Revenue Stamp
Signature of Contractor
Date:

VII . ENTRIES TO BE MADE BY TREASURY SECTION

Cash book entry no and date :

Amount Paid Rs.....
Amount unpaid Rs.....
Total Rs.....

Signature of Cashier
Date:

BHARAT HEAVY ELECTRICALS LIMITED,
2x660MW MSTPP, TENDER NO - MSTPP:
MISC-2: KLN-C FORMS & PROCEDURES

ANNEXURE A

Part I

Statement showing details of material issued to the contractor Shri/M/s..... In respect of Contract

Agreement/Work Order No..... Dated

											Whether recoverabl				If recoverable from contractor				Remarks	
Issue voucher		description								Amount										
Stores Issue	No and date allotted by	of material issued to		Quantity actually	e from the contractor	Rate at which	Amount Recoverabl		recoverable upto	Balance Now										
voucher No	stores to the	the		Quantity incorporated	or supplied	recoverable e			previous bill	recovered										
SI No	and date	SIV	contractor	issued	in the work	free	Rs	P	Rs	P	Rs	P	Rs	P						
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

Total

Signature of Contractor
Date

Signature of Engineer in charge
Date

Signature of Senior Engineer
Date

Signature of Senior Engineer
Date

BHARAT HEAVY ELECTRICALS LIMITED,
2x660MW MSTPP, TENDER NO - MSTPP:
MISC-2: KLN-C FORMS & PROCEDURES

ANNEXURE B

Statement showing TOOLS & PLANTS issued to the contractor Shri/M/s.....in respect of Contract Agreement/Work Order No..... Dated and not covered by the agreement

SI No 1	Description of tools & plants issued 2	Period for which issued 3	Rate at which Recivory is to be made 4	Amount recoverabl e 5		Amount recoverable upto previous bill 6		Balance Now recovered 7		Remarks 8
				Rs	P	Rs	P	Rs	P	

Total

Signature of Contractor
Date

Signature of Engineer in charge
Date

Signature of Senior Engineer
Date

ANNEXURE C

showing detail of other recoveries to be made from the contractor Shri/M/s.....
ment/Work Order No.....Dated.....

Sr.No	Particulars	Unit	Quantity	Rate Rs. P.	Amount recoverable Rs. P	Amount recovered upto previous bill Rs. P.	Amount now recovered Rs. P.	Remarks
1	2	3	4	5	6	7	8	9
	1 Water Charges							
	2 Electricity Charges							
	3 Seignorage Charges							
	4 Medical Charges							
	Cost of empty gunny bags and empty containers not 5 returned							
	6							
	7							
	8							
	9							
	10							
Total								

Signature of Contractor
Date

Signature of Engineer Incharge
Date

Signature of Sr. Engineer
Date

ANNEXURE D -
DEVIATION STATEMENT

Name of the Contractor

Name of the Work :

Contract Agreement Order No.

Date:

SI. No.	Description	Unit	Quantity as per agreement	Quantity actually executed	Rate as per agreement Rs. P.	Rate actually executed Rs. P.	Amount as per agreement Rs. P.	Amount actually executed Rs. P.	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 JM J.-.....-.....
in respect of Contract Agreement/Work Order No.....,..... Dated.....-.....

Name of the Work :

ON RECOVERY BASIS

*1. Nt.	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	Variation in consumption (Difference between column 5 and 8)	Rate charge- able for excess/	Amount recover- able for excess/ short	IC including material returned
1	2	3	4	5	6	7	8	9	10	11	12
1.	Cement										
2.	Bricks										
3.	Wood.....										
4.	Asbestos Sheet										
5.	Iron Materials										

10.

/tg/taturc of Contractor Daft	Signature of Engineer in Charge Date :	Signature of Senior Engineer Date :

Note : 1. The quantities shown in columns 4 and 3 above should tally with those in column 3 *tld 6
FIG ti¥Cl\$ Of Aflfienure A (Paft I and Ij).

2. Data for theoretical consumption should be attached in support of quantity/ 6pcci i£i CO)LIftlft g.

**BHARAT HEAVY ELECTRICALS LIMITED,
2x660MW MSTPP, TENDER NO - MSTPP: MISC-
2: KLN-C FORMS & PROCEDURES**

ANNEXURE F

Statement showing detail of materials issued to the contractor Shri/M/s.....

Contract Agreement/Work Order No. Dated.

Name of work;

FREE OF COST

Sr.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 Rs.P.	Amount recoverable for material not returned Rs. P	Remarks
1	2	3	4	5	6	7	8	9	10	11	12

Total

Signature of Contractor
Date

Signature of Engineer Incharge
Date

Signature of Sr. Engineer
Date

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

ANNEXURE-G

FORMS & PROCEDURES

QUESTIONNAIRE TO BE ANSWERED BY ENGINEER IN CHARGE AND SENIOR ENGINEER

(Correct particulars and answers to be recorded)

Name of the work :	
Name of the Contractor :	
Date of commencement of the work:	
Contract agreement/work ordered no. and date:	
Reference to supplementary agreement no,if any :	
Whether administrative approval and technical sanction has been accorded by the competent authority ? If so ,cite reference	
Whether sanction of the competent authority and financial concurrence of the Accounts Department for award of the work has been accorded ? If so,cite reference.	
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 Accounts Department with reasons for grant of extension? (Due and actual date of completion of the work and reference to letter no. and date granting the extension of time should be given)	
(a) 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 accounts Department together with rate analysis? If so,cite reference.	
Whether deviations have been approved by the competent authority? If yes, give reference to the approval; if not, give reasons.	
Whether the rates of recovery of stores issued to the contractor which are not provided for in the Contract Agreement have been settled in consultation with Finance?	
Whether discrepancies pointed out by the Accounts Department in the store statement have been reconciled and accepted by the Accounts Department?	

ANNEXURE-G FORMS & PROCEDURES	
QUESTIONNAIRE TO BE ANSWERED BY ENGINEER IN CHARGE AND SENIOR ENGINEER	
(Correct particulars and answers to be recorded)	
Whether materials issued to the contractor in excess of the theoretical requirements have been returned to the Stores Department and the no. and date of such returned stores vouchers have been shown in stores statement? If not, whether the cost of such excess material has been recovered at the prescribed rate? Whether consumption statements in respect of materials chargeable to the work have been attached to the bill?	
Whether consumption of materials shown has been technically checked by Senior Engineer?	
Whether materials issued and used in the work is not less than that required for consumption in work according to our specification? If consumption is less, whether necessary recovery has been made in the bill?	
Whether measurements have been checked by the Engineer and Sr. Engineer to the extent required and certificates of check recorded in the measurement books?	
Whether contractor has signed the bill and the measurement books without reservations? If not; whether reasons have been intimated to the Accounts Department?	
Whether arithmetical calculations have been checked and certificate recorded in the measurement books by a person other than the one who calculated initially	
Whether any work was done at the risk and cost of the contractor and whether such cost has been recovered from him? Give particulars.	
Whether all advance payments on running Accounts have been recovered?	
Whether all the recoveries due to services given to the contractor like rent of accommodation, water charges, electricity charges etc. have been recovered and whether payments made by the company on behalf of the contractor have been adjusted?	
Whether the files containing abstracts from measurement books/ standard measurement books have been completed/ updated?	
Whether hire charges of tools and plant have been recovered and the statement of hire charges with full details attached?	

ANNEXURE-G	
QUESTIONNAIRE TO BE ANSWERED BY ENGINEER IN CHARGE AND SENIOR ENGINEER	
(Correct particulars and answers to be recorded)	
Whether the certificate of workmanship and completion of work according to specifications, drawings etc. is recorded by Engineer/ Sr. Engineer and whether recoveries have been made for defective works, if any?	
Whether all corrections in the bill/measurement books etc. have been neatly made and attested and there are no overwriting?	
Whether final measurements have been taken as soon as possible after completion of work and the certificate of completion issued? If not, whether reasons for delay have been recorded and communicated to Accounts?	
In respect of Quantities reduced in the final bill as compared to the running payment, whether adequate reasons have been recorded and communicated to Accounts	
Whether the Expenditure has been classified correctly according to heads of Account recorded in the sanctioned estimate?	
Whether the work has been completed within the estimated cost? If not, what is the percentage of excess over the sanctioned estimate/ administrative approval? In case the excess is beyond the competency of Sr. Engineer, what action has been taken for the obtaining the approval of the authority competent to sanction the excess?	
(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?	
Whether all the previous audit objections raised on running Account bills have been settled? If so, cite reference.	
Signature of Engineer in Charge	Signature of Engineer in Charge
Date:	Date:

 PS- R	MONTHLY PLAN & REVIEW WITH CONTRACTOR							Page 1 of 4	
Name of Site						Contract No.			
						Name of Contractor			
Review for the month of						Brief Scope of work			
Date of Review									
PART- A PHYSICAL REVIEW									
Sl.No	Description of work	Unit of Measurement	Original Plan (QTY Planned for the month as per joint review of previous month)	Last months shortfall (attributable to Contractor)	Total Planned for the month (including previous month backlog attributable to Contractor)	Achieved	Shortfall attributable to (in Qty)		REMARKS
			(a)	(b)	C=(a)+(b)		BHEL	Contractor	
		UOM	Phy.	Phy	Phy	Phy.	Phy.	Phy.	
Use separate sheets if necessary									

BHEL
(Sign with name, designation and date)

CONTRACTOR
(Sign with name, designation and date)



PS- R

MONTHLY PLAN & REVIEW WITH
CONTRACTOR

Page 2 of 4

CONTRACT NO:

CONTRACTOR:

PART – B-1 REVIEW OF DEPLOYMENT OF MAJOR T&Ps

SUPPLIER SCOPE:-

SN.	MAJOR T&P TO BE DEPLOYED AS PER WORK PLANNED FOR THE MONTH	QTY.	DEPLOYMENT STATUS (ACTUAL DEPLOYED)	REMARKS (WORKS EFFECTED DUE TO NON- DEPLOYMENT OF T&Ps

BHEL SCOPE:-

BHEL
(Sign with name, designation and date)

CONTRACTOR
(Sign with name, designation and date)



PS- R

MONTHLY PLAN & REVIEW WITH CONTRACTOR

Page 3 of 4

CONTRACT NO:

CONTRACTOR:

PART – B-2 REVIEW OF DEPLOYMENT OF MANPOWER

SUPPLIER SCOPE:-

SNO.	AREA OF WORK	CATEGORY OF LABOUR	NO. OF LABOUR REQUIRED AS PER CATEGORY	DEPLOYED FOR THE PERIOD	REMARKS (WORKS AFFECTED DUE TO NON- AVAILABILITY OF LABOUR)

BHEL
(Sign with name, designation and date)

CONTRACTOR
(Sign with name, designation and date)



PS- R

MONTHLY PLAN & REVIEW WITH CONTRACTOR

Page 4 of 4

CONTRACT No.:

Date of Report:

PART C1 : PLAN FOR THE NEXT MONTH (PHYSICAL)

SL NO.	DESCRIPTION OF WORK (Area Wise)	PLANNED MT/ % / QTY (EXCLUDING SHORTFALLS ATTRIBUTABLE TO CONTRACTOR TILL DATE)	T&Ps REQUIRED	MANPOWER REQUIRED	REMARKS

NOTE: USE SEPARATE SHEETS, IF REQUIRED

PART C2: PLAN FOR THE NEXT MONTH (OTHERS)

SL NO.	DESCRIPTION OF WORK (Area Wise)	PLANNED MT/ % / QTY	T&Ps REQUIRED	MANPOWER REQUIRED	REMARKS

NOTE: USE SEPARATE SHEETS, IF REQUIRED

BHEL
(Sign with name, designation and date)

CONTRACTOR
(Sign with name, designation and date)

 PS- R	MONTHLY PLAN & REVIEW WITH CONTRACTOR	Page 5 of 4

BHEL
(Sign with name, designation and date)

CONTRACTOR
(Sign with name, designation and date)

BANK GUARANTEE FOR PERFORMANCE SECURITY

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

In consideration of the 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 Eastern Region, BHEL Bhawan, Plot No 9/1, DJ Block, Sector-II, Salt lake City, Kolkata – 700091 having awarded to (Name of the Vendor / Contractor / Supplier) having its registered office at _____¹ hereinafter referred to as the 'Contractor/Supplier', which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref No... dated ² valued at Rs.....² (Rupees -----)for <Nature of Work>³ (hereinafter called the 'Contract') and the Contractor having agreed to provide a Contract Performance Guarantee, equivalent to% (.... Percent) of the said value of the Contract to the Employer for the faithful performance of the Contract,

we, ..., (hereinafter referred to as the Bank), having registered/Head office at.....and inter alia a branch at being the Guarantor under this Guarantee, hereby, irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer a maximum amount Rs ----- (Rupees -----)⁴ without any demur, immediately on a demand from the Employer, .

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/ Supplier in any suit or proceeding pending before any Court or Tribunal relating thereto 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 thereunder and the contractors/supplier shall have no claim against us for making such payment.

We the bank 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 or discharged.

We 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/Supplier 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/Supplier and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor/Supplier or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Contractor/Supplier 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 remain in force upto and including ⁵ and shall be extended from time to time for such period as may be desired by Employer.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Contractor/Supplier 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.

Unless a demand or claim under this guarantee is made on us in writing on or before the ⁶ (3 months more than the present date of validity of Bank Guarantee) we shall be discharged from all liabilities under this guarantee thereafter.

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.....⁷
- b) This Guarantee shall be valid up to.....⁸
- c) Unless the Bank is served a written claim or demand on or before.....⁹ (3 months more than the present date of validity of Bank Guarantee) 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.

Any claim or dispute arising under the terms of this document shall only be enforced or settled in the courts of at Kolkata only.

For and on behalf of
(Name of the Bank)

Dated.....

Place of Issue.....

¹ NAME AND ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER.

² DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

³ PROJECT/SUPPLY DETAILS

⁴ BG AMOUNT IN FIGURES AND WORDS

⁵ VALIDITY DATE

⁶ DATE OF EXPIRY OF CLAIM PERIOD

⁷ BG AMOUNT IN FIGURES AND WORDS.

⁸ VALIDITY DATE

⁹ DATE OF EXPIRY OF CLAIM PERIOD

Note:

1. Units are advised that expiry of claim period may be kept 2/3 months after validity date.

2. In Case of Bank Guarantees submitted by Foreign Vendors-

- a. **From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India)** can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.

- b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)**
- b.1** In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank (BHEL's Consortium Bank). 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). In case, of Foreign Vendors, the BG Format provided to them should clearly specify the same.
- b.4** The BG should clearly specify that the demand or other document can be presented in electronic form.

BANK GUARANTEE FOR SECURITY DEPOSIT CUM PERFORMANCE BANK GUARANTEE BOND

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 Electrical 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 <Address of Power Sector Region¹> hereinafter called "The Company" (which expression shall unless repugnant to the context or meaning thereof be deemed to include its successors and assigns)

WHEREAS < Contractor's Name and Address> (hereinafter referred to as the Contractor) have entered into a contract arising out of Letter of Intent no. < LOI REF. & Date > (hereinafter referred to as "the contract") for < Name of Work > with the company.

AND WHEREAS the contract inter-alia provides that the contractor shall furnish to the company a sum of Rs.----- (Rupees -----) towards security deposit for due and faithful performance of the contract in the form and manner specified therein.

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.

The Guarantor do hereby guarantee to the company the due and faithful performance, observance or discharge of the Contract by the contractor and further unconditionally and irrevocably undertake to pay to the Company without demur and merely on a demand, to the extent of Rs.----- (Rupees -----) against any claim by the company on them for any loss, damage, costs, charges and expenses caused to or suffered by the company by reasons of the contractor making any default in the performance, observance or discharge of the terms, conditions, stipulations or undertakings or any of them as contained in the contract.

The decision of the company whether any default has occurred or has been committed by the contractor in the performance, observance or discharge of any of the terms, conditions, stipulations or undertakings or any one of them as contained in the contract and / or as to the extent of loss, damage, costs, charges and expenses caused to or suffered by the company by reason of the contractor making any default in the performance, observance or discharge of any of the terms, conditions, stipulations or undertakings or any one of them shall be conclusive 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.

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 forbear 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 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.

The Guarantor further agrees that the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the contract and its claim satisfied or discharged and till the company certifies that the terms and conditions of the contract have been fully and properly carried out by the contractor and accordingly discharges this Guarantee, subject however, that the company shall have no claim under this Guarantee after -- ----- i.e. (3 months more than 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 notwithstanding the fact that the same is enforced after the expiry of the said period.

BANK GUARANTEE FOR SECURITY DEPOSIT CUM PERFORMANCE BANK GUARANTEE BOND

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.

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 unrealized.

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 ----- (3 Months more than the validity date) we shall be discharged from our liabilities under this Guarantee thereafter.

Any claim or dispute arising under the terms of this documents shall only be enforced or settled in the courts of at < **Name of place**² > only.

The Guarantor hereby declares that it has power to execute this guarantee and the executant has full powers to do so on behalf 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

Notes :

1. **Address of Power Sector Regions (inviting the Tender)** is as below:
 - PSNR : Bharat Heavy Electricals Limited, Power Sector Northern Region, HRDI & PSNR Complex, Plot No 25, Sector 16-A, Noida – 201 301 (Uttar Pradesh)
 - PSER : Bharat Heavy Electricals Limited, Power Sector Eastern Region, BHEL Bhawan, Plot No 9/1, DJ Block, Sector-II, Salt lake City, Kolkata – 700 091
 - PSWR: Bharat Heavy Electricals Limited, Power Sector Western Region, Shree Mohini Complex, 345 Kingsway, Nagpur 440 001
 - PSSR: Bharat Heavy Electricals Limited, Power Sector Southern Region, 690, Anna Salai, Nandanam, Chennai 600 035
2. **Name of place (for jurisdiction of Courts)** is as below:
 - PSNR : Delhi
 - PSER : Kolkata
 - PSWR: Nagpur
 - PSSR : Chennai
3. 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.
4. 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.

BANK GUARANTEE FOR RELEASE OF AMOUNTS WITHHELD/LIQUIDATED DAMAGES AMOUNT

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

In consideration of the Bharat Heavy Electricals Limited ¹(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 Eastern Region, BHEL Bhawan, Plot No 9/1, DJ Block, Sector-II, Salt lake City, Kolkata – 700091 having awarded to (Name of the Vendor / Contractor / Supplier) incorporated under the having its registered office at _____¹(hereinafter referred to as the 'Contractor', which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref No.....dated ²valued at Rs.....(Rupees-----) for <Nature of Work>³(hereinafter called the 'Contract')

The Contractor as per Contract should have completed the work/ supplies under the contract by (date). As per terms and conditions of the Contract, the Employer is entitled to levy Liquidated Damages (LD) for delays and the Employer has withheld an amount of Rs..... by way of LD as per the Contract. Now, on the request of the Contractor, the Employer having agreed to release the amount of Rs.....withheld from the Contractor's invoices as Liquidated damages under the terms and conditions of the Contract on production of a Bank Guarantee for Rs.(Rupees... only) ⁴

We, ..., (hereinafter referred to as the Bank), having registered/Head office at.....and inter alia a branch at being the Guarantor under this Guarantee, hereby irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer a maximum amount of Rs ----- (Rupees-----) without any demur, merely on a demand from the Employer

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/ Supplier in any suit or proceeding pending before any Court or Tribunal relating thereto 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 thereunder and the contractors/supplier shall have no claim against us for making such payment.

We the bank 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 or discharged.

We 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/Supplier 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/Supplier and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor/Supplier or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Contractor/Supplier 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/ Supplier's liabilities.

This Guarantee shall remain in force upto and including ⁵ and shall be extended from time to time for such period as may be desired by Employer.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Contractor/Supplier 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.

Unless a demand or claim under this guarantee is made on us in writing on or before the ⁶ (3 months more than the present date of validity of Bank Guarantee) we shall be discharged from all liabilities under this guarantee thereafter.

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.....⁷
- b) This Guarantee shall be valid up to.....⁸
- c) Unless the Bank is served a written claim or demand on or before.....⁹ (3 months more than the present date of validity of Bank Guarantee) 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.

Any claim or dispute arising under the terms of this document shall only be enforced or settled in the courts of at Kolkata only.

For and on behalf of
(Name of the Bank)

Dated.....

Place of Issue.....

¹ NAME AND ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER.

² DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

³ PROJECT/SUPPLY DETAILS

⁴ BG AMOUNT IN FIGURES AND WORDS

⁵ VALIDITY DATE

⁶ *DATE OF EXPIRY OF CLAIM PERIOD*

⁷ *BG AMOUNT IN FIGURES AND WORDS.*

⁸ *VALIDITY DATE*

⁹ *DATE OF EXPIRY OF CLAIM PERIOD*

Note:

- 1. Units are advised that expiry of claim period may be kept 2/3 months after validity date.**
- 2. In Case of Bank Guarantees submitted by Foreign Vendors-**
 - a. From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India)** can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.
 - b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)**
 - b.1** In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank (BHEL's Consortium Bank). 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). In case, of Foreign Vendors, the BG Format provided to them should clearly specify the same.
 - b.4** The BG should clearly specify that the demand or other document can be presented in electronic form.

BANK GUARANTEE FOR SUPPLY FREE ISSUE MATERIAL.

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

In consideration of the 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 Eastern Region, BHEL Bhawan, Plot No 9/1, DJ Block, Sector-II, Salt lake City, Kolkata – 700091 having awarded to (Name of the Vendor / Contractor / Supplier).having its registered office at _____¹ (hereinafter referred to as the 'Contractor/Supplier/Fabricator' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref. No.....dated ² valued at Rs.....(Rupees -----) for <Nature of Work>³ (hereinafter called the 'Contract')

and, the Employer having agreed as per the terms and conditions of the Contract to supply free issue material costing Rs.__ for the manufacture/fabrication of the equipment at the Contractor's site on on furnishing a Bank Guarantee for Rs._____ (Rupees.....)⁴ in the manner hereinafter specified for the due safeguard of the free issue material,

we, ..., (hereinafter referred to as the Bank), having registered/Head office at.....and inter alia a branch at being the Guarantor under this Guarantee, hereby irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer a maximum amount of Rs ----- (Rupees -----) without any demur, merely on a demand from the Employer, .

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/ Supplier in any suit or proceeding pending before any Court or Tribunal relating thereto 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 Contractors/Supplier shall have no claim against us for making such payment.

We the Bank 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 or discharged.

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 Contract or to extend time of performance by the said Contractor/Supplier 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/Supplier and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor/Supplier or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Contractor/Supplier 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/Supplier/ Fabricator and notwithstanding any security or other guarantee that the Employer may have in relation to the Contractor's/Supplier's/ Fabricator's liabilities.

This Guarantee shall remain in force upto and including ⁵ and shall be extended from time to time for such period as may be desired by Employer.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Contractor/ Supplier/ Fabricator 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.

Unless a demand or claim under this guarantee is made on us in writing on or before the ⁶ (3 months more than the present date of validity of Bank Guarantee) we shall be discharged from all liabilities under this guarantee thereafter.

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.....⁷
- b) This Guarantee shall be valid up to.....⁸
- c) Unless the Bank is served a written claim or demand on or before.....⁹ (3 months more than the present date of validity of Bank Guarantee) 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.

Any claim or dispute arising under the terms of this document shall only be enforced or settled in the courts of at Kolkata only.

For and on behalf of
(Name of the Bank)

Dated.....

Place of Issue.....

¹ NAME AND ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER .

² DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

³ PROJECT/SUPPLY DETAILS

⁴ BG AMOUNT IN FIGURES AND WORDS

⁵ VALIDITY DATE

⁶ DATE OF EXPIRY OF CLAIM PERIOD

⁷ BG AMOUNT IN FIGURES AND WORDS.

⁸ VALIDITY DATE

⁹ DATE OF EXPIRY OF CLAIM PERIOD

Note:

1. Units are advised that expiry of claim period may be kept 2/3 months after validity date.
2. In Case of Bank Guarantees submitted by Foreign Vendors-
 - a. **From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India)** can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.
 - b. **From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)**
 - b.1 In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank (BHEL's Consortium Bank). 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). In case, of Foreign Vendors, the BG Format provided to them should clearly specify the same.
 - b.4 The BG should clearly specify that the demand or other document can be presented in electronic form.

PROFORMA OF BANK GUARANTEE FOR EARNEST MONEY
(On non- Judicial paper of appropriate value)

Bank Guarantee No.....

Date.....

To

(Employer's Name and Address)

.....

Dear Sirs,

In accordance with the terms and conditions of your 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 for.....³ . at Bharat Heavy Electricals Limited, Power Sector Eastern Region, BHEL Bhawan, Plot No 9/ 1, DJ Block, Sector- II, Salt lake City, Kolkata – 700091. ⁴ (name of the Employer)

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 ⁵ 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 Head 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. 5

.....(*).....without any reservation, protest, and recourse and without the beneficiary needing to prove or demonstrate reasons for its such demand. Any such demand made by the 'Employer' shall be

conclusive and binding on us irrespective of any dispute or difference raised by the Tenderer.

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 bids 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.....⁶ 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 ⁷ 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.....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.

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 Name and Address of BHEL Unit/Division/Region (Already filled up)

⁵ BG Amount in words and Figures

⁶ Validity Date

⁷ Date of Expiry of Claim Period

Note:

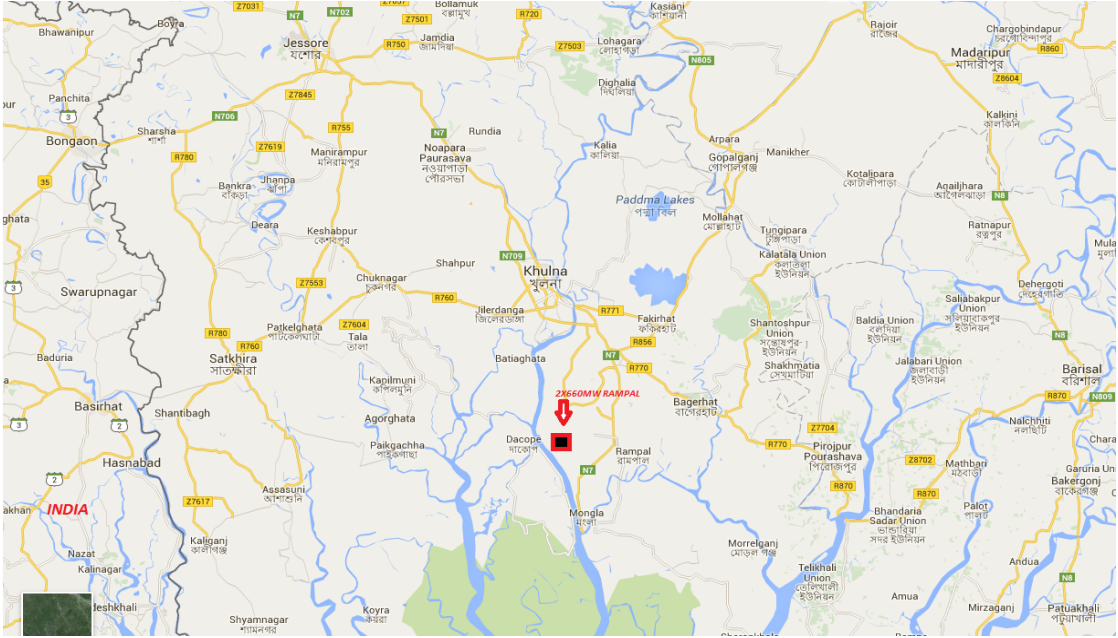
1. Units are advised that expiry of claim period may be kept 2/3 months after validity date. As per Works Policy, the Bank Guarantee shall be valid for at least six months.
2. In Case of Bank Guarantees submitted by Foreign Vendors-

- a. From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India)** can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.
- b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)**
 - b.1** In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank (BHEL's Consortium Bank). 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). In case, of Foreign Vendors, the BG Format provided to them should clearly specify the same.
 - b.4** The BG should clearly specify that the demand or other document can be presented in electronic form.

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35.0	TOOLS & PLANTS (TO BE PROVIDED BY BHEL)
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1.0	PROJECT SYNOPSIS AND GENERAL INFORMATION
1.1	The 2 x 660 MW MAITREE SUPER THERMAL POWER PROJECT is located in Moithara Village, Rampal Upazila, Bagerhat District, Bangladesh. The Bidder shall acquaint himself by a visit to the site, with the conditions prevailing at site before submission of the bid. The information given here in under is for general guidance and shall not be contractually binding on the Owner. All relevant site data / information as may be necessary shall have to be obtained / collected by the Bidder.  LOCATION MAP:2X660MW MAITREE RAMPAL PROJECT 

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	LOCATION MAP:2X660MW MAITREE RAMPAL PROJECT
1.2	APPROACH TO SITE
	The nearest town Khulna is at a distance of 23 km from project site. The site is Connected by road from Mongla- Khulna Highway. Nearest Domestic airport is Jessore, Bangladesh at a distance of about 93 KM and international airport is Dhaka at a distance of 263 KM, Bangladesh
1.3	Owner: BIFPCL (BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED)
2.0	SCOPE OF THE CONTRACT
2.1	BUIDLINGS / STRUCTURES/FOUNDATIONS
	PILE CAP (EXCEPT PILING), CIVIL FOUNDATION & SUPERSTRUCTURE, ARCHITECTURAL WORKS FOR VARIOUS MISCELLENEOUS STRUCTURES, DUCT FOUNDATIONS, FD/PA FAN FOUNDATIONS, THRUST BLOCKS , CABLE TRENCHES, ADDITIONAL MISCELLENEOUS FOUNDATIONS IN DIFFERENT SCATTERED AREAS THROUGHOUT THE PROJECT SITE FOR 2X660MW MAITREE RAMPAL PROJECT, BANGLADESH. THE SCOPE OF WORK SHALL INCLUDE CIVIL WORKS IN THE ABOVE AREAS BUT NOT LIMITED TO THE ABOVE.
2.2	For some of the structures partial civil works is executed by other vendor and hence balance work as per drawings / specifications is to be executed.
2.2a	All the major balance works to meet the project requirement have been included in the scope. Bidder may also require to execute similar works in other area not covered in the list but necessary to meet the project requirement within the rates quoted as per BOQ cum Price Schedule. Such works shall be taken up as per direction of BHEL in writing. Rate quoted by bidder as per price schedule shall be inclusive of such similar works.
	GENERAL
2.3	All necessary parts, and works necessary for transport, storage and erection purposes.
2.4	Deleted
2.5	The Work shall include everything required and necessary to finish the Work properly, notwithstanding that every item of labour or materials or accessories required to make the installation complete may not be specifically mentioned.
2.6	Deleted
2.7	Deleted
2.8	The works to be performed under this contract consist of providing all labour, supervision, material, scaffolding, construction equipment, tools and plants, temporary works, supplies including POL, transportation and all incidental items not shown or specified but reasonably implied or necessary for the proper completion of work in all respects. Testing of all materials, concrete, earthwork other allied works, preparation of bar bending schedules on the basis of construction drawings, preparation of fabrication drawings etc. are included on the rates of items of work. Works shall only be carried out with approved drawings.
2.9	The area of work shall be cleared of all vegetation, rubbish and other objectionable matter and materials remove shall be burnt or otherwise disposed of as directed by the Engineer-in-Charge. No separate payment for these operations shall be made. The cost of all these operations shall be deemed to have been included in the unit rates rendered for the different items under bill of quantities unless specifically provided in the BOQ .
2.10	All the works areas shall be adequately flood lighted to the satisfaction of the Engineer-in-Charge when the work is in progress during the night shifts.

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2.11	The unit rates shall include all material equipment, fixtures, labour construction plant, temporary works and everything whether of permanent or temporary nature necessary for the completion of job in all respects.	
2.12	The unit rates for various items of B.O.Q shall include all the stipulations mentioned in Section C and technical specifications under Section D and nothing extra over B.O.Q rates shall be payable.	
2.13	DELETED	
2.14	The bidder should fully apprise himself of the prevailing conditions at the proposed site, climatic conditions including monsoon pattern, local conditions, soil strata and site specific parameters and shall include for all such conditions and contingent measures in the bid, including those which may have not been specifically brought out in the specifications.	
3.0	SITE VISIT	
3.1	Contractor should visit site and acquire full knowledge & information about site conditions prevailing at site and in and around the plant premises together with all the statutory, obligatory, mandatory requirements of various authorities before submission of the bid. In line with the above, site visit confirmation will be required to be submitted by the bidder with the technical bid. Bidder may please note that The contractor will be responsible for the quality of workmanship, quality of materials/ items and design for which the contractor is responsible for construction of Balance structure of BOP Buildings. Even though the some part of structures will be carried out by other agency under supervision of BHEL, the successful bidder will be responsible for the above.	
3.1	OPEN SPACE FOR OFFICE & STORAGE	
3.1.1	Open spaces for material storage yard & construction of temporary site office may be allocated as made available by the customer / BHEL free / hire charges. Contractor has to make his own arrangements for labour colony including Electricity and water.	
3.1.2	Construction of necessary stores and storage of materials shall be in contractor's scope. BHEL shall provide available space as received from customer on mutually agreed basis. Security of stores & work place shall be in Contractor's scope.	
3.1.3	REMOVAL OF TEMPORARY FACILITIES When the Work is completed all such temporary structures and facilities shall be removed from the Site and the area shall be restored to its original condition.	
3.2	WATER	
3.2.1	BHEL will provide construction water at one point or at mutually agreed points within 500 m from work premises, free of cost to the contractor. Bidder to note that no ground water is allowed for construction purpose by the project authority.	
3.2.2	Further necessary network for construction water system shall be done by the bidder at his own cost. In case BHEL assigns work at multiple scattered areas and subject to availability of BHEL water network, BHEL may consider providing additional points.	
3.2.3	Contractor should arrange on their own drinking water in their labour colony.	
3.2.4	BHEL shall not be responsible for any inconvenience or delay caused due to any interruption of water supply and the contractor shall claim no compensation for delay in work for such interruption. Contractor may make standby arrangement for water for which no separate payment shall be made by BHEL.	

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3.2.5	Contractor will have to arrange for storage of water to meet the day-to-day requirement.
3.2.6	The availability of water (construction as well as drinking) in Maitree project may be limited. Contractor shall ensure that no water is wasted. In this regard the contractor shall take all necessary measure towards preservation of water.
3.3	ELECTRICITY
3.3.1	CONSTRUCTION POWER & GENERAL ILLUMINATION NETWORK: - BHEL Shall Provide Construction Power free of charge at 415V level at one/two point (within 150 M from his workplace), bidder has to make his own distribution arrangement to draw electricity. The bidder will have to procure & install adequate area illumination system during construction right from start of his work. This system will include temporary pole lighting, portable lighting towers with sufficient DG back-up for area lighting at different working areas for execution of the work & safety of workmen within the quoted rate. The illumination should be such that minimum illumination requirement as specified in specification or any-where for general illumination is maintained. In case BHEL assigns work at multiple scattered areas and subject to availability of BHEL water network, BHEL may consider providing additional points.
3.3.2	The bidder shall have to provide earth leakage circuit breaker at each point wherever human operated electrical drives / T&Ps are deployed.
3.3.3	The power supply will be from the available source of customer. BHEL shall not be responsible for any inconvenience or delay caused due to any interruption of power supply / variation in voltage level and no compensation for delay in work can be claimed by the contractor due to such non-supply on the grounds of idle labour, machinery or any other grounds.
3.3.4	Bidder will have to arrange sufficient illumination at their own work areas.
3.3.5	Deleted
3.3.6	The contractor shall have to make arrangement at their own cost for illumination that will be required in the working area for execution of the work & safety of workmen.
3.3.7	The contractor shall have to make arrangement at their own cost for illumination etc. in labor colony. However there may be provision of Chargeable Power for labor colony for which contractor has to install meters and necessary accessories
4.0	TOOLS & PLANTS
4.1	All the tools and plants required for execution of the above work are in contractor's scope.
5.0	MATERIAL HANDLING (BHEL ISSUED MATERIAL)
5.1.1	Reinforcement (TMT bar) earthing Strip/Bar, structural steel (MS plate/ ISMB/ channel/ angle/chequered plate/ stainless steel plate/liner excluding embedments) only will be issued free of cost by BHEL for use in the work covered in this contract. All other materials required for proper completion of job shall be provided by the contractor and quoted rates shall be inclusive of this. Please note that BHEL will only issue the above free materials if has written in the description of the BOQ.
5.1.2	Vendor has to arrange lifting, shifting & transportation of TMT bar or other free issued material from BHEL store without any additional cost.
5.1.3	BHEL reserve the right to recover from the contractor any loss arising out of damage/ theft or any other causes of the materials issued to him at any point.
5.1.4	Open land (very limited space) for storage shall be provided by BHEL on free of cost basis as per availability.

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	You shall make complete arrangement of necessary security personnel, to safeguard all such materials in your custody. Materials issued will be used only for construction of permanent work. You shall take care of material issued by BHEL and shall protect the same from theft, damage and weathering. Barbed wire fencing of the steel storage yard, reinforcement bending yard area etc. are to be done by the contractor at his own cost. Contractor shall also remove grass, bushes, trees etc. wherever required off the land provided to him and shall make proper continuous up-keepment of the open yard/ land by removing grass, bushes trees etc. and same is included under the scope of his work & no extra payment shall be made to the contractor in this regard.
5.1.5	The contractor shall in no case be entitled for any compensation or damages on account of any delay in supply or non-supply thereof for all or any such material.
5.1.6	Excessive rusting of steel must be avoided. In case, due to any cause attributable to the contractor, such clotting of and/ or rusting of steel occur rendering the same unusable, then such quantity of steel shall be recovered from the interim payment at the penal rate specified in the tender.
5.1.7	No material shall be issued to the contractor except as those indicated above, i.e. steel unless otherwise expressly provided for in the contract. Contractor will have to make his own arrangement at his own cost for procurement of any other material as required for the works and of such quality as acceptable to BHEL.
5.1.8	The contractor shall maintain proper store account for all the BHEL issued materials and shall give three copies of monthly computerized reconciliation statement of such account to the BHEL.
5.1.9	Contractor shall carry out in complete association with BHEL, material management functions and execution like day to day update of materials, issued to contractor, accounting for surplus/ scrap material returned etc. These functions shall also be carried out through computerized system utilizing suitable software. Contractor shall provide experienced software personnel to associate on dedicated basis for efficient discharge of the same.
5.1.10	The contractor shall solely be responsible for the safety & quality of material after it is handed over and issued to contractor by BHEL.
5.1.11	BHEL issued materials shall not under any circumstances be taken out of the project site unless otherwise permitted by BHEL.
5.1.12	Deleted
5.1.13	No separate rate will be applicable for the above job. The contractor will quote the rate for the items inclusive of all charges for the above job.
5.1.14	Bidder's scope of handling of steel under the scope of this tender includes stacking/ storing of materials over concrete sleepers. Bidder scope shall include provision of concrete sleepers for this purpose and no separate payment against the same will be made by BHEL. After completion of the job bidder shall take back the sleepers Bidder's quoted rate/ price shall be in consideration to this.
5.2	DELETED
5.3	ISSUE OF STEEL Steel shall be provided only against those items of the BOQ where it is specifically mentioned that Steel shall be supplied by BHEL as free of cost)
5.3.1	The steel shall be issued to the contractor free of cost on the following basis.
5.3.1.1	Structural steel (MS plate, angle, channel, ISMB, Stainless steel plate/Liner, chequered plate and EOT crane rails) – Weighment basis (unit – MT).
5.3.1.2	Reinforcement steel(TMT) and earthing rod (MS round) – Weighment basis (unit – MT).

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5.3.2	All the steel (structural steel, reinforcement, earthing strip/bar) issued by BHEL shall be properly accounted for. The total quantity of steel required for the work will be calculated from the approved Bar Bending schedule, fabrication drawings, approved laps, chairs and lugs. The measurement for payment as well as for accounting shall be based on the sectional weights.		
5.3.3	In case any such sectional weights are not available in the above documents, the manufacturer recommendation shall be binding.		
5.3.4	The steel issued to the contractor shall be mainly in standard length and sections as received from the supplier. However, the contractor shall be bound to accept the steel in length as available in the project stores and no claim for extra payment because of issue of non-standard length will be entertained.		
5.3.5	In case MS flats as required in the fabrication of structures are not available, you shall cut such width out of the available MS plates to make flats at no extra cost till such material is available and procured by BHEL.		
5.3.3	The contractor shall satisfy himself of the quality and quantity of the materials at the time of taking delivery from BHEL stores. No claims whatsoever will be entertained by BHEL because of quality or quantity after the materials are taken by contractor from BHEL stores.		
5.4	ISSUE OF READY MIX DESIGN(RMC)		
5.4.1	The RMC shall be issued to the contractor free of cost as per item of the Price Schedule.		
5.5	Quarterly requirement of steel must be positively submitted by the contractor at the last month of the previous quarter. In addition, the contractor shall also furnish the estimated requirement of steel during a month by the third week of the previous month indicating his requirement.		
5.6	Bidders to ensure that no lamination materials are taken over by them from BHEL. Fabrication wastage, if any due to above, shall not be compensated by BHEL		
5.7	Bidder to note that steel required for his enabling job like store/ site office etc. shall be arranged at his own cost.		
5.8	RETURN OF MATERIALS		
5.8.1	RETURN OF STEEL INCLUDING SCRAP		
5.8.1.1	All surplus steel and all wastage materials will be taken back on weight basis.		
5.8.1.2	Surplus, unused and un-tampered steel shall be sorted section-wise and returned separately at a place directed by BHEL/ engineer within the project area. Return of such materials will not be entitled to any handling and incidental charges.		
5.8.1.3	Scrap generated after reconciliation shall be the property of BHEL. All wastage/ scrap (including wastage, unusable scrap) shall be returned to the stores on weight basis and a receipt obtained for material accounting purposes. Return of such material will not be entitled to any additional cost due to handling and transportation and incidental charge.		
5.8.1.4	Scrap for reinforcement steel and structural steel shall be returned separately		
5.9	RMC & STEEL CONSUMPTION AND WASTAGE		
5.9.1	READY MIX CONCRETE (RMC) WASTAGE		
5.9.1.1	Allowable wastage – One and half (+1.5%) of theoretical consumption of RMC unless specified otherwise in the technical specification.		
5.9.1.2	For any material issued by BHEL to the contractor free of cost, and which is not accounted for by the contractor to BHEL, then recovery for such material shall be affected at penal rates.		
	SL	RMC consumption	Basis of issue & penal recovery
	C-1	Theoretical consumption (without considering any wastage or loss).	Free

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	C-2	Actual consumption being Limited to plus one and half percent (+1.5%) of aforesaid theoretical consumption towards allowable wastage.	Free
	C-3	Actual consumption beyond one and half percent (+1.5%) of above (C-1).	Penal rate
5.9.5	REINFORCEMENT STEEL CONSUMPTION		
5.9.5.1	The theoretical consumption of various diameters of reinforcement and earthing MS round shall be based on approved construction drawing and bar bending schedule. Weight shall be calculated considering the sectional weights as per Indian standards. No extra cost shall be payable to the contractor for any deviation in weights for the different procedures adopted for issue and calculation of the theoretical consumption including rolling tolerances.		
5.9.5.2	Actual consumption = Issue – Surplus		
5.9.5.3	Surplus = Un-tampered and unused quantity of steel returned by the contractor to BHEL store along-with relevant documents. However, cut pieces of length greater than or equal to 5.0 m in good condition as per judgement of the engineer shall be treated as surplus steel. If contractor deposits/returns steel more than the allowable wastage quantity to BHEL as specified in clause No. 5.10.1 & 5.12.1 then same quantity will be considered for penal recoveries.		
5.9.5.4	Wastage = Actual consumption – Theoretical consumption.		
5.10	REINFORCEMENT STEEL WASTAGE		
5.10.1	Allowable wastage – Three Percent (+3%) of the theoretical consumption shall be considered as allowable wastage.		
5.10.2	Wastage and scrap shall be as per actual weighment basis.		
	SL	Reinforcement steel	Basis of issue & penal recovery
	R-1	Theoretical consumption (without considering wastage and scrap or loss)	Free
	R-2	Wastage limited to plus three percent (+3%) of aforesaid theoretical consumption (R-1) towards allowable wastage.	Free
	R-3	Wastage beyond three percent (+3%) of the theoretical consumption above (R-1).	Penal rate
5.11	STRUCTURAL STEEL CONSUMPTION		
5.11.1	Deleted		
5.12	Deleted		
5.13	COPPER STRIP/BAR/CONDUCTOR CONSUMPTION-DELETED		
5.14	COPPER STRIP/BAR/CONDUCTOR – WASTAGE---DELETED		
5.15	RECONCILIATION OF BHEL ISSUED MATERIALS		
5.15.1	The contractor shall submit a reconciliation statement of RMC and steel issued to him once in every two months. The same may be submitted along with each RA bill. Reconciliation shall be done on total concrete consumed for various grades combined together and recovery if any shall be done at prevailing highest rate amongst the grade of concrete consumed.		
5.15.2	At the time of submission of bills, the contractor shall properly account for the material issued to him as specified herein to the satisfaction of BHEL certifying that the balance materials are available with contractor's custody at site.		
5.15.3	If it is noticed by BHEL that the wastage is high and calls recovery at the penal rate, then BHEL will proceed for recovery for the excess wastage as per penal recovery rates as specified.		

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5.15.4	The approved drawings/ bar bending schedules are to be considered for the purpose of reconciliation of materials.	
5.16.0	RECOVERY OF MATERIAL	
5.16.1	If wastage exceeds the specified limit, the recovery of excess wastage shall be made from monthly RA bill at the penal rate stipulated below.	
5.16.2	PENAL RATE OF MATERIALS	
	Item	Penal rate (USD)
	Reinforcement steel etc.	1000/- per MT.
	Structural steel/GI Flat	1560/- per MT.
	Ready Mix Concrete (RMC)	105% of BHEL purchase cost of Grade Of Concrete having the highest rate amongst the grade of concrete consumed.
5.16.3	The contractor shall ensure that all wastage material (reinforcement & structural steel, GI Flats, Copper strips & bars, SS plates, conductors) shall be deposited to BHEL store with proper weighment certification as per instruction of BHEL. The total wastage quantity is the property of BHEL and non-return of such quantity shall attract penal recovery as per above. BHEL shall inspect contractors work area & storage yard to ensure that no scraps are lying unreturned to BHEL.	
6.0	INSPECTION, TESTING AND INSPECTION CERTIFICATES	
6.1	The engineer, his duly authorized representative and / or an outside inspection agency acting on behalf of BHEL / owner shall have access at all reasonable times to inspect & examine the materials & workmanship of the works during its manufacture and if part of the works is being manufactured or assembled on other premises or works, the vendor shall obtain for the engineer and for their duly authorized representative permission to inspect as if the works were manufactured or assembled on vendor's own premises or works. Necessary arrangement for carrying out inspection including supply of labour, IMTEs, area illumination and scaffolding, if required will be vendor's responsibility and same has to be carried out within the quoted price.	
6.2	To facilitate advance planning of inspection in addition to giving inspection notice the vendor shall furnish quarterly inspection program indicating schedule dates of inspection at customer hold point and final inspection stages. Updated quarterly inspection plans will be made for each 3 consecutive months and shall be furnished before beginning of each calendar month.	
6.3	Before any plant / equipment leaves the place of manufacture, BHEL shall be given the option of witnessing inspections & tests for compliance with specifications & related standards. The vendor shall give the engineer/ inspector 15 days written notice of any material being ready for testing. Such test shall be to the vendor's account except for the expenses of the inspector. The engineer / inspector, unless the inspection is waived will attend such tests within 15 days of the date on which the equipment is notified as being ready for test / inspection, failing which the vendor may proceed with test which shall be deemed to have been made in the inspector's presence and he shall forthwith forward to the Inspector duly certified copies of test reports.	
6.4	The engineer or inspector shall within 15 days from the date of inspection as defined herein give notice to the vendor of any objection w.r.t. drawing / equipment / workmanship which in his opinion not in accordance with the specification / contract. The vendor shall either make modification as may be necessary to meet the said objection or explain to the engineer/ inspector giving reasons that no modifications are necessary to comply with the contract.	
6.5	When the factory tests have been completed at the vendor's or sub-vendor's works, the engineer or inspector shall issue a certificate to this effect within reasonable time after completion of tests but if the tests are not witnessed by the engineer or Inspector the	

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	certificate shall be issued within 15 days of the receipt of vendor's test certificate by the engineer inspector. Completion of these tests or the issue of the certificates shall not bind BHEL to accept the equipment should it on further tests after erection be found not to comply with the contract.
6.6	In all cases where the vendor provides the tests at the premises of the vendor or any sub-vendor, the vendor except where otherwise specified shall provide free of charge such items as labour, materials, electricity, fuel, water, stores, apparatus and instruments as may be reasonably demanded by the engineer/ inspector to carry out effectively such tests on the equipment in accordance with the contract and shall give facilities to the engineer/ inspector to accomplish testing.
7.0	INSURANCE
	The contractor shall make available the original insurance cover(s) taken by him, against his T&P, assets and workmen compensation and any other cover as may be pertinent to his works and obligatory in terms of law, to BHEL for necessary verification in regard to their adequacy, before commencement of work. However, irrespective of such verification/ acceptance, the responsibility to maintain adequate insurance coverage at all times during the period of the contract shall be of the contractor alone. Such insurance covers to be taken shall be in the joint names of the owner and the contractor. The contractor shall however be authorized to deal directly with the Insurance company(s) and shall be responsible in regard to maintenance of such insurance covers. Insurance covers to be taken by BHEL / Customer shall be as stipulated under relevant clause of Volume-IB.
8.0	DEVIATIONS/ CLARIFICATIONS
8.1	Normally no deviation with respect to tender is acceptable to BHEL. However, in case of unavoidable circumstances, the bidder may submit their query for seeking clarifications of BHEL as per modality stipulated in NIT or may submit the same along with his offer as per prescribed schedule/ format without any ambiguity. Any assumptions, presumptions, deviations etc. indicated or implied anywhere by the bidder except those indicated in the deviation schedule/ format will not be recognized and will not form a part of consideration/ offer. In the absence of such filled-up schedule/ format it will be understood and agreed that the bidder's offer is based on strict conformance to the specification and no negotiation would be allowed in this regard. BHEL reserve the right not to recognize any/ all deviations submitted after opening of the bid.
9.0	DEWATERING
9.1	Contractor shall ensure at all times that his work area & approach / access roads are free from accumulation of water, so that the materials are safe and the erection / progress schedule are not affected. No separate claim in this regard shall be admitted by BHEL. No separate payments for dewatering of subsoil, surface water or catchments water, if required, at any time during execution of the work including monsoon period shall be considered by BHEL. All dewatering pumps including high capacity pumps and diesel engine driven pumps are to be provided by successful bidder within finally accepted rates.
10.0	TIME SCHEDULE/ COMPLETION PERIOD
10.1	The entire work under the scope of work shall be successfully completed in all respect within 12(Twelve) months from date of issue of LOI. Mobilization at site shall be done within 20 days from date of written intimation from BHEL. Contractor shall also responsible to complete the foundations/structures in their scope of contract within schedule time frame as prescribed/finalized by BHEL/BIFPCL.

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	The purpose of the schedule is timely commencement of work in identified critical areas and completion of it as per time duration specified in the contract document as above. If for any reasons, the successful vendor fails to progress satisfactorily or the priorities of the structures changes or BHEL feels that a particular structure cannot be completed in line with the project requirement/schedule, in such cases BHEL reserves the right to exclude part or full scope of those critical/priorities structures from the vendor's scope of work and decision of BHEL shall be final and binding to the Vendor. However, BHEL shall ensure minimum 50% of the contract value to be executed within the provision of the contract. (2) Minimum 50Nos Civil workmen at site is to be mobilized at site initially which shall be progressively increased to 150Nos within two months and subsequently to be increased based on monthly L-3 / L-4 schedule of programme. (3)Minimum labour as mentioned is to be deployed to start work in multiple work front as required by BHEL. (4) To meet project requirement it is envisaged that night shift working has to be done for which manpower deployment along with Engineers/Supervisors /Safety personnel with matching T&P's has to be arranged.
11.0	PRICE BID
11.1	Bidders should quote prices in USD as per format, Volume-III-Price Schedule provided in the tender. Bids shall be evaluated based on total price quoted.
12.0	TERMS OF PAYMENT
12.1	The contractor shall submit his running bill (RA bill) once in a month at the end of each month in line with payment terms/ billing schedule indicated below. The RA bill complete in all respects accompanied by BHEL engineers certified/ measurement sheet, jointly signed, will be paid after passing of the bill subject to completeness & correctness. The measurement will be taken as specified in terms & conditions of contract and certified by the BHEL engineer of actual work. However, no extra payment shall be made in the event of delay in release of payment. 95% pro-rata monthly RA payment shall be considered for payment based on monthly work completion certificate to be issued by BHEL engineer as per approved BBU/Price Schedule. The payment shall be released within 30 days from the date of submission of complete invoice along with all necessary documents including Engineering Certificate to BHEL.
12.2	Out of above 95%, 1.5 % of gross bill amount shall be paid in the following manner on certification by BHEL engineer after compliance of each of following activity in each month. In case of non-fulfilment of respective activity by contractor in each month, no payment shall be made by BHEL against corresponding activity and no claim of bidder at a later date, whatsoever, in this regard shall be entertained by BHEL.
12.2.1	0.7 % shall be paid on compliance of housekeeping of contractor's working area and store/ office areas.
12.2.2	0.3 % shall be paid on compliance of general illumination of contractor's working area and stores, office area.
12.2.3	0.2 % shall be paid on compliance of applicable OHSAS requirement as per guidelines of BHEL/ PSER and as specified in the tender.

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12.2.4	0.3 % shall be paid on compliance of applicable safety requirement as per guidelines of BHEL/ PSER and as specified in the tender.	
12.3	Balance 5% of contract value shall be paid against FAC (Final Acceptance Certificate) to be issued by BHEL / BIFPCL after completion of warranty period. However, if desired by vendor, this 5% may be released by BHEL against submission of equivalent amount bank guarantee as per Performance Bank Guarantee format, to be kept valid till warranty period, subject to the followings:	
12.3.1	(i) Receipt of certificate that all works are completed in all respects;	
12.3.2	(ii) Reconciliation of materials / T&P / MMD;	
12.3.3	(iii) Completion of final bill formalities and	
12.3.4	(iv) Handing over to BHEL.	
12.4	Contractor shall make their own arrangement for making payment of impending labour wages and other dues in the meanwhile.	
12.5	Contractor have to submit BHEL entry gate pass of steel, and other materials required for the work, in absence of which their corresponding RA bills shall not be processed. Steel/other material reconciliation statement shall have to be submitted at an interval of two RA Bill. In case of wastage beyond normal limit, recovery shall be initiated at the rate as may be decided by BHEL including OH.RMC issue statement along with reconciliation statement shall have to be submitted against each RA Bill. Wastage beyond normal limit shall be recoverable from vendor along with applicable OH .Rate shall be decided by BHEL.	
12.6	Subject to any deduction which BHEL may be authorized to make under the contract, the contractor shall on the certification of the BHEL engineer at site, be entitled to payment explained hereunder.	
12.7	The bills will be sent to BHEL, Site Finance for scrutiny and payment will be made after processing / verification only.	
12.8	The measurement will be taken by BHEL engineer as per relevant clause of GCC and certify regarding actual work executed in measurement book and bills for work. However no additional payment shall be made in the event of delay in release of payment beyond the stated period.	
12.9	All admissible recovery / adjustment, etc. shall be made from interim payable amount.	
12.10	BHEL site at its discretion may split up percentage break up and effect payment to suit the site condition, cash flow requirement, according to the progress of work.	
12.11	Payment shall be made in USD as per order. However, for reasons, solely at the discretion of BHEL, if USD amount is not possible to be paid then BDT equivalent of USD will be paid as per of our currency Matrix. The quoted / accepted rates shall remain Firm throughout the contract period including extension period, if any, without any escalation till handing over. The payment shall be made to the successful bidder ,against all invoices raised ,in Bangladesh only.	
13.0	DELETED	
14.0	TAXES, DUTIES ETC	
14.1.0	IMPORT DUTIES: Exemption of Duties/Taxes imposed on imported goods/equipment for implementing Rampal 1320 MW (Coal-based) Friendship super Thermal power project under Bagerhat district of Khulna Division operated by Bangladesh-India Friendship Power Company (Pvt) Limited (BIFPCL)	

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14.1	As per Special Order #373/655 dtd 13.12.2018 it is to be noted that all imported goods/ equipment for implementation of the 1320 MW Rampal project shall be exempted from imposable import duties, VAT and supplementary customs duty. During importing temporarily imported erection materials, equipment and spare parts and permanently imported plant and equipment exempted under this order will not be sold or otherwise transferred without payment of duties and taxes imposable on those. Exemption shall not be extended to such goods which the bidder might import for support of their operational activities but not directly attributable for execution of the project such as air conditioner, refrigerators, vehicles, household materials etc. Any documentation needed for availing of Duty Free Imports will be submitted by the bidder in reasonable time having regard to the time for delivery of the work and the time for completion.	
14.1.2	In case of any local purchases by the Bidder on which Bidder shall have to pay VAT, the same shall have to be borne by the Bidder.	
14.1.3	Temporarily imported erection materials, machineries and spare parts during construction period of Project are exempted from payment of Customs Duty and VAT. Such items shall be exported within six months from the commercial operation date. Documentation for the same to be submitted / maintained by the bidder.	
14.1.4	Any Taxes for exporting material from source country & as applicable in the source country shall be on bidder's account. However, bidder to take into consideration Duty Free Export Provisions in source country, as applicable, including that in GST in case of exports from India. As such, while offering the rates, the bidder may take into account the benefit of above provisions, as the cost of input to the bidder will be net of such taxes and adjust their offer price accordingly to make it more competitive.	
14.1.5	Bidder may import the material required for permanent works for which exemption of Custom Duty as per local law shall be applicable provided necessary documents are submitted.	
14.2.0	BANGLADESH VAT	
14.2.1	The Bidder shall submit copy of VAT registration Certificate Musak-2.3, TIN Certificate, Trade License to the BHEL site office immediately after receiving the Order but before raising the first Tax Invoice against this tender.	
14.2.2	As per the provisions laid down U/S49(5) of Bangladesh VAT Act 2012, Output Services of the Bidder shall attract ZERO (0) VAT. Thus BHEL shall not do any VDS. Hence Bidder shall not load any VAT on Output Services.	
14.2.3	Adequate documents for not charging/ claiming VAT from BHEL shall be made available to the Bidder.	
14.2.4	The bidder shall raise Tax Invoice (Challan Patra) as per Rule 40(d)(v) (Musak-6.3) of the Bangladesh VAT and supplementary Duty Rule, 2016 mentioning Name, Address and VAT Registration Number of BHEL site office.	
14.2.5	Bidder shall note that the Tax Invoice complying with Rule 40(d)(v) of the Bangladesh VAT and supplementary Duty Rule, 2016 must contain the 'Bill to' and 'Ship to' details as below: BHEL Bangladesh VAT Regn. No. 000761853-0208 Bharat Heavy Electricals Limited Power Sector Eastern Region, 2x660 MW Maitree Super Thermal Power Project, Moidara Village, Rampal Upazila, Bagerhat District, Bangladesh	

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14.2.6	Bidders shall quote price excluding Bangladesh VAT on Output Services as no VAT is leviable on the same. In this connection please note that VAT, if and as applicable, on Bidders Quoted Price and in case BHEL is unable to provide exemption documents shall be payable extra.	
14.2.7	Value Added Tax Deduction at Source:	
14.2.7.1	BHEL will not deduct any VAT from Bidder's Gross Bill and such bidder need not to load any Output VAT in Bidder's quoted price	
14.3.0	INCOME TAX DEDUCTION AT SOURCE:	
14.3.1	Bidder should have valid 12-digit TIN number in Bangladesh prior to start of work. Advance Income Tax (AIT) under the Income Tax Ordinance, 1984 (and rules made thereunder) shall be deducted at prevailing rates on Gross Invoice value from the bills unless Exemption Certificate from the appropriate authority/ authorities is/ are furnished under Income Tax Laws of Bangladesh	
14.3.2	Since payment shall be made in Bangladesh. Bangladesh Income Tax (AIT) shall be deducted, if applicable.	
14.4.0	The Bidder shall carry out their own tax diligence to get acquainted with the relevant rules and regulations of Bangladesh pertaining to the subject job.	
14.5.0	Except otherwise mentioned above bidder shall quote their rates/ price inclusive of all taxes, duties, cess, any State or Central Levy, social security contribution and other Taxes in or outside Bangladesh (but excluding Bangladesh VAT & Import Duties) in line with provisions as mentioned above etc. together with variation thereto during contract period including extension, if any. BHEL shall not release any additional payment in this regard.	
14.6.0	The bidder is responsible for compliance of all relevant Tax Laws of Bangladesh and all other related places outside Bangladesh in connection with this contract and BHEL will not bear any such liability. Non Bangladeshi Bidder shall have to obtain Registration under BIDA and shall have to mandatorily comply the norms, as may be prescribed.	
14.7.0	New tax & duties, if imposed subsequent to latest due date of offer submission, as per NIT & TCN, as applicable, by statutory authority after due date of submission of latest price offer and within the contract period including extension, if any (provided reason for extension is not attributable to vendor), shall be reimbursed by BHEL at actual on production of relevant supporting document to the satisfaction of BHEL. However, the vendor shall obtain prior approval from BHEL before depositing new taxes & duties. Benefits and/or abolition of all existing taxes must be passed on to BHEL against new Taxes, if any, proposed to be introduced at a later date.	
15.0	PROJECT MANAGEMENT/ CONSTRUCTION MANAGEMENT	
	To meet the need of construction management at site, contractor shall provide the following services within quoted/ accepted rates.	
15.1	CUSTOMS CLEARANCE	
	The Contractor shall be responsible for Bangladesh customs clearance of all materials, supplies, equipment, tools and other articles shipped into Bangladesh by him for the implementation of his works, including the food and the personal effects of the Contractor's personnel. All payment for clearance charge, storage charge, etc. which are imposed by the relevant agencies of the Government of Bangladesh, relating to the clearance of equipment, materials and Plant that will be incorporated in the Permanent Works or relating to the Temporary Works shall be borne by the Contractor. Further, if the Contractor is delayed in submitting necessary shipping documents to the Employer, the demurrage charges by the Port Authority will be borne by the Contractor. Tools and equipment and other equipment of the Contractor for use during construction but which are to remain the property of the Contractor and which are to be exported by the Contractor from Bangladesh at the completion of the Work shall be carefully documented and specially listed to facilitate both import and export. The Contractor shall determine prior to shipment the customs regulations applicable to this special case	

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	as well as normal import rules and regulations applicable. The Contractor shall also be responsible for inland transport by barge/ truck/train to the Site.
15.2	RECEIVING, TRANSPORTING, HANDLING AND STORAGE
	The Contractor shall receive, transport, handle, store and install all materials and equipment furnished under these specifications, or otherwise involved in the implementation of this Contract. It shall be the responsibility of the Contractor to determine the availability and capacity of transportation and unloading facilities (including for the transportation, delivery and receipt of all equipment, materials, Plant to the Site) and to make the required arrangements to secure the necessary facilities for the same. The Contractor shall be responsible for the prompt unloading of all equipment or materials. The Contractor shall pay any demurrage incurred due to delay in unloading and for any other reasons. The Contractor shall handle materials and equipment carefully to prevent damage or loss. The use of bare rope slings for handling will not be permitted unless specifically approved by the Engineer. Special handling devices shall be used when necessary to avoid damage. In addition, the Contractor shall also comply with the requirements of Technical Specification with respect to the receipt, transportation, handling and storage. If BHEL has to unload of RS, SS, Copper or any other free issue materials before mobilization of the contractor for the interest of the project or If contractor fails to unload the BHEL free issue materials at site for any reason then BHEL shall be unloading the same and the cost of unloading with following rates shall be deducted from contractor RA Bill. i) For RS, SS, Copper or any other materials:- USD 4/MT or actual cost , whichever is higher.
15.3	PLATFORMS
	Open platforms shall be constructed by the Contractor at least 50 cm above grade and shall have adequate flooring and base structure to support the stored materials and equipment.
15.4	INDOOR STORAGE
	Indoor storage sheds shall be constructed by the Contractor by suitable means for keeping materials and equipment from contact with the ground and to protect it from the environment and outside atmosphere. Sensitive equipment (including inter-alia, electrical, I&C and other equipment) must be kept in dust proof and ventilated rooms and means have to be provided to maintain the moisture content at required levels, in accordance with Good Industry Practices.
15.5	SHORING
	Shoring shall be provided by the Contractor to safely support materials and equipment not less than 30 cm above the ground. The ground shall be compacted and concreted or asphalted.
15.6	WEATHERPROOF COVERINGS
	Weatherproof and flame resistant sheeting of sufficient size for outdoor storage shall be provided by the Contractor. The sheeting shall be carefully placed and tied down to

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	prevent moisture and wind from entering underneath the sheeting and to otherwise protect the equipment, materials and other Plant.
15.7	IDENTIFICATION OF CONTRACTOR'S EMPLOYEES, VEHICLES & BUILDINGS The Contractor shall provide each of his employees and his Subcontractor's employees with a name tag bearing the picture, the name or initials of the employee, a serial number and the name of the Contractor. Each employee shall wear his badge visibly to the security personnel at any time. Subcontractor's employees with a name tag bearing the picture, the name or initials of the employee, a serial number and the name of the Contractor. Each employee shall wear his badge visibly to the security personnel at any time. All vehicles and large equipment furnished and used by the Contractor or his Subcontractors on the Work shall be clearly marked with the Contractor's or Subcontractor's business name. The Contractor's offices, stores, depots and other facilities shall also be clearly identified. The detailed requirements are defined in the Health, Safety and Environment (HSE) Plan of BHEL. Around-the-clock security presence and operational routine shall be maintained throughout the year. Passes and temporary identification permits shall be issued and examined and access to any part of the Site, the site offices and living accommodation shall be controlled and limited to those who have an authorization.
15.8	EXPATRIATE PERSONNEL The Contractor shall submit to Employer data of all personnel he intends to bring into Bangladesh for the performance of the Work. This data shall include the name and present address of each person, his intended assignment and responsibility in connection with the Work and a concise resume of his experience in the type of work to which he will be assigned. This data shall be submitted to the Employer at least thirty (30) days prior to their expected arrival in Bangladesh. Any expense associated with illness of the Contractor's personnel, including replacement thereof, shall be to the Contractor's account. Costs of passports, visas, travel documents, inoculations and other incidental expenses incurred by the Contractor's non-Bangladesh employees and their dependents occasioned by travel to and from Bangladesh shall be borne by the Contractor. All accommodations and amenities for the Contractor's personnel and families (including all staff and labour) must be provided by the Contractor, and the Employer shall not have any liability for the same.
15.9	SAFETY The Contractor shall comply with all ordinances and regulations including, but not limited to, National, State, Municipal laws and Department of Labour, Transmigration and Co-operation Regulations, and other Applicable Laws that are in force in the locality of the Works and shall comply with any instructions that may be from time to time issued by Employer. The safety rules and regulations laid down in the Health, Safety and

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	Environment (HSE) Plan are to be strictly adhered to.
15.10	CONTRACT PLANNING AND CONTROL Before starting the Work at the Site, the Contractor shall submit the detail site management organization for approval by the Employer. Such proposals shall show clearly the Contractor's key personnel, classification and qualification with the detailed information and curriculum vitae for above key personnel. The Contractor's Representative, site manager and senior key personnel who will be responsible for working closely with the Employers staff to achieve efficient execution of the Contract shall be competent to conduct meetings and communications in the English language. The management organization shall include a planning and programming tools covering the Work, and shall apply the latest techniques in communication and analysis. The Contractor shall nominate a planning engineer to co-ordinate all planning activities.
15.11	RELEASE OF INFORMATION The Contractor shall not communicate or use in advertising, publicity, or sales release, photographs or other reproductions of the Work under this Contract, or descriptions of the size, dimensions, quantity, quality, or other information concerning the Work unless prior written permission has been obtained from the Employer.
15.12	SAFETY AND ACCIDENT PREVENTION It shall be the Contractor's responsibility to maintain throughout the construction period, a safety and accident prevention program satisfactory to the Employer which meets the requirements of Applicable Laws and of all other Governmental Authorities authority having jurisdiction over the Works. The rules and regulations laid down in the Health, Safety and Environment (HSE) Plan must be adhered to at all times.
15.13	SECURITY The Contractor shall be solely responsible for the security of all equipment and materials incorporated or to be incorporated in the Work by him and all equipment, materials, tools, supplies, structures, facilities and others properly used in the execution of the Work while in his care and custody. The Contractor shall conform also to any specific security requirements of Employer but such compliance shall not relieve the Contractor from the total responsibility for security.
15.14	HOUSING & TRANSPORT The Contractor shall arrange for suitable housing units together with furnishing and utilities in the close proximity of the construction Site for accommodation of all his expatriate personnel. If the services of any expatriate personnel of the Contractor or its Subcontractors If the Contractor decides in consultation with the Employer that the health or safety of any of his personnel is or might be jeopardized by political or health hazards in Bangladesh, the Contractor may, after forty-eight (48) hours' notice, order its employees and the employees of its Subcontractors and suppliers to return to their headquarters or other safe location, in which case the Work will be deemed to be suspended for the duration.

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	The Contractor shall provide to the extent agreed transport vehicles for use during construction period by the expatriate as well as local personnel.
15.15	PROPRIETARY NAMES Whenever a material or article is specified or described on the plants by using the name of a proprietary product or by using the name of a particular manufacturer or vendor, the specific item mentioned shall be understood as establishing the type, function and quantity desired. Unless otherwise specified, other manufacturers' products which in the opinion of the Employer are equivalent of those specified will be accepted. Such items shall be submitted for approval prior to their incorporation in the Works.
15.16	PERFORMANCE OF THE WORK The Contractor shall conduct all Works in such a manner as to cause the least possible disturbance or damage to the environment. In cases where some temporary disturbance or damage is unavoidably caused due to the nature of the work, the Contractor shall, as soon as possible, remove the cause of such temporary disturbance, repair the damage and, in general, restore the affected areas to their original condition to the extent possible, and in a manner satisfactory to the Employer, the landowner and any authorities. Prior to commencement of the Work, the Contractor shall provide details of its EMP specifically addressing the following: Environmental management system and manual – policies, standards and procedures, and programs; organization / responsibilities; Training Incident and accident investigation; Management support; Environmental protection, mitigation and restoration; Emergency preparedness and response; • Socio-economic plans, including historical and cultural resources; • audit, monitoring and corrective action; • information and records management; and, • Integration of safety & health requirements with the EMP. All aspects of the EMP and the environment work requirements are the Contractor's accountability and the Contractor, its management and its Site supervisory staff will be held responsible for its implementation. All relevant Health, Safety and Environment (HSE) issues, results of audit and monitoring plans and programs, and HSE performance indicators will be communicated to the Contractor's management and the Employer through daily inspection meetings and reports, weekly construction meetings, monthly meetings, and in terms of the monthly project report. The Contractor shall ensure that he has complete knowledge of all the laws, statutes,

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	statutory instruments, regulations, rules, treaties and conventions (by whatever name or title), environmental protection regimes and other Applicable Laws, in each of the jurisdictions where he shall perform the Work. The Contractor shall also take all necessary measures to protect the atmosphere, ocean, rivers, groundwater, seaports and land from pollution. In any event the Contractor shall promptly use its best efforts to eliminate and clean up any pollution caused, directly or indirectly, by the Contractor or which occurs at the Site, or other sites associated with this Work. The Contractor shall cooperate in all respects with any participant environmental representatives and with governmental persons, and allow them to inspect any and all equipment or operations that they wish to observe. The Contractor shall, at all times, be ready to discuss the implementation of the Contractor's safety, health and environmental protection program.
15.17	INSTRUCTION TO WORKERS (ORIENTATION / INDUCTION) The Contractor shall ensure that all employees, subcontractors, servants and agents (and employees, servants and agents of all Subcontractors) participating in the Work, are advised about the strategy and plan for managing the environmental-social issues related to the work, and on their role and responsibility; instructed on the requirements of environmental laws, rules, regulations and specific permit conditions applicable to the area and the Work; instructed on the application and use of the required personal protective equipment (PPE) for their job duties and functions; and, have received the appropriate training in the use, application and maintenance of PPE.
15.18	RISK MANAGEMENT The Contractor shall clearly state the management methods and techniques to be used to identify potential hazards and risks at any stage prior to the execution of a particular activity. If required, specific procedures shall be developed by the Contractor to eliminate or mitigate the hazard to a safe level prior to the work being authorized. All requirements of the project's environmental impact assessments ("EIA") and other relevant assessments and conditions of approvals accorded by the relevant Governmental Authorities must be considered by the Contractor in the development of the Contractor's Health, Safety and Environment (HSE) Plan, EMP and other related/relevant plans. The Contractor is required to implement a system whereby all risks associated with hazardous substances, whether chemicals, by-products, effluents or waste materials, are minimized and/or eliminated. In conjunction with its emergency plans and procedures, the Contractor shall develop and submit to the Employer's Representative a "Safety Philosophy Document" that details the strategy to be adopted for control and shutdown systems, including alarms and programmable electronic control systems.
15.19	EMERGENCY PREPAREDNESS, RESPONSE & CONTINGENCY PLAN The Contractor shall prepare an Emergency Preparedness, Response and Contingency Plan (a detailed program of action to minimize the effects of an abnormal event requiring prompt actions beyond normal procedures to protect human life, minimize injury and safeguard the environment) for environmental and personal safety emergencies or incidents. This plan shall be found within the Contractor's Safety & Health and/or Environmental Programs. The purpose of the plan shall be to limit

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	insurance and damage to people, property and the environment respectively. The plans, procedures, and trained personnel shall be in place for the duration of the Contract to manage and control emergency situations and incidents in a proper and expeditious manner.
15.20	SERVICING AND FUELLING To ensure adequate response capability in the event of a fuel, ground spill or other spill, all fuel transport vehicles and the Contractor's foreman vehicles shall carry a suitable amount of commercial absorbent material. In addition, floating absorbent pads and booms for spill clean- up on open water shall be kept accessible on the construction Site. All service vehicles and/or equipment utilized for re-fuelling must be equipped with automatic shut-off valves. All equipment or servicing activities with the potential for accidental spills (e.g., oil changes, hydraulic repair, coolants) will require appropriate containment methods to be in place (i.e., storage containers, impervious liners, absorbent materials, etc.) prior to the start of the activity.
15.21	SOIL AND GROUNDWATER PROTECTION The Contractor shall develop and implement soil and groundwater protection measures. Protection measures shall include building and impervious floors, where appropriate. The Contractor shall make an assessment of groundwater quality prior to the start of construction and prior to commissioning to demonstrate to Employer's Representative that construction activities have not adversely affected the environment. Groundwater quality shall be monitored throughout the construction phase.
15.22	HEALTH HAZARDS Worker and public health is a critical part of any HSE management program. The Contractor shall control substances and materials that may be a hazard to worker's health. These controls shall be a combination of hazard communication, safe work systems and the controlled handling and disposal of hazardous materials. The Contractor's controls shall commence at contract preparations and procurement stages, where all vendors and subcontractors shall be required to submit Material Safety Data Sheets ("MSDS") for all hazardous materials that will be supplied, provided or brought onto the Site. These MSDSs shall be forwarded to Contractor's HSE Manager for review and records management. In the event hazardous materials are to be used, the Contractor shall carry out assessments according to recognized international standards, to determine if there are any more suitable or less hazardous materials that could be substituted for the original materials. Only when the Project Manager, Employer and his Engineer and the Contractor are satisfied that assessments have been completed, and control measures are adequate to protect worker health, the materials shall be allowed on the project worksite. The Contractor's control measures shall include: ☐ Material transport, storage, labelling, packaging, and disposal, ☐ Personnel protective equipment (PPE), ☐ Health surveillance and monitoring, and

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	☐ Emergency procedures and training. All explosive materials to be used for blasting during Site preparation shall only be handled by approved and qualified personnel. All explosive materials shall be stored in a secure, limited access sites, protected from workers and the public, and removed from the site every day and immediately after use. All radioactive equipment and materials shall only be used by qualified, approved and permitted personnel. Radioactive materials must be stored in approved and protected container. Radioactive materials and waste products shall not be disposed of on-site but removed in protective containers and disposed at government approved storage and disposal sites
15.23	WASTE MATERIAL MANAGEMENT The Contractor shall ensure that waste management identification, handling, transport and disposal are addressed in the development of their HSE management plans. The Contractor's employees responsible for handling hazardous materials (including wastes) shall receive training and certification in the handling, transport, storage and disposal of chemicals and regulated or hazardous materials. Where applicable, Workplace Hazardous Materials Information System ("WHMIS") certification and training, or its equivalent, shall be made available to employees. Regular written updates shall be included for continued employee awareness. The Contractor shall ensure proper segregation and isolation for wastes that could react together in the event of a leak or other incident. These facilities shall include lockable, fire proof cabinets or storage in shelving units separated by fireproof barriers or walls. The Contractor shall dedicate a space for waste and drum storage. The storage area must be easily accessible for spill containment and emergency response and not be susceptible to flooding. For any waste storage area which could accumulate hazardous gases, vapors, or dust due to the nature of the wastes stored, the Contractor must supply suitable ventilation or other controls to ensure exposure by employees is kept below required minimum standards. Storage areas for hazardous wastes shall be designated as restricted areas and shall be suitably equipped to control an incident involving a leak or spill. The Contractor shall make available suitable fire extinguishing equipment and proper electrical bonding equipment in all areas involving the handling and storage of flammable and reactive wastes. Disposal of wastes by burning will not be allowed on the construction site. Sumps and waste pits shall not be used for waste storage at the work site. Sumps should only be used for temporary control and containment of spills, equipment leaks, etc. If the Contractor encounters former sump sites or waste pits during ground surveys, the Contractor shall identify and investigate the same. If any contamination is suspected, the Contractor shall excavate, remove and where required replace with an approved sump container system.

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	The Contractor shall develop and implement a waste disposal control system. This system shall control every load of waste leaving the worksite, detailing the type of waste disposal, waste origin and destination, approximate weight, date and transport details on a waste manifest/document. These documents shall be audited.
15.24	SPILL RESPONSE AND CONTROL All spills shall be stopped and cleaned up immediately to avoid potential impact to water and soil quality. All spills shall be reported using the Incident Management Process. Under no circumstance contaminated material may be “stored” on the work site. All spills shall be rapidly stopped and appropriately eliminated as defined in the Contractor’s Emergency Preparedness, Response and Contingency Plan. Spills shall be contained in a way that will prevent their redistribution. All ground spills shall be contained as quickly as possible through diking, suction methods, excavation and the use of absorbents or other appropriate recovery techniques. A list including the type, quantity and location of the storage of retaining and clean up equipment to be used during construction shall be prepared. The list shall include the procedures and mitigation measures to be used in case of a spill. A written inventory will also be prepared, before starting construction works, including lubricants, fuels, solvents, chemicals and other materials that might be accidentally discharged during construction. All on-site fuel storage tanks shall be located in an impermeable secondary containment area with a holding capacity equal to 110% of the largest tank within the berm. For above ground tanks, the tanks shall be surrounded by a berm, the entire area covered with a suitable commercial absorbent material and with a sealed plastic liner to form an area that can be pumped out in the event of a leak in the tank. A waste handling plan shall be made with the purpose of identifying the procedures necessary for cleaning and disposing of residues from a major spill. In the event of a spill, the Contractor shall make all resources available to contain and clean up the spill. Traffic shall be minimized in and around the spill site.
15.25	NOISE CONTROL Noise level specifications to be followed by the Contractor in design, assessment and monitoring activities are based upon the maximum (acceptable) levels which plant personnel may be exposed during their normal working duties. The Contractor shall be familiar with and comply with the environmental guidelines as issued by the relevant Governmental Authorities in Bangladesh, including the Department of Environment, Government of Bangladesh and other relevant Applicable Laws. All internal combustion motors of vehicles, machinery and equipment used during the construction phase, shall have adequate noise silencers, and shall be kept in good operating conditions, during the entire construction period. Where temporary noise pollution of greater than 85 dB will occur, temporary silencers shall be used. Equipment noise should not exceed the specified limits at accessible locations.
15.26	CONSTRUCTION TRAFFIC PLANNING The Contractor shall ensure that the construction Site is organized in such a way that pedestrians can move safely and without risk. The Contractor shall firstly select the

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	lowest period of traffic flow for equipment crossings; and secondly, ensure that traffic patterns and entrances to private and public roads for access are not obstructed during construction activities. All site entry will be controlled by vehicular passes. Road closures, on-site and off-site, shall be with the approval of the Contractor's site manager and/or road closure permit. Site traffic shall be minimized and speed limits posted and enforced.	
15.27	HOUSEKEEPING	
	All construction debris and other garbage shall be continuously collected and disposed at an approved facility. At the end of each day, all waste material shall be removed from the construction Site and deposited at the approved allocated area. The approved procedures to manage waste shall be specified in the Contractor's waste management plan. All empty hazardous material containers shall be removed from the work area as soon as is practicable. All empty gas containers and bottles shall be returned to their storage area and secured properly. The Contractor's shall prepare a pest and vector control program to address specific site conditions, including a mosquito control program.	
15.28	CONSTRUCTION CAMPS	
	The location of work places, camps, areas of storage and installation of works, compression, regulation and communication stations shall be located on levelled land, avoiding areas with non-cohesive soils to avoid erosive processes. Health conditions in the camp shall be controlled in order to prevent contamination of adjacent groundwater or surface water resources. Domestic sewage generated at the construction sites shall be eliminated by two systems of septic/absorption tanks or chemical toilets located on the sites. Solid combustible garbage shall be collected and secured daily, until disposal, to prevent the attraction of livestock, vermins and wild animals. Residue shall be disposed of, along with non-combustible garbage, in a disposal location approved by the Authorities. Upon abandonment, the camp site area shall be cleared of all trailers, piping, cable, insulation, lumber, blockage, metal wastes, etc., and re-graded according to the landscaping concept. These guidelines and procedures for the management of domestic and other waste shall be specified in a plan.	
15.29	SITE REGULATION MANUAL	
	The Contractor shall thirty (30) days prior starting any Work at the Site furnish a detailed and comprehensive site regulation manual for its proposed operation and works on the Site, which shall be based on the site related regulations and requirements in the Contract and which shall be subject to Employer's approval. All work on the Site, shall be carried out in compliance with the so approved site regulation manual.	
15.30	PLANNING & MONITORING	
15.30.1.1	Within 7 days of placement of order/ LOI by BHEL, successful bidder shall interact with BHEL site for kick-off meeting to discuss & firm up item-wise/ activity-wise schedule of construction so as to complete the entire job within the stipulated completion period, matching with project schedule. The bidder shall prepare detail construction schedule (L-3) as per completion dates given in this document. This schedule must include all milestone and key activities for each sub-system / components in the areas of engineering (wherever applicable), procurement,	

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	manufacture (wherever applicable), excavation / construction / erection. This network must conform to the overall project schedule. The bidder should also ensure monitoring of these activities at least weekly basis to start with and on daily basis whenever required by BHEL.	
15.30.1.2	The bidder shall also prepare progress report indicating progress on key activities, management summary for critical activities and list of actions requiring attention of BHEL. This schedule is to be preferably made in PRIMAVERA / MS PROJECTS, so that the same is compatible with BHEL's project management software.	
15.30.2	PROGRESS REPORTING	
15.30.2.1	The bidder shall submit daily, weekly and monthly progress reports for work force, materials reports, consumables (steel / gases / electrodes) report and other reports as per pro-forma considered necessary by BHEL. In case of any failure on contractor's part to comply with this, BHEL may at its discretion, consider to withhold part payment against their RA bills.	
15.30.2.2	The progress report shall indicate the progress achieved against planned with reasons indicating delays, if any, and shall give the remedial actions which the contractor intends to take to make good the slippage or lost time, so that further works again proceed as per the original program and the slippages do not accumulate and effect the overall program.	
15.30.2.3	The daily work force reports shall clearly indicate the work force deployed, category-wise specifying also the activities in which they are engaged.	
15.30.2.4	Weekly progress review meetings will be held at site during which actual progress during the week vis-à-vis scheduled program shall be discussed or actions to be taken for achieving targets. For discussions, the contractor shall present program of subsequent week. The contractor shall constantly update/revise his work program to meet the overall requirement.	
15.30.2.5	Periodic progress reviews on the entire activities of execution in respect of supply and works in scope of bidder will be held once in a month at Kolkata / site. These meetings will be attended by reasonably higher officials of the contractor and will be used as a forum for discussing all areas where progress needs to be speeded up. The contractor shall be further responsible for ensuring that suitable steps are taken to meet various targets decided upon such meetings.	
15.30.2.6	Deleted	
15.30.2.7	Successful bidder has to provide for electronic/ computerized storing and re-production / printing / plotting of various data, log sheets, protocols, measurements etc. These may be stored in CD (as per requirement) and handed over to BHEL as per requirement.	
15.30.3	SITE ORGANIZATION	
15.30.3.1	The contractor shall maintain a site organization of adequate strength in respect of manpower, construction machinery and other implements at all time for smooth execution of the contract headed by a competent construction manager for site operations with sufficient level of authority to take site decisions. The vendor will submit organization chart (showing the name of SITE-IN-CHARGE) with individual bio-data indicating various levels of experts to be posted for supervision in the fields of supervision and execution, quality, material management, planning, safety, etc. The organization shall be reinforced from time to time, as required to make up slippage (if any) from the schedule without any commercial implication to BHEL. The organization chart is to be submitted within 10 days from the date from start of work.	
15.30.3.2	Following (minimum) engineering manpower with power plant construction background to be deployed at site by the successful vendor for their day to day supervision etc.	
	FOR BUILDINGS/FOUNDATIONS	
15.30.3.2.1	Safety Steward	One No.

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15.30.3.2.2	Engineer & Supervisors for quality inspection.	Engineer-One Number Two supervisor
	GENERAL	
15.30.3.3	Deputation of above man-power shall be jointly decided at site in line with construction schedule.	
15.30.3.4	Engineer / supervisor for other functions like store & purchase, material management, fin, administration etc. are to be provided as per site requirement and not considered above.	
15.30.3.5	In the event of non-deputation of engineer/ supervisor by the bidder as per above agreed schedule, BHEL shall reserve the right to deduct USD 1050 per man-month for engineer, USD 650 per man-month for the supervisor / safety officer / chemist and USD 650 per man-month for safety supervisor from RA bills. Further induction of manpower regarding site supervisor & site engineer will be decided at site as per requirement without any financial implication.	
15.30.3.6	BHEL reserves the right to reject or approve the list of personnel proposed by the contractor. The persons whose bio-data have been approved by BHEL will have to be posted at site and deviation in this regard will not be permitted unless specific & reasonable justification is made.	
15.30.3.7	In addition to above, a well experienced qualified engineer to be designated, as 'Project Co-coordinator', shall be deployed by the contractor. Such engineer shall have adequate exposure on the job and shall remain fully involved in all planning activities, guidance etc. to contractor's own team during the complete execution period of contract.	
15.30.3.8	The contractor should also submit to BHEL for approval a list of T&Ps along with their fitness certificates. The tools & tackles shall not be removed from site without written permission of BHEL.	
15.30.3.9	The contractor should also submit network programs for the erection of various items. These networks shall show the BIFCL/ BHEL hold points, which have to be cleared by BIFCL/ BHEL, or their authorized representatives before further erection can take place. These programs for the erection would clearly identify responsibilities of the contractor and BIFCL/ BHEL. It is the responsibility of the contractor to get the Networks approved by BHEL within four weeks of the date of finalization of award of work/ placement from start of work.	
16.0	QUALITY CONTROL & QUALITY ASSURANCE	
16.1	Contractor's engineers & supervisors shall be adequately qualified and also inclined to do a quality job. The quality assurance engineer shall co-ordinate all aspects of quality control, inspection, implementation of quality assurance procedures laid down in Quality Plan and technical specification by BHEL. He shall fill up quality assurance log sheets / formats and submit to BHEL for joint inspection and acceptance. The contractor shall fill up, maintain & preserve the quality records in computerized media. BHEL's authorized representative shall be given free access at all time to such quality related records etc. for inspection, review etc.	
17.0	QUALITY ASSURANCE PROGRAMME	
17.1	The contractor shall arrange for suitable quality assurance programme to control all activities pertaining to the scope of work, as necessary. Such programs shall be outlined by the contractor & shall be finally accepted by BHEL. A quality assurance programme of the contractor shall generally cover the following	
17.2	Organization structure and qualification data for key personnel of the contractor for the management and implementation of proposed quality assurance programme	

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17.3	The procedure for source inspection, incoming raw material inspection, verification of material purchased etc.	
17.4	System for maintenance of records.	
18.0	GENERAL REQUIREMENTS – QUALITY ASSURANCE	
18.1	All materials, components and equipment covered under the specification shall be procured, manufactured, erected, commissioned and tested, as applicable, at all stages as per comprehensive quality assurance program. An indicative program for inspection / test, to be carried out by the contractor, for some of the major items is given in the respective technical specification.	
18.2	Field quality plan will detail out the quality practices and procedures etc. to be followed by the contractor's site quality control organization, during various stages of site activities from receipt of material / equipment at site.	
18.3	BHEL reserves the right to carry out quality audit and quality surveillance of the systems and procedures of contractor's quality management. Contractor shall provide all necessary assistance to enable BHEL to carry out such audit.	
18.4	Quality audit / approval of the results of test & inspection will not prejudice the right of BHEL to reject an equipment service not giving desired performance and shall not in any way limit the liabilities and responsibilities of the contractor in earning satisfactory performances of equipment/ service as per specification.	
18.5	Repair / rectification procedure to be adopted to make any job acceptable shall be subject to the approval of BHEL.	
18.6	All the latest relevant codes as per technical specification should be available with the contractor at site within 15 days from the date of placement from start of work or otherwise specified by Construction Manager/ Project Manager, BHEL.	
19.0	HEALTH, SAFETY & ENVIRONMENT	
19.1	REFER DOCUMENT NUMBER :-HSEP:14-MAITREE:VENDOR: DATE: 05.05.16	
	DOCUMENT TITLE:-HEALTH, SAFETY AND ENVIRONMENT PLAN FOR 2X660MW MAITREE SUPER THERMAL POWER PROJECT	
20.0	SPECIFIC REQUIREMENTS FOR ISO 9002	
20.1	Contractors shall ensure that all their staff / employees are exposed to periodical training programs conducted by qualified agencies/ personnel on ISO 9002 Standards.	
20.2	Contractor shall ensure that the quality is maintained in all the works connected with this contract at all stages of the requirement of BHEL.	
20.3	Contractor shall ensure that all MMDs that are used, whether owned by the contractors or used on loan, are calibrated by the authorized agencies and the valid calibration certificate will be available with them for verification by BHEL. A list of such instruments possessed by the contractor at site with its calibration status is to be submitted to BHEL Engineer for control.	
20.4	Contractor shall ensure that fitness certificate of the tools & plants, that are in use, whether owned by contractor or issued on loan, are tested by authorized agency and the valid fitness certificate is available for verification by BHEL.	
20.5	Contractors shall arrange for the inspection of the works at various stages as required by BHEL. The contractors shall take immediate corrective action for the non-conformances if any, observed and pointed out by BHEL.	
21.0	INTEREST BEARING RECOVERABLE ADVANCE/ MOBILISATION ADVANCE	
21.1	Not applicable for this tender.	
22.0	OVER RUN CHARGES----- NOT APPLICABLE	
23.0	REVISION ON ACCEPTED CONTRACT RATE	
23.1	Not applicable in this tender	

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24.0	PRICE VARIATION CLAUSE / ESCALATION
24.1	Not applicable for this tender.
25.0	LIQUIDATED DAMAGE
25.1	Intermediate Milestones----- Not Applicable
25.2	Overall Completion
25.2.1	If the contractor fails to maintain the required progress of work which results in delay in the completion of the works as per the contractual completion period, BHEL shall have the right to impose Liquidated Damage / Penalty at the rate of 0.5% of the contract value, per week of delay or part thereof subject to a maximum of ceiling specified below. For this purpose, the period of delay shall be the delay attributable to the Contractor for the completion of work as per contract. Contract Value for this purpose, shall be the final executable contract value exclusive of ORC, Extra Works executed, Supplementary / Additional Items and PVC.
25.2.2	If Completion of work goes beyond specified contract period of 12 (Twelve) months from date of start of work for reasons attributable to contractor, as certified by Construction Manager, BHEL, LD will be imposed with maximum LD amount shall be 10 % of total executable contract value.
25.2.3	BHEL shall deduct the amount of such compensation from any money due or which may become due to the contractor and/or recover such compensation from the bank guarantees / security deposit of the contractor. To be entitled to impose such compensation, BHEL will not be required to prove that he has incurred such amount as actual damage.
25.2.4	BHEL reserve the right to cancel the order/ contract or a portion thereof at the risk & cost of the contractor and the contractor shall be liable to BHEL for any excess costs thereof.
Note:-	*Executable Contract value- <i>Value of work for which inputs/fronts were made available to contractor and were scheduled for execution till the date of achievement of that milestone.</i>
26.0	GUARANTEE / WARRANTY
26.1	The contractor will be responsible for the quality of workmanship, quality of materials/ items and design for which the contractor is responsible. Even though the work will be carried out under supervision of BHEL, the successful bidder will be responsible for the above.
26.2	Guarantee / warranty period shall be 24 months from the date of issue of PAC till completion of the Guarantee/Warranty period as per relevant clause of GCC. Commencement of guarantee period shall be from the date completion of work under the contract as certified by BHEL.
27.0	EXTENSION OF TIME FOR COMPLETION
27.1	If the completion of work as detailed in the scope of work gets delayed beyond the contract/ completion period due to reasons not attributable to contractor, the contractor shall make request for an extension of the contract and BHEL at its discretion may extend the contract. However such extension shall not entitle the vendor for price revision or price compensation as this being FIRM price contract.
27.2	Based on review of agreed & jointly signed L-2 / construction schedule (as enumerated in the tender), the balance work 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 contractor. Further 'Time extension' or 'Time extensions' at the end of previous extension shall be worked out similarly.
27.3	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

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	attributable to the contractor, in addition to any other actions BHEL may wish to take at the risk and cost of contractor.
27.4	A joint program shall be drawn for the balance amount of work to be completed during the period of 'Time Extension', along with matching resources to be deployed by the contractor as per specified format. Review of the programme and record of shortfall shall be done.
27.5	During the period of 'Time extension', contractor shall maintain their resources as per mutually agreed program
27.6	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, (ii) Force majeure conditions, and (iii) BHEL, shall be worked out and shall be considered to be exhausted in the same order. 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 attributable solely to contractor after adjusting delay attributable to BHEL & Force majeure and shall be recoverable from the dues payable to the contractor.
28.0	EARNEST MONEY DEPOSIT (EMD / SECURITY DEPOSIT (SD) / PERFORMANCE BOND (PB)
28.1	EARNEST MONEY DEPOSIT (EMD)
28.1.1	EMD is to be paid by tenderers for securing fulfilment of any obligations in terms of the NIT. In case of EMD submitted in USD by the successful tenderer, the same shall be converted and adjusted towards the required amount of Security Deposit of 50%. In case of EMD in INR, whole EMD shall be converted into USD as per stipulated selling conversion rate of INR to USD as per State Bank of India (SBI) publication on tender floating date. In case of EMD in BDT, whole EMD shall be converted into USD as per stipulated selling conversion rate of BDT to USD as per Bangladesh Bank publication on tender floating date. Tender cost & EMD can be submitted in INR/ USD/ BDT for this tender. Exchange Rate of currency as available in the web site of Bangladesh Bank on the tender floating/publishing date. If the date happens to be a holiday / or rate is not published, then the exchange rate of previous day / previous published day will be considered. Irrespective of submission in any of the aforesaid modes, amount of refund of EMD shall be net of submitted EMD less applicable Bank charges.
28.1.2	EMD & Tender cost amount can also be submitted directly by Foreign Bidders (other than Indian bidders) to the followings Bharat Heavy Electricals Limited bank account in Bangladesh- EMD & Tender cost amount can also be submitted directly by Foreign Bidders (other than Indian bidders) to the followings Bharat Heavy Electricals Limited bank account in Bangladesh- 1. SBI (Branch Address:-Khulna, Bangladesh), A/C No. 05620257520201, BDT Account., SWIFT: SBINBDDH056, Routing number : 220471543 2. SBI (Branch Address:- Khulna, Bangladesh), A/C No. 05620257520202, USD Account, SWIFT: SBINBDDH056, Routing number : 220471543

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28.1.3	EMD & Tender cost amount can also be submitted directly by Indian Bidders to the followings Bharat Heavy Electricals Limited bank account in India- 1. SBI(Branch Address:-Commercial Branch, Saltlake, Sector V, Kolkata ,Branch Code SBIN0004289),A/C No. 11107800029,INR Account.	
28.1.4	Amount of EMD exceeding INR 20 Lakh may be submitted in the form of Bank Guarantee (INR or eqv. USD/ BDT).In case of any Non-Indian Bank BG of local Bangladesh Bank, the same is to be countered guaranteed from any scheduled Bank from India.	
28.1.5	Bidder may also deposit EMD in the form of Fixed Deposit Receipt (FDR) issued from the following banks valid for six months, as an additional mode of EMD submission. (a)AB Bank Limited (b)Citibank N.A. (c) Sonali Bank Limited (d)Standard Chartered Bank (e)The Hong Kong Shanghai Banking Corporation Ltd (f)Woori Bank (g) State Bank of India.	
28.1.6	All other terms & conditions shall be as per GCC.	
28.2	SECURITY DEPOSIT(SD)	
28.2.1	The total amount of Security Deposit will be 5% of the contract value. EMD of the successful tenderer shall be converted and adjusted towards the required amount of Security Deposit.	
28.2.2	At least 50% of the required Security Deposit, including the EMD, shall be collected in before start of the work. Balance of the Security Deposit shall be collected by deducting 10% of the gross amount in USD progressively from each of the running bills of the Contractor till the total amount of the required Security Deposit is collected. If the value of work done at any time exceeds the contract value, the amount of Security Deposit shall be correspondingly enhanced and the additional Security Deposit shall be immediately deposited by the Contractor or recovered from payment/s due to the Contractor. 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 the authority competent to award the work.	
28.2.3	All other terms & conditions shall be as per GCC.	
28.3	PERFORMANCE BOND	
28.3.1	Not Applicable	
29.0	CERTIFICATE TOWARDS COMPLETION	
29.1	The work under the scope of the contractor shall be deemed to have been completed in all respects only when so certified by BHEL / owner. The decision of BHEL in this regard shall be final and binding on the contractor.	
30.0	CIVIL LABORATORY	
30.1	Deleted	
31.0	CONSTRUCTION SCHEDULE	

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31.1	Entire work shall be carried out in accordance with the broad construction schedule given in CL No.10.1 above. Within 7 days from start of work, the contractor shall discuss with BHEL site engineer & furnish detail construction schedule (L-3/ L-4) indicating all milestones on the basis of major activities and get it approved from BHEL engineer. This schedule will undergo review and based on progress vis-à-vis project requirement, contractor shall have to submit revised schedule for approval of BHEL.	
31.2	Deleted	
31.3	The contractor shall plan his work in such a manner so as to meet the overall project schedule, in consultation with BHEL/ BIFCL engineer.	
31.4	Contractor shall submit daily work program based on above construction schedule. Deferment of above schedule is not acceptable. Contractor will adhere to schedule and resource planning to be augmented to ensure completion as per schedule.	
31.5	Periodic progress reviews on the entire activities of execution in respect of supply & works in scope of contractor will be held once in a month at Kolkata / site. These meetings will be attended by reasonably higher officials of the contractor and will be used as a forum for discussing all areas where progress needs to be speeded up. The contractor shall be further responsible for ensuring that suitable steps are taken to meet various targets decided upon such meetings.	
31.6	Above schedule is indicative. The contractor shall plan his work in such a manner so as to meet the overall project schedule, in consultation with BHEL/BIFCL Engineer.	
32.0	PAYMENT FOR ADDITIONAL/EXTRA ITEMS FOR CIVIL FOUNDATION WORKS	
32.1	It shall be as per relevant clause of the GCC. However, “BPWD Schedule of Rates 2018” as mentioned in the price schedule will be considered.	
33.0	DELETED	
34.0	TOOLS & PLANTS (TO BE PROVIDED BY CONTRACTOR)	
34.1	Tentative list of T&P to be deployed by contractor for successful completion of work is detailed below.	
34.2	It may be noted that the list is not exhaustive and is only for general guidance. The contractor is required to provide all necessary T&P (other than those specified to be provided by BHEL, if any) measuring (calibrated) instruments & handing equipments to maintain work progress for timely completion of total work as per contract. In case of project requirement, some activities may have to be pre-pended. In such cases the contractor may have to deploy additional T&P. Quoted rate shall be inclusive of such emerging requirements. However, contractor shall submit deployment plan of all T&P along with tender bid.	
34.3	In the event of any failure on the part of the contractor to deploy T & P to sustain desired work progress, BHEL may at his discretion also terminate the contract on this ground and take out any or whole amount of the contract from the scope of the contractor. In the event of failure of contractor to deploy necessary and sufficient T&P/ IMTEs to maintain work progress, BHEL will be at liberty to arrange the same at the risk & cost of contractor including transportation cost of same from any of BHEL site/ other agency & charges as applicable shall be deducted from contractor’s RA bill. Decision of BHEL in this regard will be final & binding on contractor.	
34.4	Following Major T&Ps to be arranged by contractor within the indicated time	
	Major T&P items	Broad Mobilizing time from date of start of work
34.4.1	1 No Hydraulic Excavator	Within 15 days from start of work
34.4.2	1 No. hydraulic excavator / Poclain With Long Boom arrangement	Within 20 days from start of work
34.4.3	1 No. JCB / Pay Loader	As per site requirement

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34.4.4	2 nos. transit mixer (4.5/5/6 M3 capacity)	As per site requirement
34.4.5	1 no. concrete pump (30/60 cum/ hr min capacity & lift 70M)	As per site requirement
34.4.6	2 nos. self priming dewatering pump 5 HP (diesel/ electric)	As per requirement
34.4.7	1(One) No.10 HP submersible mono-block electric pump (KOS-1040+ of Kirloskar or equivalent),	Within 30 days from date of start of work
34.4.8	1 nos. self priming dewatering pump 2 HP (diesel/ electric)	Within 30 days.
34.4.9	1 no. curing pump – 1.5 /2 HP (pump for curing at heights)	Within 30 days.
34.4.10	2 nos. dumper	Within 30 days.
34.4.11	1 no. reinforcement bending machine	As per requirement
34.4.12	1 no. reinforcement cutting machine	As per requirement
34.4.13	1 no. power driven earth rammer	As per requirement
34.4.14	1 no. Vibro compactor/ plate compactor – drum width 750mm	As per requirement.
34.4.15	1 no total station with adequate arrangement for Surveyors	Within 15 days.
34.4.16	1 no. auto level & staff + 2 nos as required	Within 15 days.
34.4.17	20 nos concrete cube moulds	As per requirement.
34.4.18	Adequate no. of small trucks 2T/5T for movement within site	As per requirement.
34.4.19	One no drinking water tank – 2000 lit.	As per requirement.
34.4.20	5 Nos. Concrete vibrator with adequate needle (3Nos. diesel driven +2Nos. electric driven)	5 Nos (at least 2nos. diesel driven) within 30 Days.
34.4.21	Minimum staggering Pipe – 1500RM, Clamp – 6000Nos, Shuttering board/plate – 500 Sqm	As per requirement
34.4.22	Portable fire extinguishers as below: Soda acid – 5 sets. Dry chemical powder – 02 sets CO2 – 1 set. Water & sand bucket (4 buckets in one stand) – 5 sets. Fire hose with nozzle (50 M length) – 2 sets.	As per requirement
34.5	T&P shown in the above mentioned list are tentative based on planned progress requirement. Actual Mobilisation schedule, based on front availability, drawings, construction schedule and material availability at site is to be reviewed and mutually agreed with BHEL site periodically from time to time for mobilisation of major T&Ps, and the same have to be adhered to. No change will be permitted without written approval of Construction Manager,BHEL site. Further requirement will be reviewed time to time at site and contractor will provide additional T&P/equipments to ensure completion of entire work within schedule time without any financial implication to BHEL. All other T&Ps shall be provided by the	

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	contractor without any extra cost to BHEL. Vendor will give advance intimation & certification regarding capacity etc prior to dispatch of heavy equipments.	
34.6	All T&P and all IMTEs, which are required for successful and timely execution of the work covered within the scope of this tender, shall be arranged and provided by the contractor at his own cost in working condition.	
34.7	In the event of non mobilisation of any T&P by the successful bidder and as a result progress of work suffered, BHEL reserves the right to deduct suitable amount from the dues of the bidder, with assigning reasons thereof at the following rates	
	Major T&P items	Recovery rates
34.7.1	Hydraulic excavator / Poclain	USD 800/- per week or part thereof
34.7.2	JCB / Pay Loader	USD 800/- per week or part thereof
34.7.3	Transit mixer (4.5/5/6 M3 capacity), peak period 4 nos. transit mixer	USD 100/- per week or part thereof
34.7.4	concrete pump (20 cum/ hr min capacity & lift 70M)	USD 300/- per week or part thereof
34.7.5	self-priming dewatering pump 5 HP (diesel/ electric)	USD 25/- per week or part thereof
34.7.6	10 HP submersible mono-block electric pump (KOS-1040+ of Kirloskar or equivalent),	USD 25/- per week or part thereof
34.7.7	self-priming dewatering pump 2 HP (diesel/ electric)	USD 25/- per week or part thereof
34.7.8	curing pump – 1.5 /2 HP (pump for curing at heights)	USD 25/- per week or part thereof
34.7.9	Dumper	USD 70/- per week or part thereof
34.7.10	reinforcement bending machine	USD 70/- per week or part thereof
34.7.11	reinforcement cutting machine	USD 70/- per week or part thereof
34.7.12	power driven earth rammer	USD 10/- per week or part thereof
34.7.13	Vibro compactor/ plate compactor – drum width 750mm	USD 300/- per week or part thereof
34.7.14	Total station with adequate arrangement for Surveyor	USD 70/- per week or part thereof
34.7.15	Auto level & staff + 1 nos if required	USD 70/- per week or part thereof
34.7.16	drinking water tank – 2000 lit.	USD 70/- per week or part thereof
34.7.17	Concrete vibrator with adequate needle (3 Nos. diesel driven + 6 Nos. electric driven)	USD 50/- per week or part thereof
34.7.18	Any other instrument	As per discretion of the BHEL engineer
35.0	T&P TO BE PROVIDED BY BHEL	
35.1	BHEL shall not provide any T&P to contractor. Contractor shall arrange the required T&P for construction of the structures.	
36.0	OTHER TERMS	
39.1	All other term & conditions of this specification shall be governed by the pertinent provisions of GCC and other volumes of this tender, as applicable.	

Special Notes:

1. The following welfare measures, in addition to those covered above, are to be taken at the site :
 - a. Adequate Drinking Water

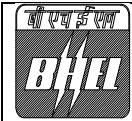
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- b. Adequate no of toilets and washing area
 - c. Canteen
 - d. Rest Shed
 - e. Hygienic Accommodation (Labour Colony) and allied facilities
2. Water sprinkling arrangement for suppression of dust to be made
3. A Safety Park will be put up with participation by all major contractors
4. It must be ensured that no contaminated water including those discharged from Toilets, Canteen, Office and Labour Colony shall be discharged to under-ground water table and river water
5. AS THIS SITE IS LOACTED IN A CYCLONE-PRONE AREA, ALL BUILDINGS AND SHED MUST BE CONSTRUCTED STRONG ENOUGH TO WITHSTAND ADVERSE WEATHER CONDITION
6. FURTHER TO POINT # 5, MASS EVACUATION OF PEOPLE FROM SITE MAY BE CALLED FOR, IF ADVISED SO, BY GOVT AGENCIES. AS IT WILL BE EXTREMELY DIFFICULT TO FIND A REST SHELTER FOR A FEW THOUSAND PEOPLE, IT IS FURTHER EMPHASISED THAT ACCOMMODATION MUST BE STRONG ENOUGH TO SURVIVE SUCH EXTREME WEATHER CONDITION.
7. BHEL shall provide drawing for labour accommodation and contractor shall construct the same in line to BHEL drawing with contractor's own contribution/expenses.
8. It is assumed that First aider will be sitting in a porta-cabin.
9. The initial shelter in labour colony for one month till Vendor is able to construct their own labour accommodation may be available in the existing colony on rental basis , based on availability in the existing labour colony.
10. Adequate Quarantine Facility for isolation of workmen of 14 days during induction is to be arranged by the Bidder due to Pandemic COVID-19.All sort of sanitization , hand gloves, nose mask social distancing at labour colony is to be maintained and ensure due to pandemic of COVID-19 as per SOP attached with this Tender. It shall be in practice till such time as demanded by Project Authorities.

Currency Matrix for Erection contract being executed in Bangladesh - in USD (Rev.01 (11-04-2018)

Sl no	Nature	Mode	Currency	Place of Deposit/ Return	Exchange Rate On	Rate Published by	Payable
1	Cost of tender	DD/NEFT/RTGS	Indian Rupees (INR)	India			In INR
		DD/ Telegraphic Transfer	United States Dollars(USD)	India	Tender floating	SBI Card Rate	INR/USD [SBI Card Rate -- Bank TT Buying Rate]
		DD/ Telegraphic Transfer	Bangladesh Taka (BDT)	India/ Bangladesh	Tender floating	Bangladesh Bank	INR/BDT [Bangladesh Bank -- Bank Selling Rate]
		DD/ Telegraphic Transfer	Other Foreign Currency	India	Tender floating	SBI Card Rate	INR/ Other Foreign Currency [SBI Card Rate --Bank TT Buying Rate]
2	Financial Evaluation of Pre Qualification Criterion		Indian Rupees (INR)	India	Tender floating	SBI Card Rate	INR/USD [SBI Card Rate -- Bank TT Selling Rate]
			United States Dollars(USD)	India			In USD
			Bangladesh Taka (BDT)	India	Tender floating	Bangladesh Bank	BDT / USD [Bangladesh Bank - Bank Selling Rate]
			Other Foreign Currency	India	Tender floating	SBI Card Rate	Other Foreign Currency / INR [SBI Card Rate - Bank TT Buying Rate] ----- INR / USD [SBI Card Rate - Bank TT Selling Rate]
3	EMD by Bidder [Upto INR 20 Lakhs--- Compulsory] [More than INR 20 Lakhs --- Optional]	DD/NEFT/RTGS	Indian Rupees (INR)	India			In INR
		DD/ Telegraphic Transfer	United States Dollars(USD)	India	Tender floating	SBI Card Rate	INR/USD [SBI Card Rate -- Bank TT Buying Rate]
		DD/ Telegraphic Transfer	Bangladesh Taka (BDT)	India/ Bangladesh	Tender floating	Bangladesh Bank	INR/BDT [Bangladesh Bank -- Bank Selling Rate]
		DD/ Telegraphic Transfer	Other Foreign Currency	India	Tender floating	SBI Card Rate	INR/ Other Foreign Currency [SBI Card Rate --Bank TT Buying Rate]
4	EMD by Bidder [More than INR 20 Lakhs - Optional]	Bank Guarantee from Scheduled Bank in India.	Indian Rupees (INR)	India			In INR
		Bank Guarantee from Scheduled Bank in India. In case of Bank Guarantee by Foreign Bank, the bank Gurantee should be counter Guranteed / Confirmed by any Scheduled Bank in India	United States Dollars(USD)	India	Tender floating	SBI Card Rate	INR/USD [SBI Card Rate -- Bank TT Buying Rate]
			Bangladesh Taka (BDT)	India	Tender floating	Bangladesh Bank	INR/BDT [Bangladesh Bank Card Rate --Bank Selling Rate]
			Other Foreign Currency	India	Tender floating	SBI Card Rate	INR/ Other Foreign Currency [SBI Card Rate --Bank TT Buying Rate]
5	Offer by Bidder		USD Compulsorily (If inadvertently the same is quoted in any other currency , it will be converted to USD at TT Buying rate of SBI as on latest date of Part-I Bid opening). In case of bank holiday , forex rate of previous SBI Working day.				
6	Reverse Auction		United States Dollars(USD)				

Sl no	Nature	Mode	Currency	Place of Deposit/ Return	Exchange Rate On	Rate Published by	Payable
7	Price Bid Evaluation		USD Compulsorily (If inadvertently the same is quoted in any other currency , it will be converted to USD at TT Buying rate of SBI as on latest date of Part-I Bid opening). In case of bank holiday , forex rate of previous SBI Working day.				
8	Order by BHEL		United States Dollars(USD) / Evaluated USD				
9	Return of EMD to unsuccessful Bidder [Net of Bank Charges]	DD/NEFT/RTGS	Indian Rupees (INR)	India			At the Actual amount received in INR
		DD/ Telegraphic Transfer	United States Dollars(USD)	India			At the Actual amount received in USD
		DD/ Telegraphic Transfer	Bangladesh Taka (BDT)	India			At the Actual amount received in BDT
		DD/ Telegraphic Transfer	Other Foreign Currency	India			At the Actual amount received in Other Foreign Currency
10	Conversion of EMD to SD for successful Bidder	Book Adjustment in BHEL	Indian Rupees (INR)	India	Tender floating	SBI Card Rate	INR/USD [SBI Card Rate -- Bank TT Selling Rate]
			United States Dollars(USD)	India			At Actual USD
			Bangladesh Taka (BDT)	India	Tender floating	Bangladesh Bank	BDT / USD [Bangladesh Bank - Bank Selling Rate]
			Other Foreign Currency	India	Tender floating	SBI Card Rate	Other Foreign Currency / INR [SBI Card Rate - Bank TT Buying Rate] ----- INR / USD [SBI Card Rate - Bank TT Selling Rate]
11	Billing	By Sub-contractor (Hord Copy)	United States Dollars(USD)	Bangladesh			In USD
12	Payment against contract execution[Currency of the Contract USD]	Cheque/ EFT / SWIFT	United States Dollars(USD)	Bangladesh			In USD
			Bangladesh Taka (BDT) -- (At the discretion of BHEL only if payment in USD is not possible)	Bangladesh	Date of Payment	Buying Rate of Banker of BHEL	USD / BDT [BHEL's Bangladesh Banker's Buying Rate]
13	Balance SD	As per Tender (Deposit before start of work / Recovery from RA Bills)	United States Dollars(USD)-- (After adjusting 100% EMD converted to SD)	Bangladesh for Recovery from RA Bill /India in case of BG			In USD
14	Performance Bank Guarantee (where applicable)	Bank Guarantee from Scheduled Bank in India.	United States Dollars(USD)	India			In USD
		Bank Guarantee from Scheduled Bank in India. In case of Bank Guarantee by Foreign Bank, the bank Gurantee should be counter Guranteed / Confirmed by any Scheduled Bank in India					



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MAITREE STPP, RAMPAL,
BANGLADESH**

Document No:
PE-TS-421-600-C006

**SPECIFICATIONS FOR
CIVIL, STRUCTURAL AND
ARCHITECTURAL WORKS**

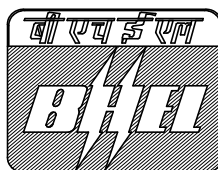
Rev: 2 Date: 28/12/2016

**BANGLADESH-INDIA FRIENDSHIP
POWER COMPANY (PVT.) LIMITED**

**2x660MW MAITREE STPP, RAMPAL
BANGLADESH**

**VOLUME – II B
CIVIL, STRUCTURAL & ARCHITECTURAL WORKS
PE-TS-421-600-C006 R02**

**SECTION C
SPECIFIC TECHNICAL REQUIREMENT**



**Bharat Heavy Electricals Limited
Project Engineering Management
PPEI Building, Power Sector,
Plot No. 25, Sector 16A,
Noida-201301**

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1.0 Civil Works

This specification covers the design, manufacturing, supply, erection, commissioning and handing over of the complete civil works for the entire specified power plant.

It is to be emphasized, that this specification does not enumerate or describe all the materials and equipment to be supplied and all the services to be performed. However, the civil works shall be complete in every respect and shall ensure safe and reliable operation of the Plant. This means, all material and equipment shall be provided as required to make a complete, properly functioning installation and shall conform to the highest standards of engineering design and workmanship.

Contractor shall read the parts of specification relevant to contract and shall ignore other parts of specification. In case of ambiguity between BOQ, Part C and Part D of specification, the following priority for acceptance of items may be followed:

- a) BOQ
- b) Specific technical specification (Part C)
- c) General technical specification (Part D)

1.1 General

This section covers the design, construction and supply of all civil works including building services and fire fighting works of the specified power plant.

The various buildings and parts of the Project must form an architectural, structural and functional unit. Special attention must be paid, in addition to basic design and construction, to the aspects which are specific to climate and local requirements.

The buildings and structures shall be designed with due respect regarding the need for inspection, maintenance, cleaning and repair and able to operate for long-time periods with a minimum of inspection, adjustment and repair.

All material shall be new and of the best quality suitable for working under the conditions, variations in temperature and load encountered in service without undue distortion or deterioration or the occurrence of undue stresses in any part, such as to affect the efficiency and reliability of the plant.

The Contractor is not allowed to use the works, materials or furniture or parts thereof for temporary purposes without the written consent of the Employer.

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The conceptual and detailed plant configuration of the various components shall be proposed by the Contractor, subject to the approval of the Employer to suit the requirements of the supplied equipment, under consideration of the existing situation, as well as the tie-in points. In doing so, adequate safety clearances, fire compartments, favorable layout of the plant components for monitoring and maintenance and any other requirements of up-to-date power plant construction shall be taken into account.

Optimization can be executed by the Bidder/Contractor while finalizing layout during basic/detail engineering subject to BIFPCL approval.

2.0 Civil Design Criteria

2.1 Codes and standards

The engineering and execution of all the civil works shall be based on the latest editions and revisions of the applicable codes and standards as listed in **Section D**.

If any standard contains a provision, which is inconsistent with a provision in another standard, the more stringent in respect of quality shall apply. In case of selection of equivalent international code instead of the code specified in the documents, the same shall be used only after approved by BHEL/BIFPCL.

2.2.2 Architecture

Architectural Design and detailing Aspects of all buildings shall be rendered through professional services of an Architect of reputation having experience in similar kind of works and familiar with vernacular architecture of Bangladesh.

For detail working drawings preparation, in house pool of architects may be utilized.

The overall architectural character of main plant buildings e.g. Administration Building, Auditorium, Main Gate Complex, Canteen Building and Service Building shall be architecturally treated in such a way that it presents an overall image befitting the image of the Employer as a reputed international Power Company, comparable with international buildings of repute and yet, incorporates a pleasing composition of mass and void with suitable and functionally designed projections and recesses.

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All external and internal finishes shall be modern finishes as per international standards and latest construction technology. Buildings shall be designed considering the climatic condition, building orientation, landscape design, interior design, to meet the International Building Code and the vernacular architecture. The overall architectural character shall be in sympathy with the local environment and in harmony with the local culture

Requirements and international fire safety regulations and shall incorporate sustainable Building Design features like energy efficiency, solid waste management, water conservation and recycling etc. Service building, Administration Building, Auditorium and Canteen Building shall be designed as Green Buildings compliant to minimum LEEDs Gold rating. Certification of buildings is in the scope of Contractor.

All Buildings with RCC Roof and suitable/sufficient space shall be designed for installation of Solar Photovoltaic Panels on roof tops for Renewable Energy Purpose.

All public buildings like administration building, auditorium, main gate complex, canteen building, service building (the list may be finalized/extended during design phase) shall be furnished with reinforced concrete stairs. The minim width of the flight shall be min 1500mm, risers" 150mm and threads 300mm.

All public buildings like administration building, auditorium, main gate complex, canteen building, service building (the list be finalized/extended during design phase) shall be designed incorporating the provision of barrier free environment for physically disabled persons.

All buildings shall be provided with toilets and drinking water facilities as per international building code requirements.

Buildings shall be designed as Intelligent Buildings with futuristic concepts with Standardized Components and incorporating Building Information Management System (BIMS, for details, refer clause no. 2.3.11). Aesthetic Treatment shall be designed with a view to develop responsible structures, acceptable to the Community and visually pleasing for next 25 to 30 years Landscaping shall be designed to take care of rain water harvesting and

ground water recharging.

An intelligent building may be understood as a building which makes use of technology & process to create a building that is safer and more productive for its occupants and more operationally efficient for its owner. It involves Energy Efficient Design, Sustainable Construction Practices, Access Control & Monitoring, Lighting Control, Energy Information & Management Systems etc.

Interiors of the buildings shall be designed based on functional requirements and shall interface smoothly with Mechanical & Electrical Services, so as to

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have an ergonomically designed and visually stimulating environment.

The Bidder shall submit a convincing architectural concept along with tendering documents, for guideline see **Annex C**.

Detailed working drawings, perspective views, walkthrough views and model (to scale) of the entire plant shall be submitted after contract award.

2.2.3 Design loads

The following design loads shall be considered for the design of buildings and structures:

- **Dead load**

Dead load is defined as the weight of all permanent construction including walls, foundations, floors, roofs, ceilings, partitions, stairways, and fixed service equipment and shall be calculated according to BS EN 1991-1-1 or equivalent (e.g. DIN EN 1991-1-1) and the Bangladesh National Building Code, whichever is more stringent.

For heavy industrial work, this would include equipment, vessels, including internals, pipes, valves, and accessories, electrical and lighting conduits, switchgear, instrumentation, fireproofing, insulation, ladders, platforms, and other similar items. Equipment and piping should be considered empty of product load when calculating dead load. The gravity weight of soil overburden shall be considered as dead load.

- **Erection dead load**

The erection dead load is the weight of the equipment at time of erection plus the weight of the footing, pedestal and overburden soil.

- **Live load**

Live load is defined as the weight superimposed by the use and occupancy of the building or other structure, but not permanently attached to it. For industrial design, live load can be defined as the load produced by personnel, moveable equipment, tools, and other items placed on the structure, but not permanently attached to it. Design shall be done for the actual plant live loads or the live loads specified in according to BS EN 1991-1-1, (or equivalent DIN EN 1991-1-1) or the Bangladesh National Building Code, whichever is more stringent.

Unless specified otherwise, or required due to erection, operation and maintenance the minimum live load values for floors and roofs given in Table below shall be considered.

The Employers consent is required in all cases for reductions of load



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carrying capacities and for exceeding the permissible stresses.

Minimum requirements for live loads [kN/m²]

	Slabs and secondary supports	Gratings ²⁾	Main girders	Supports, e.g. columns, walls, brackets, etc.	Foundations
1. Reinforced concrete structures					
1.1 at road level in areas used by large vehicles	15 SLW 30 ³⁾	5	15 SLW 30 ³⁾	10	10
In areas of major assembly work at their access roads	SLW 60 ³⁾		SLW 60 ³⁾		
1.2 Machinery floor for storage of heavy machine parts	30	10	20	20	20
1.3 Heavy intermediate floor slabs	10	5	10	7,5	7,5
1.4 Medium intermediate floor slabs	7,5	5	7,5	5	5
1.5 Light intermediate floor slabs	5	5	5	5	5
1.6 Roofs	1,5		1,5	1,5	0,75
2. Steel structures					
2.1 Heavy platforms	15	10	15	10	10
2.2 Medium platforms	5	5	5	5	5
2.3 Platforms and walkways in Conveyor galleries	5	5	5	5	5
2.4 Light platforms and walkways	2,5	2,5	2,5	2,5	2,5
2.4 Roofs	1,5		1,5		0,75

1) Figures in kN/m²

2) The loads shown are used for determining the load for structural analysis but not for dimensioning the gratings

3) Truck loads according to DIN 1072

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Areas designated for different loadings on the same floor shall be clearly and permanently marked.

- **Crane/hoist load**

Crane/hoist loads shall be considered as live loads. The vertical and horizontal loads from cranes/hoists shall be as per the supplier's loading data. In the absence of specific information, the following minimum horizontal loads shall be considered at the location of each wheel:

- transverse surge = 20 % of static wheel load
- ii) longitudinal surge = 10 % of static wheel load.

- **Product load**

The load shall be defined as the gravity load imposed by liquid, solid, or viscous materials in vessels, tanks, equipment or piping during operation.

- **Test load**

The test load shall be defined as the gravity load imposed by any method necessary to test vessels, tanks, cranes, equipment or piping.

- **Thermal load**

Thermal loads shall be defined as forces caused by changes in temperature (ambient temperatures see Section B0). The primary source of thermal loads in an industrial plant is the expansion or contraction of vessels and piping. Another source of thermal loads in a structure is the expansion or contraction of the entire structure or individual structural components.

- **Truck load**

Structures accessible to trucks shall be designed to withstand the gravity, lateral and impact effects of truck loading. Truck loading shall be SLW 60 or equivalent as per relevant standards or codes.

- **Soil load**

Soil loads shall consist of lateral earth pressures. Active and passive coefficients for lateral pressures shall be obtained from the project soils report. The weight of soil shall be considered as dead load.

- **Hydrostatic load and buoyancy**

Hydrostatic load is the load due to water pressure. The design of structures shall include hydrostatic loads when applicable. The buoyancy load is equal to the weight of the volume of displaced water.

- **Wind load**

The wind load calculation for the buildings and structures shall be as per Bangladesh National Building Code -2012, Part 6, Chapter 2.4.

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Basic wind Speed, V, shall be taken as 73 m/s, Three-second gust at 10 m above ground in exposure C, having a return period of 50 years.

- **Earthquake load**

All buildings, structures and foundations shall be designed and adopt necessary earthquake design criteria.

The Project site is exposed to seismic conditions. The area is in Seismic Zone 1 as determined by the Bangladesh National Building Code (BNBC-2012).

Related to Soil Type as identified to Soil Investigation Report, the effect of local soils on earthquake ground motion shall be determined.

For site class S1 and S2, as expected for this project, site specific studies shall be carried out to determine Design acceleration response spectrum.

Values regarding Soil Factor shall be verified during Soil Investigation.

- **Dynamic loads**

Each structure shall be designed to withstand the effects of vibration and impact to which it may be subjected. Each structure and foundation supporting a compressor, turbine, pump or other machinery having significant dynamic unbalance shall be designed to resist the peak loads specified by the manufacturer. Vibration amplitudes of the supporting structure or foundation shall be kept within acceptable limits for dynamic forces that occur during normal machine operation. In the case of a tall and slender structure, there may be a need to investigate the dynamic effects of wind gusts. The vibration pad for absorption of vibration due to rotating or reciprocating machine shall be suitably designed to reach maximum thickness of material required and its complete spreading below entire foundation.

In the dynamic analysis, the following codes are to be considered: DIN 4024, ISO 1940-1 and ISO-10816. The vibration amplitudes & velocities, if not specified by the manufacturer, shall follow ISO-10816.

- **Impact loads**

When a structure, structural component or connection is subjected to moving or vibrating loads which do not warrant a dynamic analysis, the following impact loads shall be considered:



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Elevator machinery	100% machinery weight
Shaft or motor driven machinery	50% machinery weight
Reciprocating machinery	20% machinery weight
Overhead travelling crane	Crane load shall be considered as live load, when applying this load the following impact load shall be considered as per BS 6399:PART 1 EN 1991 or equivalent.
Vertical force	25% of maximum wheel loads for cab operated crane.
Lateral force	10% of maximum wheel loads for pendent operating crane.
Longitudinal force	20% of the weight of the trolley and lifted load (but exclusive of other parts of the crane).
Truck loads	10% of maximum wheel loads.
	Impact effects of truck loading shall be considered according to BS EN 1991-1-7 6399: PART 1 or equivalent. (e.g. DIN EN 1991-1-17)
Vertical force	20% of lifted loads

- Load combinations
Design load combinations shall be generally in accordance with the relevant British standard or equivalent. The load combinations shall include the erection loads and crane test loads also.

2.2.4 Deflections

The maximum allowable deflections under the serviceability loads shall be as given below, if not other requirements due to functionality of the structures shall be followed, e.g. for transfer points and trestles of conveyor belt:

a) Structural steel

Cantilevers	L/180
Beams carrying plaster	L/360 or 20 mm, whichever is less
Other beams (except purlins and sheeting rails)	L/200

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Top of columns (single floor)	H/300
Top of columns in each floor (more than one floor)	H/300
Crane gantry girders	
Vertical	L/600
Horizontal	L/500
(where L: span/H: Height)	
Purlins and sheeting rails	L/200

b) Concrete structures

L/500 or 20 mm (whichever is less)

2.2.5 Settlements

Settlements have to be calculated according to BS EN 1997-1 or equivalent and to be monitored.

The following requirements for settlements shall be applied:

- Max. settlement 25 mm,
- Max. differential settlement 1/500 rad.

2.2.6 Stability

All ground stability analysis should be based on data given in the soil investigation report.

Ground stability of structures has to be calculated according to BS EN 1997 - 1 or equivalent.

Embankment stability analysis shall be calculated according to BS 6031 or equivalent.

Stability of masonry wall shall be checked according to BS 5628 or equivalent.

The structures shall be designed and checked using a factor of safety of 1.50 for stability against overturning and sliding under the permanent loads and 1.2 under the temporary loads.

For Buoyancy the structures shall be designed to fulfill the purpose and follow BNBC.

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2.2.7 Miscellaneous metal works

Stairways

Main stairways shall be min. 1250 mm wide.

Riser max. 180, Tread min. 260, and Local stairway shall be min. 1200 wide. The number of steps between flights shall be limited to 12.

Head clearance min. 3000 mm for air conditioned buildings, and min. 3500mm for non-conditioned buildings.

Head clearance of toilets shall be designed as per good engineering practice and applicable regulations.

The requirements of the specific local codes of procedures and the Local Authority requirements have to be respected by the Contractor.

Steel ladders other than companion way ladders

Rung: round bars of 20 to 50 mm diameter

Rise: 250 mm

Width: 400 mm

Safety cages shall be provided if height exceeds 2.5 m and the ladder design shall comply with BS 5395: Part 3.

Handrails

Handrails shall be min. 1100mm high. Design to follow BS 5395: Part 3/BS 4592-0:2006+A1:2012 or equivalent.

Gratings

Gratings shall be hot-dip galvanized and comply with BS 4592: Part 1 & 2 or equivalent.

Chequered plates

Chequered plates shall be minimum 6 mm thick mild steel.

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2.2.8 Drainage systems

General

The drainage systems will consist of open reinforced concrete drains for stormwater and surface drainage and piping for other drainage systems and reinforced concrete culverts for street crossings. In general, drainage systems shall be designed in accordance with BS 6367 or equivalent, the Bangladesh National Building Code 2012 and all relevant Local Authority requirements.

The drainage shall be separated into the following systems:

- storm water and surface drainage
- sanitary sewage reticulation
- oily water drainage
- chemically polluted water drainage.

Rain run-off

Rainwater runoff shall be determined in accordance with the relevant Bangladesh Standards by considering the maximum rainfall intensity of 95 mm/hr for a one hour rainfall with 50 year return period. The maximum surface rainfall shall be considered with 349mmper day.

water shall be collected in a storm water pond located outside the Plant The (indicated on Indicative Plant Layout). The Pond is not in scope of EPC-Contractor.

The Tie-in point of the system will be at the pond. In addition, contractor may develop retention basins/ponds for rainwater to be used for spraying the coal stockyard and landscape irrigation, in the plant area.

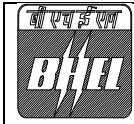
Sizing of ditches and pipes shall be determined by using Manning's formula, using the following Roughness coefficient N for the various types of material:

Type	Roughness efficient N
Concrete pipe	0.014
Plastic pipe	0.013
Vitrified clay pipe	0.013
Smooth concrete channels	0.014

Gradient

Drains shall have the following minimum gradient:

• open ditch for storm water drainage	1/1000
• sanitary sewage drainage pipes	1/150
• oily water drain pipes	1/200
• chemically polluted water drains/pipes	1/250
• other drainage systems	1/400.



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However, the sectional shapes have to be determined by the water carrying requirements and must have the most favorable hydraulic qualities so as to remove the drain water in a proper manner without settlements.

Velocity of flow

Minimum velocity 0.80 m/s (to maintain self cleaning)

2.2.9 Road works

Plant access roadways shall be designed to accommodate AASHTO HS-20 semi-truck loading with impact added. Parking areas for cars and light trucks shall be designed for AASHTO H-10 loading. The roads shall be designed to sustain the maximum loads from the vehicles likely to use them during construction and throughout the life of the facility including articulated vehicles and transporters used for the removal and replacement of major items of equipment during maintenance.

The following requirements shall be met:

- single lane 3.75 m with solidly compacted shoulders of 1.50 m at each side all along (Total width 6.75 m)
- double lane 7.5 m with solidly compacted shoulders of 2.25 m at each side all along (Total width 12 m)
- patrol roads 3.75 m with solidly compacted shoulders of 1.50 m at one side all along
Patrol road is to be constructed inside Plant boundary (Total width 5.25 m).
- minimum kerb radius at junctions shall be 10 m for double lane roads and 4 m for single lane/patrol roads
- cross-falls shall be 2.5% from one side to the other
- maximum longitudinal slope shall be 1:25.
- The roads and paving shall be laid to falls leading the storm water to gullies and to the discharge system and shall also comply with the Local Authority requirements.

All road/pavement shall be plain jointed concrete pavement (JCP) designed as per AASHTO. The road shall be provided as follows:-

- **Subgrade**

The area for the roads shall be cleared of any material or obstructions and the top layer removed to a depth of 300 mm (or more if the design so required). Any ruts or soft areas caused by improper drainage conditions, hauling or any other cause shall be corrected and rolled to the required compaction before sub-base is placed thereon. The formation shall be compacted to 85% relative density (ASTM D-4253 and D-4254) for free draining soils containing less than 15% by weight finer than 75 micron sieve non plastic material or 98% of the maximum density as determined by ASTM D-1557 for soils containing more than 15% material passing the 75 micron sieve.

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- Subbase course
A layer of 250 mm granular sub-base shall be provided. Sub-base material shall be crushed rock or other approved local material like brick metal having suitable properties (materials passing 425 micron sieve when tested in accordance with AASHTO or British Standard should have Liquid Limit and Plasticity Index of not more than 25 and 6 respectively) and confirming to the following grading

Sieve [mm]	Percentage by Weight Passing
75	100
37.5	85 - 100
10	45 - 100
5	25 - 85
0.6	8 - 45
0.075	0 - 10

The material shall be spread evenly on the preceding material in layers not exceeding 150 mm compacted thickness.

The sub-base shall be compacted by approved plant to a dry density, which shall not be less than 98% relative compaction until movement of the surface ceases and the surface is closed. The CBR value shall be at least 30% at the optimum moisture content.

Brick aggregates shall be made of overburnt bricks or brick bats and free from dust and other foreign materials. The **LAA(LOS ANGELES ABRASION)** value for coarse aggregate either from bricks, gravels or stone shall not be more than 50% and AIV **AIV(Aggregate Impact Value)** shall not be more than 40%. The water absorption shall be less than 18%.

- Base course
100 mm thick dry lean concrete (DLC) of grade C8/10 shall be provided as base course. A layer of 125 micron plastic sheet shall be laid over the PCC layer.
- Pavement slab
Pavement concrete slab of grade C25/30 shall be laid over the sub-base. The thickness of pavement slab shall be as per the design requirement conforming to AASHTO. Transverse contraction joints shall be provided at 4 m c/c spacing alongwith dowel bars. Longitudinal contraction joints shall be provided at 3.75 m spacing (for double lane road only) alongwith tie bars.

Chlorides and sulphates

The level of chlorides and sulphates in the wet mix sub-base shall be within the following limits:

	Maximum by weight	
	Sub-base	wet-mix road base
Acid soluble chloride (NaCl)	3.5%	0.5%
Acid soluble sulphate (SO ₃)	2.0%	0.5%

Shoulders

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The shoulders for double lane road shall be raised with kerbs at the edge of the road. The shoulders for single lane road and patrol road shall be at the level of the road top. The shoulder shall consist of 150 mm thick granular layer. The material used for shoulders shall comply with the specification for wet mix as following:
The wet mix material shall consist of crushed gravel or crushed rock and shall be suitably proportioned to conform to the following grading:

Sieve [mm]	Percentage by Weight Passing
50	100
37.5	90-100
20	60-80
10	40-60
5	25-40
2.36	15-30
0.6	8-22
0.075	0-8

Road construction shall consider all required measures to avoid different settlements.

- Main approach road to BTG and BOP from main gate complex shall be : Double Lane Road
- Access Roads to buildings/facilities inside BTG area shall be:
Single lane road for access roads to minor structures and double lane road for access to main equipment. Road shall be suitable for expected traffic.
- Access Roads to buildings/facilities inside BOP area shall be:
Single lane road for access roads to minor structures and double lane road for access to main equipment. Road shall be suitable for expected traffic.
- Patrol road shall be as suitable for purpose

2.3 Scope of Supplies and Services

This section sets out the scope of civil works and installations covered by this specification as well as the requested supplies and services, but without excluding other necessary components and services not mentioned.

2.3.1 General

The Contractor shall supply and erect all buildings, structures and systems which are necessary to support, to protect and to provide the required environmental conditions for the entire plant including roads, security fencing and any other measures needed for safe and practicable operation of the plant.

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Social and sanitary rooms in the appropriate size and arrangement shall be provided wherever required due to usage of the building, minimum in the buildings as per 2.3.2.

The following types of works have to be considered, but without excluding other necessary works and services not mentioned:

- all necessary surveys
- all necessary soil investigation required in addition to the investigation works carried out prior to the EPC Contract
- all other investigations and studies necessary for the design and execution of civil works (drainage system, flooding possibility of the site, safety measures, etc.)
If Bidder/Contractor is of the option that design criteria are sufficient for design, no further drainage study is required.
Flooding possibility of site shall be investigated.
- site organization works for the entire project execution phase including but not limited to:
 - arrangements of all temporary and permanent surfaces allocated for the new plant
 - temporary buildings for offices, stores, workshops, sanitary rooms, canteen and kitchen, first aid station, etc. offices for the staff of the Employer, creche, safety centre & field quality assurance lab, prayer room, visitor habitations
 - open area for future maintenance works
 - security installation on the site, including temporary fencing; temporary bridges, etc.
 - access roads and outdoor storage facilities
 - temporary water
 - temporary electricity supply
 - temporary storm water drainage and sewage system
 - final cleaning of the temporary and permanent plant sites to the full satisfaction of the Employer
 - housekeeping and cleaning of the sites during construction and equipment erection/testing works
 - temporary fire fighting facilities for the entire execution phase of the project
 - provision and maintenance of lay-down area including access roads

(Temporary facilities can be located within site installation area. Un-leveled/un-filled land outside plant boundary can be provided to the Contractor for temporary accommodations of Contractors' labors or laydown. Exact acquisition line will be furnished before award of contract. Employers temporary accommodation shall be inside the plant boundary. Labour camp shall be located outside the plant boundary on BIFPCL land, e.g. north of boundary.)

- site fill on the location of all required buildings and areas
Leveling and Grading is required under the Contract. Contractor shall make himself familiar with the site, to estimate the effort.
- structural and civil engineering design of all buildings, structures, foundations including the complete structural and dynamical analysis, design, execution and workshop drawing
- Third Party Verification of structural documents, including the complete structural and dynamical analysis, design, execution and workshop drawings

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All structural documents e.g. calculation, formwork drawings,

reinforcement drawings, steelwork drawings requires 3rd Party verification.

Verification shall consider Structural Stability, Ultimate Limit State and Serviceability Limit State.

An appropriate local design consultant, having similar work experience would be appreciated.

- removal of all debris, underground obstacles (if any) and surplus materials to approved dumping locations
- earthworks, permanent drainage works, soil exchange (if needed), refilling works on the plant site and on the additional areas allocated for temporary works
- all ancillary works and installations necessary for the execution of civil works, such as but not limited to: sheet piling, dewatering, fencing, signs, scaffoldings, etc.
- permanent roads, paved areas, footpaths, etc. on the plant site
- piling works
- execution of complete building, foundations and structures necessary for the installation of the indoor and outdoor equipment of the plant
- execution of all finishing and indoor installation works (such as doors, windows, wall cladding and roofing) painting and coating works, sanitaris, plumbing, ventilation-and air conditioning works, fire fighting, sanitary works, sewage, electrical lighting-and lightning, earthing, etc.
- supply of all necessary furniture, housekeeping small equipment (kitchen, refrigerators, exhaust installations, etc.), laboratory equipment, etc. This Phrase is related to Employer's and Engineer's office and Living accommodation, as specified under B.9.3. Details shall be defined by Bidder/Contractor and shall be subject to approval by BIFPCL during basic/detail engineering.
- Every working place shall be equipped with a computer, connected to a local network with connection to the plant computer network.
- execution of all necessary outdoor works for water supply, sewage and drainage works, fire fighting, earthing etc.
- all necessary crane and hoist girders, pipe and cable bridges and supports according to the requirements of the electrical and mechanical installations.

2.3.2 Buildings and structures

2.3.2.1 Steam turbine building

The steam turbine building shall be sized to accommodate the steam turbine generator(s) together with all associated facilities and ancillary plant installations.

Measures shall be taken to avoid the transmission of vibrations due to

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equipment and rotating machines (mainly steam turbines, feedwater pumps) to the building structure. These measures shall mainly be separate reinforced concrete foundation to be insulated from the remainder of the structure either by shock absorbing joints or vibration control systems typically consisting of spring elements and viscodampers to prevent the transmission of vibrations.

The building shall be served by overhead traveling crane(s). Capacity and Number of cranes as per requirements of heaviest lift.

At ground floor level access ways for traffic with heavy trucks shall be provided.

At all levels toilets for operation and maintenance staff shall be provided.

Within the Steam Turbine Building the main electrical components of the project shall be accommodated:

- unit switchgear and I&C
- auxiliary switchgear
- central control room.

Next to the Central Control Room additionally to the required technical rooms such as switchgear room, relay rooms for electronic panels battery rooms, relay rooms, computer room, UPS and DC equipment room, DCS engineering rooms, the following rooms have to be provided:

- 1 (one) office
- tea kitchen
- archive/storage room
- engineering diagnostic room
- toilets for operators (male and female).

Description of building:

- structure: steel structure
- floors: Groundfloor with intermediary platforms/levels
- flooring: reinforced concrete with suitable hardener and special oil resistant coating; TG hall combination of granite and heavy duty vitrified tile
- foundations: according to the soil investigation report and Special Technical Requirements of Foundations; special attention has to be paid for the safe transmission of dynamic loads and vibrations to the underground 230 mm thick brick walls or autoclave aerated concrete blocks with plaster finish up to 3.0 m or autoclave
- external wall:

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aerated concrete blocks
from floor level and

double skin metal cladding above.
For architectonical appearance, inside in addition

single skin metal cladding from operating floor up to
EOT Crane girder
External walls on transformer side shall have
250 mm thick RCC wall up to 5.0 m height as fire
barrier wall, with single skin metal cladding above 5.0
m up to turbine floor. From turbine floor to crane
girder level, double skin cladding will be provided.
230 mm thick brick walls or autoclave aerated
concrete blocks or autoclave aerated concrete blocks
with plaster finish
double skin metal roofing or as applicable
self closing sandwich steel doors with insulation

- internal wall:

- roof:
- doors:
- roller shutters as
required
- windows:
- entrances:
- ventilation:
- louvers:
- lifting equipment:

double glazed aluminum
electrical driven roller shutters
natural/mechanical
aluminum alloy
travelling crane (see mechanical section).

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The battery room shall be equipped with:

- cleaning sink minimum size 580 x 450 mm
- emergency shower with eye wash
- acid resistant floor and drain
- sink outlets and floor drains shall be chemical resistant and piped into the chemical drain system.

False floors and suspended ceilings wherever required.

Electrical hoist designed for the transport of the electrical and control panels.

Finishes: The control room shall be of noble appearance. Flooring of the control room shall consider electrostatic problems (suitable earthing mats where required). Powder coated metal false ceiling with noise reduction factor (0.5) shall be implanted. Airlocks of glass or at least with visions shall be provided. The lighting shall be adequate and in accordance with the arrangement of the individual working places.

The design of finishing works will comply with the requirements of the code of procedures with regard to the mirroring effects, lighting of working places, shadowing etc.

The minimum head clearance for the control room shall be 3650 mm.
The front towards the operation floor shall be fully glazed.

Turbine Generator foundation shall be finished with chemical resistant, anti-slip, abrasion resistant rubber flooring. Areas considered for maintenance purpose shall be marked permanently including the allowable bearing capacity as per structural calculation. Bearing Capacity shall consider maximum loads as per Operation and Maintenance Concept.

Operating floor of Main Power House shall be finished with Granite Stone and General Circulation/Movement area shall be provided with Vitrified Ceramic Tile flooring. Unit control Room & Control Equipment Room shall have Vitrified Ceramic Tiles floor with pattern."

This Specification shall be applicable for flooring; other surfaces are not considered here.

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2.3.2.2 Steam generator and air heater building

The Steam Generator and Air Heater Building may be of open or semi-open installation.

Description of building:

- foundation: according to the soil investigation report and Special Technical Requirements of Foundations
- floors: as required for proper O&M access
- flooring: reinforced concrete in ground floor, metal grating in other floors
- structure: steel structure
- walls: double skin metal cladding (if necessary, else single skin metal cladding)
- roof: double skin metal roofing (if necessary, else single-skin metal casing)
- lift: 1 passenger & goods lift with a minimum capacity of 4,000 kg to the highest accessible platform
- hoist: outdoor hoist arrangement at one side for long items.

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2.3.2.3 CENTRAL WORKSHOP

General

The area for the workshop shall be about (but not limited to) 3,000 m² overall, designed for all maintenance facilities with related services e.g. offices, locker and sanitary rooms. The clear height shall be minimum 6m. However the clear height shall be determined by requirement of overhead travelling crane clearance.

The workshops will allow all required works for daily maintenance and repair, which can be executed at site. The building will have enough capacity for the personnel of the plant which usually is employed in the workshops and for external personnel in case of major inspections or repairs.

Partitioned areas with suitable work benches, equipment and racking shall be provided for:

- mechanical workshops (welding, machine, overhaul)
- electrical workshops
- I & C workshops
- civil workshops (carpenters, etc.)
- air conditioned plant room
- tool rooms
- 1 meeting room 35 m² each,
- 5 offices for technical and admin. personnel (15 m² each)
- Sanitary equipment as below.
- locker rooms
- kitchen.

The complete workshop areas shall be designed for the use of fork lifters with a minimum lifting capacity big enough for the heaviest part to be handled.

Overhead travelling cranes shall be provided in the area of the workshops.

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Description of building:

- structure: steel structure
- floors: one
- flooring: reinforced concrete with hard screed topping
carborundum type (25 mm thick heavy duty cement
concrete tiles) with oil resistant epoxy coating (300
micron thick)
WCs tiled; offices with PVC flooring,
- foundations: according to the soil investigation report and Special
Technical Requirements of Foundations
- external wall: double skin metal cladding
- internal wall: 230 mm thick brick walls or autoclave aerated concrete
blocks with plaster finish
- roof: double skin metal sheet roof
- doors:
 - main entrance: electrically operated rolling shutter
 - external: self closing sandwich steel doors with insulation
 - internal: wooden doors with steel frames
- windows: double glazed aluminum
- air conditioning: centralized air conditioning,
- ventilation: natural/mechanical
- sanitary equipment in the office area:
 - showers in changing room
 - eastern WC with cleaning brush in toilet
 - western WC with cleaning brush in toilet
 - bowl urinal in male toilet
 - wash basins in toilet

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Special design criteria

The minimum load bearing capacity of ceilings and floors shall be as defined in BS 6399: Part 1 or equivalent and in Section “General technical requirements” of this Specification.

The live loads for ground floor shall be min. 50 kN/m².

2.3.2.4 Dozer maintenance shed

General

The area for the Dozer Maintenance Shed shall be about (but not limited to) 500 m² overall, designed for all routine maintenance on mobile equipment with related services e.g. washing area, storage area locker and sanitary rooms.

The workshops will allow all required works for daily maintenance and repair, which can be executed at site. The building will have enough capacity for the personnel of the plant which usually is employed in the workshops and for external personnel in case of major inspections or repairs.

Description of building:

- structure: steel structure
- floors: one
- flooring: reinforced concrete with hard screed topping carborundum (25 mm thick heavy duty cement concrete tiles) with oil resistant epoxy coating (300 micron thick)
- foundations: WCs tiled; offices with vitrified tile flooring according to the soil investigation report and Special Technical Requirements of Foundations
- external wall: double skin metal cladding
- internal wall: 230 mm thick brick walls or autoclave aerated concrete blocks or autoclave aerated concrete blocks with plaster finish
- roof: double skin metal sheet roof
- doors:
 - main entrance: folding doors with motor drive
 - external: self closing sandwich steel doors with insulation
 - internal: wooden doors with steel frames
- windows: double glazed aluminum
- air conditioning: decentralized air conditioning,
- ventilation: natural/mechanical
- sanitary:
 - showers in changing room
 - eastern WC with cleaning brush in toilet
 - western WC with cleaning brush in toilet
 - bowl urinal in male toilet
 - wash basins in toilet

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Special design criteria

The minimum load bearing capacity of ceilings and floors shall be as defined in BS 6399: Part 1 or equivalent and in Section “General technical requirements” of this Specification.

The live loads for ground floor shall be min. 30 kN/m^2 .

2.3.2.5 Operation and maintenance storage building

General

The area for the Operation and Maintenance storage shall be about (but not limited to) 3000 m^2 overall, designed for required storage with related services e.g. locker and sanitary rooms.

Partitioned areas with suitable, equipment and racking shall be provided for:

- small spare parts store
- spare parts pallet store
- large spare parts store
- 2 (two) offices for store keeper (15 m^2 each)
- sanitary equipment as below
- locker rooms
- tea kitchen.

The dimensions of the building shall be adequate to accommodate all different types of racks for goods and spare parts necessary for the operation of the Plant as specified in **Section B12**.

Heavy material store shall be single storey building, free of columns for easy movements of material. Light material store shall be double storey building. 1 No. of Goods lift with a capacity of 1,000 kg with rated speed of 0.5m/s shall be implemented.

A part of light material store shall have facility for storing electronic equipment/instruments.

Lifting devices shall be provided as required for heaviest part.

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- structure: reinforced concrete,
- floors: one/two floors
- flooring: reinforced concrete with hard screed topping
carborundum (25 mm thick heavy duty cement
concrete tiles) with oil resistant epoxy coating (300
micron thick); WCs tiled; offices with PVC
flooring
- foundations: according to the soil investigation report and Special
Technical Requirements of Foundations
- external wall: 230 mm thick autoclave aerated concrete blocks with
metal cladding
- internal wall: 230 mm thick brick walls with plaster finish
- roof: double skin metal sheet roof
- doors: electrically operated rolling shutter
- main entrance: self closing sandwich steel doors with insulation
- external: wooden doors with steel frames
- internal:
- windows: double glazed aluminum
- sanitary:
 - showers in changing room
 - eastern WC with cleaning brush in toilet
 - western WC with cleaning brush in toilet
 - bowl urinal in male toilet
 - wash basins in toilet

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2.3.2.6 Administration building

General

The area for the Administration Building shall be about (but not limited to) 5,000 m² overall, designed as 4 G+3 storey building for administration purpose with related services e.g. locker and sanitary rooms.

2 panoramic elevators shall be provided in the building.

The top floor of the building shall be reserved for provision of IT and satellite communication services.

The building shall house:

- a representative entrance and waiting hall and an information desk
- head of plant office (50 m²) incl. restroom and 2 assistant offices (20 m²)
- HOP Conference Hall (50m²)
- 6 Head of Department offices (25 m²) with each 1 assistant offices (10 m²)
- 11 Middle level executive offices (10 m²)
- 84 Workstations/Halls
- meeting rooms at each floor (30 m² each)
- archive (30m²)
- electrical rooms, as required
- library (50 m²)
- print room (20 m²)
- sanitary facilities
- prayer room (30 m²)
- canteen (150 m²)
- recreation room for the number personnel mentioned here above,
- first aid center with medical support facilities (2 rooms 30 m² each).
- gym (35 m²)
- model & exhibition room (70 m²).

Furniture for this building is also in the scope of the Contractor as per local practice.

Medical support facilities are also in the scope of the Contractor as per requirements due to Bangladesh regulations.

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Description of building:

- structure: reinforced concrete
3 to 4 floors
 - floors: see below
 - flooring: according to the soil investigation report and Special Technical Requirements of Foundations
 - foundations: 230 mm thick brick wall or autoclave aerated concrete blocks or autoclave aerated concrete blocks with aluminum composite panel cladding
 - external wall: 230 mm thick brick walls or autoclave aerated concrete blocks with plaster finish
 - internal wall: internal stairway
 - access: representative double plain door
 - doors:
 - external: aluminum glazed doors and wooden doors with steel frames
 - internal: double glazed aluminum with internal sun shades
 - windows: centralized air conditioning
 - air conditioning: natural/mechanical
 - ventilation:
 - showers in changing room
 - eastern WC with cleaning brush in toilet
 - western WC with cleaning brush in toilet
 - bowl urinal in male toilet
 - wash basins in toilet
 - sanitary equipment in the office area:
 - For this building prestigious finishes shall be provided. The offices shall have vitrified tile flooring; in the manager's office carpet flooring, fabric wall coverings, and decorative suspended ceilings with lighting fittings embedded. Floor and walls of the kitchen future and recreation room shall be fully tiled. Entrance hall and stairs with polished granite stone flooring. The shower cabins to have partition walls with doors.
 - finishes:

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2.3.2.7 Service building near turbine hall

General

The area for the Service Building shall be about (but not limited to) 5,500 m² overall, designed as 5 G+4 storey building for administration purpose

with related services e.g. locker and sanitary rooms.

2 lifts with 16persons capacity shall be implemented.

A direct connection from Service Building to Turbine Hall shall be provided at Turbine Floor Level from the top floor (5th floor) of the Service building.

The building shall house:

- head of O&M (35 m²) incl. restroom and assistant offices (12 m²)
- HOP Conference Hall (50 m²)
- 8 Head of Department offices (25 m²)
- 31 Middle level executive offices (10 m²)
- 109 Workstations/Halls
- meeting rooms at each floor (30 m² each)
- archive (30 m²)
- electrical rooms, as required
- library (50 m²)
- print Room (20 m²)
- drawing hall (30 m²)
- prayer room (30 m²)
- canteen (75 m²)
- recreation room for the number personnel mentioned here
- first aid center with medical support facilities (2 rooms 30 m² each)
- gym (35 m²)
- locker and dressing rooms with showers and toilet rooms for the following personnel (Percentage ladies/men 25%/75%):
 - own personnel: 205
 - foreign personnel: 25
- electrical Laboratory (60 m²)
- C&I Laboratory - pneumatic (40 m²)
- C&I Laboratory - instrument(40 m²)
- 5 Department stores (60 m²).

Furniture for the building is also in the scope of the Contractor as per local practice.

Medical support facilities are also in the scope of the Contractor as per requirements due to Bangladesh regulations.

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- floors: 3-4 floors
- flooring: see below
- foundations: according to the soil investigation report and Special Technical Requirements of Foundations
- external wall: 230 mm thick autoclave aerated concrete blocks with aluminum composite panel cladding
- internal wall: 230 mm thick brick walls with plaster finish
- access: internal stairway
- doors:
 - external: representative double plain door
 - internal: aluminum glazed doors/wooden doors with steel frames
- windows: double glazed aluminum with internal sun shades
- sanitary equipment:
 - showers in changing room
 - eastern WC with cleaning brush in toilet
 - western WC with cleaning brush in toilet
 - bowl urinal in male toilet
 - wash basins in toilet
- finishes:

The offices shall have vitrified tile flooring covering; in the manager's office carpet flooring, fabric wall coverings, and suspended ceilings with lighting fittings embedded. Floor and walls of the kitchen future and recreation room shall be fully tiled. Entrance hall and stairs with natural stone or ceramic tiling. The shower cabins to have partition walls with doors.

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2.3.2.8 Local service buildings including control room

Service Buildings including Control room shall be provided at the following locations:

- near coal handling unit
- near ash handling unit/jetty
- near FGD/ESP
- near Oil handling plant
- near intake structure
- near water treatment plants
- near cooling tower.

The buildings shall house:

- control room as per functional requirement 2 offices for technical personnel (15 m² each)
- electrical rooms
- locker and dressing rooms with showers and toilet rooms for 10 workers. (Percentage ladies/men 25%/75%).

Buildings can be constructed as single storey building, floor height shall be as per requirements and BNBC.

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Description of building:

- structure: reinforced concrete
- floors: one floor
- flooring: see below
- foundations: according to the soil investigation report and Special Technical Requirements of Foundations
- external wall: 230 mm thick brick walls or autoclave aerated concrete blocks with plaster finish
- internal wall: 230 mm thick brick walls or autoclave aerated concrete blocks with plaster finish
- doors:
 - external: self closing sandwich steel doors with insulation
 - internal: wooden doors with steel frames
- windows: double glazed aluminum with internal sun shades
- air conditioning: centralized air conditioning
- ventilation: natural/mechanical
- sanitary equipment in the social area:
 - showers in changing rooms
 - eastern WC with cleaning brush in toilets
 - western WC with cleaning brush in toilets
 - bowl urinal in male toilets
 - wash basins in toilets
- finishes: The offices shall have vitrified tiling covering; fabric wall coverings, and decorative suspended ceilings with lighting fittings embedded. Floor and walls of the kitchen future and recreation room shall be fully tiled. The shower cabins to have partition walls with doors.

2.3.2.9 Canteen

The central canteen shall be a building for workers and staff members shall be located suitably in the plant with an area about (but not limited to) 1000 m² overall. The building shall house the restaurant with all kitchen facilities and related services e.g. locker and sanitary rooms.

This building shall be a one storey building with attractive appearance. It consists of a reinforced concrete structure with concrete block walls, reinforced concrete floors and roof.

The following rooms shall be accommodated in this building:

- dining hall with partition for senior executives and others (250 persons in total at a time)

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- kitchen approx. 100 m²
- wardrobe
- store
- cooling storage
- locker rooms
- sanitary rooms (toilets, showers)
- air conditioning room
- entrance
- electrical rooms.

Wardrobe is also in scope of Contractor and shall be suitable for seize of canteen, floor height shall be as per requirements and BNBC.

Description of building:

- structure: reinforced concrete
- floors: one floor
- flooring: see below
- foundations: according to the soil investigation report and Special Technical Requirements of Foundations
- external wall: 230 mm thick brick walls or autoclave aerated concrete blocks with plaster finish
- internal wall: 230 mm thick brick walls or autoclave aerated concrete blocks with plaster finish
- doors:
 - external: representative double plain door
 - internal: aluminum glazed doors/wooden doors with steel frames
- windows: double glazed aluminum with internal sun shades
- air conditioning: centralized air conditioning
- ventilation: natural/mechanical
- waste water: grease trap
- sanitary equipment in the social area:
 - showers in changing rooms
 - eastern WC with cleaning brush in toilets
 - western WC with cleaning brush in toilets
 - bowl urinal in male toilets
 - wash basins in toilets
- finishes: The floor finishes shall be cement screed with different top finishes as vitrified tiling (60 cm x 60 cm) with skirting for dining and wardrobe and glazed non-slip vitrified tiles (60 cm x 60 cm) for kitchen and store. Glazed non-slip ceramic tiles (20 cm x 20 cm) for sanitary areas. Entrance with natural stone with skirting.

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2.3.2.10 Auditorium

The area for the Auditorium shall be about (but not limited to) 1,000 m² overall, designed for a seating capacity of minimum 250 persons and related services e.g. sanitary rooms.

This building shall be a one storey building with attractive appearance. It consists of a reinforced concrete structure with concrete block walls, reinforced concrete floors and roof.

The following rooms shall be accommodated in this building:

- entrance hall with exhibition area
- information desk
- auditorium (clear headroom of min. 4.00 - 8.00 m, variable) incl. stage
- tea kitchen
- sanitary rooms (toilets)
- air conditioning room, as required
- electrical rooms, as required.

Description of building:

- structure: reinforced concrete
- floors: one floor
- flooring: see below
- foundations: according to the soil investigation report and Special Technical Requirements of Foundations
- external wall: 230 mm thick brick walls or autoclave aerated concrete blocks with plaster finish
- internal wall: 230 mm thick brick walls or autoclave aerated concrete blocks with plaster finish
- doors:
 - external: representative double plain door
 - internal: aluminum glazed doors/wooden doors with steel frames
- windows: double glazed aluminum with internal sun shades
- air conditioning: centralized air conditioning
- ventilation: natural/mechanical
- sanitary equipment in the social area:
 - eastern WC with cleaning brush
 - western WC with cleaning
 - bowl urinal in male toilet
 - wash basins
- finishes:
 - For this building prestigious finishes shall be provided. The floor finishes shall be polished granite stone flooring in entrance hall and exhibition area, non-slip fully vitrified ceramic tiles (20 cm x 20 cm) for toilet, tea kitchen. Auditorium with carpet first quality, false ceiling and wall paneling. First quality means best quality suitable for this purpose.

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2.3.2.11 Water and waste water treatment buildings

The buildings accommodate the water and waste water treatment facilities with a laboratory and sanitary facilities.

Description of building:

- structure: steel structure
- floors: one
- flooring: reinforced, water tight concrete, with acid-resistant coating or tiling, as applicable
- foundations: according to the soil investigation report and Special Technical Requirements of Foundations
- external wall: double skin metal cladding
- internal wall: 230 mm thick brick walls or autoclave aerated concrete blocks or autoclave aerated concrete blocks with plaster finish
- roof: double skin metal sheet roof
- doors:
 - external: self closing sandwich steel doors with insulation
 - internal: wooden doors with steel frames
- windows: double glazed aluminum
- air conditioning: decentralized air conditioning,
- ventilation: mechanical

Laboratory with suspended ceiling tiled walls and floor. Laboratory has to be air conditioned and provided with fume extraction hood cabinet

Chemical unloading station (only slab and roof)

- structure: reinforced concrete
- floors: one
- flooring: reinforced, water tight concrete as per applicable codes and standards, with acid-resistant coating or tiling, as applicable
- foundations: according to the soil investigation report and Special Technical Requirements of Foundations
- external wall: none, only reinforced concrete columns
- roof: reinforced concrete

Ring foundations for tanks shall be provided.

Special requirements for R/O building/room regarding HVAC shall be considered as per table in Section B12.6

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Pits, tanks and basins will not require covering.

All wet areas (indoor and outdoor) and acid-alkali prone areas shall be provided with chemical-resistant catchments pits systems connected to the waste water tanks of the process waste water system. Acid resistant coating or tiling shall be provided in the catchments zones, subject to the approval of the Employer.

All water retaining structures shall be constructed as water tight concrete as per applicable international Codes/ standards e.g. DIN 1045-2:2008-08 and DIN EN 206-1:2001-07.

2.3.2.12 Fire station

This building accommodates the equipment for fire fighting described in the mechanical section.

In addition office, small duty room and maintenance room with window units shall be provided.

Space for fire engine truck and other equipment, such as trailer etc. as required, shall be provided.

Building description:

- structure: reinforced concrete
- floors: one floor
- flooring: reinforced concrete with hard screed topping
carborundum type (25 mm thick heavy duty cement
concrete tiles) with oil resistant epoxy coating (300
micron thick)
- foundations: according to the soil investigation report and Special
Technical Requirements of Foundations
- external wall: 230 mm thick brick walls or autoclave aerated concrete
blocks with plaster finish
- internal wall: 230 mm thick brick walls or autoclave aerated concrete
blocks with plaster finish
- doors:
 - main entrance: electrically operated rolling shutter
 - external: self closing sandwich steel doors with insulation
 - internal: double plain steel door
- windows: double glazed aluminum with internal sun shades
- air conditioning: centralized air conditioning
- ventilation: mechanical/louvers

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Next to the fire station a drill tower shall be provided.

2.3.2.13 Pump houses

The structures of the following pump houses are included under this item:

- fire water pump house
- Fire water booster pump house
- Foam pump house
- portable water pump house
- ash water recirculation pump house
- HCSD pump house
- service water pump house
- Fuel Oil pressurizing pump house
- Fuel Oil unloading pump house
- other specified pump houses not included above
- concrete structure with fill-in blockwork and concrete roof.

Alternatively a structural steel structure, with metal cladding and roofing can be provided.

The building is divided in sections including a local switchgear room, if required.

Pump Houses shall be provided with an overhead crane with the capacity of the heaviest lift.

For pump houses other than cooling water and plant water intake appropriate cranes shall be employed to handle the heavy equipment; specific design shall be based on the equipment layout requirements and must comply with Section B0.

All requirements to enable Operation and Maintenance shall be considered. Adjacent to pump houses maintenance bay shall be provided.

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2.3.2.14 Chlorination

The chlorination buildings accommodate the chlorination installation for the production of the hypochlorite solution.

Chlorination facilities shall be erected at the plant area and near the Intake structure, if applicable.

Building description:

- structure: reinforced concrete
- floors: one floor
- flooring: reinforced concrete, with acid-resistant coating where required;
- foundations: according to the soil investigation report and Special Technical Requirements of Foundations
- external wall: 230 mm thick brick walls or autoclave aerated concrete blocks with plaster finish
- internal wall: 230 mm thick brick walls or autoclave aerated concrete blocks with plaster finish
- doors
- external Double plain steel doors
- internal Double plain steel doors
- windows Double glazed aluminum
- air conditioning Decentralised air conditioning
- ventilation mechanical

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2.3.2.15 H2 generation plant building

The H2 Generation Plant building shall accommodate the equipment for the production H2, as described in **Section B12**.

Building description:

- structure: reinforced concrete
- floors: one floor
- flooring: reinforced concrete, with acid-resistant coating where required
- foundations: according to the soil investigation report and Special Technical Requirements of Foundations
- external wall: 230 mm thick brick walls or autoclave aerated concrete blocks with plaster finish
- internal wall: 230 mm thick brick walls or autoclave aerated concrete blocks with plaster finish
- doors:
 - external: double plain steel doors
 - internal: double plain steel door double
- windows: glazed aluminum
- air conditioning: decentralized air conditioning
- ventilation: mechanical

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2.3.2.16 Compressed air building

The building shall accommodate the equipment as described in **Section B12**.

Building description

- structure: light-weight steel structure
- floors: one
- flooring: reinforced concrete, with acid-resistant coating where required
- external walls/roofs: double skin metal sheet cladding/roofing
- ground floor: reinforced concrete with acid resistant finishing
- doors: double plain steel doors
- windows: double glazed aluminum
- ventilation: mechanical
- air conditioning: decentralized air conditioning.

2.3.2.17 FGD related building and structures

FGD absorber

According to **Section B3** the absorber shall be made of steel with respective lining. All necessary foundations resting on piles shall be provided as per structural analysis.

The Contractor shall provide a structural steel staircase with an elevator to reach all relevant platforms of the absorber.

FGD pump and blower building

The FGD pumps and blowers shall be housed in a separate building consisting of structural steel with insulated corrugated metal cladding and insulated and water tight roofing.

The various levels shall be created by reinforced concrete slabs with screed of industrial type and suitable epoxy coating.

Limestone silo and unloading facilities

The intermediate limestone silo shall be made of reinforced concrete.

Beneath the silo the crusher and milling systems and the limestone slurry preparation system shall be installed. The area below the silo shall be housed inside a structural steel building with insulated trapezoidal cladding.

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The limestone silo shall be constructed on the jetty.

The unloading for the vessels shall be via coal conveying system to limestone storage.

The Contractor shall provide all necessary foundations and related civil works for the lime stone system.

Hydro cyclone and limestone slurry building

This building shall house the hydro cyclone station and the limestone slurry tanks.

The building shall be of a steel structure with insulated metal cladding.

A staircase shall be provided to reach all necessary platforms.

The Contractor shall provide all foundations and related civil works for the building and necessary mechanical and electrical installations.

Gypsum silo

The gypsum will be stored in an intermediate gypsum silo next to the plant, and transported via pipe conveyor to gypsum silo next to jetty.

The gypsum silo shall be a reinforced concrete silo on columns which are arranged such that loading of trucks and ships is possible. The silo shall be provided with all foundations and other structural elements needed for the mechanical installations. The Silo shall be located at the jetty.

The gypsum silo shall be equipped with an elevator of industrial type with a capacity sufficient for all operation and maintenance cases, leading up to the various platforms required for service and up to the top level of the gypsum store.

The gypsum not meeting the requirements shall be stored in an open storage area surrounded by a reinforced concrete wall which is protected by a steel liner in the lower portion against damage by front wheel loaders.

Emergency drain tank

The emergency drain tank shall consist of an enclosed steel structure on foundations according to the structural analysis.

2.3.2.18 Stack

One chimney with one outer structure (outer shell) of reinforced concrete each designed to be free standing against static and dynamic wind loads for two internal separate flue gas ducts shall be provided, including all necessary foundations, coatings, etc..

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The height of the chimneys based on Bangladesh Standards for Gaseous Emission from Industries or Projects, of the Environment Conservation Rules 1997, shall be minimum 275 m.

The parameters required (e.g. maximum and minimum exit velocities) for finalisation of flue diameter and chimney height shall follow requirements of EIA and requirements of Section B3.

The diameter of the chimneys depends on the diameters of the inserted flue gas ducts. In all levels a clear space of at least 1 m between the chimney structure and the flue gas ducts shall be maintained. In this area the lift and staircase shall be integrated.

The design of chimney stack shall be checked & verified by wind tunnel test at a reputed institute, having prior experience of conducting such type of test.

Reinforced concrete designed in accordance with the recommendations of ACI-307 and CICIND (International Committee on Industrial Chimneys). Standard and strong anti-corrosion protection, UV-resistant and acid and heat resistant paint shall be applied on the outside. Color and selection of bands shall be to the requirements of the relevant authority.

Roof area shall be tiled with acid resistant tiling.

The structure shall be sturdy and well founded to enable it to support both the expected wind and earthquake loads as well as the temperature stresses. Preferably the structural analysis of the system shall be done in one system including outer shell, foundation plate and piles.

All concrete parts below ground level shall be protected outside by a waterproof membrane and protection board as specified.

The lift shall be of industrial type, installed at the inside of the chimney's concrete surface with a nominal carrying capacity of 500 kg. It shall travel from ground floor to each platform for service and maintenance except roof slab platform. From last platform to roof of chimney (approx 6 m), shall be accessed by a cage ladder. Inserts shall be provided as required for monitoring the stack gases.

Flue gas monitoring platforms, intermediate duct supporting provisions, landings and maintenance platforms with access shall be provided.

Galvanized steel ladder located in the space between the concrete

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shell and ducts shall be provided from the ground level to the top of the stack. Galvanized steel floor grating landings shall be provided, as required for Maintenance and operation, including a 360 degree landing at the test ports and at aircraft warning lights levels.

Additional external platform at aircraft warning lights levels shall be provided, if required due to operation and maintenance works.

Installations necessary for rescuing persons have to be assured in the whole area of the chimney.

The flue gas pipe can be either be of GRP or alternatively of carbon steel coated externally and with a suitable internal liner (Pennguard System or similar) or Stainless Steel.

In case Bidder/Contractor will provide GRP flue gas liners, Codes and Standards as mentioned in section B5 shall be followed.

The design shall consider all operating conditions like Design Pressure, Design Temperature, etc.

Liners shall be designed to with stand all internal and external loads.

In case Bidder/Contractor will provide Flue liner material Austenitic stainless steel of designation UNS 31727, it shall be conforming to ASTM A240/A240M.

Finalizing the material for chimney flue liner, construction methodology and sourcing as per relevant codes/standards is in the scope of Bidder/Contractor. Supplier with traceable experience for this work shall be proposed by Bidder/Contractor and shall be subject to approval by BIFPCL during basic/detail engineering.

Flue gas liners shall be adequately insulated as per requirements **Section B0**.

Expansion joints shall be implemented as per requirement. Construction of joints shall follow international codes and standards.

A stainless steel stack cap and galvanized louvers, doors, and other openings with miscellaneous steel frames shall be provided.

Drainage system for condensates (inside the flues) and rainwater (from the roof top) shall be provided with appropriate treatment.

Aircraft warning lights, earthing, lightning protection, lighting and other

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electrical installations for maintenance shall be installed. The local regulations and ICAO regulations shall be followed.

Building description

- structure: reinforced concrete structure
- surfaces: coating and protection painting inside and outside
- foundation: a reinforced concrete ring beam or block/slab on piles as stipulated by the results of the soil investigations
- floors: galvanized steel gratings on structural steel, all galvanized and painted
- stairs: open grid steel flooring mounted on galvanized steel structures inside the concrete structure
- railing: Along the steel gratings, around the various openings and for the stairs and ladders tubular steel railings of galvanized and painted tubular steel shall be provided.
- access and escape routes: Access shall be made by galvanized steel ladders with safety cages. For all escape routes the local regulations have to be followed. All ladders and stairs shall be secured by platforms and railings.

Note-1: Tension piles might be used. Piles must be suitable and tested for tension loads.

Note-2: Painting philosophy as follows would be accepted:

- Top 50 m of the outside surface of the shell shall be painted with acid and heat resistant paint (Polyurethane) in alternate bands of signal red and white color. The remaining portion of the outside surface of the shell shall be painted with Synthetic enamel paint in alternate bands of signal red and white color.
- Inside the shell does not require painting. Flue gas liner shall be insulated and protected, that no acid and heat attack shall be expected to concrete shell.

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2.3.2.19 Laboratories

Laboratories shall be incorporated in the main buildings wherever required, such as water treatment building, as specified in B6 etc. One centralized laboratory for overall analysis e.g. coal analysis, gypsum analysis, etc. shall be provided. Contractor shall provide concept for location of laboratories. The laboratory rooms shall have suspended ceilings and tiled floors and shall be air conditioned. It shall be furnished with work benches, chemical fumes exhausting systems, acid proof sinks linked with acid collecting tanks- respective connected to neutralization systems and shall have different rooms for different tasks e.g. for tests related to the water and waste water treatment or test related to coal or oil, etc. Secure storage rooms for chemicals and emergency shower facilities are required.

2.3.2.20 Oil unloading station and forwarding pump house

The fuel unloading station shall accommodate the following: It shall be possible to unload several road tankers at the same time. Final requirements are to be determined by Contractor according **Section B4** and **Section B0**. The unloading pumps shall be installed 45 cm above the road level.

The station shall consist of a reinforced concrete slab (treated against oil leakages) and sunshade of about 6 m height. The sunshade shall be of steel covered with trapezoidal steel sheets. The floor scale shall be provided with retaining and discharge facilities for oil leakages.

The pump house shall be of solid reinforced concrete structure towards the tank yard and lightweight steel structure in the opposite site. The requirements of the valid rules and standards for the design and construction of fuel unloading stations especially with regard to the fuel oil catchment pit and fire protection have to be strictly respected by the Contractor.

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2.3.2.21 400/230 KV GIS control building

The sizes of the control building have to be determined according to the requirements for the electrical and instrumentation/control equipment.
The following rooms shall be accommodated in this building:

- battery room
- offices
- store
- sanitary tea kitchen
- AC/DC-Distribution rooms
- control room
- telecommunication, metering and SCADA rooms
- medium voltage rooms

Description of the building

- structure: reinforced concrete
- floors: one
- flooring: reinforced concrete, vitrified tile flooring
- foundations: according to the soil investigation report and Special Technical Requirements of Foundations
- external wall: 230 mm thick brick walls with metal cladding
- internal wall: 230 mm thick brick walls with plaster finish
- roof: insulated-watertight RC roof
- doors:
 - external: self closing sandwich steel doors with insulation
 - internal: aluminum glazed doors/wooden doors with steel frames
- windows: double glazed aluminum
- finishes: The control room shall be of noble appearance and receive e.g. sound absorbing wall cladding and suspended ceiling.
- air conditioning: centralized air conditioning
- ventilation: natural/mechanical
- sanitary-equipment: toilets for ladies and gents consisting of
 - western type WC with cleaning brush
 - eastern type WC with cleaning brush
 - bowl urinal
 - wash basin
 - hot air hand drier.

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The battery room shall be equipped with:

- cleaning sink minimum size 580 x 450 mm
- emergency shower with eye wash
- acid resistant floor and drain
- Sink outlets and floor drains shall be chemical resistant and piped into the chemical drain system.

False floors and suspended ceilings wherever required. The control room(s) shall have windows with sunshades and may be divided with a glass wall into two sections. Flooring of the control room to consider electrostatic problems (to provide suitable earthing mats where required) and the ceiling to be sound absorbing. Airlocks of glass or at least with visions shall be provided.

Electrical hoist designed for the transport of the electrical and control panels.

Finishes: the control room shall be of noble appearance and receive e.g. sound absorbing metal wall cladding. The lighting shall be adequate and in accordance with the arrangement of the individual working places. Windows to be double glazed aluminum PVDF coated.

The design of finishing works will comply with the requirements of the code of procedures with regard to the mirroring effects, lighting of working places, shadowing etc.

2.3.2.22 400/230 KV GIS building

The GIS buildings shall consist of a steel structure with trapezoidal metal panels for external walls and roofs. The floor shall be a concrete foundation.

Description of the building

- structure: steel structure
- floors: one
- flooring: reinforced concrete
- foundations: according to the soil investigation report and Special Technical Requirements of Foundations
- walls: single skin metal sheet cladding
- roof: single skin metal roofing
- doors:
 - external: self closing sandwich steel doors with insulation
- windows: double glazed aluminum
- ventilation: natural/mechanical.

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2.3.2.23 HCSD - building

The building shall accommodate the equipment for high concentrated slurry disposal, as described in **Section B04**.

Building description

- structure: reinforced concrete
- floors: one floor
- flooring: reinforced concrete
- foundations: according to the soil investigation report and Special Technical Requirements of Foundations
- external wall: 230 mm thick brick walls or autoclave aerated concrete blocks with metal cladding
- internal wall: 230 mm thick brick walls or autoclave aerated concrete blocks or autoclave aerated concrete blocks with plaster finish
- roof: double skin metal sheet roof
- doors:
- main entrance:
 - external: folding doors with motor drive
 - internal: self closing sandwich steel doors with insulation
- windows: double glazed aluminum
- air conditioning: centralized air conditioning, if required
- ventilation: natural/mechanical

2.3.2.24 Main gatehouse

The main gatehouse located inside of the plant site serves for control of the entrance. From the working place the gate keeper shall be able to watch the areas in the front and behind the gate house and to release the pedestrian and vehicle gates.

The main gate house symbolizes the entrance of the plant and shall be of a good esthetical appearance.

Electrically operated Mild steel (MS) gates are included in the scope.

The following rooms shall be accommodated in this building:

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- security staff offices
- time office incl. time machine
- reception area
- lounge
- safety induction center.

Floor area shall be suitable for purpose and Floor height shall be as per requirements and BNBC.

Description of building:

- structure: reinforced concrete structure
- floors: one
- flooring: vitrified tiling
- external wall: 230 mm thick brick walls or autoclave aerated concrete blocks with paster
- internal wall: 230 mm thick brick walls or autoclave aerated concrete blocks with plaster
- doors:
 - external: self closing sandwich steel doors with insulation
 - internal: wooden doors with steel frames
- windows: double glazed aluminum
- ventilation: mechanical
- air conditioning: decentralized air conditioning
- sanitary equipment: toilet with 1 WC and 1 wash basin.

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2.3.2.25 Secondary gatehouses

On Plant area secondary Gatehouses shall be located at the following locations:

- near Jetty Area
- on additional location for labor entrance/ any suitable place.

The gate houses, serves for control of the entrance. From the working place the gate keeper shall be able to watch the areas in the front and behind the gate house and to release the pedestrian and vehicle gates. The building shall be provided with the guard room a small office and a sanitary room. Electrically operated Mild steel (MS) Gate is also included in the scope.

Floor area shall be suitable for purpose and Floor height shall be as per requirements and BNBC.

Description of building:

- structure: reinforced concrete structure
- floors: one
- flooring: vitrified tiling
- external wall: 230 mm thick brick walls or autoclave aerated concrete blocks with metal cladding
- internal wall: 230 mm thick brick walls or autoclave aerated concrete blocks with plaster
- doors:
 - external: self closing sandwich steel doors with insulation
 - internal: wooden doors with steel frames
- windows: double glazed aluminum
- ventilation: mechanical
- air conditioning: decentralized air conditioning
- sanitary equipment: toilet with 1 WC and 1 wash basin.

2.3.2.26 Construction sheds

On the plant area 30 small, partly enclosed buildings (closed by three sided, and open to one side, covered by roof sheet) shall be provided as permanent construction sheds for repair and maintenance issues.

Office and store shall a building structure, whereas the workplace is just a covered area.

The locations shall be:

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- 8 pcs near ID-fan - chimney area
- 6 pcs near turbine hall - 0.00 mm
- 2 pcs near cooling water pump house
- 6 pcs near coal handling control room
- 4 pcs near ash handling control room
- 4 pcs near jetty.

The sheds shall consist of:

- office (15 m²)
 - store (20 m²)
 - workplace (50 m²), only covered.
- Floor height shall be as per requirements and BNBC.

Description of building:

- structure: reinforced concrete structure
- floors: one
- flooring: PVC tiling or equivalent
- external wall: 230 mm thick brick walls or autoclave aerated concrete blocks with metal cladding
- internal wall: 230 mm thick brick walls or autoclave aerated concrete blocks with plaster finish
- doors: self closing sandwich steel doors with insulation
- windows: double glazed aluminum
- ventilation: mechanical
- air conditioning: window/split air conditioning system
- sanitary equipment in the office area:
 - eastern WC with cleaning brush in toilet
 - western WC with cleaning brush in toilet
 - bowl urinal in male toilet
 - wash basins in toilet

For these structures, pre-engineered structures can be used.

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2.3.2.27 Maintenance workshops

On the plant area Maintenance Workshops shall be provided as permanent construction sheds for repair and maintenance issues.

The locations shall be:

- mill maintenance workshop (70 m² with EOT)
- mill maintenance workshop (with cylinder holding fixtures, sand blasting facility)
- fan maintenance bay (with monorail)
- coal handling plant workshop cum office building with min. area 900 m².
The workshop shall be in addition to the central workshop.

Where applicable, workshops can be combined with other facilities.

Floor area shall be suitable for purpose and floor height shall be as per requirements and BNBC.

Description of building:

- structure: steel structure
- floors: one floor
- flooring: concrete or paving
- walls: double skin steel cladding
- roof: double skin galvanized steel sheet
- doors: sandwich steel doors with insulation
- windows: double glazed
- ventilation: mechanical
- air conditioning: window/split air conditioning system.

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2.3.2.28 ESP CONTROL ROOM BUILDING

Description of building:

- structure: concrete structure
- flooring: concrete or paving
- External walls: 250 mm thick Aerated concrete blocks
- Internal walls: 250 mm thick brick wall
- roof: concrete
- doors: sandwich steel doors with insulation
- windows: double glazed

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2.3.3 Outdoor foundations and structures

2.3.3.1 Transformer bays

Oil-filled transformers shall be supported on reinforced concrete foundations.

Provision shall be made for the catchment of oil spillage and fire deluge water. Appropriate measures are to be made to prevent pollution of the environment by leading of ejected oil.

The foundation supporting the transformers shall incorporate transformer rails. Each transformer foundation shall be provided with slope and raised borders, enclosing an oil retention basin in which the oil content of the transformer can be carried in the event of an oil leak. The oil retention basin shall be sized to hold the oil capacity of the largest transformer, rainwater and water from fire fighting system. The basin shall be adequately coated. Above the oil pit a min. 20 cm thick gravel layer on a steel grating shall be provided. The retention basins shall drain into a central oil separator conforming to VDE-Standard or equivalent. Water from the separator shall drain to the site drainage (process waste water) system.

A deluge system shall be installed.

The transformer bays shall have reinforced concrete fire walls towards the neighboring buildings and between each other –if applicable- and security fencing on the other sides with personnel gates to the front.

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2.3.3.2 400/230kV GIS

The civil portion of the 400/230kV GIS consists of foundations, transformer foundation, control building, GIS building, Bus duct supports, tower & gantries and equipment support structures etc.

The transformers bays shall be provided, as described above.

The sizes of the control building have to be determined according to the requirements for the electrical and instrumentation/control equipment. It shall be constructed as reinforced concrete and brickwork building.

The GIS buildings shall consist of a steel structure with trapezoidal metal panels for external walls and roofs. The floor shall be a concrete foundation.

Details for tower and gantries and support details of outdoor switchyard equipment will be described in electrical part.

The complete Area shall be fenced off from site. The access shall be from Main Plant. Additional access from outside direct to the 400/230 GIS is not required.

2.3.3.3 Other outdoor foundations

The following foundations shall be included under this clause:

- for dust filter (electrostatic precipitator or fabric filter plant)
- for flue gas desulphurization plant
- for supporting structures of pipes/cables, etc.
- for outdoor switchgear supports and gantries
- for air condensers and coolers (as applicable)
- for other outdoor structures not explicitly mentioned above.

The foundations shall be of reinforced concrete designed and constructed according to the recommendations of the soil investigation report.

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2.3.3.4 Foundations of various storage tanks

The foundations of the following storage tanks are included under this item:

- potable water storage tanks
- demineralized water storage tanks
- service water tanks
- condensate tanks
- feedwater tanks
- foam storage tanks
- fire fighting water
- neutralization buffer tanks - if applicable
- other specified tanks not included above, e.g. Section B6.

The tanks shall be founded 0.60 m above surrounding level on ring foundations of reinforced concrete and a well compacted layer of fine graded asphalt concrete of 50 mm thickness with max. grain size of 5 mm.

On the ground beside the tanks (other than the potable water storage tanks), concrete slabs with raised borders are to be provided which shall collect all the leakages. These slabs are to be adequately protected against the chemical attack involved.

2.3.3.5 LFO/HSD storage tank

Care should be taken to ensure that no pollution of groundwater through oil may occur and that all precautions for fire protection are taken. The LFO/HSD storage tank has to be installed as individual tank farm bund. The dewatering system of the oil catchment area of the substation shall be provided with a locking system, which should be activated during the unloading phase at the tanks.

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- tank foundations:
The tank shall be founded 0.40 m above tank yard level on ring foundations of reinforced concrete and a well compacted layer of fine graded asphalt concrete of 50 mm thickness.
- bund of LFO/HSD:
The bund and floor are to consist of reinforced concrete. The whole tankyard shall be isolated by a non-rotting oil and water-proof foil laid on the soil. The top protection for the insulating foil shall be achieved by concrete slabs. The joints responsible for absolute water and oil tightness between foundations and oil bund must not be endangered by possible settlements.
- In case of storage tank including a double bottom, a double wall (second wall in steel serving as spilling basin) up to the top of the tank and a roof covering the two walls, the bund can be omitted.
- drainage:
The tank farm floor is to be sloped and provided with drainage channels so that trouble-free drainage of rainwater into the oil separators is possible. No oil should get into the rain water line even when an oil separator is overfilled.

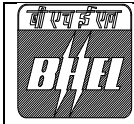
2.3.3.6 Cable and pipe ducts/pipe bridges

For cables and pipes the Contractor shall provide ducts in such areas where installation above ground is not possible or advisable. Cables and pipes shall be laid in separate ducts. In general, ducts shall be avoided, as appropriate.

Pipe bridges shall be provided for supporting and routing of various pipes and electrical cables between the plant components.

Pipe sleepers are also acceptable, as long as all aspects due to accessibility and head clearances are fulfilled.

Details will be discussed during design stage.



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2.3.3.7 Covered car parks

The following parking provision shall be foreseen:

- in the area of the administration building: min. 75 shaded car parking lots and 75 unshaded car parking lots
- in the area of the service building: min. 75 shaded car parking lots and 100 unshaded car parking lots
- in the area of the central canteen: min. 50 shaded car parking lots and 50 unshaded car parking lots
- in the area of the auditorium: min. 75 shaded car parking lots and 75 unshaded car parking lots (when auditorium is near administration Building, number of car parks can be reduced)
- in the workshop and other areas: min. 50 unshaded car parking lots
- in different areas of the plant: min. 50 shaded motor-bicycle parking lot
- dividing stripes shall be marked.

2.3.3.8 Open storage area

A free area (one no.) of min. 2500 m², paved with interlocking blocks (for heavy traffic) shall be arranged in the immediate vicinity of the workshop/store for the future installation of a camp of containers used during the maintenance works of the plant equipment.

The design of the area shall consider the loading and space requirement of minimum 20 standard containers. To the scope of works belong the water, electrical power, telephone as well as sewage facilities necessary for the connection of the above-mentioned container. The area shall be enclosed with chain link fence with pedestrian and vehicle gate.

2.3.3.9 Underground services

Pipe & cable channels

Channels for pipes and cables shall be of reinforced concrete and must be watertight. Dimensions of the box shape channels shall be such that adequate working access and ventilation could be available to maintenance staff. The ducts shall be designed to comply with the fire protection requirements and shall withstand soil pressure and any live loads that may be imposed on the channels. Particular attention shall be paid to satisfactory expansion and settlement joints.

For drainage purposes the ducts shall be provided with slopes of a minimum 0.3% towards accessible pump sumps. An automatically controlled sump

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pump shall be permanently installed for any sump which is found to need pumping.

Hot dip galvanized anchor rails at a spacing of 1.5 m shall be provided on the internal walls of the channels to support cable racks. Minimum required distance between power and instrumentation cables and between cables and pipes shall be observed. Heavy duty removable covers shall be provided at access points to the cable channel.

For smaller quantities of cables PVC pipe sleeves shall be placed from one manhole to the next.

Pipe laying under roads

Where it becomes necessary to lay a pipeline across and under a road the Contractor may install a permanent liner at a safe depth.

The liner shall be designed for the likely ultimate loadings and may be of spun concrete or steel. The diameter of the liner shall be adequate for the number of pipelines as required to accommodate and for possible maintenance requirements.

Cable and pipe ducts, trenches, tunnels outside building

Generally cables shall be placed directly below ground buried in a depth of at least 0.8 m below ground. All necessary measures shall be taken at road crossings to protect cables against damage.

The necessity of providing cable and pipe ducts, trenches and/or tunnels and their possible routing are all as outlined in the relevant parts of the specification for electrical and I&C works.

General

For construction of cable and pipe ducts, trenches and/or tunnels the requirements of DIN 1045, DIN 1054 (or equivalent ISO – EN Codes), BS EN 1992-1-1, BS 6031 or approved equivalent standards shall be complied with.

For large numbers of cables and pipes the Contractor shall provide ducts, trenches and/or tunnels in such areas where installation by directly burying or above ground on racks is not possible or advisable. Cables and pipes shall be laid in strictly unit-wise separated ducts, trenches and/or tunnels.

The ducts, trenches and/or tunnels are to be constructed of reinforced concrete according to the requirements of clause “Concrete works” specified herein, and must be watertight and non-buoyant under the prevailing groundwater conditions. Particular attention must be paid to satisfactory expansion and settling joints. The walls and covers of the ducts, trenches and/or tunnels must be designed and reinforced to withstand the prevailing soil & water pressure, the relevant traffic loads and the weight of suspended cables and pipes.

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The ducts, trenches and/or tunnels are to be provided internally with hot dip galvanized anchor rails every 1.5 m for the easy attachment of clips and cable racks. Plugging and shooting of fixing devices are permissible only in isolated cases and are subject to the Employer's agreement. All ducts, trenches and/or tunnels covered by removable covers will have to be provided with metal protection angles protecting on one hand the edges of removable covers and on the other hand the edges of the duct walls beside the removable covers. Every attempt shall be made to locate the ducts, trenches and/or tunnels away from roads in order not to disrupt or endanger traffic during subsequent necessary work such as overhauls and repairs. The corners of the duct walls in the vicinity of junctions, inlets and bends must be "rounded-off" so that no damage is suffered by the cables when they are being drawn in – allowing for their minimum bending radii.

If the bottom of slab of a duct, trench or tunnel is below groundwater level, the slab shall have a slope and openings in the slab for natural drainage.

For drainage purposes the cable and pipe ducts, trenches and/or tunnels shall be provided with sumps and slopes (min. slope 0.3%) towards the sumps. Where necessary, pumps with automatic water level control shall be provided within the sump. Sumps which are likely to be dry most of the time may subject to the Employer's approval be designed for pumping by portable pumps to be provided by the Contractor.

If a culvert(s), and/or tunnel(s), trench(s) or any other underground services are crossing streets, the street shall be constructed as a bridge for truck loading without effecting the underground structures.

All open trench concrete covers shall be pre cast (not cast in-situ) using straight moulds. Covers shall be adequately reinforced to withstand the induced loads; with cover to reinforcement not less than 15 mm (reduced concrete cover due to weight constraints). The trench cover soffits shall receive a bituminous seal coat.

Small cable & pipe ducts/trenches

Where approved removable covers may be used for small ducts and trenches. The covers may be chequered plates, gratings internal or precast concrete slabs outside.

Dimensions of cable & pipe ducts trenches

Dimensions of ducts and trenches shall be appropriate to accommodate the installation of the cables and pipes with their required spacing and for the space required for their maintenance. Ducts and trenches with removable covers may not have any access manholes

Covers, trash gratings, climbing irons

Shaft and manhole covers shall be made from cast iron or reinforced concrete, of watertight construction, with or without dirt traps, to suit local

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requirements. All covers shall be approved for loading as expected from the likely traffic conditions. The dimensions of trash gratings shall be those determined by proper structural design. Trash gratings shall be of cast iron.

The type and choice of climbing irons shall meet the requirements of BS 1247, BS EN 13101 or other approved standards. Only corrosion protected materials shall be used. Where shafts are constructed of reinforced concrete, the step spacing shall be 330 mm, and for brick shafts as close to that spacing as possible subject to the brick courses. Climbing irons shall be staggered, maintaining a horizontal axial spacing of 300 mm.

2.3.4 Outdoor facilities and installations

2.3.4.1 Potable water system

The scope of this section is to supply with potable water all buildings, which require sanitary and potable water, see also **Section B6**.

Foundations for storage tanks shall be provided.

The scope of this system includes all equipment required for the potable water system including piping for hot and cold water lines, water heaters, drinking fountains, valves, insulation and lagging, hangers and supports. Emergency showers and eye wash stations will be provided as required e.g. in the chemical feed area and station battery rooms and shall be supplied with potable water.

2.3.4.2 Service water system

The scope of this section is to supply with service water to all locations which require service water, see also **Section B6**.

Foundations for storage tanks shall be provided.

The service water tank shall also be designed to serve for the purpose of the fire fighting water needs as described in **Section B12**.

The scope of this system includes all equipment required for the service water system including piping, valves, insulation and lagging, hangers and supports.

2.3.4.3 Storm water drainage system

For the entire plant, a complete storm water drainage system is required. A substantially maintenance-free and, above all, an operationally safe installation must be guaranteed. The surface water drainage shall include all necessary open channels, gutters, down pipes, gullies, traps, catch pits, manholes, etc. and shall incorporate the plant drainage requirements.

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Stormwater shall be drained by gravity. If this is not possible, necessary pumping stations with sand traps are to be provided. For each pumping station the pumps are to be provided with stand-by pump of 100% capacity.

Rainwater run-off from plant area shall be directed through drains, channels and culverts into a storm water collection pond. The size of the storm water collection pond shall be capable for rain water run-off. The volume shall be determined by EPC Contractor.

Any excess rain water during the monsoon season will overflow into the river.

During heavy rainfall site can get flooded with storm water carrying effluents from ash dyke, coal settling pond etc. It shall not be naturally discharged into river or low lying area without any treatment.

2.3.4.4 Sanitary sewage drainage system

Sanitary sewage from administration, control, workshop buildings etc. shall be discharged in the sewage drainage system. The wastewater shall be treated in a Sewage Treatment Plant. For further Details see **Section B6**.

2.3.4.5 Sewage treatment plant

The Sewage treatment Plant shall be provided as described in **Section B6**.

It shall comprise beside the required components also a small building for the pumps and the local electrical panels. The basins will be concrete structures and the building shall be a concrete /block work structure.

The plant shall be designed to ensure that the effluents will have the quality which is required to allow the re-use for irrigation.

For this purpose the water shall be stored in a storage basin of suitable size with overflow to the central effluent monitoring sump CEMS. The water will be removed periodically by means of tank truck.

2.3.4.6 Fire water retention, if applicable

Spent fire fighting water shall be contained. The required retention volume shall cover the total water amount of the connected systems during defined operation time. This shall be achieved by respective thresholds and other up stands to form a containment of sufficient volume. Furthermore the rain water and fire fighting water retention basin shall be used to collect fire water from the drains of sealed outside areas.

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The total fire water retention volume shall be based on the fire fighting water demand and duration according to NFPA 850.

Tanks with flammable or hazardous content shall have a bund structure creating sufficient retention volume. In the assessment of the total fire extinguishing time where such tanks are involved in the fire, account shall be taken of the collecting capacity present in this area including the volume of oil discharged in the event of a leakage.

2.3.5 Coal and ash handling and storage facilities

2.3.5.1 Handling facilities

The civil portion of the coal and ash handling facilities consists of foundations. Weather protecting metal roof on steel structures, junction tower, etc., and structures for the hoppers and the like are described in **Section B4**.

2.3.5.2 Coal yard

Coal storage

The coal storage shall be suitable for coal demand of 90days. The final size shall be determined by EPC-Contractor.

The coal yard shall be constructed for 2 x 660 MW. An area for additional coal yard for further extension shall be reserved in Layout.

Soil replacement and ground improvement shall be carried out for the coal storage area to have the required safe bearing capacity with negligible relative and absolute settlement characteristics. The minimum height of storage shall be considered as 13.00 m.

A coverage for the whole coal storage area has to be considered. The coal yard coverage shall be complete in all respects, including foundations and installation of steel structure and metal roof and sheeting. Sand piles and pre-loading of the entire storage area for a period as required may be the most economical and effective way to achieve the required results. The ground improvement work shall be started as early as possible to achieve the required results.

For steel structures, Tubular steel can be used. Usage of intermediate column is dependent on concept for stocking and reclaiming. Collision of equipment with column is not acceptable.

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The improved sub grade shall be well compacted to the required lines and levels before sealing it with an impermeable layer of high density membrane. At least 300 mm layer of clay of high plasticity index shall be

laid on the impermeable membrane. The clay layer shall be covered with a minimum 250 mm layer of well graded gravel sub-base. Perforated high intensity pipes shall be recessed into the gravel layer to form a close grid of drainage system. The drainage system shall be prevented from clogging by using suitable geo textile cover or proven filter criteria according Terzaghi. Finally, the gravel layer shall be covered with a layer of minor quality coal of a minimum 200 mm thickness.

For collecting the storm water and spray water from dust suppression a drainage system shall be provided. The drainage system will drain into trenches around each coal pile thus be connected to drain into a separate coal drainage settling pond. The basin shall be founded on well compacted selected soil after removal of the existing top soil and weak subsoil. Complete with fully sealed reinforced concrete lining, the pond shall be constructed at a level that will be best suited for gravity flow of the drainage water. Slope of drainage lines shall consider long term settlement of coal storage area. Suitable removable type covers of the drains shall be provided.

A water spray system for dust suppression shall be provided.

Coal transfer towers/coal crusher building

The civil works for the coal crusher buildings, the coal sampling units and all corner towers and conveyer bridges shall comprise foundations and drainage systems required.

Where necessary, pile foundations or other deep foundations shall be provided.

The system shall be fully enclosed. Proper access shall be provided.

To prevent any dust accumulation, horizontal surfaces shall be avoided.

Provisions for regularly washing of structures and floors shall be made along with proper drainage.

All civil works for the crusher building and transfer towers shall be provided to meet the requirements of the mechanical and electrical installations and as described in **Section B4**.

Measures shall be taken to avoid the transmission of vibrations due to equipment (mainly crushers) to the building structure. These measures shall mainly be separate reinforced concrete foundation to be insulated from the remainder of the structure by vibration control systems consisting of spring elements and viscodampers to prevent the transmission of vibrations.

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Unbalanced forces due to equipment shall be considered.

Building description:

- structures: structural steel frame
- foundations: piled foundations for steel columns (see also and the results of the geotechnical investigation results)
- base floor: reinforced concrete with slopes to gullies and drainage, coating according to the regulations
- external walls: 230 mm thick brickwall with plaster finish up to 0,9 m or autoclave aerated concrete blocks from floor level and double skin metal cladding above. Metal cladding from the top to the last operating floor shall be provided.
- roof: galvanized steel structure with metal cladding water proofing.

Coal conveyor

All civil works for the coal conveyors shall be provided to meet the requirements of the mechanical and electrical installations. If for structural reasons required deep foundations shall be taken into account for conveyor belt supports.

The system shall be fully enclosed. Proper access shall be provided.

To prevent any dust accumulation, horizontal surfaces shall be avoided.

Provisions for regularly washing of structures and floors shall be made along with proper drainage.

Coal conveyor bridges

The civil works for the coal conveyor bridges shall comprise foundations, steel structure and drainage systems required.

Where necessary, pile foundations or other deep foundations shall be provided.

The system shall be fully enclosed. Proper access shall be provided.

To prevent any dust accumulation, horizontal surfaces shall be avoided.

Provisions for regularly washing of structures and floors shall be made along with proper drainage.

Structural analysis shall be performed for both conveyors running with 100% loading.

All civil works for the crusher building and transfer towers and coal

conveyor bridges/gallery shall be provided to meet the requirements of the mechanical and

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electrical installations and as described in **Section B4**.

Building description:

- structures: structural steel frame
- foundations: piled foundations for steel columns (see also and the results of the geotechnical investigation results).
- base floor: reinforced concrete with foundations, coating according to the regulations
- external walls: 230 mm thick brickwall with plaster finish up to 0,9 m or autoclave aerated concrete blocks from floor level and double skin metal cladding above.
- roof: steel structure with metal cladding water proofing.

Coal stacker/reclaimer

The civil works for the coal stacker/reclaimer shall comprise all foundations and civil works required for the equipment described in **Section B4**. Where necessary, pile foundation or other deep foundations shall be provided.

Construction shall consider all requirements due to long term settlement, e.g. adjustments of the equipment runway.

Covered coal yard

The coal sheds shall be of structural steel columns and roof trusses with a metal roof and metal sheet siding. Foundations with piled foundations for the steel columns, according to the geotechnical investigation. The profile of the roof shall follow the profile of the coal handling equipment. Each coal pile shall be covered separately. The distance between the steel columns shall be approximately 80 m, the height of the roof at about 40 m (for a coal pile of about 50 m width), the two cantilevers connected with a joint at the highest point must not be symmetrically depending on the size of coal handling equipment used. However the size and shape of the coal shed shall be finalized as per the requirement of coal stock pile and subject to BIFPCL approval. It may also be noted that internal column within coal stock pile area shall not be acceptable.

Any collision of the stacking and reclaiming machines with the shed must be safely avoided in any operational case.

The take-out of the coal yard shall be considered as option 4.1, see **Section B4**.

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2.3.5.3 Ash pond

An Ash Pond of 25 acre shall be provided exclusively for storage of High Concentrated Slurry Disposal (HCSD). The peripheral structures will require additional area of around 18 acres located around ash pond. The system shall include starter dyke storage lagoons and overflow lagoon dyke construction, ash slurry pipe line, drainage system, ash water recirculation pump house, seepage water pump house and maintenance roads on top of dyke embankment & all around the outer perimeter of dyke at natural ground.

The average ground level on proposed land is RL=1.0m. The height of the starter dyke shall be approx. 5.60 m. Provisions shall be made for construction of further raising dykes to extend the storage volume of ash. The minimum height of storage shall be considered as 13.00 m in center of ash pond.

The starter dyke shall be constructed in such a way to maximize ash storage and considering seismic influence. Ash dyke embankments can be designed as an earthen dam as per relevant code. Depending on the type of the soil for the embankment construction, it may have either of the following sections:

- i. a homogeneous section with internal drainage arrangement of sand chimney and sand blanket
- ii. a heterogeneous section consisting of an inner impervious core and outer shell of available soil.

Based on the properties of soil and fill material, the stability and seepage analysis shall be carried out. The design shall be done for ultimate height and the unutilized as to be stored. Soil Improvement shall be considered, if required to minimize settlements of the dyke and inside the pond. The bearing capacity in the area shall be as required, but not less than 100 kN/m².

The ash pond shall be provided with impermeable liner in compliance with legal regulations. The liner may be natural or synthetic depending upon the substrata encountered and the permeability of soil. Toe drain shall be provided all around the periphery of outer dyke, where applicable. An RCC peripheral drain shall be provided to guide the seepage water from toe drain into seepage water sump and the same shall be pumped into Over Flow Lagoon (OFL). Toe drain shall be connected to peripheral RCC drain suitably at regular interval.

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Water escape structure for decantation, method of discharge and recirculation of decanted water shall be provided as per requirement. For the escape of excess rain water from storage lagoon, spillway type structures shall be provided. The spillways along with energy dissipating device on downstream side shall be designed to discharge the excess rain water from the OFL and storage lagoon.

Height of Overflow Lagoon shall be specified by Bidder/Contractor, approx.4.00m

Internal drainage arrangement and toe drain around the dyke shall also be provided. Suitable Protection measures from back water of river shall be provided all around the ash dyke.

In addition, on downstream (D/S) slope of the embankment, stone pitching with inverted filter arrangement shall be provided from GL to HFL plus 1.0m height of dyke embankment. Provision shall also be made to protect the upstream slope of embankment. Rock-toe with toe drain shall be provided at the toe of the embankment all around the ash dyke.

Dust suppression system for ash pond shall be provided, as required to ensure IFC guideline requirements.

The overflow of storm water shall be disposed of properly; reutilization in the power plant shall be encouraged as far as possible.

The Contractor shall provide a simple and effective filling concept, which will allow proper settling effect during all stages of the progressing fill of the pond and which shall keep the exposed ash surface to a minimum at all times. In order to monitor the performance of ash dyke during construction and operation, instruments should be installed at suitable locations.

All pump houses shall be protected for flooding, therefore the finish floor level of pump houses shall be the same as for plant levels.

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Weighbridge

A weighbridge for weighing bulk goods to be brought in or out of the plant shall be provided in the area of the main entrance/gatehouse, which can be changed during design stage.

The scope of supply includes the design, delivery, installation and commissioning of the mechanical civil and data capturing and transporting system for one weighbridge to be installed at the gate house and consist of the following:

- weighbridge with a length of 12.0 m and 30 tones capacity
- reinforced concrete trough designed to support the weighbridge including drainage provision connected to the sewage system of the plant, all necessary embedded part for anchoring, sleeves, base plates etc.
- accessories including load cells, weigh indicators, arrestors and all devices necessary for proper operation of the weighbridge
- transponder system complete with all accessories
- 2 units of vehicle barriers with all accessories
- outdoor printer complete with printer stand with waybill depository boxes and accessories
- traffic light complete with all accessories
- message sign board to be installed in the gate house
- data processing system and communication equipment complete with computer, data switches and software for the control of weighbridge transactions
- all cabling between the weighbridge and the control desk.

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2.3.6 Roads, paving and surfacing

The road system must be arranged in such a way that free- flowing traffic is guaranteed. Wherever possible, cross roads are to be avoided. The following asphalt roads shall be provided:

Road connections to the different buildings are to be provided.

Sidewalks shall be provided from roads to interconnect all facilities and all building doors. The walkways shall be reinforced concrete and shall be prepared with an adequate depth of compacted base course and shall be at minimum of 1.5 m wide. Walkways will be formed with slopes and/or steps at the correct level to drain storm water.

The area around the buildings and outdoor auxiliary plant, which are used infrequently, the lay down areas for small loads, the footpaths, the parking areas, etc. shall be paved with interlocking concrete blocks.

Entire area from transformer yard to chimney shall be provided with paving in combination with interlocking concrete blocks and high wearing resistant concrete. RCC paving of minimum 150 mm thick with C20/25 grade concrete, over an underbed as specified herein shall be provided. RCC paving shall be designed as rigid reinforced concrete pavement for the crane/ vehicular/ equipment movement loads which the paving has to bear. The underbed for paving shall consist of preparation and consolidation of sub-grade to the required level, laying of stone soling of 200mm compacted thick with 63 mm and down aggregate with interstices filled with selected sand followed by 75 mm thick 1:3:6 PCC (1 part cement, 3 parts sand and 6 parts stone aggregate) with 40mm nominal size aggregate.

Surfaces of unbuilt and remaining areas within the site boundary which are neither built nor paved shall be adequately leveled and covered with topsoil to allow proper landscaping. Road signs, traffic signs, road surface marking and guardrails shall be provided as per authority requirements for traffic in industrial areas.

The works shall include temporary site access roads from the existing outer roads.

After finishing of construction works all temporary site access roads used by the Contractor shall be reinstated to the original standard i.e. the standard after refurbishment.

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2.3.7 Landscaping

There shall be comprehensive landscape development in entire Plant area to create a pleasant and healthy environment. The scope of work for landscape and horticulture work shall include supply and planting of trees, shrubs, hedges/edges/borders, grass lawn around different areas, buffer and peripheral plantation etc. The scope shall also include supply and installation of all landscape furniture i.e. park benches, gazebos, landscape fountain and water bodies, landscape pavers/ tiles etc. and all associated electrical and mechanical works/items and all other work required for completion of landscape development.

The landscape design and drawing shall be developed by competent Landscape Architect. The landscape shall use the suitable plants and trees preferably local trees, plants, and shrubs. There shall be provision of pathways in and around the landscaped area, with suitable provision for disabled persons.

Around the pathways and roads, trees shall be planted. Rainwater harvesting for the entire Plant Area shall be integrated within the landscape development. There shall be provision of irrigation system for irrigation of landscaped area. Intense landscape with four water body development shall be provided near the following areas:

- main gate complex
- administration building
- service building
- canteen building.

All other open areas of plant, which are not covered by buildings, structures, roads, lay-down areas, graveled areas, etc., shall be planted with shrubs and grass.

Around the coal yard, trees shall be planted in order to limit dust contaminations.

Landscaping shall be considered within the plant boundary. Entire Plant Area is to be considered for Landscaping with Intensive Landscaping around Entrance Gate, Administration Building Complex, Canteen Building, Service Building and in front of A-row of MPH.

Green belt development outside plant is not in scope of Bidder/Contractor.

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2.3.8 Main entrance area outside the plant

In the Area of the main Gate a welcome and waiting complex shall be provided.

The area shall consist as a minimum of:

- 3 helipads
- Restroom, min 30 m²
- 160 car parks, shaded
- 34 truck & trailer parks
- 6 shops
- prayer hall, min 6 m²
- toilet building, min 15 m²

The structures shall fulfill the technical requirements as stated in this specification.

All buildings shall be equipped with electricity, HVAC, telephone connection, etc. Structure shall be designed to fulfill the purpose and follow BNBC

2.3.9 Employer's and Engineer's office (temporary structure)

A temporary Employer's and Engineer's Office (separate structure) of. 2800 m² for minimum 100 engineers, meeting rooms and social rooms for minimum 50 persons, furniture, copy machine, kitchen shall be provided and maintained throughout the construction period. A combination with other facilities should be avoided. Structures shall not be removed after completion of the works. Area shall be designed as depicted on indicative general layout and as per Bidder/Contractors experience. Proposal shall be submitted by Bidder/Contractor and is subject to approval by BIFPCL during basic/detail engineering phase.

Offices shall be provided for:

- Site Manager (40 m²)
- Discipline Site managers (25 m²)
- Middle level executive offices (10 m²)
- Workstations/Halls.

Every working place shall be equipped with a computer, connected to a local network with common printer.

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These offices shall be separate permanent reinforced concrete structures, according to the civil specifications. The offices shall be ready for occupation latest 8 weeks following the commencement of the works at the site.

Kitchen shall be equipped with cupboard, refrigerator and heating plate, or electric oven, china and tools, dish washer, glasses and coffee machine, etc.

Sun shaded car parks, helicopter Pad septic tank and cesspool shall be included as well as a temporary elevated water tank. AC window units and sufficient power supply shall be included.

The following additional equipment shall be made available in sufficient number:

- automatic telephone exchange (domestic/international lines)
- telephone installed in each room
- telefax machine
- CAD work stations
- min 2 colour printer for drawings up to A0 size
- min 10 colour printers for documents size A4 & A3
- photocopying machines for A4 & A3
- PC's with related processor, network for data exchange, storage, •internet browser and standard office software.

This equipment shall be state-of-the-art and furniture shall be of 1st class standard; all are subject to approval by the Engineer. The Contractor shall provide the offices with electricity, water, coolers and refrigerators.

All office supplies, operating and maintenance costs for the offices and the installed equipment shall be at the Contractor's expense, for the whole period of contract the full service of the equipment with consumables (toner cartridges, paper, etc.) and the billing cost of telephone, telefax and internet browsing.

Customer will provide clear land for construction of employer's office with in project premises.

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2.3.10 Living accommodation

The Contractor shall construct living accommodation made of reinforced concrete, according to the civil specifications for the Employer's and Engineers site supervision staff. Layout and finishing materials shall be approved by the Engineer.

All accommodation shall be situated close to the construction site and consist of 30 independent houses (each with 3 bedrooms with all required rooms and the consequent floor area) located near the project site. Customer will provide clear land for construction of employer's living accommodation with in project premises. Location/layout shall be proposed by Bidder/Contractor, and will be subject to approval by BIFPCL during basic/detail engineering.

These houses shall have fully furnished living and bedrooms, kitchen etc. completely equipped (TV, stereo, stove, refrigerator, dish-washer, washing machine, ironing board and kitchen utensils) and bathrooms. No common recreation facility or separate boundary is required. They shall be supplied with water, electricity, air conditioning and telephone and connected to a drainage system so as to provide immediate utilization.

All running expenses such as water, electricity, telephone, maintenance, cleaning, etc. shall be at the Contractor's expense.

If this accommodation is not available in the specified time, the hotel expenses incurred by the Engineer's representatives during the corresponding period shall be at the Contractor's expense.

Time period for providing accommodation shall be 8 weeks following the commencement of the works at the site.

These houses shall be for the sole use of the Employer's and the Engineer's representatives up to issue of the last preliminary acceptance certificate of the power and desalination plant.

Ten houses shall remain available during the warranty period plus 3 months extra period.

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2.3.11 Building information management system (BIMS)

A BIMS shall be provided. The BIMS shall be a SCADA system to collect all relevant data from various subsystems to enable a centralized visualization with unified HMI graphics throughout different subsystems.

The system shall support standard interface protocols for signal exchange. The system shall be interfaced to following subsystems: HVAC, Weather station, Fire detection, Access control system, CCTV, Elevator emergency call systems, etc.

The BIMS shall provide functionalities to optimize energy usage and minimize energy consumption of buildings by e.g. lighting and HVAC controls. It shall support automatic or timed control of events (such as switching on/ off dedicated lighting areas, operating shading equipment such as shutters, and similar). It shall ensure a clear and easy operation and support the optimization of the work flow of the building maintenance personnel. The system shall provide alarm and event logging as well as report generating facilities.

One (1) normally unmanned operator station shall be installed in the office of the facility management department. Automatic alarms shall be generated and sent to the maintenance personnel via SMS and/ or e-mail.



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2.4 Special Technical Requirements

2.4.1 Basic requirements for all civil works

- The design of all structures under this contract shall be such that differential and total settlements or other movements shall not exceed acceptable limits and full provision shall be made for all expansion and other joints. The design shall be to the approval of the Employer.
 - Structural members subjected to flexure shall be designed to have adequate stiffness to limit deflections or any deformations that affect strength or serviceability of a structure adversely. The maximum allowable deflections of structural members shall be in accordance with the relevant design standards and/or the limits prescribed by the machinery manufacturers.
 - The superstructures and foundations subjected to vibrations (the primary source of these vibrations being the unbalanced forces generated by rotating or reciprocating equipment) shall be designed such that Vibrations will be neither intolerable to personnel, and will not cause damage to the machine or structure. The natural frequency of the whole of the superstructures and foundations or parts thereof and all structures adjacent thereto shall not coincide with the operating frequency of the vibrating plant.
 - The dimensions of all the buildings shall be such as to provide adequate space for the safe installation and proper operation, maintenance and repair of all plant and equipment.
 - Throughout the works all floor slabs above rooms containing electrical equipment shall be watertight. No drain pipes or water pipes are permitted to pass through these rooms.
 - All materials used in the works shall be of the best quality of their respective kinds as specified herein, obtained from sources and suppliers approved by the Employer.
 - The work shall be carried out by competent personnel skilled in their various trades.
 - Suitable access to the roofs of the buildings by means of galvanized steel stairs shall be provided for maintenance and firefighting purpose.
 - All rooms with fire hazard shall be provided with suitable emergency exits.
- Proper access roads with footpaths shall be provided to bring in all the equipment and to take it out in case of maintenance. These access roads shall be suitable for the vehicles which will be used (cars, forklifts, trucks/trailers etc.) to reach up to the point of unloading of the equipment.
- Safe, convenient and straight forward accesses and means are to be provided to take equipment in and out of all rooms, at all levels using suitable stair wells and suitable electric hoists. The dimensions of rooms, stairwells, doors, etc. shall be designed to suit the a.m. transport concept.
 - An appropriate serviceable and functional master key system for the whole

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plant shall be supplied and installed.

- Before starting of design works, the Contractor shall submit to the Employer for approval a **project design manual** containing the design data, the design criteria and the standards for all civil works. All loadings considered in the design shall be justified with supporting details.

2.4.2 Site organization and preparatory works

2.4.2.1 Site services during construction and testing phases

Contractor's temporary site buildings & accommodation

All buildings and equipment provided in accordance with this requirement shall be made available within 8 weeks following the commencement of the works at the site and must not be removed without the prior approval of the Employer.

All temporary buildings, structures, and equipment must be removed from the site to the Employer's approval and the site returned to its original state. All resulting debris shall be removed to an approved dumping area to the Employer's satisfaction.

The Contractor shall propose an area to the approval by the Employer for his site organization in the limits allocated for this purpose, for the storage of plant, equipment and materials during the execution of the Contract. The Contractor shall be responsible for the off-loading, transporting and handling of all the plant and equipment and materials needed for the purpose of the Contract.

Within the proposed area the Contractor shall provide and maintain an office appropriate to the efficient management and control of the project by his own staff.

The Contractor is to provide a site first aid station including an ambulance fitted with all essential facilities and the needed medical and paramedical personnel. The station shall be made available for the use of all personnel who shall be employed on the site for overall project works.

Site fire protection

See section Fire Fighting

Temporary latrines and ablutions

The temporary toilets and ablutions shall be provided for the use of the Contractor and his subcontractors.

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The Contractor shall also include in his Contract the disposal of the sewage resulting from all temporary toilet and ablution facilities.

Temporary electricity and water supplies

The Employer will provide an interface for electricity demand for the Contract works. The Contractor shall provide the cables and equipment for construction power at Site, together with the supply to the Employer's and Engineer's site office.

Base case:

Power supply for construction purposes will be provided at 33 kV voltage (2 no. of lines). The same will be extended to the Contractor for him to develop 33/11 kV sub-stations and construction power supply comprising of:

- Two (2) 5 MVA, 33/11 kV step-down transformers,
- Two (2) 11 kV switchgears,
- 11 kV main ring, design according to plant layout, construction requirement and schedule,
- 11kV/415 V step-down transformers (number and sizes as required according to plant layout, construction requirement),
- Two (2) 11 kV feeders (minimum 630 A), for usage of the Employer.

For improved reliability these feeders shall be connected to separate 11 kV bus systems at 33/11 kV sub-stations.

The electricity prices/power tariffs for the case of 33 kV voltage level are defined in the **Annex C**.

Further preliminary details regarding provided construction power system are shown in **Annex C**.

Construction Water:

Supply of construction water is in the scope of Contractor. It is not allowed to use ground water. For construction, only river water suitably treated for his purposes shall be used.

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Security fencing including gates and barriers

Main plant and Township Boundary wall will be constructed by Employer. It consists of 3m high, plastered brick work with barbed wire on top. Location and Details are shown in **Annex C**.

All facilities, which are erected outside of the boundary wall, e.g. jetty area, intake structure, etc shall be enclosed by a boundary wall including access gates. The standard shall comply with boundary wall as provided by Employer.

Contractor shall propose suitable arrangement in line with his layout to secure the area from unauthorized access, except in ash pond area, subject to BIFPCL approval.

Watch Towers:

- Watch towers to be provided at max. distance of 600 m and at every corner/bend.
- Construction of Tower as per requirements, minimum 3 x 3 m area, 25 m height and external staircase.
- Watch tower shall be RCC structure.

Fencing round Contractors material storage etc. shall be done by Contractor as required.

Site visit

Site visits by the Bidder are mandatory to.

- get sufficient knowledge about the conditions at the site
- get sufficient knowledge about the reachability of the site
- determine the effort of site investigation to be done by the Bidder.

Site visits have to be announced at least two days before targeted visit at BIFPCL. Transport to the site has to be organized by the Bidder.

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Site preparatory works

Site was filled up to RL +5.50m in 2014. RL shall be considered same as M.S.L The surface of filling is uneven (more than +/- 10 cm). Swampy areas at the surface or below may be found. The contractor has to replace the swampy, soft soil with filling material (less than 5% silt).

Consolidation of soft soil/clay and settlement of soil has not finished yet. Required works in respect of leveling, filling, drainage, preloading, etc. shall be considered by Contractor in his work program.

Area of ash pond will not be filled by contractor. After checking the suitability the site the area shall be leveled and compacted by filling and cutting to a final level to be established upon a site survey.

Survey works

The coordinates of the envisaged site location are stated in **Annex C**.

The Contractor shall carry out close grid survey of the site to set up Plant Datum.

Plant elevation shall be defined as follows:

- finished ground level of the plant + 5.00 M above MSL
- plant level (turbine hall plinth level) + 5.60 M above MSL
- final level of road + 5.15 M above MSL
- final level of landscaping + 5.00 M above MSL
- final level of paving of power house block + 5.00 M above MSL.

Finished floors of the power island buildings at ground level shall be fixed at 0.00 m Plant Datum (PD), subject to optimization by the Contractor, and this PD being at least 0.60 m above ground level.

The Employer will furnish to the Contractor site investigations performed prior to the EPC Contract.

Nevertheless the Contractor shall carry out the necessary topographical survey works in order to obtain the following information:

- location of the plant site relative to the existing bench marks of the area
- establishment of site boundaries with site levels
- installation of site bench marks
- preparation of a site survey report, with the description of survey works, methods applied and survey map(s) on scale 1:500, showing the results with the location of bench marks

The levels have to be given in an adequate scaled grid line system.

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Moreover the Contractor shall carry out a bathymetric survey and all investigations required for the intake and outfall structures.

The full responsibility of the investigations to be carried out lies with the Contractor.

Geotechnical investigations

Geotechnical investigation at the site of the works has been carried out for the Employer (see **Annex C**). The investigation comprised boreholes with soil sampling, SPT testing in the main areas of the plant.

Geotechnical investigation data available as of now is of preliminary nature.

The existing information about subsoil conditions, quality of filling, water levels in the ground etc. are for information only, and is not binding during execution phase.

In case the Bidder needs more information for proper calculation of works during bidding process, additional investigations can be performed on his own expense. There are no restrictions about the investigations.

The Bidder/Contractor is responsible for any matter of subsoil, filling and water in the ground.

In general the subsoil conditions can be described as follows: top layer filled sand (with unknown silt content), underlying layers of clay, underlaying fine sand.

Hence, contractor has to carry out detail geotechnical investigation at his own cost. Methodology and Specification of investigation is subject to approval by the Employer. Special attention should be paid to Seismic Parameters. Related to Soil Type as identified to Soil Investigation Report, the effect of local soils on earthquake ground motion shall be determined.

For site class S1 and S2, as expected for this project, site specific studies shall be carried out to determine Design acceleration response spectrum.

Seismic Study

The seismic study shall be performed by an accredited consultant with adequate references and experiences in equivalent projects.

Study area

The study area is defined with a radius of 200 km (incl. safe distance) around the power plant location at Mongla.

Geological structure model

The following data shall be obtained for the model:

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- large-scale plate tectonic exposure for the study area
- small-scale micro plates are to be described or excluded
- existing faults, dislocations, drops and lineaments in the deeper and shallower subsurface
- lithological as well as stratigraphic structures for the deep subsurface layers up to Holocene boundary.

Based on the information, a litho-stratigraphic 3D model of the subsurface shall be developed up to the Holocene boundary.

Earthquake

All documented earthquakes in the study area shall be listed with their magnitude-height. A differentiation between the respective focal depth and the location of the epicenter (shallow or deep tremor) shall be considered. From the available seismic data, the energy values of the shear waves (maximum and average values) at the construction site shall be derived. Furthermore, the wave intervals between 4.0 s up to 10 min must be taken into account. Subsequently the thus obtained values must be transferred to the soil parameters.

Soil parameters

The grain size distribution, density and water content for the depth profiles of the boreholes and / or soundings shall be described in order to assess the possibility of a tendency to liquefaction of the soil. The soil must be tested for its damping characteristics in the laboratory. Transformations in the geotechnical characteristics must be documented.

All test results have to be evaluated for every individual building component of the proposed power plant complex according to the British Standard or the DIN EN ISO 1998 sheets 1- 6. Based on this evaluation recommendations for the construction of the individual components have to be given.

2.4.2.2 Earthworks

General

This section applies to all earthwork required for the construction of buildings, structures, pavements, road works, landscaping and burying service lines in the ground.

The Contractor shall satisfy himself as to the ground conditions on the site including the nature of the strata to be excavated, obstructions, possibilities of flooding and such like and shall allow for all provisions necessary to carry out the work in the most suitable manner.

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Furthermore, this division applies to excavation works in connection with pavement, roadwork and landscaping.

Leveling & grading

Fill materials

The fill materials used are to be examined and approved. Excavated materials can be used if they fulfill the requirements as specified in Tender Documents. Material approval is required on site. Source for fill material shall be determined by Contractor. All works related to transport and handling of filling material is in the scope of Bidder/Contractor.

- **Select fill**

Select fill shall have the following properties:

Well graded, non-cohesive and nearly silt free (silt content not greater than 5%; up to 10% tolerated, except below footings of structures), soils free of organic matter (limit 2%). Decomposing or compressible materials shall not be used.

The material shall be of such nature and character that it can be compacted to the specified densities. It shall be free of highly plastic clays, of all materials subject to decay, decomposition or dissolution and of cinders or other materials which will corrode piping or other metal. The intention is to use select fill below structures, roads, parking areas etc.

- **Ordinary fill**

Ordinary fill shall have the following properties:

Natural inorganic soils: Organic matter less than 3%. For other properties see under 'Select fill'.

The intention is to use ordinary fill for non-built areas.

- **Special fill**

Special fill material shall be gravel or crushed rock.

The intention is to use special fill e.g. as sub-base material for tanks, roads and switchyard areas.

Density requirements for filling shall be as follows:

80% relative density (ASTM D-4253 and D-4254) for free draining soils containing less than 15% by weight finer than 75 micron sieve non plastic material or 95% of the maximum density as determined by ASTM D-1557 for soils containing more than 15% material passing the 75 micron sieve.

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Execution

The works shall be excavated either by hand or by use of excavating plant and tools acceptable to the Employer.

Safety precaution

The Contractor shall be responsible for all necessary safety measures. Proper strutting, sheeting and bracing, stabilization and protection of slopes, methods of excavation to reduce risks of slides, etc. shall be to the Contractor's debt.

Over excavation

If somewhere, and for any reason, excavation is executed beyond the established lines and without the Employer's previous approval, the Contractor shall at his own expenses backfill with approved material (including required compaction) or with lean concrete.

Stockpiles and disposal

Excavated material from the Works selected by the Employer for re-use shall be placed immediately in its final position, if possible, or otherwise may be stockpiled or deposited on Site as directed by the Employer.

Contractor shall remove the excess earth and deposit the excess earth at a location outside the plant boundary duly and in accordance with the local and environmental regulations and subject to BIFPCL approval

Preparation of foundations

All surfaces on which or against which concrete is to be poured shall be carefully cleaned and roughened and shall be free of any detrimental impurities, organic matter or unsuitable material to the Employer's satisfaction.

The surface shall be free of oil, stagnant or running water, mud, loose rock, residue and impurities or any other improper material.

Immediately after excavation, all such surfaces shall be moistened and treated as directed by the Employer and then protected by means of a lean concrete layer, 5 cm in thickness. No concrete is to be poured until formation is inspected and approved by the Employer.

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Backfilling

Foundations and structures shall be backfilled with approved material compacted in layers by suitable equipment until optimum stability has been obtained to the satisfaction of the Employer. Compacting shall be carried out by means of pneumatic or mechanical rollers or other compactors of a type previously approved by the Employer.

Density requirements shall be as follows:

- under buildings and structure foundations and slabs 85% relative density (ASTM D-4253 and D-4254) for free draining soils containing less than 15% by weight finer than 75 micron sieve non plastic material or 98% of the maximum density as determined by ASTM D-1557 for soils containing more than 15% material passing the 75 micron sieve.
- under roadways and parking areas
- under transformers and other major foundations
- embankment 80% relative density (ASTM D-4253 and D-4254) for free draining soils containing less than 15% by weight finer than 75 micron sieve non plastic material or 95% of the maximum density as determined by ASTM D-1557 for soils containing more than 15% material passing the 75 micron sieve.



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The thickness of fill layers, number of passes and type of equipment to be used shall be proposed to the Employer after compaction tests have been made.

Backfilling of foundation work shall be carried out only after foundations have been inspected by the Employer.

Soil replacement

The material to be used for replacement of soil shall not contain soluble or swelling components such as clays, or organic matters. Sand gravel mixtures of favorable grain size distribution shall be used in exchange.

Prior to the commencement of work, samples shall be taken from the anticipated borrow area and tested in respect of Proctor density, optimum moisture content, grain size distribution and content of soluble matters.

The fill material shall be placed in horizontal layers of no more than 25 cm in compacted thickness. The fill moisture content shall be controlled and adjusted in order to achieve a maximum of compaction.

The fill material shall be compacted by vibratory roller (min. weight 20 t).

Tests and properties

The Control of working and tests operations shall be carried out by the Contractor according to the respective standards in the presence of the Employer.

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2.4.2.3 Foundations

General

Foundation design shall be based on approved geotechnical investigation report. The Contractor shall submit a detailed design for the foundation to the Employer for approval. The bid price for the piling shall be lump sum and shall remain firm irrespective of the type design.

Once the final plant layout has been established by the Contractor, he shall carry out a more detailed geotechnical investigation. The scheme of geotechnical investigation shall be prepared by the Contractor and will be subject to the Employer's review and approval

Information from the soil investigation performed in the year 2014 at this site is provided to the Bidders for information. Bidder may note the presence of thick deposit of soft clay as revealed through borelogs attached. The onus of correct assessment/ interpretation and understanding of the existing subsoil condition/data is on the Bidder. The Bidder should note that nothing extra whatsoever on account of variation between soil data collected by Employer and that found by the Bidder during additional soil investigation or during execution of works, shall be payable.

A study of soil liquefaction potential shall be performed using parameters from the geotechnical investigation performed by the Contractor and subject to the Employer's review and approval.

Special measures have to be taken if the results of soil and laboratory tests prove chemical aggressive conditions.

The soil conditions met during the foundation works are to be checked by the Contractor's soil engineer, recorded and compared with previous results. If essential differences occur, the Contractor has to inform the Employer and to propose further measures.

Immediately prior to concreting, the Contractor has to verify the specified soil conditions below the foundation level by a sounding.

Design of the foundations shall be in accordance with the latest DIN/Euro codes and/or other approved standards and codes of practice including the following:

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DIN 1054	Subsoil: Permissible loading of subsoil; Load Testing of Piles (2005-01, Section 8).
DIN 1626	Welded circular steel tubes subject to special requirements, technical delivery conditions.
DIN 1629	Seamless circular steel tubes subject to special requirements, technical delivery conditions
DIN 4014	Part 1: Bored piles: construction procedure, design and bearing behavior Part 2: Bored piles: large bored piles: construction procedure, design and bearing behavior
DIN 4026	Driven piles: Construction procedure, design and bearing behaviour.

Furthermore, the ICE Specification for Piling and Embedded Retaining Walls (latest edition) shall be observed.

From the detailed study of the sub-surface ground conditions, the type of foundations required for each location shall be determined to suit the loads imposed.

The foundation/soil improvement could include any of the following:

- shallow foundations on existing ground/improved ground
- sand piles
- bored cast-in-place concrete piles
- driven piles
- vacuum consolidation.

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The Contractor may propose any other type of foundation and ground improvement as required provided the proposal is based on proven engineering and acceptable standards and codes of practice. As a part of the design of the works and after fully detailed ground investigations, the Contractor shall submit for the Employer's approval a comprehensive foundation plan for the works proposing the type of foundation for each part of the works.

The mentioned pile capacity (Annex C) shall be read only as assumption and shall be considered for information only. Employer does not take any responsibility for these values.

It is in the scope and responsibility of the Bidder/Contractor to execute a soil investigation and perform his own design with related pile load capacities.

Responsibility related to soil remains with the contractor

The turbine/generator pedestal foundations shall be independent of the enclosing turbine building foundations.

All large tanks shall be dimensioned so that their aspect ratio (height/diameter) is less than about 0.4. The tanks can then be supported on ring type foundation under perimeter walls. The Contractor shall demonstrate the adequacy of the ring beam foundation, without piles, from total and differential settlement and will be subject to Employer's review and approval.

Dewatering

During the foundation works the excavated areas, foundation levels and pits are to be kept free of water down to at least 1.0 m below the foundation level.

Damp proof course and Waterproofing

All foundations, footings and slabs in contact with ground water shall be of water tight concrete in accordance with DIN 1045 or equivalent approved standards and shall be protected against water action and rising damp in accordance with:

- DIN 18195
- DIN 18336.

All foundations, footings and slabs in contact with ground shall receive a bituminous coating.

Damp proof course (DPC) thickness shall be applied to brick and block walls at about 300 mm above ground level to check rising damp. The DPC shall be in accordance with DIN 18195 or equivalent approved standards.

Pitwall stability

The excavated pit sides, walls or slopes have to be stable and established with respect to safety regulations.

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Settlement and expansion joints

Joints are to be arranged in such a way that stresses and strains caused by settlements, temperature, differential settlement, etc. do not adversely affect the structures. The settlement joints shall run through the complete structure down to foundation level, the expansion joints however shall stop on the top level of foundations.

The joint width shall be at least 2 cm.

Settlements of all relevant structures shall be measured, recorded and shown in diagrams according to BS EN 1997-1 or other equivalent standards.

Foundations at different depths

Foundations at different levels should be based beyond a load spread angle of 30° (against the horizontal).

Safety against uplift

For all parts of the structures extending into the ground water, safety against uplift has to be guaranteed during all execution stages.

Soil replacement

If unsuitable soils are encountered below the foundation level or basement floor, they are to be replaced by suitable layer-wise compacted material down to the bearing soil.

2.4.2.4 Piling works

These specifications cover the requirements for the materials, the installation and the realization of bored cast-in-place concrete piles with grouting at the base, if required, and driven piles.

The piling works and design shall be in accordance with BS EN 1997-1 or equivalent.

Two types of piles foundation can be proposed and quoted by the Contractor: driven piles or cast-in-place bored piles.

The net vertical pile capacity computed from the soil investigation report is used to determine the maximum test load in case of piles testing.

Bored cast-in-place piles

The piles are drilled up to the depth indicated by the pile drawing submitted by the Contractor and approved by the Employer. For each pile, the Contractor draws up the geo-technical profile of the drilling with description of the strata and samples taken for each stratum as mentioned in the piling record item of these specifications. A representative sample from each stratum will be kept in tight packing until the end of the works.

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A suitable type of drilling equipment shall be provided in order to penetrate obstacles (e.g. boulders) which may be met during the execution of the piles.

Generally drilling operations shall be carried out in such a way as to avoid any disturbance of the surrounding soil. A temporary casing shall be installed to the full depth of the borehole. The bottom of the casing shall always be kept sufficiently below the excavated borehole bottom, in order to prevent inflow or loosening of the adjacent soil.

When drilling below the groundwater table inside the casing shall always be maintained above the natural groundwater level by at least 1.5 m, i.e. water has to be added accordingly.

Just before reinforcing and start of concreting the pile foot is to be cleaned out so that no disturbed, loose or weak soil remains below the pile tip.

Driven piles

The weight of the falling mass must always be adequate to take down the piles at the depth defined at the project.

In case of damages to the adjacent piles, for example observation of concrete raising in the neighboring piles, the Contractor must alter the driving sequence.

The pile driving is carried out following a sequence in order to avoid, as much as possible, an increasing of the driving resistance for the last piles. Each pile has to be driven continuously until the specified depth has been reached.

The Contractor immediately informs the Employer in case any unexpected change in driving characteristics occurs and proposes methods to solve the problem. A detailed record of the driving resistance over the full length of the nearest available pile will be taken if required by the Employer.

The Contractor gives adequate notice and provides all facilities to enable the Employer to check driving resistances; a set of blows recordings is taken only in the presence of the Employer unless otherwise approved.

The final set of blows has to be recorded for each pile either as the penetration in millimeters per 10 blows or as the number of blows required to produce a penetration of 25 mm (see item on piling record of these specifications).

Staking out-tolerances

The landmarks to be used for the implementation of the piles must be effective, solid and well protected.

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The method of location of the piles is a duty of the Contractor. The setting out has to be carried out from the main grid lines of the respective structures.

The maximum allowed deviation of the piles center from the theoretical location shown on the setting out drawing is 50 mm in any direction. The maximum permitted deviation of the completed pile from the vertical is 20 mm per meter (2.0%).

Cut-off

The piles are to be concreted up to a minimum of 60 cm above the cut-off level. The cut-off must eliminate all polluted or poor characteristics concrete at the top of the pile and should be carried 10 cm into sound concrete.

The concreting of the raft may start only after the cut-off of the pile and after obtaining a satisfactory resistance of the pile concrete.

The cut-off must be carefully performed according to a method approved by the Employer. The concrete in the head of the pile shall be carefully broken away from the reinforcement, which shall then be cleaned and bent as shown on the drawings or as directed. The concrete surface at the cut-off level shall be horizontal, plane and free from all loose aggregate.

Piling Records

For each pile, a piling record book giving the main checked values during execution shall be drawn up and updated by the Contractor with all the work hazards and incidents. That record book shall be submitted daily to the approval of the Engineer as the execution proceeds.

This record book shall include for each pile details on:

- location, reference number (corresponding to the number fixed on the drawing), type and diameter of the pile;
- length of the temporary casing;
- date and hour of start and end of each operation drilling, reinforcement setting, concreting;
- level from which the pile is bored or driven (platform level);
- level at the pile base;
- top level of the concreted pile before the cut-off operation;
- used materials (driving or drilling tools, concreting equipment);
- cleaning results of the bottom of the hole before putting down the reinforcement cage and before concreting;
- nature and description of the encountered soils;
- poured concrete volume and theoretical volume (measured concrete curves);
- behavior, workability, fluidity of concrete, results of the compression tests;
- water level within the hole before concreting;

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- for driven piles, the refusals corresponding to the three last sets of blows (10 hammer blows) shall be noted for each pile; for one pile from each 20 piles, a driving diagram shall be drawn up;
- type of boring-chisel, lengths of piles where chisel has been used.

Records shall be submitted in duplicate to the Engineer every following working day until 9 a.m.

The Contractor shall submit to the approval of the Employer/Engineer a proposal of piling record sheets including all the details mentioned above.

Pile tests

The Contractor shall carry out pile tests on a minimum of 0.5% of total no. of working piles of each type. The piles to be tested shall be to the approval of the Employer.

The tests shall include as minimum:

- compression load test at piles
- lateral load test at pedestal piles.

In addition, at least one Test Pile for each of the main structures shall be tested and approved before the commencement of the working piles for that structure.

The maximum test load shall be 2.5 times the working load for Test Piles and 1.5 times the working load for tests on working piles.

The loading materials and equipment, the measurement devices and procedures shall all be to the approval of the Employer. All tests shall be carried out only under the supervision of an experienced and qualified supervisor familiar with the test equipment and test procedure. All personnel operating the test equipment will have been trained in that field. The number of increments of load shall be a maximum of 25% of the design load, with a decreasing of load down to zero after each increment.

In the case of a test failing to meet the set criteria, the Contractor shall propose for the approval of the Employer his plan for the necessary changes in the pile design without any cost implication to the Employer.

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2.4.3 Concrete works

2.4.3.1 General

The concrete works shall be based on applicable approved codes and standards.

In general, the concrete for foundations shall be Grade 30. The type of cement to be used shall satisfy the requirements of the relevant international and local Standards or equivalent.

All materials used for concrete and reinforced concrete structures shall be of the best quality and free of defects likely to undermine the strength and shorten the service life of the works. The materials furnished shall comply with the agreed standards with the requirements of the soil investigation report regarding the aggressiveness of soil and water and with all requirements set out in these Specifications. The high sulfate content according water analysis shall be considered for concrete in contact with sea water.

All materials shall be stored and handled in a manner that will prevent contamination and/or deterioration. Deteriorated and/or contaminated material shall not be used for the concrete and shall be removed from the site at the expense of the Contractor.

All aggregate and sand used in the production of concrete shall be thoroughly tested for silica alkaline reaction, flakiness, aggregate crushing value etc.

The design and execution of the works shall consider a minimum development, the corrosion risks and the durability of the concrete and be based on the latest applicable approved codes and standards as listed in **Section B0**.

2.4.3.2 Materials for concrete

Cement

The cement used for concrete, reinforced concrete, mortar, grout and plaster (acid or sea water resistant) works shall be Ordinary Portland Cement unless noted otherwise. The cement shall comply with EN 197-1. The manufacturer's test certificate will normally be accepted as proof of compliance with Specifications but the Employer may order further tests as specified in the relevant standards. The Contractor shall bear all expenses required for the preparation, dispatch, and tests of the samples.

The cement for underground concrete shall be Sulphate resisting type

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(cement type V) as per ASTM C150 or equivalent.

All accepted cement shall be delivered to the site in strong, sealed, waterproof containers unless written approval to the contrary is given. All cement delivered shall be marked in accordance with standards, stating the following particulars: type of cement, strength category, manufacturer, weight, quality control marking, date and transport data.

The cement shall be protected against all impurities and dampness during transportation and storage on the site. Sufficient cement shall be stored on site to ensure continuity of the works and to allow testing of any consignment before it is required for use. All cement shall be fresh when delivered. Cements of different types shall not be mixed one with another. Consignments shall be used in order of delivery.

Cement shall be stored in bags or in unopened containers on a dry, raised platform in a well ventilated but watertight building.

Cement shall be kept in the store until actually required for use on the works and any cement temporarily placed near the mixer shall be adequately protected. Cement stored on site for a period longer than two months shall be laboratory tested before use.

Water

The water shall be clean and free of salt, oil or acid, organic material or other matter harmful to the finished product and shall be from a source approved by the Employer. The Contractor shall undertake tests to determine the sulfate content and acidity of the water and make adequate arrangements to deliver and store sufficient water at the work site for use in mixing and curing the concrete. Water shall comply with the requirements of BS EN 1008 or equivalent.

Aggregates

Materials used as aggregate shall be obtained from a source known to produce aggregate satisfactory for concrete and shall be chemically inert, strong, hard, durable, of limited porosity and free from adhering coats, clay lumps or organic impurities that may impair the strength or durability of the concrete. Aggregate shall comply with and be tested in accordance with the requirements of BS 812, BS 882, BS 1199 and BS 1200 or equivalent.

Each size of aggregate shall be separately stored in a manner that will prevent contamination, intermixing and/or segregation. The equipment and methods of handling aggregates shall be such as to prevent deterioration and contamination of the stockpiles.

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Frequency of testing the aggregates shall be at least as follows:

Frequency of testing		
Test Type	Coarse Aggregate	Fine Aggregate
Grading of each	Daily	Daily
Grading of combined aggregates	Daily	Daily
Specific gravity	7 days	7 days
Magnesium sulphate soundness	30 days	-
Clay silt and dust content	Daily	Daily
Shape (elongation and flakiness)	Twice a week	-
Los Angeles abrasion	Initially only	Initially only
Moisture content	2 days	Daily
Drying shrinkage	Initially only	Initially only
Organic impurities	30 days	30 days

Fine aggregate shall be clean natural sand or sand derived by crushing stone and shall consist of hard, dense, durable uncoated particles. Sand derived from stone unsuitable for coarse aggregate shall not be used as fine aggregate.

The grading of the aggregates shall be such as to produce a concrete of the specified proportions, which will work readily into position without segregation and without the use of excessive water content. Grading shall be controlled throughout the work so that it conforms closely to that used for the preliminary tests.

Washing, screening, classifying and other operations on the fine aggregate required to meet this specification shall be done by the Contractor. Washing is required if the content of salt and other impurities adhering to the aggregates exceed the level given in the standards.

Coarse aggregate shall be crushed or uncrushed gravel or crushed stone and shall be free of decomposed stone, clay, earth or other deleterious substances. The specific gravity of the coarse aggregate shall be not less than 2.5 t/m^3 . Aggregate of crushed natural stone is deemed adequate if the stone reveals a crushing strength of 1000 kg/cm^2 when tested. Friable, flaky and laminated pieces, mica and shale shall only be present in such quantities as not to affect the strength and durability of the concrete.

The grading of coarse aggregate for concrete shall comply with the requirements of BS 882 or equivalent. Samples of aggregates shall be submitted to the Employer, together with a sieve analysis showing the proportion by weight passing sieves. Should it become necessary to change the source or characteristics of the material supplied, this shall only be done after additional tests.

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Concrete additives

If necessary, concrete additives approved by the Employer could be used to improve consistency, workability, quality and strength of the concrete.

Waterproof concrete and mortar shall be used where necessary. Waterproofing shall be achieved by an approved brand of additive, which shall be used in accordance with the manufacturer's instructions.

Plasticizer/ superplasticizer cum water proofing additives of approved make shall conform to BS 934 or equivalent international standard

Accelerating and retarding additives shall only be used in case of necessity and after obtaining the written approval of the Employer.

In addition to the Concrete Additives mentioned in this clause bidder may use fly ash to improve quality of concrete.

Plasticizers and air entraining additives

Plasticizers and air entrainers are intended to reduce bleeding of free water at the surface. It shall only be used after the written approval of the Employer and in accordance with the manufacturer's instructions.

2.4.3.3 Concrete mixes

The mix proportions shall be determined by proper mix design based on the requirements for strength, workability and the particular site in which the concrete shall be placed. The design of mixes shall be based on the principles of BS 5328 or equivalent (e.g. DIN 1045), BS 8500 in addition to BS EN 206 and the British Building Research Station Publication: "Design of Normal Concrete Mixes".

Before concreting commences, the Contractor shall make trial mixes to determine the mix proportions required to produce the strengths specified for each class of concrete and for each degree of workability required to allow placing transporting and compacting of the concrete. Only materials which the Contractor intends to use for concreting shall be used in the trial mixes.

Test cubes from trial mixes shall be made and tested in accordance with BS 1881 or equivalent (e.g. DIN 1048 Part 2).

The amount of water used in the concrete shall be adjusted as required to ensure such a consistency that it can be readily transported, placed and compacted without segregation of the materials or bleeding of free water at the surface. Addition of water to compensate for stiffening of the concrete before placing shall not be permitted. Consistency of the concrete shall be

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checked by slump tests and shall not exceed the values given by BS 5328, BS 8500 in addition to BS EN 206 and BS 1881 or equivalent. Admixture for concrete to achieve requires slump shall conform to BS EN 934.

The cement and aggregate shall be thoroughly mixed in a batch-type pug mill mixer. The capacity of the mixer shall not be less than 1 (one) cubic meter. Partly set or excessively wet concrete shall not be used. No concrete shall be mixed by hand except some small quantities approved by the Employer, the proportion of cement in this case being increased by 10%.

The Contractor shall establish and maintain a field laboratory on the site and this laboratory shall be available at all times to the Employer. The laboratory shall be adequately equipped to ensure that all necessary testing work can be carried out in compliance with the standards.

2.4.3.4 Strength of concrete

All test cubes shall be made and tested for compressive strength in accordance with BS 1881 or equivalent.

The minimum required strength for different classes of concrete is as follows:

Grade	Characteristic strength N/mm ²	Lowest grade for compliance with appropriate use
7	7.0	lean concrete
10	10.0	plain mass concrete
15	15.0	reinforced concrete with lightweight aggregate
25	25.0	reinforced concrete with dense aggregate
30	30.0	reinforced concrete with dense aggregate (in contact with seawater, waste water and below ground level)
35	35.0	reinforced concrete with dense aggregate (Turbine Foundation, Boiler feed Pump Foundation)
30	30.0	pre-stressed concrete with post-tensioned tendons
40	40.0	pre-stressed concrete with pre-tensioned tendons
50	50.0	precast concrete members

The characteristic strength shall be determined from test cubes of 150 mm nominal size at an age of 28 days.

Mass concrete filling	C 8/10
PCC below pilecap/foundations including TG foundations, Fan foundation and all vibratory foundations	C 10/15
Pipe encasement	C 16/20

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PCC below Paving incl. plinth protection	C 10/15
RCC in grade slabs	C 20/25
Boiler/ESP area paving	C 20/25
RCC for superstructure works in structural steel Buildings	C 30/37
RCC in foundation and water retaining structures including piles	C 30/37
RCC in superstructure works in RCC buildings	C 30/37
RCC for dynamic foundation including column/deck (TG, Mill, Fan and BFP)	C 30/37
Precast RCC trench covers	C 40/50
Encasement of Base plate/Steel columns/ Wall beams	C 20/25
Drain / cable trench	C 25/30

2.4.3.5 Transport of concrete

Immediately after mixing, the concrete shall be conveyed to the place of use as rapidly as possible using methods, which will prevent the segregation, loss or contamination of materials. The concrete shall be placed and compacted within 30 minutes of the addition of water to the mix. Any concrete left unplaced after this time shall be rejected and removed from the site.

The concrete shall be transported in clean metal buckets, barrows, dumpers, or trucks. Before using concrete pumps, placer pipelines, chutes or spouts it is necessary to have the written approval of the Employer.

2.4.3.6 Concreting operations

All concreting methods shall be subject to the approval of the Employer.

Concrete placing shall not be started until the Employer has approved all preparation of forms, reinforcement, joints and all mixing, conveying, spreading, curing, finishing and protection equipment.

Concrete shall be placed in the forms as close as possible to its final position in a single operation to the full thickness of slabs and beams and shall be placed in horizontal layers, not exceeding 2.5 m height in a single pour in walls, columns and similar members.

The Contractor shall organize the pouring of concrete in such a manner that once concreting of a section has started the operation shall be continuous and each operation shall be completed prior to a stoppage.

Where specified on the drawings, construction, expansion or contraction

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joints shall be provided and the concrete shall be poured continuously between two adjacent joints. No other joints than shown on the drawings shall be permitted. Stoppage (cold) joints formed between two concreting operations separated by more than six hours time shall be subject to the same treatment as the construction joints.

Concrete which has partially hardened shall not be exposed to injurious vibration or shock, except for controlled re-vibration where specified. When concreting of a certain large structural element is specified strictly as to be poured continuously, then the concreting operations shall be organized for day and night working, in long shifts, as necessary.

Ultrasonic pulse velocity test shall be carried as per BS EN 12504 for the top decks of all machine foundation viz. TG substructures, BFP foundation, ID, FD and PA FAN and mill foundations to ascertain homogeneity and integrity of the concrete.

As concrete is being placed it shall be compacted by mechanical vibrators, to obtain a dense material free from honeycombing and without water or air holes.

The Contractor shall ensure that the vibrators are used in such reinforcement is not displaced, the formwork not damaged and no segregation caused, but complete compaction of the concrete is achieved.

The concrete face shall have the finishes indicated on the drawings or in the present Specifications. The finished surface of the concrete shall be sound, solid and free from honeycombing, protuberances, air holes or exposed aggregate. No plastering, cement wash, mortar or paint shall be applied to cover defective concrete surfaces.

Construction, expansion and contraction joints

The number of construction joints shall be kept as low as possible consistent with reasonable precautions against shrinkage. Concreting shall be carried out continuously up to construction joints.

Where it is necessary to introduce construction joints, careful consideration shall be given to their exact location, which shall be indicated on the drawings. Alternatively, the location of joints shall be subject to agreement between the Employer and the Contractor before any work commences.

Immediately prior to recommencement of concreting on a joint, the surface of the concrete against which new concrete will be cast shall be free from laitance and be roughened to the extent that the largest aggregate is exposed but not disturbed. Care shall be taken that the joint surface is clean immediately before the fresh concrete is placed against it.

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Expansion joints, contraction joints and otherwise permanent structure joints shall be provided at positions shown in the drawings. Joints shall be straight and vertical, except where otherwise specified and concrete surfaces on both sides of the joint shall be flush. Where necessary, water stops of a type approved by the Employer shall be embedded in the concrete. To ensure a good tightness with or without movement of the joints, the PVC water stop shall be provided with anchor parts. The PVC water stops at construction joint shall be 150 mm wide and 6 mm thick and at expansion joint shall be 230 mm wide and 8 mm thick.

In case of expansion joints, preformed bitumen impregnated fibre board shall be used as joint filler. The joints shall be sealed with bitumen sealing compound, however in case of liquid retaining/carrying structures, two parts polysulphide sealant or silicon sealing compound shall be used.

Concreting at night

When approval is given to carry out concreting operations at night or in places where daylight is excluded, the Contractor shall provide adequate lighting at all points of mixing, transportation and placing of concrete.

Concreting in high ambient temperature

For concreting in high ambient temperatures the “ACI Standard 305 – Concreting in Hot Weather” shall apply.

The Contractor shall take special measures in the mixing, placing and curing of concrete; alternatively all pouring and finishing works shall be done at night. These measures shall include the shading of aggregates, spraying of aggregates with water, cooling of the mix constituents (introduction of ice to the mixing water) and reduction of transportation time to the minimum.

During pouring suitable measures shall be provided to prevent setting of concrete placed in contact with hot surfaces. All concreting areas, formwork and reinforcement shall be shielded from the direct sun rays and sprayed with water when necessary.

The temperature of fresh concrete used for top decks of TG foundation shall not exceed 25 degree Centigrade when placed. For maintaining the temperature of 25 degree centigrade in the top decks of TG foundation, crushed ice shall be used in mixing water and cooling of aggregate.

Concrete subject to chemical attack

Concrete with increased resistance to chemical attack shall meet the provisions of DIN 1045 or equivalent. Liquids, soils and vapours aggressive to concrete should be judged in accordance with DIN 4030 and be classified according to 'mild', 'severe' and 'very severe' attacks.

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The resistance of concrete to chemical attack depends on its imperviousness. The concrete must be at least sufficiently dense to ensure that the maximum depth of water penetration tested according to DIN 1048, does not exceed 6 mm in the case of mild attack nor 3 mm when exposed to severe attack.

Concrete, which is likely to be exposed to severe chemical attack for a prolonged period shall be suitably protected by an adequate coating system, and this shall be subject to the Employer's approval.

All vertical concrete surfaces in contact with soil shall receive two coats of bituminous coating @ 1.7kg/sqm with 1% antistripping compound. Soffit and side of foundations shall be protected by means of suitable membrane installation. For basements of buildings and water tight basins protection of concrete surfaces below ground level shall consist of an approved self-adhesive pressure sensitive membrane. The membrane shall adhere to all concrete surfaces, including undersides of structures and other surfaces where concrete is cast in contact with the membrane. The membranes shall be installed strictly to the manufacturer's instructions. The membranes shall extend 150 mm above ground level.

All exposed concrete surfaces above ground (foundations, superstructures, etc.) shall be protected by epoxy coating with a compatible primer penetrating into the concrete. The epoxy coating must be able to bridge the maximum allowable crack width. The minimum thickness of this coating shall be 300 microns.

Alternatively, where appropriate the concrete surfaces shall be protected with approved tiles. In case any structural parts of concrete are likely to be exposed to chemical attack, crack width for such structural parts shall be designed not to exceed the dimension prescribed by the coating manufacturer.

Concreting under water

Underwater placing of concrete may be allowed for un-reinforced components, or as approved by the Employer. The placing being performed exclusively with stationary tremies and shall be in accordance with the requirements of relevant standards.

The min. cement content shall be increased by 50 kg/m³ for underwater concrete.

Underwater concrete is to be placed continuously without interruption.

The concrete is to be placed in such a way that it does not fall freely through the water. The tremies must at all times dip sufficiently far into the freshly placed concrete to ensure that the concrete emerging from the tremie does not come into contact with the water. All work connected with the placing of concrete under water shall be designed, directed and inspected with due regard to local circumstances and purposes. Work shall not proceed until all phases and methods to be used in the placing operations have been approved

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by the Employer.

Protective measures for concrete

In general the cover of rebars shall be as per BS EN 1992-1-1 or equivalent taking into account the site conditions (high temperature, humidity).

Immediately after the compaction of the concrete has been finished, the Contractor shall ensure adequate protection from the weather. Excessive drying can lead to crack formation as a result of plastic contraction. The concrete surface shall be covered with a layer of sacking, canvas, straw mats or similar absorbent material, special protection sprays or a layer of sand kept constantly moist for at least 14 days.

Curing compounds or other methods of preventing evaporation may be used if approved by the Employer.

Where large sections of concrete are poured, special precautions subject to the approval of the Employer shall be taken to reduce and dissipate the heat generated by setting and hardening of the concrete.

Repair of damaged or defective concrete

Concrete which has completed its final setting shall be inspected by the Employer and any cracks, honeycomb areas, segregations, etc. shall be marked. No repairs shall be carried out until so directed by the Employer.

Dimensional tolerances

The permissible tolerances shall comply with the BS 5606 and BS EN 1992-1-1 or equivalent.

2.4.3.7 Finishing of concrete surfaces

The concrete face shall have the finish indicated on the drawings or in the specifications.

All surfaces, which may come into contact with oil or oily water, will have to be adequately protected (paint, etc.). The finished surface of all concrete work shall be sound and free of defects. No plastering, cement wash or mortar shall be applied to cover defective concrete faces.

The fairfaced concrete in superstructure which is placed against shuttering shall be rubbed down with a carborundum stone immediately upon removal of the shuttering to remove fins or other irregularities. The face of the concrete for which shuttering is not provided, other than slabs, shall be smoothed with a wooden flat to give a finish equal to that of the rubbed down face where shuttering is provided. The cavities left by formwork fixing devices shall be made good closing the hole with plastic plugs and epoxy mortar. In watertight concrete structures the formwork fixing devices shall be of such a design as not to leave any holes after removing the shuttering.

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All exterior corners of reinforced concrete shall be chamfered at least 25 mm x 25 mm, at stair treads 10 mm x 10 mm.

The top or final surface of all concrete works shall be finished by screeding, or floating, or trowelling or grinding, or tooling as approved by the Employer.

Dry cement or cement and sand shall not be used to dry excess water on the concrete surface.

Floors and slabs, which are required to be finished smooth, shall be trowelled just before the setting of the concrete.

Screeding:	This shall be executed by moving a straight edge or template by hand or by mechanical means immediately after compaction of the concrete.
Floating:	This shall follow screeding, but shall not be started until some stiffening of the concrete has taken place.
Trowelling:	Where specified as necessary, floating shall be followed by finishing until a smooth surface free from defects is obtained.
Grinding and tooling:	Where specified, the methods to produce the desired surface shall be approved by the Employer. Grinding and/or tooling shall not start until the concrete has hardened sufficiently to prevent dislodgment of the aggregate.
Chiseling:	Wherever possible all chiseling works shall be carried out with mechanical devices. Manual chiseling may be required at difficult points.

Exposed concrete surface treatment

Exposed concrete surface of a structure shall be coated with an approved clear silicone water repellent suitable for application on the concrete.

2.4.3.8 Formwork

Design and construction

For the proof of stability and for the type of formwork and support framing used, BS 3809, BS EN 13168:2012+A1:2015 or equivalent shall be used.

The formwork and the supporting structure shall be so dimensioned as to be able to withstand all vertical and horizontal forces safely shall be sufficiently rigid to maintain the forms in their correct position and to be true to shape and dimensions so that the final concrete is within the limits of the dimensional tolerances specified in Clause "Dimensional tolerances" herein.

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The Contractor shall submit for the approval of the Employer the calculations, designs and details of the methods adopted and materials proposed for the formwork.

Removable type formwork shall be used for all cast-in-situ concreting works. In case lost formwork shall be used, approval from Client is required.

Forms shall be constructed from steel or from sound timber well seasoned and free from shakes. Plywood lining for forms shall be of timber, which is resin bonded and water repellent. Formwork surfaces in contact with

concrete shall be free from adhering grout, projecting nails, splits or other defects.

Joints shall be sufficiently tight to prevent the leakage of cement grout.

Before concrete is placed, all formwork shall be inspected to see if it is built according to the approved plans and to see if it has been cleaned and is free of sawdust, shavings, dust, mud, earth or other contamination and properly oiled. Contact surfaces of panels shall be treated with a suitable release agent (e.g. non staining mineral oil) where applicable. Surfaces, which are not oiled, shall be wetted thoroughly to prevent warping.

If the formwork for columns is erected to the full height of the columns, one side shall be provided with openings for concreting in order to guarantee a proper compaction of the poured concrete.

Formwork for walls and elsewhere shall be arranged for as large as possible concreting height of one floor level in a single pour. Where necessary, panel openings shall be provided in the forms for cleaning, inspection, access of vibrators, etc.

Before placing of concrete, bolts, ties and fixings shall be positioned and all devices used for forming openings, holes, pockets, chases, recesses, etc. shall be fixed to the formwork carefully.

Where concrete surfaces will be exposed to view (permanently exposed surfaces) the formwork shall be such as to produce a completely true, smooth surface, free from perceptible irregularities or to show clearly the desired texture. Such formwork shall be marked on drawings as "Fair-faced Formwork".

Internal spacers and ties, if any, shall be so arranged that after removing of the forms no holes shall extend through the concrete, in the case of watertight concrete or be closed by plastic plugs and epoxy mortar in all other cases. All formwork will be inspected and approved by the Employer before concrete placing commences but this shall not relieve the Contractor of any of his responsibilities under the contract.

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Formwork shall not be removed until the concrete has sufficient strength to carry its own weight plus any constructional or design loads which it is likely to be subjected to it with a normal factor of safety. It shall be removed in such a manner that no shock or damage shall result to the concrete.

Before removal of the formwork the concrete shall be examined and removal shall proceed only on the instructions and under the supervision of a competent person.

The minimum period for striking the formwork (cast-in-situ concrete made with Ordinary Portland Cement) under specified conditions may be taken as follows:

• soffit formwork to slabs	4 days (*)
• soffit formwork to beams	10 days (*)
• vertical formwork to columns, walls and large beams	1 day
• props to slabs	10 days
• props to beams	14 days
• (*) props left under	

Extreme care shall be taken to avoid chipping of corners during removal of formwork.

2.4.3.9 Reinforcing steel

Reinforcing steel used in reinforced concrete shall be of grade B500B conforming to BS 4449 latest.

All reinforcement shall be hammered free of scale, scraped and wire brushed free of all loose rust and after such treatment shall be within the margins allowed by the Standards. The reinforcing steel shall be free of oil, grease or preservative coatings.

The Contractor shall supply the Employer with the manufacturer's certificate stating the process of manufacture and a test sheet giving the results of each of the materials purchased and, when required, the chemical analysis and all tests as specified in the relevant standards.

In particular it shall be possible to derive the following data from the stress-deformation curves:

- ultimate tensile strength

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- guaranteed yield stress
- permissible stress
- elongation.

Reinforcing bars shall be transported and stored so that they remain clean, straight, undamaged and free of corrosion, rust or scale.

Reinforcement shall be cut and/or bent in accordance with BS 8666 or equivalent standards.

Reinforcement shall be accurately fixed and secured against displacement in the position shown in the drawings by means of spacers, chairs or other supports in order to maintain the reinforcement in its correct position, within a tolerance of 3 mm. For the distance between the bars (horizontal and vertical distances), the requirements according applicable standards shall be observed. Jointing of reinforcement bars by welding on site shall be avoided if possible, but where necessary the requirements of BS EN 1992-1-1 or equivalent standards have to be observed.

Where reinforcement is to remain exposed to the weather for a prolonged period, a thick cement grout shall be applied to the bars.

Grounding of reinforcement

Reinforcement shall be grounded according to the requirements laid down in other parts of these specifications.

2.4.3.10 Durability of concrete

All measures necessary in the design and selection of materials including the following shall be taken to ensure the required durability of concrete for the various concrete elements:

- Maximum crack width in the design of all reinforced concrete for structures in contact with water or chemicals and for major structures shall be kept below 0.20 mm. This value might have to be varied depending of the required coating system (e.g. stack).
- In general, reinforcement for cast-in-place concrete shall have a minimum cover of 40 mm. However, cover for thin panels like concrete slabs, concrete walls etc shall be 25 mm. For concrete in contact with the ground or sea water, the minimum cover shall be 75 mm.
- specify clearly location of expansion and construction joints and their surface preparation
- specify foundation surface coating and of concrete surfaces above ground
- specify type of cement appropriate for the ground water, the soil conditions and ambient temperatures
- use smaller size reinforcing bars well distributed in the tensile zone
- limit the tensile stress in reinforcement

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- ensure adequate slope for concrete surfaces likely to receive rainwater or chemicals
- provide chamfers at all concrete edges
- provide strict measures for concrete curing to prevent plastic shrinkage and thermal gradients resulting from early age heat of hydration of the fresh concrete.

2.4.3.11 Roof -Waterproofing

Roof water proofing treatment shall be as follows:

a) For roofs having structural slope:

Over the top surface of sloped R.C.C. slab extruded polystyrene insulation of 75 mm thickness shall be provided. Top surface of polystyrene block shall be finished with 15mm thick cement plaster (1:4). Over the finished surface PU based water proofing treatment shall be applied. This treatment shall include one coat of polyurethane or any other equivalent material based primer with an application rate of minimum 6 sq.m per litre and two successive liquid coatings of high solids content urethane pre-polymers or equivalent material based finish coats as per relevant ASTM standards to form an elastomeric membrane with overall dry film thickness of 1.5 mm. Top of the elastomeric membrane shall be finished with 25mm thick PCC (1:2:4) cast in panels of maximum 1.2 x 1.2m size and reinforced with 0.56mm dia galvanised chicken wire mesh and sealing of joints using sealing compound. However, chequered concrete tile flooring 22 mm (min.) thick of approved colour and shade shall be provided for path way of 1 meter width for access of personnel and handling of equipment and for the entire area of the roof where equipment like AC /Ventilation plant, cooling towers, etc. are provided in place of PCC wearing course. Equipment shall be installed on raised pedestal of minimum 30 cm height from the finished roof to facilitate maintenance of roof treatment in future.

b) For roofs having no structural slope:

Screed concrete 1:2:4 (1 part cement, 2 part sand, 4 parts of aggregate by volume) having minimum 25mm thickness at the lowest point of the slope shall be laid over R.C.C. Over the top surface of screed extruded polystyrene insulation of 75 mm thickness shall be provided. Top surface of polystyrene block shall be finished with 15mm thick cement plaster (1:4). Over the finished surface PU based water proofing treatment shall be applied. This treatment shall include one coat of polyurethane or any other equivalent material based primer with an application rate of minimum 6 sq.m per litre and two successive liquid coatings of high solids content urethane pre-polymers or equivalent material based finish coats as per relevant ASTM standards to form an elastomeric membrane with overall dry film thickness of 1.5 mm. Top of the elastomeric membrane shall be finished with 25mm thick PCC (1:2:4) cast in panels of maximum 1.2 x 1.2m

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size and reinforced with 0.56mm dia galvanised chicken wire mesh and sealing of joints using sealing compound. However, chequered concrete tile flooring 22 mm (min.) thick of approved colour and shade shall be provided for path way of 1 meter width for access of personnel and handling of equipment and for the entire area of the roof where equipment like AC /Ventilation plant, cooling towers, etc. are provided in place of PCC wearing course. Equipment shall be installed on raised pedestal of minimum 30 cm height from the finished roof to facilitate maintenance of roof treatment in future.

2.4.4 Structural steel works

2.4.4.1 Materials

All ferrous materials, their dimensions, forms, weights, tolerances, chemical and mechanical properties, shall be the best of their kind, complying with relevant international Standards.

All structural steel material shall be grade S275-JR+AR for Rolled sections & plates upto 20mm thickness, S275-J0+N for plates above 20mm and S275-J2+N for plates used in Gantry girder as per BS EN10025-2.

In the case of structural steel work, care shall be taken that all parts in the assembly fit accurately together and corresponding parts shall preferably be interchangeable.

The Contractor shall submit to the Employer for approval the country of origin and manufacturer of the steel he proposes to supply.

The structural steelwork and testing shall comply with the relevant clauses of BS 4, BS EN 10162, BS 4360 and BS 6323, BS EN 10025-1:2004, BS EN 10130:2006 or equivalent standards.

Each steel part shall be marked with the manufacturer's name or trademark.

The steelwork shall be manufactured by a specialist firm approved beforehand by the Employer. As much of the work of manufacturing of the steelwork as is reasonably and technically practicable shall be executed in the manufacturer's works, and facilities for inspection by the Employer shall be provided.

All steelwork before and after manufacturing shall be smooth, undeformed, straight and free of cracks, twist and burrs. All steelwork shall be cut and fabricated to a tolerance of ± 1.5 mm in its length. All plates shall be truly at

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right angles to the longitudinal axis of the section. No work shall be painted, packed or dispatched from the manufacturer's works until it has been inspected and complies with or has been certified to comply with all the tests and requirements of the standard applicable to the material specified and until it has been inspected and approved.

Tests

The manufacturer's test certificate for all steelwork shall be supplied to the Employer. The certificates shall state the manufacturing process and shall include a test sheet giving the results of the mechanical tests and the chemical composition. The Contractor shall provide free of charge any supplementary tests reasonably required by the Employer. Steel which do not conform to the specified standards shall be rejected at the expense of the Contractor. No steelwork shall be delivered from the manufacturer's works until it has been tested and the results comply with the requirements of the relevant standards.

2.4.4.2 Workmanship

Tolerances

Care shall be taken to ensure that the tolerances specified on the drawings or the relevant standards are worked to. The erection tolerance for cleated ends of members connecting steel shall be not greater than 2 mm at each end. No work shall be painted, packed or dispatched from the manufacturer's works until it has been tested and complies with all requirements of the standards.

Cutting

Cutting may be by shearing, cropping, sawing or machine flame cutting. Hand flame cutting shall be avoided. If rolled products for steel structures under predominantly static loading are cut by flame-cutting or shearing there will generally be no need for a finishing operation if the cut surface is free of defects.

Bolting

The threaded portion of each bolt shall project through the nut by at least one thread. Approved high strength friction grip bolts, preferably the type with indicated load, shall be used where specified and shall be tightened strictly in accordance with the manufacturer's instructions and the relevant regulations. The surfaces in contact shall not be painted and shall be free of oil, dirt, loose rust, burrs and other defects, which would prevent proper seating of the parts or interfere with the development of friction between them. When connections are made using high strength friction grip bolts the relevant standards shall be observed.

Welding

The execution and testing of welding shall be in accordance with BS EN 1011-1, BS EN 1011-2 or equivalent standards.

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All welds, unless otherwise stated shall be continuous minimum 6 mm fillet weld and shall be dressed smooth, free of porosity, cracks, holes and finished to match adjacent surfaces. When welding operations are completed, all welding flux shall be removed without delay. Cooling of welds shall not be accelerated by any special measures.

Site welding shall be restricted to the absolute minimum. Site welding is subject to approval by Employer. The examination of welded work and the inspection of welds during and after manufacture shall be carried out by responsible specialist welding engineers. Welding shall be carried out by expert trades men and in strict accordance with the current code of practice.

Painting

Surface treatment and painting before and after delivery to site shall be in accordance with Section B0.

Parts to be encased in concrete shall not be painted or oiled. Surfaces inaccessible after shop assembly shall receive the full-specified protective treatment before assembly.

Erection

The Contractor shall supply all suitable plant, hoisting gears and tackles for the erection of the steelwork and shall provide all temporary baulks, struts, shores, etc.

Steelwork damaged due to inadequate precautions being taken during the storage, transport and erection of the steelwork shall be made good to the satisfaction of the Employer at the Contractor's expense.

All shop connections shall be made by electric welding. All site connections shall be bolted unless otherwise specified in drawings or directed by the Employer.

Encased steelwork and steel in foundations shall be solidly encased in concrete with a minimum cover of 100 mm. Anchors of the required structural strength shall be used as holding down anchors in concrete foundations for columns. Sole plate of the column shall be grouted with low shrinkage grout of 50 mm nominal thickness.

Top of pedestal for building structures will be kept at lower level so that column base plate together with gussets and stiffeners remain below FFL.

The column bases as well as column section shall be encased in concrete above FFL as per following:

- a) Open area : 300mm above paved level
- b) Covered area : 150mm above FFL
- c) Stair and ladder pedestal will be kept 200mm above FFL.
- d) Pedestals to steel column for equipment structures:
 - i) Equipment in open area : as required (minimum 300mm)
 - ii) Equipment in covered area: as required (minimum 150mm)

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The grout shall be shaped with an inclination of 45° from the lower edge of the sole plate to avoid stagnant water.

Rejection

Any steelwork, which in the opinion of the Employer is not in accordance with the requirements of the standards or with the specifications, shall be mandatory rejected and removed from the site at the Contractor's expense.

2.4.4.3 Small non-structural steel parts

General

This Clause refers to the specifications covering the provision of all materials and labor in relation to supply and manufacture on site of articles made of steel or cast iron.

All steel structures and parts specified under this clause shall be hot dip galvanized and painted according to **Section B0**.

The list of small items to be furnished shall contain but not be limited to the following:

- steel sections, bent plate sections and square bars for construction of:
 - metallic stairs, platforms and walkways
 - railing for stairs, platforms, walkways and protective around floor openings
 - corner and edge protection for concrete steps and concrete
 - structural parts such as columns, beams, removable cover slabs, etc.
 - support of any equipment foundation
 - joint covers
 - anchors, ties, hangers, inserts, slots, embedded steel parts, etc.
- steel pipes and plain round bars for making guardrails and ladders
- steel plates, chequered and/or flat, for fabrication of removable covers
- open steel grating for metal steps, platforms, and walkways.

Materials

The requirements for materials of structural steel specified herein are applicable to all steel sections, bars, plates, pipes and any sections as far as their quality, source, dimensions, mechanical characteristics and their delivery, handling, storage and tests on site are concerned.

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2.4.4.4 Roof and wall cladding

Metal cladding

The insulated sandwich roof and wall construction shall consist of a double skin construction, rear ventilated and comprising the following:

Internal liner profile: trapezoidal profile min. 0.75 mm thick.

The internal sheet shall be a multilayer, protected metal system consisting of a trapezoidal galvanized steel substrate, heavy epoxy base coat and an internal decorative coat as follows:

Substrate

Hot-dipped galvanized steel substrate, with a minimum zinc coating weight of 275 g/m² total both sides. The steel substrate shall be min. 0.75 mm thick.

Pre-treatment

After cleaning, a "chemical conversion" of the zinc coating to a non-metallic surface with corrosion inhibiting and adhesion additives shall be applied.

Primer

Nominal 8-micron thick anti-corrosive pigmented epoxy primer applied to both sides of the sheet.

Epoxy barrier coat

Nominal 70-micron thick TF Epoxy Barrier coat with special flexibilizer compounds applied to both sides of the sheet and baked to a hard corrosion resistant finish.

Internal decorative coat of the interior profiled liner

Nominal 20 micron stoving polyester decorative finish on inner exposed face of the sheet.

External weathering profile: trapezoidal profile min. 0.75 mm thick

The sheeting unit shall be a multilayer, protected metal system consisting of a trapezoidal galvanized steel substrate, heavy epoxy base coat and a high build weather coat of polyurethane as follows:

Substrate

Hot-dipped galvanized steel substrate, with a minimum zinc coating weight of 275 g/m² total both sides. The steel substrate shall be min. 0.75 mm thick.

Pre-treatment

After cleaning, a "chemical conversion" of the zinc coating to a non-metallic surface with corrosion inhibiting and adhesion additives shall be applied.

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Primer

Nominal 8-micron thick anti-corrosive pigmented epoxy primer applied to both sides of the sheet.

Epoxy barrier coat

Nominal 70-micron thick TF Epoxy Barrier coat with special flexibilizer compounds applied to both sides of the sheet and baked to a hard corrosion resistant finish.

External weather coat

Nominal 40 micron thick urethane exterior coating on outer exposed face of the sheet pigmented in one of the standard colors of the manufacturer's color range.

Insulation core: 60 mm (minimum) thick non-combustible material like glass wool or similar of density not less than 16 kg/m^3 .

Requirements for roofs

These requirements apply to all roofs (not only for roof cladding).

The roof construction is to be such that, with due allowance for the climatic conditions and any air conditioning plant installed in the rooms, and with the intended use of the rooms taken into account, no damp will penetrate into the materials used.

All roofs must have a minimum sound absorbing index of 20 dB (A) and a maximum heat transmission coefficient of $0.45 \text{ W/m}^2\text{K}$. Appropriate insulation materials will have to be used to achieve the a.m. figures.

Bidder/Contractor shall provide insulation as required to fulfill requirements due to heat insulation or noise restrictions.

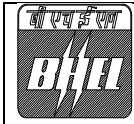
Bidder/Contractor shall provide a concept showing the requirements of each building to ensure that the design fulfils requirements of specification, local requirements, related codes and standards and EIA requirements.

Roof surfaces are to be designed with a min. slope of 3% for concrete roofs and 5% for metal roofing.

All roofs shall be suitable constructed to serve for PV-Modules. The roofs shall be able to mount the supporting structure and provide sufficient arrangements for operation and maintenance.

Requirements for walls

These requirements apply to all walls (not only for wall cladding). External walls are to be constructed that, taking into account the climatic conditions and any air conditioning plant installed in the rooms as well as the manner of use of the rooms, no damp will penetrate the walls. All external walls must have a minimum sound-absorbing index of 20 dB (A) and a maximum heat



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transmission coefficient of $0.75 \text{ W/m}^2 \text{ K}$. Appropriate insulation materials will have to be used to achieve the above mentioned figures.

Bidder/Contractor shall provide insulation as required to fulfill requirements due to heat insulation or noise restrictions.

Bidder/Contractor shall provide a concept showing the requirements of each building to ensure that the design fulfils requirements of specification, local requirements, related codes and standards and EIA requirements.

The walls shall not allow the passage of rain or moisture into the building. The walls shall be provided with all necessary horizontal and vertical damp-proof courses and flashings.

2.5 Masonry works

Autoclave aerated concrete (AAC) block masonry conforming to Category I of BS EN 771-4:2011+A1:2015 shall be used for external/internal masonry works. All external walls shall have a minimum sound-absorbing index of 20 dB (A). All external walls shall have a maximum heat transmission coefficient of 0.75 W/(sqm K) . Autoclave aerated concrete (AAC) block masonry shall have minimum compressive strength of 4MPa.

Masonry work with brickwork shall be conforming to relevant BS code.

Encasement of structural member shall be done by brick/AAC block masonry work around flanges, webs etc. and filling the gap between steel and masonry by minimum 12mm thick mortar. Encased members shall be wrapped with chicken wire mesh with a lap of 50mm.

2.6 Plastering

The mix for plastering shall be as follows:

1. Outside plaster : 18mm thick in two coats in cement mortar 1:6
2. Inside plaster : 12mm thick in cement mortar 1:6
3. Concrete ceiling plaster: 6mm thick in cement mortar 1:4

Parapet, Chajjas over window and door heads, architectural facias, projections etc shall be provided with drip course in cement sand mortar 1:3.

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2.7 Finishing works

Floor and wall finishes

The finishing works to be applied for the buildings and structures of the plant are listed below. Buildings or rooms not included, or special items, must be agreed with the Employer.

Floor finishes (typical)

Room	Floor Finishes
Switchgear rooms	Epoxy screed (trowel applied minimum 5 mm thick) and epoxy seal coat
Neutralisation pit	115 mm thick Acid Resistant bricks over 6 mm thick under bed of potassium silicate mortar
Pump house floors, cable vaults	Cement concrete flooring with metallic hardener
Rest room, toilets, kitchen mess room	Glazed non-slip fully vitrified ceramic tiles (7 mm thick).
Offices	Vitrified ceramic tiles (10 mm thick)
Corridors, stairs, landings	Vitrified ceramic tiles (floor tiles with epoxy grout) (7 mm thick)
Battery rooms	Acid resistant tiles (20 mm thick)
Control room, relay rooms, electrical equipment	Heavy duty PVC(2mm thick) sheeting on false floor (if required) Vitrified ceramic tiles in main control rooms
A/C Plant rooms	Carborundum (25 mm thick heavy duty cement concrete tiles)
Instrument/electrical workrooms	Heavy duty PVC tiles (6.5 mm thick)
Stores workshop, mechanical work room and store room	Carborundum (25 mm thick heavy duty cement concrete tiles) with oil resistant epoxy coating (150 micron thick)
Transformer pits	Oil-proof hard-wearing epoxy coating (150 micron thick)

- Total Floor finish (including underbed of cement mortar and top finish) shall be 50mm thick.
- Granite stone shall be 18 mm thick of approved color.

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Internal Finish

Area/Location	Internal Wall finish	Ceiling finish
Control rooms, LVAC rooms, computer rooms, restroom, administration areas, offices and similar rooms, corridors, instrument and electrical workrooms, mechanical workroom and storeroom.	Plaster, two coats of acrylic emulsion paint over polymer based putty	Acrylic distemper where no false ceiling is provided For control room of Power House, combination of glass fiber gypsum plaster board (GRG) (12 mm thick) and pre coated (color) Aluminum false ceiling
Switchgear rooms, HVAC mechanical plant rooms, stores, pump houses, compressor house, air washer, Air handling room, cable vault and workshop	Fair faced block/brick work, cement wash (2 kg cement mixed to 1 Liter of water), two coats of acrylic distemper	Acrylic distemper
Toilets, washrooms, locker rooms, kitchen, etc.	Glazed ceramic tiles upto a level of 2.3m. Plaster and two coats of acrylic emulsion paint over polymer based putty in the remaining height	Acrylic distemper
Lead acid Battery room, waste treatment plant, laboratory, rooms where any chemicals are stored, handled or prepared.	20 mm thick Acid resistant tiles over potassium silicate based cement mortar upto 1.2m height. Plaster and two coats of chlorinated rubber acid resistant paint over chlorinated rubber zinc phosphate primer in the remaining height	Two coats of chlorinated rubber acid resistant paint over chlorinated rubber zinc phosphate primer
Oil canal, oil room and other areas where oil spillage is likely to occur	Plaster and Epoxy based oil resistant paint (150 micron thickness) over epoxy primer upto 1.2 m height. Acrylic distemper on the remaining height	Acrylic distemper

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External Finish

The external finish of buildings with Autoclave aerated concrete blocks masonry (where no metal cladding or Aluminum composite panels are required as per the individual building description given above) shall be two coats of acrylic based weather coat paint.

2.8 Sanitary installations

The Western WCs closet seats and covers are to be of plastic of a color to match the tiles. The WCs shall be provided with hand spray with angle valve and hand trigger, 100 cm long hose, toilet roll holders made of chromium-plated brass to be fitted within convenient reach.

The Asian Squatting WCs are to be white ceramic plates (500 x 400 mm approx.) with raised treads for flush installation at floor level. The WCs shall be provided with hand spray with angle valve and hand trigger, 100cm long hose, toilet roll holders made of chromium-plated brass to be fitted within convenient reach.

Washbasins, minimum size 58 x 45 cm, are to be provided with a mixing tap. Above each washbasin is to be provided one mirror, minimum size 70 x 50 cm and one soap dispenser for fluid soap.

Bowl urinals are to be fitted with flushing devices.

Each toilet is to be equipped with one push button operated hot air hand dryer provided with overheating protection.

All rooms where leakages of liquids may occur (pump rooms, wash rooms, toilets, shower rooms, battery rooms, etc.) are to be provided with adequate floor drains, even if this does not result from the relevant civil drawings and/or from the written part of the specification.

2.9 Doors

Metal doors

All internal and exterior and safety doors shall be made of 45 mm thick flush design with double steel sheet walls, insulated with mineral wool.

Minimum nominal dimensions of doors shall be as follows:

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Single leaf doors:	width 1.01 m x height 2.135 m
double doors to rooms housing valves pumps and similar equipment:	width 2.2 m x height 2.135 m
double doors to rooms housing electrical equipment:	width 2.2 m x height 2.5m

Steel parts of the doors shall be protected in accordance with the relevant section of the specification for coating of steel surfaces. All doors shall be fitted with approved locks and self closing mechanism.

Fire rated doors shall be all in accordance with the applicable regulations and standards and shall have glazing panel of the same fire resistance as that of the door: G30 or G90 to match T30 or T90.

All doors and gates shall be installed such that rain water penetration is avoided.

All doors shall meet the requirements of the applicable standards/
Bangladesh National Building code

Wooden doors shall be solid core flush door shutter having 35mm thick homogenous particle board conforming to Bangladesh National Building Code

Aluminum doors and windows shall be anodized and electro color coated as per relevant BS code.

Aluminum composite panel shall be of 4 mm total panel thickness with PVDF based coating.

All toilet doors shall be 25 thick PVC doors.

Roller-shutter doors

Large openings to buildings shall be fitted with electrically operated rolling shutters as appropriate. An escape door shall be provided next to each rolling shutter. The shutters shall be of double walled hollow sections of galvanized steel protected with coating in accordance with the **Section B0**.

Hand crank with continuous chain reel shall be fitted to operate the door by hand in case of emergency.

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2.10 Windows

All windows shall be aluminum with double glazing which meet the requirements of the applicable standards/ Bangladesh National Building code. Each window shall have side and bottom sash fitting and shall safely absorb an impact force of at least 7.5 kN. Scissor type stay shall be designed to prevent the sash from dropping in case of malfunctioning. The windows shall be resistant to pelting rain. Approved sunshade system shall be provided for windows facing east, west and south.

Window sill shall be of aluminum matching in color with that of the window on the outside and with the color of the room on the inside. Fastening devices for safety harness shall be provided on the exterior of the building for windows which cannot be cleaned from inside the building or from the floor outside.

Glazing

1. Glazing of doors and partitions shall be done with 5.5 mm thick clear float glass. However, 12mm thick BWP particle board shall also be provided in some locations. However, the external doors shall have Hermetically sealed double glazing of 6mm thick clear toughened glass on inner side and 6mm thick reflective toughened glass on outer side
2. Hermetically sealed double glazing of 4 mm thick float glass shall be used for windows located in ground floor and at accessible floors.
3. Windows and ventilators located at higher elevation where frequent replacement is not feasible, shall have hermetically sealed double glazing of 6mm thick clear toughened glass.
4. For glazing between Air Conditioned and Non air conditioned areas composite double glazing shall be 24mm thick consisting of 6mm thick clear toughened glass on inner side and 6mm thick reflective toughened glass on outer side. The two glasses shall be separated by 12mm air-gap and hermetically sealed by beading of anodized aluminum with outer edge sealed with silicon sealant.
5. 4mm thick single glazing of ground glass shall be provided for toilets.

2.11 Aviation warning lights

Aviation warning lights shall be provided for the stack and on all tall buildings and structures in accordance with the aviation safety requirements.

2.12 Earthing and lightning protection

All buildings and structures shall be provided with an adequate earthing and lightning protection system (see **Section B7**).

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2.13 Roads and surfacing

General

The actual thickness of road-courses shall be calculated based on the results of the soil investigation, loads, intensity of traffic, design life, etc. the thickness of road-courses shall be in no case less than those of the existing roads in the zone of the plant.

The design of all pavements shall conform to the requirements of the American Association of State Highway and Transportation Officials (AASHTO), and Local Highway Requirements or local standards whichever is more stringent.

Foundation bed

The requirements for the particular road type and the recommendations of the soil investigation report have to be observed.

Wearing course

The requirements for the particular road type have to be observed as per the local standards and codes.

Compaction of sub-grade

The area for the roads shall be cleared of any material or obstructions, which in the opinion of the Employer might adversely affect the stability of the fill or pavement, and the top layer removed to a depth of 300 mm (or more if the design so required).

Any ruts or soft areas caused by improper drainage conditions, hauling or any other cause shall be corrected and rolled to the required compaction before sub-base is placed thereon.

The formation shall be compacted to a dry density of at least 95% of the maximum dry density.

Tests for sub-grade

The sub-grade compaction test and in-situ dry density tests on each layer of compacted material shall be carried out at an average of not less than 2 per 100 m length of carriageway.

Sub-base

Sub-base material shall be crushed rock or other approved local material having suitable properties and confirming to the following grading:



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Sieve [mm]	Percentage by Weight Passing
75	100
37.5	85 - 100
10	45 - 100
5	25 - 85
0.6	8 - 45

Sieve [mm]	Percentage by Weight Passing
0.075	0 - 10

The material shall be spread evenly on the preceding material in layers not exceeding 150 mm compacted thickness.

The sub-base shall be compacted by approved plant to a dry density, which shall not be less than 98% relative compaction until movement of the surface ceases and the surface is closed. The CBR value shall be at least 30% at the optimum moisture content.

Wet mix road base

Wet Mix road base material shall consist of crushed gravel or crushed rock and shall be suitably proportioned to confirm to the following grading as approved by the Employer:

BS Sieve Size [mm]	Percentage by Weight Passing
50	100
37.5	90 - 100
20	60 - 80
10	40 - 60
5.00	25 - 40
2.36	15 - 30
0.600	8 - 22
0.075	0 - 8

The final surface shall be shaped and finished true to line and level within a tolerance of + 10 mm to the levels shown on the drawings.

Placing of road base

The compaction procedure and plant shall be proved by trials at the commencement of the Works.

Road base material shall be placed and spread evenly, without delay, using a paving machine or spreader box, operated with a mechanism which level off the material at an even depth and it shall be spread in layers not exceeding 150 mm compacted thickness. Segregation shall be avoided during transport and placing and any segregation evident after compaction shall be corrected by vibrating in non-plastic fines or made good by removing and replacing with properly graded material.

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The road base shall achieve a minimum dry density of 98.1% of the maximum laboratory dry density.

Before placing the next construction layer or applying prime coat, the road base shall be mechanically swept, then cleaned with compressed air to remove loose material. As soon as possible after cleaning of the surface, the road base shall be sealed by the application of a prime coat as specified.

Chlorides and sulphates

The level of chlorides and sulphates in the sub-base and wet mix road base shall be within the following limits:

	Maximum by weight	
	Sub-base	wet-mix road base
Acid soluble chloride (NaCl)	3.5%	0.5%
Acid soluble sulphate (SO ₃)	2.0%	0.5%

Hard shoulders

The material used for any hard shoulders shall comply with the specification for wet-mix road base.

Segmental Concrete Paving Block Surface

For the stipulated requirements of the laying of the segmented concrete paving block surface, it is assumed that the sub-grade or sub-base has been properly constructed, that there are no soft or unstable areas and that the sub-grade or sub-base has been trimmed to within ± 10 mm of the specified level.

Laying Pattern

Unless otherwise approved, all blocks shall be laid in herringbone pattern. The blocks shall be laid against the edge restraint shown on the plans in order to prevent the outward migration of blocks. Areas against kerbs, manholes, etc. requiring infilling and which exceed 25% of a full block unit shall be filled with units cut to size using a mechanical or hydraulic guillotine, bolster or angle grinder. Infill areas constituting less than 25% of a full block area and of 25 mm minimum dimension shall be filled with 25 MPa concrete. Smaller areas shall be filled with cement mortar having proportions of 1 sack cement to 130 litre of good quality mortar sand.

Bedding Sand

Except for mine sand, sand for the bedding layer shall comply with the following grading limits:

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SIEVE SIZE (mm)	% PASSING
9,52	100
4,75	95 -100
2,36	80 - 100
1,18	50 - 85
0,600	25 - 60
0,300	10 - 30
0,150	5 - 15
0,075	0 - 10

Mine sand may be used where experience has shown it to be satisfactory. The moisture content of the sand shall be 5 - 8%. Bedding sand shall be maintained in a loose condition and protected against pre-compaction. Any pre-compacted areas shall be removed and replaced. The loose sand-bedding layer shall be evenly laid and shall not be used to fill hollows in an uneven subgrade or subbase surface. The compacted sand layer shall have a thickness of not less than 15 mm and not more than 35 mm.

Block Laying

All blocks shall be laid true to line and level. Full blocks shall be laid first, care being taken that joint lines are straight and square. Disturbance of laid blocks shall be prevented and any areas distorted or damaged shall be lifted and re-laid by the Contractor. The maximum joint width shall be limited to 5 mm.

Compaction of Blocks

After laying the blocks, a mechanical flat plate vibrator shall be applied to the surface of the blocks to bed them. For block thicknesses up to and including 80 mm the vibrator shall be capable of producing a centrifugal force of approximately 7 to 16 kN at a frequency of approximately 75 - 100 Hz, the plate area being between 0,2 m² and 0,4 m². For greater thicknesses the required centrifugal force shall be 16 - 20 kN at a frequency of approximately 75 - 100 Hz, the plate area being between 0,35 and 0,5 m². Compaction of blocks shall follow block laying as closely as possible, but shall not be attempted within 1 m of the laying face. At the end of each day compaction must be completed up to within 1 m of the working face. All blocks damaged during the compaction process shall be removed and replaced. Sufficient passes shall be made to compact the block pavement fully and to produce an even surface. The number of passes shall, however, not be less than two.

Jointing Sand

Joints between blocks shall be filled with a 50-50 sand-cement mixture. The jointing sand shall pass a 1,18 mm sieve and contain 10 - 50% material

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passing the 75 μ m sieve. The sand shall be free of soluble salts or contaminants likely to cause efflorescence or staining. After initial vibration, joint filling sand shall be uniformly distributed over the surface of the pavement and brushed into the joints. Further passes of the plate vibrator shall be made to fill the joints, more sand being spread over the surface if required.

Excess sand shall be removed before the pavement is opened to traffic.

Surface Tolerances

Surface tolerances on the finished paving are based on the layer directly below the bedding sand complying with:

- a) maximum deviation in surface level from the true surface level to be ± 10 mm;
- b) maximum deviation from a 3 m straight edge placed on the surface to be 10 mm, except where vertical curves necessitate a greater deviation;
- c) the finished paving shall be so laid as to create a regular and smooth appearance.
- d) Surface tolerances shall be as follows:
 - maximum deviation in surface level from the true surface level to be ± 10 mm, except immediately adjacent to gullies, where the tolerance shall be +3 mm and 0 mm
 - maximum deviation from a 3 m straight edge placed on the surface to be 10 mm, except where vertical curves necessitate a greater deviation
 - levels of adjacent blocks shall not differ by more than 3 mm
 - the line of the pattern shall not deviate more than 15 mm from a 3 m straightedge.

Site Clearance

Before the pavement is opened to traffic the area shall be cleared of all debris and other waste and left in a tidy condition.

Weed/Ant Poison

An weed and ant poison approved by the Employer, shall be applied to the sand layer strictly in compliance with the manufacturer's specification prior to block laying.

Gravel Wearing Course Surface

For this type of road surface, the road base shall be of an approved Gypsum gravel with a grading complying with a G4 quality natural gravel, the finished surface of which acts as the wearing course surface.

New and existing pavement joints

Where new bituminous pavement is required to join into existing road construction, each layer of existing bituminous course shall be cut back to a clean vertical face and coated with hot bitumen of a grade suitable for the

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purpose immediately before laying the new bituminous material.

The existing pavement layers shall be cut back to form a stepped pattern. The lower layers of bituminous courses shall be prepared to receive the new covering coats by removal of dust and deleterious materials by air jetting or other approved means, and shall be coated with bituminous tack coat.

Exposed existing road base surfaces shall be scarified then re-compacted and sealed with bituminous prime coat in accordance with road base specification.

Bitumen macadam

Aggregate shall be hard, clean, durable crushed rock or gravel, and sand and shall be obtained from approved source which shall not include quarries containing significant proportions of weather bed, decomposed or extensively fractured materials.

Coarse aggregate is defined as that fraction retained on a 3.5 mm sieve. It shall have physical properties, which do not exceed the following test values:

	Wearing course	Base course
Aggregate crushing value	20%	25%
Flakiness index	25%	30%
Elongation index	25%	30%
Water absorption	2%	2%

Separate coarse and fine aggregate fractions shall be tested for soundness.

Wearing course shall be of min. 40 mm finished thickness; the aggregate grading shall be as follows:

Test Sieve [mm]	Grading (20mm nominal size) % by weight passing
28	100
20	95 - 100
14	70 - 90
10	55 - 75
6.3	40 - 60
3.35	25 - 40
1.18	15 - 30
0.075	2 - 6

Composition of bitumen macadam

Mixes shall be submitted for approval and proved by means of laboratory, plant and field trials.

The designed mixes shall comply with the following:

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	Binder Course	Wearing Course
Voids in mix [%]	7 - 10	5 - 8
Voids in mixed aggregate [%]	14 - 20	14 - 20
Minimum stability [kg]	750	1000
Flow (mm)	2 - 4	2 - 4
Minimum stability flow ratio [kg/niTn]	270	320
Bitumen content [% of total mix]	3.3 - 4.0	3.5 - 4.2
Voids filled with Bitumen [%]	48 - 60	48 - 60

Mixing and laying

The aggregate and bitumen shall be mixed in an approved plant of the batch type. Constituents shall be proportioned by weight; the bitumen may be proportioned by a metering pump.

Bitumen and aggregates shall not be heated to above 150°C and 170°C, respectively, and the temperature difference between them at the time of mixing shall not exceed 15°C. The mixing temperature shall be established from the bitumen viscosity/temperature graph. Approved facilities for continuous measurement of temperatures shall be provided.

Bitumen macadam shall be transported in clean vehicles. Dust, coated dust, oil or water may be used on vehicle bodies to facilitate discharge, but the amounts shall be kept to a minimum and any excess shall be removed by tipping or brushing.

Immediately after arrival at the site, the macadam shall be supplied continuously to the paver and placed without delay.

Joints in wearing course shall be offset by at least 300 mm from parallel joints in the layer beneath.

A priming coat of petroleum/bitumen shall be applied to the road base at the rate of 0.55 to 7 l/m², before placing macadam. The binder course shall not be laid until the priming coat has been cured.

The binder course shall be prepared to receive the wearing course by removal of dust and deleterious materials by air jetting or other approved means.

Interlocking paving blocks

Footpaths and areas to be paved with interlocking concrete blocks shall be excavated and placed with 300 mm depth of compacted material at the exact levels and falls required for the finished work.

If parts of the base are found to be unstable the Contractor shall excavate further to a firm bed and fill with layers of fine crushed rock or aggregate, thoroughly compacted. The upper surface of the base shall reflect the exact profile, fall or contour of the final paving, irregularities shall not be

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compensated by varying the depth of sand bedding.

Compaction of formation and base for interlocking concrete slabs shall be as Clauses (Compaction of Sub-Grade), (Road Base), (Tests on Sub-Base and Road Base).

A stable edge shall be provided to retain the paving units and sand bedding by means of pre-cast concrete edging unit or kerbs set in-situ concrete. The sand bedding shall be a fine, well graded sand in a dry to moist condition and laid to an uncompacted thickness of 50 mm.

The mix for paving blocks shall contain a water-repelling additive.

The paving blocks shall be laid in accordance with the manufacturer's instructions and shall be compacted at completion of each day's work. The interlocking block shall be a minimum of 80 mm thick and of grade C25/30 and the concrete quantity must be approved by the employer.

Site surfacing

The area of site not covered by buildings, structures, roads and paving, plants, etc. shall be leveled and covered by a single layer of drainage geotextile membrane topped by a layer of 30 mm uniform gauge gravel of minimum 15 cm thickness after compaction.

Kerbs

All roads shall be provided with kerbs.

Kerbs, channels, edgings and quadrants shall be cast generally to BS EN 1343 or equivalent. They shall be cast to the required radius for all curves not less than 10 meters.

Raised kerbs shall be laid with a 6 mm gap and pointed with 1 to 3 polymer modified cement mortar above road level only. Concrete bedding and backing to kerbs shall be cast in-situ to the dimensions shown on the drawings.

Flush kerbs shall be similarly laid and jointed or may be cast in-situ. The outside corner of the kerbs shall be chamfered.

Marginal strips and kerbs shall be protected against covering or splashing with bitumen or cement. Kerbs and manhole frames shall be primed before bituminous macadam is laid.

All raised kerbs shall be alternately painted black and white in the plant area and at junctions.

Traffic signs

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Traffic signs shall be reflectorized and shall comply with the latest revision of the latest Bangladesh standard.

Number, type and position of the signs have to be as agreed with the Employer.

Mounting posts shall be of circular hollow steel section structural steel. Single post signs will generally be cast directly into a concrete base.

Guardrails

Guardrails shall be provided where the occupants of a vehicle or passers-by can be endangered by a vehicle leaving the road.

Guardrails are to be used also to protect pipes and structures located at traffic areas and are to be designed to withstand impact forces in accordance to the traffic type and speed.

Railings shall be of galvanized steel, which shall be epoxy-painted in addition. Plastic guideposts with glass reflector elements shall be used where required.

Road drainage system

The drainage system of the roads shall comply with the respective standards.

The arrangement of the drain lines discharge collectors shall suit the traffic requirements, simplicity and reliability, having maintenance facilities to make sure that the system is working properly.

2.14 Fences and gates

The following fences shall be provided:

- internal fences around different plant components (open storage area, switch yard, etc.).

Internal fences

Chain link fences shall be constructed of plastic coated galvanized steel wire and shall be of such manufacture that when any one segment is cut remaining segments within the pattern retain their rigidity.

Overall height of the fencing shall be 2.4 meters (1.8m plastic coated galvanized steel wire mesh + 0.6m barbed wire) above ground level. All mesh shall be of plastic coated galvanized steel wire of minimum 8 gauge (including PVC coating). Line wires shall be of plastic coated galvanized steel wire of the same gauge to adequately support the mesh rigidly. Line wires shall be provided at the top and bottom of the mesh and at two evenly

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spaced intermediate levels. The line wires shall be attached to the supporting posts. The top wire shall be doubled, making five line wires in all. Mesh and line wires shall comply with BS 4102 or equivalent standards.

Supporting posts and struts shall be of precast reinforced concrete of grade C40/50. The posts shall be set in concrete in the ground. The posts shall have cranked tops set at 45° outward to the posts, to which shall be attached three strands of galvanized barbed wire. Droppers shall be fitted at the center of each bay of fencing, to prevent the wires bunched together. Intermediate posts shall be provided at centers not exceeding 3 meters. Corner posts and struts shall be provided at all changes in direction.

The fences shall be connected to the earthing system.

Gates

Along the internal fences mentioned above an adequate number of single-leaf pedestrian gates and double-leaf hinged gates shall be provided.

The height of these gates shall correspond to the height of the adjacent perimeter fences.

Gates shall comply with BS 1722 or equivalent standards and shall be constructed of plastic coated galvanized chain link mesh on a plastic coated galvanized RHS or tubular steel frame, with three strands of barbed wire across the top on cranked galvanized extension arms.

Gateposts shall be made of plastic coated galvanized RHS section and set in concrete in the ground. Gate hinges (pivots) shall be heavily galvanized and plastic coated.

All gates shall be provided with locks.

Also the gates shall be connected to the earthing system.

2.15 Intake and pump houses

See **Section B5**.

2.16 Outdoor facilities

2.16.1 Potable water system

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Drinking water pipelines shall be constructed to BS 8558, BS EN 806 or equivalent.

For water piping the material listed in BS 3505:1986 shall be used.

For the water storage tank glass-fibre reinforced polyethylene shall be used providing the materials satisfy the requirements of the appropriate standards. Any material used shall meet the requirements of the World Health Authority with regard to harmful influences on the drinking water. They shall not promote the formation of algae or the growth of bacteria in water.

The materials used shall be UV-resistant and withstand any climatic conditions to which they are exposed.

The tank shall be covered and provided with sun protection as well as a visible outside water level gauge and automatic float control.

Glass-fibre reinforced material shall meet the requirements laid down in the "Voluntary Product Standard" of the National Bureau of Standards (US Department of Commerce) or other relevant internationally recognized standards.

2.16.2 Storm water drainage

Storm water drainage shall be supplied for all buildings, roads, paved areas etc. in accordance with the local rainfall conditions. If possible by gravity only, lifting or pumping stations shall be avoided.

All storm water and fire-fighting water has to discharge over sand traps to be collected in a retention basin, whether it is polluted or not and send to external disposal or sent to the stormwater pond.

2.16.3 Oily water drainage/separators

The tank farm, the transformer enclosures and the workshop have to have provisions to collect oily water and to treat it in one or more oil separators.

2.16.4 Chemical drainage

The drainage from battery rooms and similar shall not be connected to the storm water systems, but to the chemical drainage system, connected to the neutralization tank tank or to the waste water tanks.

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2.16.5 Manholes

Manholes shall be provided for the above-described drainage systems, at each change in gradient or direction, and at maximum intervals of 50 m. The diameter of manhole shall be chosen as a function of the pipe cross section. Either prefabricated or cast-in-situ concrete manholes may be used.

Shaft and manhole covers shall be made from cast iron and reinforced concrete, of watertight construction, to suit local requirements. Shaft and pit covers shall have a test load suited to the traffic conditions. Trash gratings shall be of cast steel.

2.16.6 Piping material for outdoor systems

General

- Tubes and fittings of other materials shall be used only if they are in conformity with local regulations and with the approval of the Employer.
- All materials shall comply with the regulations regarding quality and dimensions and shall be adequate for the required work.
- Materials and structural parts not standardized shall be subject to the approval of the Employer's Engineer prior to use.
- All pipes and joints shall be marked indelibly immediately after taking from the moulds.
- The marking shall include:
 - name of manufacturer
 - date of manufacturing and serial number
 - nominal diameter and pipe class.

Unplasticized Polyvinyl Chloride (UPVC) pipes

UPVC pipes conforming to BS 3505:1986 shall be used for water supply and storm water and sewerage purposes. Pipes couplings and pipe fittings of UPVC shall have a uniform dark gray color throughout.

Pipes for rainwater downtake shall conform to Class C as per BS 3505:1986.

UPVC pipes conforming to BS EN 13476 shall be used for sewerage purposes.

2.17 Pipe and cable ducts

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The ducts are to be constructed of reinforced concrete and must be watertight. Particular attention must be paid to satisfactory expansion and settling joints. The walls and covers of the ducts must be designed and reinforced to withstand the soil pressure and the relevant traffic loads. The ducts are to be provided internally with hot dip galvanized anchor rails every 1.5 m for the easy attachment of clips and cable racks. All ducts covered by removable covers will have to be provided with metal protection angles.

Pipe ducts shall be big enough for maintenance. Trench and cover shall be designed for the relevant traffic loads.

For drainage purposes the cable and pipe ducts shall be provided with slopes (min. slope 0.3%) towards accessible pump sumps. The pump sumps in which will be frequently water will have to be provided with permanently installed automatic pumps.

2.17.1 Pipe bridges/racks

Structure of pipe bridges shall be of galvanized steel and shall consider reasonable heights for under passing and impact loads due to traffic. Floors and stairs shall be galvanized steel grating. Along the pipe bridge, around the various openings and for the stairs tubular steel railings of galvanized steel shall be provided.

Access shall be made by steel stairs and/or from the various plant items. For escape purposes a clear width of min. 1.00 m and minimum headroom of 2.20 m shall be provided along the pipe bridge. All fittings, apparatus and parts requiring maintenance must be easily accessible via stairs (only in exception cases via ladders) and must be secured by platforms and railings. Minimum headroom of 2.20 m and a clear width of min. 1.00 m must be assured everywhere and no dangerous objects must protrude into the accessible areas. When are crossed, care must be taken to ensure a clear headroom of min. 8.00 m for the main access roads, 6.00 m for any other road and a clear width not less than the road width.

The structure must be sturdy and well founded to enable it to support both, the pipe loads as well as the horizontal and vertical pressures and tensile stresses at the fixed points. Sliding bearings must ensure an adequately long travel without jamming. The settlements of pipe bridges must be kept to a minimum in order to avoid unacceptable stresses in the pipes.

2.18 Synthetic filter fabrics

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Where filter membranes or geo-textiles are required, only non-woven needle-punched fabrics shall be used. In this process discrete long fibre is mechanically interlocked by a barbed needle-punching operation. The filter fabrics shall be installed permanently as required.

2.18.1 General requirements

Resistance to chemical attack

The material shall experience no significant change in its physical, chemical or engineering properties under the influence of oil, sulphates, chlorides, acids and alkalis in the forms and concentrations, which are present in soils, brackish water and groundwater to be found at the site.

Resistance to biological attack

The material shall be resistant to bacterial attack, fungus, insects and vermin etc.

Stability under ultraviolet light

The material shall incorporate sufficient resistance to ultraviolet light that its physical properties shall satisfy the specification after exposure for a period of up to 30 days of full sunlight in summer at the site.

The Contractor shall propose for review methods of storage and laying of the material which will ensure that exposure is not more than half of the manufacturer's recommended maximum exposure period for conditions at site.

Drinking water suitability

The material shall be of such quality that drinking water is not affected.

Supply

Filter fabrics shall be supplied in rolls of at least 3.5 m width and shall be jointed in accordance with the manufacturer's specification. Roll length of each fabric shall be such as to lay one strip complete in one operation, without jointing, each of the various separate sloping and horizontal lengths involved (e.g. for the shoreline protection, placing direction vertical to the coastline). Rolls of adequate standard lengths shall be supplied for this purpose.

Material approval

The Contractor shall demonstrate before use that the proposed materials, from all the proposed sources of supply, meet the specification. Such demonstrations (laboratory tests) shall be performed or stated by an approved official laboratory for materials testing. The results shall be

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summarized and interpreted in a report and presented to the Employer for approval.

Filtration properties and pore size distribution

Filter fabrics shall be permeable and have a mean pore size not greater than 0.3 mm and a pore size for a fraction of 90% not greater than 1.0 mm, retaining at least 50% of material with a particle size in the range of 0.06 mm to 0.2 mm. The pore size distribution shall be determined by appropriate methods in accordance with good engineering practice.

Permeability

The transverse filter fabric permeability range shall be $k = 5 \times 10^{-4}$ m/s and 5×10^{-3} m/s at a loading of 0.5 bar (50 kN/m^2).

Mechanical and hydraulic filter stability

3 samples shall be taken from the filter fabrics used for every kind of soil to be tested. The fabric shall be fastened as the bottom of at least 15 cm diameter and 10 cm high PVC-cylinders where these tools are filled with 1500 g of dry soil to be tested each. These cylinders shall be submerged 40 cm into water and lifted up reciprocally every 30 seconds for 34 hours. The sand penetrated through the fabric shall be measured after 4, 9, 24, 29 and 34 hours where the penetrated sand shall be not more than 2.5 g in the last 10 hours. The water volume passing the above sample shall also be measured at above intervals. After the end of the test, two fabric samples shall be taken from each cylinder and their reduced permeability shall be measured which might be caused by soil particles penetrated into the fabric. This permeability still shall be more than of the natural soil.

Weight

In respect of hydrodynamic reversing flow conditions the fabric weight shall be equal or greater than 1000 g/m^2 (at 20°C and 65 percent humidity) for shoreline protection and scour protection.

2.18.2 Tensile properties of filter fabrics

The tensile strength of the filter fabric shall be verified in any direction (longitudinal and cross) under a uniformly applied load. The following laboratory tests shall be performed on wet samples, which have been fully submerged in water for a period of 48 hours before testing.

Plain strain test

This test shall be carried out according to ISO 13934 but with a 20 cm by 20 cm fabric sample, restrained from reduction in width by laths on the two tensioned sides of fabric with steel pins penetrating fabric. The tensile strength of the material shall not be less than 1.2/1.6 KN over a 200 mm width and the breaking strain shall exceed 50/70%.

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“Grab” tensile test

The 25 mm „grab” tensile strength shall be not less than 1.0 KN. Tests shall be carried out in accordance with ISO 13934.

2.18.3 Testing frequency

The thickness, weight, permeability and tensile properties (plain strain test) shall be carried out once at start of works and then on every 5000 m² of each material used. The samples shall be taken from the material at the site and tested by a specialized official institution to be approved by the Employer. More tests may be required if above tests fail or there are doubts about fabric quality.

2.19 Technical schedules

The following technical schedules constitute part of the specification. The data and requirements specified in the respective forms are to be adhered to and the required data of the forms are to be completely filled in. The completed technical schedules are to be submitted with the Bid:

2 TS Technical Schedules

2.20 Other Miscellaneous Works

PVC Pressure release valves and under drainage arrangements shall be provided below the forebay slab of CW pump house and CW water channel to prevent uplift.

Coal Bunker (inside Mill Bunker Building) shall be of MS while the hopper shall be of MS with stainless steel (grade SS 304) lining. The SS lining in hopper portion shall be 6 mm thick, cold rolled, annealed & pickled and skin passed. 308L and 309L electrodes/fillers shall be used for welding stainless steel to stainless steel and stainless steel to mild steel respectively.

Pre-formed flexible open ended bellow strap of neoprene shall be provided between top of bunker and bottom of tripper floor to avoid coal dust leakage / escape. The bellow strap shall be of minimum 200 mm wide under un-stretched condition and shall be of minimum 2mm thick.

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2.21 Additional requirement for Green buildings

Green Buildings are to be designed to be compliant to minimum LEEDs Gold rating.

Additional requirements for Green building are as follows:-

- All necessary documentation (certificates, manufacturer declarations) in regards to the recycled content, distance of manufacture, other special requirements for green building etc shall be provided.
- Top 40 cm of fertile soil in areas of green building shall be excavated, stacked separately and re-layed in specified areas post building construction through contour trenching, mulching etc. In case of no fertile soil, soil test report from lab shall be submitted confirming the non fertile nature of soil.
- The cement used for concrete, reinforced concrete, mortar, grout and plaster should be done with Portland Pozzolona Cement with flyash content of minimum 25%. Raw material used in the cement shall be extracted/manufactured within 800 Km distance from the site.
- Course and fine aggregates used in the concrete, grout, plaster etc shall be extracted/manufactured within 800 KM distance from the site.
- Reinforcement shall be with post consumer recycled content of minimum 40%.
- Volatile organic compound (VOC) limits of Adhesives, Sealants and Sealant Primers must comply with South Coast Air Quality Management District (SCAQMD) Rule #1168. VOC content test certificate or technical specification from manufacturer for adhesives, sealants and sealant primers shall confirm that SCAQMD prescribed testing standards for determining VOC content are followed.
- Source of teak tree and frame manufacturing shall be within 800 Km from site.
- Raw material source and manufacturing of particle board shall be within 800 KMT from project site.
- All composite wood products should not contain urea formaldehyde.
- Raw material used for AAC blocks manufacturing and manufacturing facility need to be within 800 Km from project site.
- VOC of all paints shall not exceed Green Seal Standard GS-11
- Flooring tiles shall be certified by Floor Score standard (except natural stone like kota, granite etc.,)
- Recycled content shall be minimum 20% for tiles with material source and manufacturing within 800 Km from site.
- All carpet shall be CRI certified.
- Adhesives and Sealants VOC content test certificate or technical specification from manufacturer shall confirm that SCAQMD prescribed testing standards for determining VOC content are followed.
- All false ceiling material with material source and manufacturing shall be within 800 Km from site

3. Induced draft Cooling Tower

The major civil works of Induced draught cooling tower are as listed below.

- Foundation of cooling tower
- Basin Wall and Floor
- Cells, Distribution System and Stack

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- iv) Cold Water Outlet Channel
- v) Fills
- vi) Fills Supporting Structure
- vii) Painting To Concrete Surfaces
- viii) Stairs
- ix) Paving
- x) Water proofing of structures and construction joints
- xi) Structural steel works
- xii) General appurtenant works of a Civil & Structural Engineering nature.

3.1 MATERIALS OF CONSTRUCTION

Reinforcing steel used in reinforced concrete shall be as per equivalent.

Concrete: C25/30 for cooling tower foundation and
superstructure
C40/50 for precast elements

The staircase shall be of structural steel. All steel used for walkways and stairways shall be hot dip galvanised and fabrication in accordance with ASTM A123.

3.2 MINIMUM THICKNESS OF STRUCTURAL CONCRETE ELEMENTS:

The actual thickness of the structural elements shall be as per design calculation. However the following minimum thickness shall be followed for the structural concrete elements:

a) Foundations	:	350 mm
b) Louvers and walkway	:	100 mm
c) Basin walls	:	150 mm
d) Pre cast cover slab	:	100 mm
e) Fan cylinder	:	125 mm
f) Hot Water Plank	:	80 mm

3.3 STRUCTURAL ANALYSIS AND DESIGN:

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The entire cooling tower is visualized to consist of frames in transverse and longitudinal Directions. The columns at the bottom shall be assumed to be fixed for the analysis of frames. The analysis shall be done for dead, live loads and lateral loads due to wind or seismic forces.

The design of C.W. Basin, outlet channel, sludge pit and Hot Water Basin shall be designed for cracked condition keeping crack width as mentioned below as per BS EN 1992-1-1-2004

The crack width shall be limited to.

- a) 0.2 mm for all reinforced concrete structure in contact with water or chemicals.

C.W. basin shall be designed for the following conditions:

- (i) Water pressure inside up to the design level and no earth pressure outside
- (ii) No water pressure inside and earth pressure outside.

SPECIFIC DESIGN ASPECTS:

CONCRETE WORK

3.4.1. BASIN, WALL AND FLOOR

All walls and slab below ground level shall be of water proof concrete. The floor of cooling tower basin shall be sloped to a silting pit to permit flushing and drainage of the floor area. Cooling tower internal columns and posts shall extend to bottom of the concrete basin.

The floor of the basin shall be sloped to minimum 1 in 80 towards the sludge drains. The required slope shall be achieved by screed. Drainage arrangement of basin shall be provided suitably.

3.4.2 CELLS, DISTRIBUTION SYSTEM AND STACK

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Cooling tower cells shall consist of RCC columns, beams and walls. Hot water distribution channel shall also be of RCC and covered with suitably designed precast / cast - in - situ concrete slab.

Cell division partition walls shall be cast - in - Situ RCC.

3.4.3 PAINTING TO CONCRETE SURFACES

All concrete surfaces in direct contact with water/ water spray/moist air shall be applied with two coats of bitumen @ 1.7 Kg/sqm. All concrete surfaces subject to water/ water spray/moist air up to and including Fan Deck slab level including basin slab, inner faces of cladding walls, all faces of cell partition wall, all faces of columns, all faces of beams (both cast in situ and precast), bottom surface of fandec slab for counter flow tower and both surface of fandec slab for cross flow tower, inner face of fanstack, all faces of hot water basin (for cross flow tower) etc shall receive the said coating after cleaning and drying of the concrete surface.

All foundations, footings and slabs in contact with ground shall also receive a bituminous coating.

The R.C.C. structure of the Cooling Tower shall be painted on the exterior surface with three coats of waterproof cement paint.

3.4.4 PAVING

Paving shall be provided for a minimum clear width of 2.0 m from the outer face of the HW pipes all around the cooling tower basin. Paving shall also be provided in between the hot water pipes and space available between HW pipes and CT basin wall spray catcher.

3.4.5 WATER PROOFING AND CONSTRUCTION /EXPANSION JOINTS

For water proofing of underground structures including basin slab and hot water distribution channel, water proofing cum plasticizer compound shall be mixed with the concrete. PVC sealing strips shall be used for all expansion joints where water is retained. At expansion joints, joints filler material (preformed bitumen impregnated fibre board) with sealing compound on both sides shall be provided throughout the length of the joint.

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The number of construction joints shall be kept as low as possible consistent with reasonable precautions against shrinkage. Concreting shall be carried out continuously up to construction joints.

FIELD QUALITY PLAN for CIVIL WORKS (EXCEPT PILING WORK)

2X660 MW MAITREE SUPER THERMAL POWER PROJECT



BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED

OWNER'S ENGINEER

FICHTNER

Fichtner GmbH & Co. KG, Germany

BIFPCL DOC. NO. : MAITREE-00-U-QA-300001-PSE, REV. NO. : 2



BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR - EASTERN REGION
KOLKATA – 700091

BHEL DOC. NO. : QPE-MTE-660-CL-01
REV No.: 2

FIELD QUALITY PLAN for CIVIL WORKS (EXCEPT PILING WORK)

2X660 MW MAITREE SUPER THERMAL POWER PROJECT

BIFPCL DOC. NO. : MAITREE-00-U-QA-300001-PSE, REV. NO. : 2

PREPARED BY	 DE/QLY, BHEL, PSER	APPROVED BY	 HEAD / QLY, BHEL, PSER
FQP NO.	QPE-MTE-660-CL-01		
ORIGINAL DATE OF ISSUE	20/07/2017		
REVISION NO. & DATE	2, Dt. 15/11/2017		
COPY NO.			
ISSUED TO			
DATE OF ISSUE			
PURPOSE :			
ISSUED BY (SIGNATURE & DESIGNATION)	DE/QLY, BHEL, PSER		



BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR - EASTERN REGION
KOLKATA – 700091



PSER

**FIELD QUALITY PLAN
FOR
CIVIL WORKS
(EXCEPT PILING WORK)**

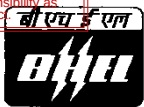
FQP NO.: MAITREE-00-U-QA-300001-PSE BHEL Doc. No. : QPE-MTE-660-CL-01

REV No.: 2

SHEET 1 / 1 SHEETS

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 PSER	FIELD QUALITY PLAN FOR CIVIL WORKS (EXCEPT PILING WORK)	FQP NO.: MAITREE-00-U-QA-300001-PSE BHEL Doc. No. : QPE-MTE-660-CL-01
		REV No.: 2
		SHEET 1 / 1 SHEETS

STATUS OF REVISIONS

SL. NO.	REFERENCE OF SHEETS REVISED	REVISION NO. & DATE	REMARKS
01	All	A, Dated 20/07/2017	Document prepared as per Technical Specifications of BIFPCL
02	Sl. No. A.01 in Sheet 02 of 'Statement of Checks'	1, Dated 15/09/2017	Revised as per comment dated 12/09/2017 from BIFPCL / OE
03	Sl. No. A.02 in Sheet 02 of 'Statement of Checks'		Revised as per comment dated 12/09/2017 from BIFPCL / OE
04	Sl. No. B.07A, B.07B, B.07C in Sheet 02 of 'Statement of Checks'		Revised as per comment dated 12/09/2017 from BIFPCL / OE
05	Sl. No. C.01 in Sheet 03 of 'Statement of Checks'		1. Review of physical & compositional requirement added 2. quantum of check changed
06	Sl. No. C.05 in Sheet 04 of 'Statement of Checks'		Revised as per comment dated 12/09/2017 from BIFPCL / OE
07	Sl. No. D.03 in Sheet 04 of 'Statement of Checks'		Revised as per comment dated 12/09/2017 from BIFPCL / OE
08	Sl. No. D.05B in Sheet 04 of 'Statement of Checks'		Revised as per comment dated 12/09/2017 from BIFPCL / OE
09	Sl. No. D.08 in Sheet 05 of 'Statement of Checks'		Revised as per comment dated 12/09/2017 from BIFPCL / OE
10	Sl. No. D.09F in Sheet 06 of 'Statement of Checks'		Quantum of check changed & remarks added.
11	Sl. No. E.01 in Sheet 06 of 'Statement of Checks'		Revised as per comment dated 12/09/2017 from BIFPCL / OE
12	Sl. No. G.01 in Sheet 08 of 'Statement of Checks'		Revised as per comment dated 12/09/2017 from BIFPCL / OE
13	Sl. No. H.01C, H.01D, H.03C & H.03D in Sheet 10 of 'Statement of Checks'		Revised as per comment dated 12/09/2017 from BIFPCL / OE
14	Sl. No. L.06C in Sheet 13 of 'Statement of Checks'		Revised as per comment dated 12/09/2017 from BIFPCL / OE
15	Sl. No. Q.03A in Sheet 16 of 'Statement of Checks'		Revised as per comment dated 12/09/2017 from BIFPCL / OE
16	Sl. No. Q.03A in Sheet 16, Q.04A in Sheet 17 & Q.05A in Sheet 19 of 'Statement of Checks'		Revised as per comment dated 12/09/2017 from BIFPCL / OE
17	Annex-II		Revised as per comment dated 12/09/2017 from BIFPCL / OE
18	AUTHORISATION FOR DIFFERENT CATEGORY OF CONSTRUCTION/ ERECTION CHECKS & NONCONFORMITY DISPOSITION	2, Dated 15/11/2017	Revised as per comment dated 14/11/2017 from BIFPCL / OE
19	Sl. No. B.07C in Sheet 2, B.07D in Sheet 3 & M.03 in Sheet 13 of 'Statement of Checks'		

 PSER		AUTHORISATION FOR DIFFERENT CATEGORY OF CONSTRUCTION/ ERECTION CHECKS & NONCONFORMITY DISPOSITION			
Category of Check	Inspection Authority	Witness Authority	Nonconformity (if any) Disposition Authority	Accepting Authority	
'A' (Customer Hold Point)	BHEL Engineer	OWNER / CONSULTANT	BHEL ENGG Centre/ Head (Quality): BHEL PS-ER	OWNER / CONSULTANT	
'B' (Formal intimation shall be forwarded by BHEL. Check shall commence at notified time whether parties show-up or not)	BHEL Engineer	OWNER / CONSULTANT	BHEL ENGG Centre/ Head (Quality): BHEL PS-ER	OWNER / CONSULTANT	
'C'	BHEL Engineer	BHEL Engineer	BHEL ENGG Centre/ Head (Quality): BHEL PS-ER	BHEL HOS	

Abbreviations used:

HOS – Head of Section

Note:

- Nonconformity Disposition authority for all categories of checks shall be as under:
Product nonconformities: BHEL Engineering Centre.
Process/System nonconformities: Head (Quality): BHEL, PS ER.
- Wherever log sheet is not called for, suitable record shall be maintained in protocol / Site register.
- In case of nonconformity, accepting authority will consider the solution for the nonconformity as proposed by the Nonconformity Disposition Authority before acceptance, and such solution shall be reflected in the log sheets/protocols.
- Owner's Engineer is authorized to carry out surveillance in any of B & C category of checks at his discretion.
- Concerned agencies shall ensure that instruments having valid calibration are only used for measurements.
- Quantum of check shall be 100% for all characteristics unless otherwise mentioned specifically in Field Quality Plan/ reference documents.
- Only authorised persons with proper safety gears to enter construction area



PSER

FIELD QUALITY PLAN FOR CIVIL WORKS (EXCEPT PILING WORK)

FQP NO.: MAITREE-00-U-QA-300001-PSE
BHEL Doc. No. : QPE-MTE-660-CL-01

REV No.: 2

SHEET 01 / 19 SHEETS

STATEMENT OF CHECKS

Capacity / Type : 660MW

System : CIVIL WORKS

Sub-system : CIVIL WORKS (EXCEPT PILING WORK)

Area : CONSTRUCTION & TESTING

NOTES :

- As an evidence of having carried out the work satisfactorily, a general purpose log sheet, L-00 shall be maintained for all the checks.
- Abbreviations used:
 - R – Record Verification
 - V – Visual Check
 - P – Physical Check
 - M – Measurement
 - T – Test
 - MTC – Manufacturers Test Certificate
 - SR – Site Register

APPROVED

Checked and Approved.

Date: 28-Nov-2017

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BHARAT HEAVY ELECTRICALS LIMITED PS:ER, KOLKATA			TENDER NO-PSE/PSCT/KUN/019/1018 FIELD QUALITY PLAN FOR CIVIL WORKS (STATEMENT OF CHECKS)				FQP NO.: MAITREE-00-U-QA-300001-PSE BHEL Doc. No. : QPE-MTE-660-CL-01	
							REV.NO.: 2	
							SHEET 02 / 19 SHEETS	
SYSTEM: CIVIL WORKS			SUB-SYSTEM: CIVIL WORKS (EXCEPT PILING WORK)				AREA: CONSTRUCTION	
SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS OF CHECK	QUANTUM/ FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
A	GENERAL REQUIREMENTS							
A.01	Ensure availability of requisite laboratory set up and equipment in good working condition well before commencement of concerned activity. All MMRs in the field shall be calibrated before commencement of tests and then at interval as per manufacturer's recommendations and as per direction of owner / OE. 	P & R	-	A	Once prior to start of work and thereof monthly	- Technical Specifications & Drawing -The calibration certificate shall specify the fitness of the MMRs within the limit of tolerance for use. 	SR	-Functioning of laboratory equipment in proper working condition to be verified on monthly basis. -calibration of MMRs shall be done by approved lab and the report shall be submitted to owner/ OE. 
A.02	Sampling for testing of building materials for concrete mix design etc.	P		A	Once per each source & each grade of concrete	- do -	Joint Protocol 	
A.03	Ensure availability of following - a) approved drawing b) approved Design mix of concrete	P	-	A	100% for each structure & each grade of concrete	ACI 211.1-97 (Design Mix of Concrete) & ACI 318-14 OR BS EN 206:2013A1:2016 (Acceptance criteria for fresh & hardened concrete)	-	Concrete Mix design to done as per ACI 211.1-97 and in line with the requirements of approved drawing,
B	EARTH WORK (EXCAVATION, BACKFILLING, LEVELLING, GRADING & COMPACTION)							
B.01	Identification of disposal points for excavated material	P	-	B	Before start of excavation	The Conditions of Contract	Joint Protocol	
B.02	Nature, type of soil / rock before and during excavations	V	As required & agreed	B	Random in each shift	Owner's Tech. Specifications & Drawing	SR	
B.03	Initial ground level before start of excavations	M	As required & agreed	B	100%	Drawing, BS 6031:2009	SR	
B.04	Final shape and Dimensions of excavations.	M	As required & agreed	B	Random in each shift	Drawing, BS 6031:2009	SR	
B.05	Final excavation levels	M	As required & agreed	B	100%	Drawing, BS 6031:2009	SR	
B.06	Side slope of final excavation	M	As required & agreed	C	100%	Drawing, BS 6031:2009	SR	
B.07	EXCAVATION IN HARD ROCK - IF REQUIRED							
B.07A	Receipt, Storage, accountability of Explosive	P	As required	 A	Randomly once in a week	Bangladesh Explosive Act and any other statutory requirement	SR	OWNER approved specialist blasting agency shall be deployed at site for trial blasts, design blasts, blast vibration monitoring etc. Seismographs shall be deployed at site for monitoring of blast operation vibrations.
B.07B	Execution of Blasting Operation	P	As required	 A	Random in each shift	Approved Method, BS 6031:2009 & BS 5607:1998	SR	
B.07C	Submission of Blasting report to EIC	P	As required	 C	Each blast	-	Report	

APPROVED
Checked and Approved.

Date: 28-Nov-2017

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BHARAT HEAVY ELECTRICALS LIMITED
PS:ER, KOLKATA

TENDER NO-PSE/PSCT/KUN/019/01A
FOR
CIVIL WORKS
(STATEMENT OF CHECKS)

FQP NO.: MAITREE-00-U-QA-300001-PSE
BHEL Doc. No. : QPE-MTE-660-CL-01

REV.NO.: 2

SHEET 03 / 19 SHEETS

SYSTEM: CIVIL WORKS SUB-SYSTEM: CIVIL WORKS (EXCEPT PILING WORK) AREA: CONSTRUCTION

SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS OF CHECK	QUANTUM/ FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
B.07D	Excavation in Hard Rock (Blasting Prohibited)	P	As required	 A	100%	Drawing, Owner's Tech. Specifications BS 6031:2009	SR	
B.08	Checks for suitability of borrow fill material	T	As required	A	As Per Annex-II	Annex -II & Drawing	SR / Lab Report	The parameters should not be worse than the parameter of the existing soil in plant area
B.09	Standard proctor Test of fill material before fill	T	As required	A	As Per Annex-II	Annex -II & Drawing	SR / Lab Report	
B.10	Moisture content of fill material before compaction	T	As required	A	As Per Annex-II	Annex -II & Drawing	SR / Lab Report	
B.11	Dry density by core cutter method OR Dry density in place by sand displacement method	T	As required	A	As Per Annex-II	Annex -II & Drawing	SR / Lab Report	
B.12	Relative density (Density Index)	T	As required	A	As Per Annex-II	Annex -II & Drawing	SR / Lab Report	
B.13	Dry Density by proctor needle penetration	T	As required	A	As Per Annex-II	Annex -II & Drawing	SR / Lab Report	
B.14	Checking of level after compaction	M	Auto level / Total station	B	100%	Drawing	PROTOCOL	
C	RAW MATERIALS FOR CONCRETE							
C.01	Tests on Cement : A. Review of MTC for both physical & compositional requirement (Type of cement with clinker composition for Bogue's compounds viz. C3S, C2S, C3A, C4AF)  B. Field Tests - i) Consistency of cement & Initial and final setting time ii) Compressive strength - 3 days & 7 days iii) Fineness iv) Sulphate Resistance (if applicable)	R & T	Vicat Needle, Compressive Testing Machine, Cube Mould, Vibrator, Curing chambers, Weighing Devices	A	for each batch or per month whichever is earlier 	A) Drawing, Mix Design, ASTM C150M - 16 & ASTM C1157M - 11 B-i) ASTM C191M B-ii) ASTM C109/C109M B-iii) ASTM C 430M-08(2015) B-iv) ASTM C452M	MTC & SR	To be sourced from BIFPCL / OE approved supplier. Each consignment of cement shall be duly correlated with manufacturers TC
C.02	Tests on Fine Aggregate (Sand)	T	As required	A	As per Annex-I	Mix Design, BS EN 12620:2002+A1:2008 / ASTM C 33M-16E1	PROTOCOL / Lab. Report	To be sourced from BIFPCL / OE approved supplier. Each size of aggregate shall be separately stored & the material shall be handled in a manner that will prevent contamination & intermixing.
C.03	Tests on Coarse Aggregates	T	As required	A	As per Annex-I	Mix Design,, BS EN 12620:2002+A1:2008 / ASTM C 33M-16E1	PROTOCOL / Lab. Report	

APPROVED
Checked and Approved.

Date: 28-Nov-2017

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BHARAT HEAVY ELECTRICALS LIMITED
PS:ER, KOLKATA

TENDER NO-PSE/SC/KUN/019/018
FIELD QUALITY PLAN
FOR
CIVIL WORKS
(STATEMENT OF CHECKS)

FQP NO.: MAITREE-00-U-QA-300001-PSE
BHEL Doc. No. : QPE-MTE-660-CL-01
REV.NO.: 2
SHEET 04 / 19 SHEETS

SYSTEM: CIVIL WORKS SUB-SYSTEM: CIVIL WORKS (EXCEPT PILING WORK) AREA: CONSTRUCTION

SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS OF CHECK	QUANTUM/ FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
C.04	Admixtures (Type & suitability)	R	-	B	Each batch of supply	Mix Design, ASTM C1017M-13E1 (high-slump concrete producing admixtures), ASTM C 494M-16 (Water-reducing, Accelerating, Retarding admixtures) & ASTM C1582M – 11 (Chloride-Induced Corrosion Inhibit admixture)	MTC & SR	- To be sourced from BIFPCL / OE approved supplier & Review of MTC at site - Trial mix to be made using the cement, aggregates and admixture using the mixture proportions, batching sequence and other physical conditions proposed for the specific work (refer D.01)
C.05	Construction Water	 R / T	-	B	Once per month	ASTM C1602M – 12 OR BS EN 1008:2002	Test Report	Test for pH shall be done weekly at site. 
D	CONCRETING (MIXING, CONVEYING, PLACEMENT, COMPACTION, CURING & TESTING)							
D.01	Trial Mix (Trial mixes of each mix design to ascertain the workability and cube strength)	P	-	A	One for each mix proportion	ACI 211.1-91 (2009) & ACI 318-14 OR BS EN 206:2013+A1:2016 (Acceptance criteria for fresh & hardened concrete)	SR / Lab. Report	1. Concrete Mix Design by ACI 211.1-91 2. Slump test of fresh concrete & compressive strength test at 7 days & 28 days to be done.
D.02	Mixing of concrete	V	Calibrated batching plant	A	100%	ASTM C94M – 16b	Batching plant ticket / slip	Batching plant to be calibrated at the time of starting and subsequently once in three months or in event of major repair. Provision of online printer is mandatory
D.03	Temperature control of concrete & mix adjustment/batch correction	V	As required	A	100%	Owner's Technical Specifications, Designed mix., drawing & ACI 318-14 OR BS EN 206:2013+A1:2016	SR	Temperature control check of concrete shall be for mass concreting & hot weather concreting.
D.04	Arrangement for transportation of concrete.	V	As required	C	100%	-	SR & Checklist	As per approved construction methodology
D.05	TESTS ON FRESH CONCRETE :							
D.05A	Review of grade of Concrete (at pouring point)	R	-	C	Each truck	Drawing & ACI 318-14 OR BS EN 206:2013+A1:2016	SR	Review batching plant ticket / slip
D.05B	Slump Test (at pouring point)	T	Slump Test Apparatus	B	As required 	BS EN 12350-2 or ASTM C 143/C 143M-15A	SR	

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Date: 28-Nov-2017

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BHARAT HEAVY ELECTRICALS LIMITED
PS:ER, KOLKATA

TENDER NO-PSE/SC/KUN/019/01A
FIELD QUALITY PLAN
FOR
CIVIL WORKS
(STATEMENT OF CHECKS)

FQP NO.: MAITREE-00-U-QA-300001-PSE
BHEL Doc. No. : QPE-MTE-660-CL-01

REV.NO.: 2

SHEET 05 / 19 SHEETS

SYSTEM: CIVIL WORKS			SUB-SYSTEM: CIVIL WORKS (EXCEPT PILING WORK)				AREA: CONSTRUCTION	
SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS OF CHECK	QUANTUM/ FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
D.05C	Sampling for compressive strength (at pouring point)	P	Cube / Cylinder moulds	B	As per Table 17 of BS EN 206:2013+A1:2016	ASTM C 31M-15AE1, BS EN 206:2013+A1:2016	SR	Min. of 6 cubes for each sample. 3 specimen shall be tested at 7 days remaining 3 shall be for 28 days
D.05D	Workability time (at batching plant & pouring point)	T	Slump Test Apparatus	B	First truck each day	BS EN 12350-2 or ASTM C 143/C 143M-15A	SR	Check for Change of slump from Batching plant to site
D.06	Placement of concrete.	P & M	Measuring tape / Auto level	C	100%	ACI 318-14 OR BS EN 206:2013+A1:2016	SR & Checklist	As per approved construction methodology
D.07	Compacting of concrete.	P	As required	C	Random in each shift	ACI 318-14 OR BS EN 206:2013+A1:2016	SR & Checklist	As per approved construction methodology
D.08	Curing of concrete.	P	As required	C	Random in each shift	ACI 308R - 16 	SR & Checklist	As per approved construction methodology. If used, curing compound shall comply with ASTM C309
D.09	Tests / Checks on hardened concrete :							
D.09A	Visual inspection of concrete surface of foundations just after removal of shuttering	V	-	B	100%	Owner's Tech. Specification & Drawing	SR & Checklist	
D.09B	Dimensional check on finished structures	M	Measuring tape / Auto level	B	100%	Owner's Tech. Specification & Drawing	SR	
D.09C	Pulse velocity test through concrete of Top deck of TG & other vibrating equipment (viz. BFP, ID fan, FD fan, PA fan etc.)	R	As required	A	100% for top deck of major equipment only	ASTM C 597-16 OR equivalent European Standard	Test Report & SR	BIFPCL/ OE approved agency to be deployed for test
D.09D	Embedment of inserts in concrete shall be checked for gap if any using hammer for all major equipment foundations	T	Hammer	B	100% for major equipment foundations	No hollow sound	SR	
D.09E	Workmanship and dimensions of precast concrete members	M	As required	B	100%	BS EN 13369:2013 OR equivalent American Standard	SR	

APPROVED
Checked and Approved.

Date: 28-Nov-2017

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BHARAT HEAVY ELECTRICALS LIMITED
PS:ER, KOLKATA

TENDER NO-PSE/SC/K/JA/Q19/018
FIELD QUALITY PLAN
FOR
CIVIL WORKS
(STATEMENT OF CHECKS)

FQP NO.: MAITREE-00-U-QA-300001-PSE
BHEL Doc. No. : QPE-MTE-660-CL-01

REV.NO.: 2

SHEET 06 / 19 SHEETS

SYSTEM: CIVIL WORKS

SUB-SYSTEM: CIVIL WORKS (EXCEPT PILING WORK)

AREA: CONSTRUCTION

SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS OF CHECK	QUANTUM/ FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
D.09F	Type test on precast concrete members 	T	as required	A	1 no for every 1000 nos. or part thereof for each type 	BS EN 13369:2013 OR equivalent American Standard	SR	- When the design of a product has been approved by owner / OE, type-test is not required. - for other products, rebound hammer test / flextural strength test to be done. 
D.10	JOINTS IN CONCRETE							
D.10A	Joint material - bitumen impregnated fibre board, PVC/Copper water stops, Sealing compound, Expanded polystyrene board, Hydrophillic strip, Acrylic polymer etc.	R	-	A	Each batch of delivery at site	Owner's Tech. Specifications & Drawing	SR	- BIFPCL / OE approved source - Review of co-related MTC
D.10B	Acceptance of installation	V	-	B	100%	Drawing	SR	
D.11	EMBEDDED Parts (INCLUDING RAILS & ANCHOR BOLTS)							
D.11A	Material	R	-	A	Each lot of delivery at site	Owner's Tech. Specifications & Drawing	SR	- BIFPCL / OE approved source - Review of co-related MTC - for shop fabricated parts, MDCC shall be review
D.11B	Fabrication Checks (if site fabricated) - cutting, bending, forming, welding, final dimension & primer painting	V & M	Measuring tape	B	100%	Owner's Tech. Specifications & Drawing	SR	
D.11C	Position / alignment / levels of embedded parts / bolts / pipe sleeves / rails / PVC pipes / etc.	V & M	Measuring tape / Auto level	B	100%	Drawing	SR	for shop fabricated parts, MDCC shall be reviewed
E	REINFORCEMENT BARS							
E.01	Review of MTC for Mechanical, Physical and Chemical Properties for each lot 	R	-	A	Each lot of supply	BS 4449:2005+A2:2009 & drawing	MTC & SR	To be sourced from BIFPCL / OE approved supplier & Review of MTC at site
E.02	Visual inspection of steel (freedom from cracks, surface flaws, Lamination & rust)	P	As required	B	Random in each shift	BS 4449:2005+A2:2009 & drawing	SR	1. To be checked at site. 2. Steel should be free from excessive rust. 3. To be stored on concrete slippers without touching the earth and as per Technical Specs.
E.03	Bar bending schedule with necessary lap, Spacers & Chairs	R	As required	B	100%	Drawing & BS 8666:2005/ ACI 315-99 & ACI 307 (for chimney)	BBS	
E.04	Bending of bars, cutting tolerance	V	As required	C	100%	Drawing & BBS	SR	

APPROVED

Checked and Approved.

Date: 28-Nov-2017



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BHARAT HEAVY ELECTRICALS LIMITED PS:ER, KOLKATA			TENDER NO-PSE/SC/KUN/019/10-18 FIELD QUALITY PLAN FOR CIVIL WORKS (STATEMENT OF CHECKS)				FQP NO.: MAITREE-00-U-QA-300001-PSE BHEL Doc. No. : QPE-MTE-660-CL-01	
							REV.NO.: 2	
							SHEET 07 / 19 SHEETS	
SYSTEM: CIVIL WORKS			SUB-SYSTEM: CIVIL WORKS (EXCEPT PILING WORK)				AREA: CONSTRUCTION	
SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS OF CHECK	QUANTUM/ FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
E.05	Acceptance - Cover, spacing of bars, spacers and chairs after the reinforcement cage is put inside the formwork	V & M	As required	B	100%	Drawing	SR	
F	FORM WORK & STAGING							
F.01	Materials and accessories	V	-	B	ANNEX-III	ACI 347R-14 OR Equivalent European Standard	SR	
F.02	Soundness of staging, shuttering and scaffolding including application of mould oil / release agent	R	-	B	ANNEX-III	ACI 347R-14 OR Equivalent European Standard	SR	Review of method statement. * For TG deck, the form work & staging to be vetted by BIFPCL/OE approved third party
F.03	Acceptance of formwork before start of concreting	V & P	As required	B	ANNEX-III	Method statement	SR	
F.04	SPECIAL CHECKS FOR SLIP-FORM SHUTTERING							
F.04A	Review of Slipform System Design.	R	-	A	Before Commencement of work	ACI 347R-14 OR Equivalent European Standard	Report	- The design is to be vetted by a BIFPCL / OE approved third party -Submission of vetted design to BIFPCL / OE for review
F.04B	Review of method statement for Positions and arrangement of Jack rods, proposed method for concrete curing and protection and Proposed arrangement for continuous readings	R	-	A	Before Commencement of work	Owners Technical Specifications, BS EN 12810 & BS EN 12811	Method Statement	Submission to BIFPCL / OE for review
F.04C	Acceptance of the Slipform shutters before start of concreting	V & P	As required	B	100%	Slip Form Design & Method statement	SR	* Customer Hold Point
F.04D	Check for All type of openings, Chases, Fixing of Blocks and similar built-up features	V & M	As required	B	100%	Drawing & ACI 307	SR	
F.04E	Checks for Temporary Lightening protection & Aircraft warning lights during construction	V & P	As required	A	Once prior to start of work and thereof weekly	as per approved methodology	SR	
F.04F	Check for Sliding Operation	P	As required	C	Six hourly intervals	Owner's Technical Specifications, ACI 307 & Clause No. 7.2 of BS EN 206	SR	

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Date: 28-Nov-2017

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Nov-2017

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BHARAT HEAVY ELECTRICALS LIMITED

PS:ER, KOLKATA

TENDER NO-PSE/PSCT/KUN/019/10-18

FIELD QUALITY PLAN

FOR

CIVIL WORKS

(STATEMENT OF CHECKS)

FQP NO.: MAITREE-00-U-QA-300001-PSE

BHEL Doc. No. : QPE-MTE-660-CL-01

REV.NO.: 2

SHEET 09 / 19 SHEETS

SYSTEM: CIVIL WORKS

SUB-SYSTEM: CIVIL WORKS (EXCEPT PILING WORK)

AREA: CONSTRUCTION

SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS OF CHECK	QUANTUM/ FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
G.03	Tests on Mortar -							
G.03A	Tests on Mortar aggregates	T	As required	A	Once every 50m ³ or part thereof	ASTM C 144-11 (Standard Specification for Aggregate for Masonry Mortar)	SR	
G.03B	Compressive strength	T	As required	A	random in each shift	ASTM C 109M-16A (Standard Test Method for Compressive Strength of Hydraulic Cement Mortars)	SR	
G.04	Masonry construction - Workmanship, verticality and alignment	V	As required	B	As per Standard	TMS 602-08 / ACI 530.1-08 / ASCE 6-08	SR	
G.05	Curing of masonry construction	V	As required	C	100%	Owner's Tech. specifications, drawings and agreed methodology	SR	
G.06	PLASTERING							
G.06A	Tests on aggregates for plaster	T	As required	A	Once every 50m ³ or part thereof	ASTM C C897 – 15 (Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters)	SR	
G.06B	Thickness, finishing of plaster & trueness of plastering system	T	As required	A	random in each shift	ASTM C 926-17 (STANDARD SPECIFICATION FOR APPLICATION OF PORTLAND CEMENT-BASED PLASTER)	SR	
G.06C	Curing of plaster	V	As required	C	100%	Owner's Tech. specifications, drawings and agreed methodology	SR	
G.07	Galvanized wire netting for plastering	R	-	B	100%	Drawing & ASTM C 1032-14	SR	BIFPCL/OE approved source & Review of MTC
G.08	DAMP PROOF COURSE							
G.08A	Material - Hot bitumen and water proofing materials etc. (for checks on concrete for DPC, relevant points of this FQP to be referred)	R	-	A	Each batch of delivery at site	Drawing & BS 6398:1983	SR	BIFPCL/OE approved source & Review of MTC
G.08B	Acceptance of damp proof course	V	-	B	100%	Drawing	SR	

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Checked and Approved.

Date: 28-Nov-2017

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FIELD QUALITY PLAN
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FQP NO.: MAITREE-00-U-QA-300001-PSE
BHEL Doc. No. : QPE-MTE-660-CL-01

REV.NO.: 2

SHEET 10 / 19 SHEETS

SYSTEM: CIVIL WORKS

SUB-SYSTEM: CIVIL WORKS (EXCEPT PILING WORK)

AREA: CONSTRUCTION

SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS OF CHECK	QUANTUM/ FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
H	PAINTING & FINISHING							
H.01	PAINTING SYSTEM - CONCRETE WORKS AND PLASTERED MASONRY SURFACES							
H.01A	Materials and accessories- Hot Bitumen, Bituminous Paint, Oil Bound, Acrylic Emulsion, Epoxy Chemical Resistant, Oil Resistant Paint etc.	R	-	A	Each batch of delivery at site	Drawing / Paint Schedule & relevant European or American Standards	SR	BIFPCL/OE approved source & Review of MTC
H.01B	Surface preparation	V		B	Random in each shift	Drawing / Paint Schedule & Paint manufacturer's recommendation	SR	
H.01C	Primer application	V & M	As required	 B	100%	Drawing / Paint Schedule & Paint manufacturer's recommendation	SR	10% Random surveillance checks by BIFPCL / OE
H.01D	Final Paint application & acceptance of painted surfaces	V & M	As required	 A	100%	Drawing / Paint Schedule	SR	
H.02	STONE GRIT PLASTER / GRANULAR TEXTURED FINISH							
H.02A	Materials and accessories	R	-	A	100%	Drawing & Owner's Tech. Specifications	SR	- BIFPCL / OE approved source - Review of MTC ('MTC shall contain all the parameters specified in the technical specifications)
H.02B	Thickness & finishing of plaster	P	As required	B	100%	Drawing & Manufacturer's recommendations	SR	
H.03	PAINTING SYSTEM - STEEL WORKS (OTHER THAN STRUCTURAL STEEL WORKS)							
H.03A	Materials and accessories- Oil Bound, Acrylic Emulsion, Chemical Resistant, Oil Resistant Paint etc.	R	-	A	Each batch of delivery at site	Drawing / Paint Schedule & relevant European or American Standards	SR	BIFPCL/OE approved source & Review of MTC
H.03B	Surface preparation	V		B	Random in each shift	Drawing / Paint Schedule & Paint manufacturer's recommendation	SR	
H.03C	Primer application	V & M	As required	 B	100%	Drawing / Paint Schedule & Paint manufacturer's recommendation	SR	10% Random surveillance checks by BIFPCL / OE
H.03D	Final Paint application & acceptance of painted surfaces	V & M	As required	 A	100%	Drawing / Paint Schedule	SR	

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BHARAT HEAVY ELECTRICALS LIMITED
PS:ER, KOLKATA

TENDER NO-PSE/SCOT/KUN/019/101A
FIELD QUALITY PLAN
FOR
CIVIL WORKS
(STATEMENT OF CHECKS)

FQP NO.: MAITREE-00-U-QA-300001-PSE
BHEL Doc. No. : QPE-MTE-660-CL-01
REV.NO.: 2
SHEET 12 / 19 SHEETS

SYSTEM: CIVIL WORKS			SUB-SYSTEM: CIVIL WORKS (EXCEPT PILING WORK)				AREA: CONSTRUCTION	
SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS OF CHECK	QUANTUM/ FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
L	DOOR, WINDOWS, LOUVERS, GLAZING FENCING & FALSE CEILING							
L.01	STEEL & FIRE DOORS							
L.01A	Source of supply	R	Review of MTC & additionally review of approved drawing in case of fire proof doors	A	Each type of door	Owner's Tech. Specifications & Drawing	SR	- BIFPCL / OE approved source - The Fire proof door drawing proposed for supply should have been tested and approved by CSIR-CBRI Roorkee or HBRI, Bangladesh or any other vetting agency approved by BIFPCL/OE for the similar dimensions & similar fire rating.
L.01B	Receipt inspection (Dimensions & Finish) - Door & accessories	V & M	As required	B	100%	Drawing	SR	
L.01C	Fixing (Finishing and acceptance)	V	As required	B	100%	Drawing	SR	
L.02	ANODISED ALUMINIUM WORKS							
L.02A	Material - Aluminium sections & accessories	R	-	A	Each Lot of supply	Owner's Tech. Specifications & Drawing	SR	- BIFPCL / OE approved source - Review of MTC
L.02B	fabrication (Dimensions & Finish) - Door & accessories	V & M	As required	B	100%	Drawing	SR	
L.02C	Fixing (Finishing and acceptance)	V & M	As required	B	100%	Drawing	SR	
L.03	STEEL WINDOW, LOUVERS, GRILL / ROLLING SHUTTERS							
L.03A	Material (including accessories)	R	-	A	Each Lot of supply	Owner's Tech. Specifications & Drawing	SR	- BIFPCL / OE approved source - Review of MTC
L.03B	Receipt inspection (Dimensions & Finish) - including accessories	V & M	As required	B	100%	Drawing	SR	
L.03C	Fixing (Finishing and acceptance)	V & M	As required	B	100%	Drawing	SR	

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TENDER NO-PSE/SC/KUN/019/01A
FIELD NO-19/01A
FOR
CIVIL WORKS
(STATEMENT OF CHECKS)

FQP NO.: MAITREE-00-U-QA-300001-PSE
BHEL Doc. No. : QPE-MTE-660-CL-01
REV.NO.: 2
SHEET 13 / 19 SHEETS

SYSTEM: CIVIL WORKS			SUB-SYSTEM: CIVIL WORKS (EXCEPT PILING WORK)				AREA: CONSTRUCTION	
SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS OF CHECK	QUANTUM/ FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
L.04	GLAZING (GLASS, POLY CARBONATE SHEET - SINGLE WALL & MULTI WALL, PVC SHEET ETC.)							
L.04A	Material	R	-	A	Each Lot of supply	Owner's Tech. Specifications & Drawing	SR	- BIFPCL / OE approved source - Review of MTC
L.04B	Installation finishing and acceptance	V & M	As required	B	100%	Drawing	SR	
L.05	FENCING & GATES							
L.05A	Material (including accessories)	R	-	A	Each Lot of supply	Owner's Tech. Specifications & Drawing	SR	- BIFPCL / OE approved source - Review of MTC
L.05B	Installation finishing and acceptance	V & M	As required	B	100%	Drawing	SR	
L.06	FALSE CEILING							
L.06A	Materials (gypsum glass, glass fibre membrane, fibre board acoustical tiles, metal false ceiling panels support system etc.)	R	-	A	Each Lot of supply	Owner's Tech. Specifications & Drawing	SR	- BIFPCL / OE approved source - Review of MTC
L.06B	Installation finishing and acceptance	V & M	As required	B	100%	Drawing	SR	
1 L.06C	Acceptance of erected supporting rail / hangers	P	As required	B	100%	Drawing	SR	
M	WATER PROOFING (INCLUDING ROOF TREATMENT)							
M.01	Methodology for the application of water proofing system	R	-	A	Before start of work	Owner's Tech. Specifications & Drawing	Method Statement	- BIFPCL / OE approved source - Review of methodology
M.02	Material	R	-	A	Each Lot of supply	Owner's Tech. Specifications & Drawing	SR	MTC shall contain all the parameters specified in the technical specifications
M.03	Acceptance of water proofing work	V & M	As required	2 A	100%	Drawing & approved method statement	SR	
N	FLOOR FINISHES AND ALLIED WORKS (Cement Concrete Flooring, Tiles, Interlocking Blocks, Kota Stone, Granite, Marble, Metallic / non-metallic hardener, Acid / alkali and oil resistant high built seamless epoxy finish & Rubber Flooring)							
N.01	Materials	R	-	A	Each Lot of supply	Owner's Tech. Specifications & Drawing	SR	- BIFPCL / OE approved source - Review of MTC ('MTC shall contain all the parameters specified in the technical specifications)

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TENDER NO-PSE/SC/KUN/019/10-18
FIELD QUALITY PLAN
FOR
CIVIL WORKS
(STATEMENT OF CHECKS)

FQP NO.: MAITREE-00-U-QA-300001-PSE
BHEL Doc. No. : QPE-MTE-660-CL-01
REV.NO.: 2
SHEET 14 / 19 SHEETS

SYSTEM: CIVIL WORKS			SUB-SYSTEM: CIVIL WORKS (EXCEPT PILING WORK)				AREA: CONSTRUCTION	
SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS OF CHECK	QUANTUM/ FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
N.02	Finishing and acceptance	V & M	As required	B	100%	Drawing	SR	Experienced workers to be deployed & work to be done as per recommendation of manufacturer.
O	WATER SUPPLY / SANITARY INSTALLATIONS (Water supply fittings and fixtures; Sand cast iron / cast iron pipes; Sanitary fittings and fixtures; RCC Pipes & Water Storage Tanks)							
O.01	Materials	R	-	A	Each Lot of supply	Owner's Tech. Specifications & Drawing	SR	- BIFPCL / OE approved source - Review of MTC ('MTC shall contain all the parameters specified in the technical specifications)
O.02	Finishing and acceptance	V & M	As required	B	100%	Drawing	SR	Experienced workers to be deployed.
P	OTHER SPECIAL ITEMS							
P.01	BITUMEN LAYER FOR TANK FOUNDATION							
P.01A	Material (Grade of bitumen)	R	-	A	Each Lot of supply	Owner's Tech. Specifications & Drawing	SR	- BIFPCL / OE approved source - Review of MTC ('MTC shall contain all the parameters specified in the technical specifications)
P.01B	Acceptance and workmanship	V & M	As required	B	100%	Drawing	SR	
P.02	COMPOSITE ALUMINIUM PANELS AND STRUCTURAL GLAZING							
P.02A	Material (Type of aluminium panels / structural glazing / fasteners and fixtures / silicon sealant)	R	-	A	Each Lot of supply	Owner's Tech. Specifications & Drawing	SR	- BIFPCL / OE approved source - Review of MTC ('MTC shall contain all the parameters specified in the technical specifications)
P.02B	Acceptance and workmanship	V & M	As required	B	100%	Drawing	SR	Experienced workers to be deployed.

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PS:ER, KOLKATA

TENDER NO-PSE/SC/KUN/019/10-18
FIELD QUALITY PLAN
FOR
CIVIL WORKS
(STATEMENT OF CHECKS)

FQP NO.: MAITREE-00-U-QA-300001-PSE
BHEL Doc. No. : QPE-MTE-660-CL-01
REV.NO.: 2
SHEET 15 / 19 SHEETS

SYSTEM: CIVIL WORKS			SUB-SYSTEM: CIVIL WORKS (EXCEPT PILING WORK)				AREA: CONSTRUCTION	
SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS OF CHECK	QUANTUM/ FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
P.03	Pressure Release Valves							
P.03A	Material	R	-	A	Each Lot of supply	Owner's Tech. Specifications & Drawing	SR	- BIFPCL / OE approved source - Review of MTC ('MTC shall contain all the parameters specified in the technical specifications)
P.03B	Acceptance and workmanship	V & M	As required	B	100%	Drawing	SR	Experienced workers to be deployed.
P.04	ANTI WEED TREATMENT							
P.04A	Anti-weed treatment materials	R	-	A	Each Lot of supply	Owner's Tech. Specifications & Drawing	SR	- BIFPCL / OE approved source & Agency - Review of MTC
P.04B	Execution of treatment	P	As required	B	Random check for each treatment	Drawing	SR	
Q	ROAD WORKS							
Q.01	CONSTRUCTION OF SUB-GRADE AND EARTHEN/HARD SHOULDERS							
Q.01A	Modified proctor Test	T	As required	A	As Per Annex-II	Annex -II, Owner's Tech. Specifications & Drawing	SR / Lab Report	
Q.01B	Moisture content of fill before compaction	T	As required	A	As Per Annex-II	Annex -II, Owner's Tech. Specifications & Drawing	SR / Lab Report	
Q.01C	Dry density by core cutter method ---- OR---- Dry density in place by sand displacement method	T	As required	A	As Per Annex-II	Annex -II, Owner's Tech. Specifications & Drawing	SR / Lab Report	
Q.01D	CBR Test	T	As required	A	As Per Annex-II	Annex -II, Owner's Tech. Specifications & Drawing	SR / Lab Report	
Q.01E	Grade Line and cross section	P & M	As required	B	One in every 500 SQM area	Owner's Tech. Specifications & Drawing	SR	
Q.02	WATER BOUND MACADAM (NON-BITUMINOUS) FOR BASE COURSE AND SUB-BASE COURSE							
Q.02A	Aggregate Impact value	T	Aggregate Impact value Test Apparatus	A	One test per 200 m3 of Test aggregate	AASHTO Guide for Design of Pavement Structure / Owner's Technical Specifications	SR / Lab Report	

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FIELD QUALITY PLAN
FOR
CIVIL WORKS
(STATEMENT OF CHECKS)

FQP NO.: MAITREE-00-U-QA-300001-PSE
BHEL Doc. No. : QPE-MTE-660-CL-01

REV.NO.: 2

SHEET 16 / 19 SHEETS

SYSTEM: CIVIL WORKS

SUB-SYSTEM: CIVIL WORKS (EXCEPT PILING WORK)

AREA: CONSTRUCTION

SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS OF CHECK	QUANTUM/ FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
Q.02B	Grading	T	Set of AASHTO Sieves	B	One test per 100 m3 of aggregate	AASHTO Guide for Design of Pavement Structure / Owner's Technical Specifications	SR / Lab Report	
Q.02C	Flakiness index and elongation index	T	Flakiness test gauge	B	One test per 200m3 of aggregate	-do-	SR / Lab Report	
Q.02D	Atterberg Limits of binding material	T	Atterberg limits determination apparatus	A	One test per 25m3 of binding material	-do-	SR / Lab Report	
Q.02E	Atterberg Limits of portion of aggregate passing 425 micron sieve	T	Atterberg limits determination apparatus	A	One test per 100m3 of aggregate	-do-	SR / Lab Report	
Q.02F	Camber, surface, slope	T	As required / agreed	B	One in every 500 m2 area	Drawing	SR / Lab Report	
Q.03	BITUMINOUS MACADAM FOR BASE AND BINDER COURSE							
Q.03A	Quality of binder	T / MTC 	Penetrometer with St. needle	A	No. of samples per Lot & tests as per AASHTO Guideline as applicable	AASHTO Guide for Design of Pavement Structure / Owner's Technical Specifications	SR / Lab Report	
Q.03B	Aggregate Impact Value / Los angeles abrasion value	T	Aggregate Impact Value Test apparatus	A	Once per source	-do-	SR / Lab Report	
Q.03C	Flakiness Index and elongation index of aggregates	T	Flakiness test gauge	B	One test per 50 cum of aggregate	-do-	SR / Lab Report	
Q.03D	Stripping value of aggregate (Immersion tray test)	T	As required / agreed	B	Initially one set of 3 representative specimen per source, and on every change of source.	-do-	SR / Lab Report	

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BHARAT HEAVY ELECTRICALS LIMITED PS:ER, KOLKATA		TENDER NO-PSE/SC/KUN/019/18 FIELD NO-18 FOR CIVIL WORKS (STATEMENT OF CHECKS)					FQP NO.: MAITREE-00-U-QA-300001-PSE BHEL Doc. No. : QPE-MTE-660-CL-01	
							REV.NO.: 2	
							SHEET 17 / 19 SHEETS	
SYSTEM: CIVIL WORKS		SUB-SYSTEM: CIVIL WORKS (EXCEPT PILING WORK)					AREA: CONSTRUCTION	
SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS OF CHECK	QUANTUM/ FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
Q.03E	Water sensitivity of mix	T	As required / agreed	A	Initially one set of 3 representative specimen per source, and on every change of source.	-do-	SR / Lab Report	
Q.03F	Grading of aggregates	T	Set of AASHTO Sieves	B	Two test per day per plant both on individual constituents and mixed aggregate from dryer	-do-	SR / Lab Report	
Q.03G	Water absorption of aggregate	T	As required / agreed	A	Initially one set of 3 representative specimen per source, and on every change of source.	-do-	SR / Lab Report	
Q.03H	Soundness (Magnesium and Sodium Sulphate)	T	As required as per IS:2386	A	Once per source by each method and on every change of source	-do-	SR / Lab Report	
Q.03I	Percentage of fractured faces	T	As required / agreed	B	When gravel is used one test per 50m3 of aggregates	-do-	SR / Lab Report	
Q.03J	Binder content and aggregate grading	T	Bitumen extractor	A	Periodic, subject to a min of two tests per day per plant	-do-	SR / Lab Report	
Q.03K	Control of Temperature of binder and aggregate for mixing and of the mix at the time of laying and rolling	T	Thermometer	B	At regular close intervals	-do-	SR / Lab Report	
Q.03L	Rate of spread of mixed materials	T	As required / agreed	B	Regular control through checks of layer thickness	-do-	SR / Lab Report	
Q.03M	Density of compacted Layer	T	As required / agreed	A	One test per 250 m2 of area	-do-	SR / Lab Report	
Q.04	BITUMINOUS SURFACING - OPEN GRADED PREMIX CARPET AND SEAL COAT							
Q.04A	Quality of binder	T / MTC 	Penetrometer with St. needle	A	No. of samples per Lot & tests as per AASHTO Guideline as applicable	AASHTO Guide for Design of Pavement Structure / Owner's Technical Specifications	SR / Lab Report	

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							REV.NO.: 2	
							SHEET 18 / 19 SHEETS	
SYSTEM: CIVIL WORKS			SUB-SYSTEM: CIVIL WORKS (EXCEPT PILING WORK)				AREA: CONSTRUCTION	
SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS OF CHECK	QUANTUM/ FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
Q.04B	Aggregate Impact Value / Los angeles abrasion value	T	Aggregate Impact Value Test apparatus	A	Once per source	-do-	SR / Lab Report	
Q.04C	Flakiness Index and elongation index of aggregates	T	Flakiness test gauge	B	One test per 50 cum of aggregate	-do-	SR / Lab Report	
Q.04D	Stripping value of aggregate (Immersion tray test)	T	As required	B	Initially one set of 3 representative specimen per source, and on every change of source.	-do-	SR / Lab Report	
Q.04E	Water absorption test	T	As required	A	Initially one set of 3 representative specimen per source, and on every change of source.	-do-	SR / Lab Report	
Q.04F	Water sensitivity of mix	T	As required	A	Initially one set of 3 representative specimen per source, and on every change of source.	-do-	SR / Lab Report	
Q.04G	Grading of aggregates	T	Set of Sieves	B	One test per 25 m3 of aggregates	-do-	SR / Lab Report	
Q.04H	Soundness (Magnesium and Sodium Sulphate)	T	As required	A	Once per source by each method and on every change of source	-do-	SR / Lab Report	
Q.04I	Polished stone value	T	As required as per BS:812(Part 114)	B	as per BS:812(Part 114)	BS:812(Part 114)	SR / Lab Report	
Q.04J	Temperature of binder at application	M	Thermometer	B	At regular close intervals	AASHTO Guide for Design of Pavement Structure / Owner's Technical Specifications	SR / Lab Report	
Q.04K	Binder content	T	Bitumen extractor	A	One test per 500 cum& not less than two tests per day	-do-	SR / Lab Report	

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Frequency of testing the aggregates shall be at least as follows:

Test Type	Coarse Aggregate	Fine Aggregate	Remarks
Grading of each aggregate	Daily	Daily	Should be as per the requirement of design mix, subject to variation within the limit as specified in BS EN 12620:2002+A1:2008 OR ASTM C 33-16E1
Grading of combined aggregates	Daily	Daily	
Specific gravity	7 days	7 days	
Magnesium sulphate soundness	30 days	-	
Clay, silt and dust content	Daily	Daily	
Shape (elongation and flakiness)	Twice a week	-	
Los Angeles abrasion	Initially only & on change of source	Initially only & on change of source	
Moisture content	2 days	Daily	
Drying shrinkage	Initially only & on change of source	Initially only & on change of source	
Organic impurities	30 days	30 days	

Frequency of Sampling & Testing of Soil and Sand for Backfilling & Grading:

SL No.	Nature of Test / Characteristics		Method of Test	No. of samples & Frequency of Test	Remarks
I	Suitability of Fill Materials				
	(a)	Grain size Analysis	ASTM D 6913-04(2009)E1	Once per each type of source or change of source	Test for soil and sand
	(b)	Liquid limit and Plastic Limit	ASTM D 4318-10E1	Once per each type of source or change of source	Test for soil
	(c)	Shrinkage Limit	ASTM D4943-08	Once per each type of source or change of source	The frequency of Test shall be increased depending on type of soil.
	(d)	Free swell Index	ASTM D4546 - 14		
	(e)	Chemical Analysis		Once per each type of source or change of source	Test for soil and sand
		i) Organic matter	ASTM D 2974-14		
		ii) Calcium Carbonate	ASTM D 4373-14		
		iii) PH	ASTM D 4972-13		
		iv) Total soluble sulphate	ASTM C 1580-15		
II.	Standard Proctor Test		ASTM D 698-12E2	One in every 5000m ³ for each type, each layer and each source of fill materials 	Test for soil for determining optimum moisture content, Dry Density etc.
III	Moisture content of Fill before compaction		ASTM D 2216-10 OR ASTM D 4944-11	One in every 5000m ³ for each type, each layer and each source of fill materials 	Test for soil

SL No.	Nature of Test / Characteristics	Method of Test	No. of samples & Frequency of Test	Remarks
IV.	Modified Proctor Test	ASTM D 1557-12E1	One in every 2000m ³ for each type, each layer and each source of fill materials	Test for soil
V	Degree of compaction of fill			
	a) Dry density by core cutter method OR b) Dry density in place by sand displacement methods	a) ASTM D 2937-17 b) ASTM D 1556M-15E1	I. For foundation filling one for every ten foundations for each compacted layer for location of important and heavily loaded foundations. II. For grading & area filling, one for every  5000 m ² area for each compacted layer. III. For road work: One in every 500 m ² area for each compacted layer. * One Test consists of 3 nos sample.	Test for soil
	c) Relative density Index	ASTM D 4253 and D 4254	-do-	Test for sand
	d) Dry Density by proctor needle-penetration.	ASTM D 698-12E2	Random checks to be carried out for each compacted layer in addition to tests mentioned under V (a) above.	Test for soil.
	e) Permeability Test.	ASTM D2434	Random checks	Test for soil
	f) CBR	ASTM D1883	One in every 5000m ³ for each type and each source of fill materials or every 1000m linear length of road, whichever earlier	For Road Subbase course only

Frequency of Checks on Formwork:

Nature of Test / Characteristics	Method of Test	No. of samples & Frequency of Test	Remarks
a) Staging (Durability, strength & soundness of staging, joints. adequacy of its foundation and specific level).	Visual / Measurement	Each member / structure	Any staging intended for use shall be approved by the BHEL Engineer & BIFPCL/OE for its durability and strength. After erection of staging, BHEL Engineer & BIFPCL/OE shall check the soundness of the staging as a whole, its joints, adequacy of its foundation and the specific levels.
b) Shuttering			
i) Materials (as per ACI 347R or equivalent European standard)	Visual	Random	Forms shall be constructed from waterproof plywood. Plywood lining for forms shall be of timber, which is resin bonded and water repellent Form work materials shall be strictly as per specifications and approval of the BHEL & BIFPCL/OE. Materials for form work shall be unwrapped, thoroughly clean and without broken or damaged edges.
ii) Joints	Visual	Random	Joints shall be leak proof to avoid loss of liquid.
iii) Dimensions and plumb	Physical. measurement	Each member and before every lift.	Tolerances as per Specifications.

APPROVED
Checked and Approved.

Date: 28-Nov-2017

*Approval doesn't absolve the EPC contractor of it's responsibility as specified in the Contract

TENDER NO-PSER:SCT:KLN-C1910:18



PSER

RECORD OF QUALITY CHECKS

SHEET NO. OF FQP	CHECK NO.	RESULTS ACHIEVED OK / NOT OK	DRAWING / DOCUMENT REFERENCE	FORMAT OF RECORD	INSPECTED BY SIGN. & DATE	CLEARED BY SIGN. & DATE	REMARKS

Note : Any protocol made is to be numbered & mentioned in “Format of Record” column.

		SYSTEM	SUB-SYSTEM	AREA	FQP. NO.: QPE-MTE-660-CL-01
PROJECT					REV. NO. : 2
UNIT NO.					LOG SHEET NO. L-00
RATING					PAGE 1 OF 1

APPROVED

Checked and Approved.

Date: 28-Nov-2017

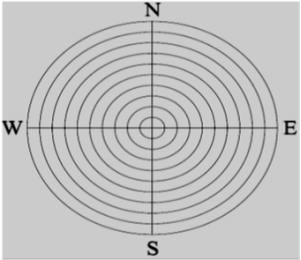
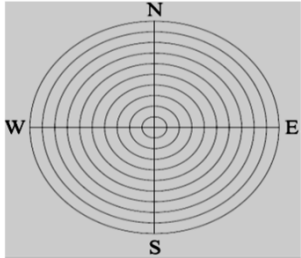
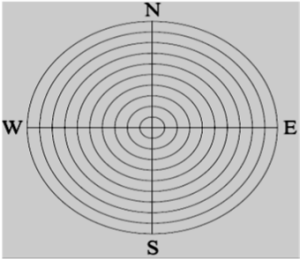
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APPROVED

Checked and Approved.

Date: 28-Nov-2017

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INSTRUMENT REG. NO.		TENDER NO-PSER:SCT:KLN-C1910:18						
DATE OF INSPECTION					TIME			
PSER		DRAWING / DOC. REF.						
DAILY MEASUREMENT OF VERTICALITY OF CHIMNEY ELEVATION : SHUTTER LEVEL / CONCRETE LEVEL INNER RADIUS (AS PER DRAWING) SHELL THICKNESS (AS PER DRAWING)								
YOKE NO	INNER RADIUS	THICKNESS OF SHELL	DEVIATION (W.R.T. DRG.) OF RADIUS / WALL	YOKE NO	INNER RADIUS	THICKNESS OF SHELL	DEVIATION (W.R.T. DRG.) OF RADIUS / WALL	VERTICALITY / TWIST MEASUREMENT
1				29				CENTRE
2				30				
3				31				
4				32				
5				33				
6				34				
7				35				
8				36				
9				37				
10				38				
11				39				
12				40				
13				41				
14				42				
15				43				
16				44				
17				45				
18				46				
19				47				
20				48				
21				49				
22				50				
23				51				
24				52				
25				53				
26				54				
27				55				
28				56				
				NAME		SIG. / DATE		FQP NO. : QPE:RKL:250:CL:01
PROJECT			CHECKED BY					REV. NO. : A
UNIT NO.			ACCEPTED BY					LOG SHEET NO. L-01
RATING			CUSTOMER					SHEET 1 / 1 SHEETS

Date: 28-Nov-2017

*Approval doesn't absolve the PSE contractor of its responsibility as specified in the Contract



PSER

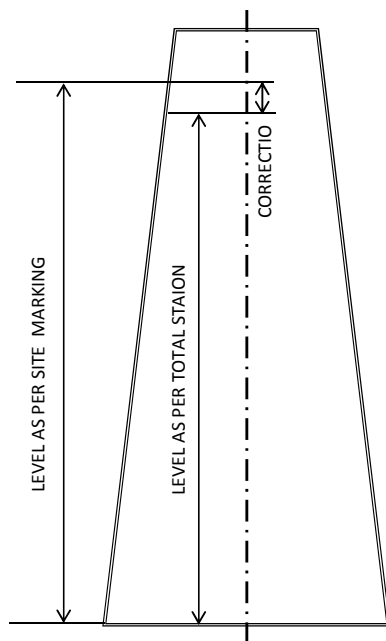
INSTRUMENT REG. NO. TENDER NO-PSER:SCT:KLN-C1910:18

DATE OF INSPECTION

TIME

DRAWING / DOC. REF.

PERIODICAL CORRECTION OF LEVEL OF CHIMNEY



MASUREMENT AT YOKE NO. :

BENCH MARK 1 (STATION POINT) :

BENCH MARK 2 (BACK SIGHT POINT) :

S

S

E

E

RL

RL

MACHINE RL (L_M) :

TARGET LEVEL ON YOKE NO. AS PER SITE MARKING (L_T) :

RL OF TARGET ON YOKE NO. AS PER TS READING (L_R) :

ACTUAL RL OF TARGET ($L_A = L_R - L_M$) *:

∴ CORRECTION OF HEIGHT ($L_A - L_T$) :

* ACTUAL RL TO BE TRANSFERRED IN OTHER YOKES WITH WATER LEVEN

			NAME	SIG. / DATE	FQP NO. : QPE-MTE-660-CL-01
PROJECT		CHECKED BY			REV. NO. : A
UNIT NO.		ACCEPTED BY			LOG SHEET NO. L-02
RATING		CUSTOMER			SHEET 1 / 1 SHEETS

*Approval does not absolve the EPC contractor of its responsibility as specified in the Contract.



PSER

INSTRUMENT REG. NO./TAG NO.

DATE OF INSPECTION

DRAWING / DOCUMENT REF.

PROTOCOL

			NAME	SIGNATURE & DATE	FQP. NO.: QPE-MTE-660-CL-01
PROJECT		INSPECTED BY			REV.NO.: 2
UNIT NO.		CLEARED BY			PROTOCOL
RATING		CUSTOMER			PAGE:

VOLUME-III PRICE SCHEDULE, REV-01	
PACKAGE MISC-2 : MISCELLANEOUS CIVIL SUB STRUCTURE AND SUPERSTRUCTURE WORKS FOR DIFFERENT STRUCTURES FOR 2X660 MW MAITREE RAMPAL PROJECT, BANGLADESH.	
TENDER NO - MSTPP: MISC-2: KLN-C	
PREAMBLE	
01	This preamble forms part of tender document and schedule of items. The tenderer should read this preamble carefully before filling in rates for various items. Clauses under this preamble shall be read in conjunction with various volumes of tender and other tender sections as applicable and shall have precedence over any contrary statement mentioned anywhere in this document.
02	The work shall be carried out strictly as per specifications, description of the items in these schedule and / or engineer's instructions. Drawings enclosed with the tender are only preliminary and for tender purposes and giving some idea of the work involved. The work is to be executed as per drawings & documents, which shall be furnished during execution.
03	Items of work provided in this schedule but not covered in this specification shall be executed strictly as per instruction of the engineer.
04	Unless specifically mentioned otherwise in the tender document, the tenderer shall quote for the finished items and shall provide for the complete cost towards power, fuel, tools, tackles, equipment, constructional plants, temporary works, labour, dismantling of all temporary piping, structures, valves, pumps, tanks & other misc. equipment, strengthening of roads/culverts/bridges etc. including arranging all clearances etc. required for carrying out different activities & tests, materials, levies, taxes (except service tax), transport, layout, repairs, rectification, maintenance till handing over, supervisions, colonies, shops, establishments, overheads, profits and all incidental items not specifically mentioned but reasonably implied and necessary to complete the work according to the complete tender document and this schedule.
05	The quantities of the various items mentioned in this schedule of items are approximate, based on very preliminary information and may vary to any extent or be deleted altogether. The quoted rates of each item will remain firm throughout the period of execution including extension, for reasons whatsoever, as long as variation in the total value of work executed under any part of this contract including extra items, if any but excluding any price variation remains, within plus minus thirty percent ($\pm 30\%$) of the awarded price as per LOI.
06	Prior written approval of BHEL shall be sought by the contractor in case quantity variation of any item crosses +50% (plus fifty percent) limit during execution and approval to be obtained before execution of further quantity for this item.
07	In case Sealed /Paper Price Bids are opened for finalisation of the tender, for any Item Rate/BOQ based contract, possibility of variation of quantity/ addition/deletion of items can not be ruled out. Under such circumstances, after execution of work, if it is observed that standing as L-1 is changed based on actual quantity executed, the bidder shall give suitable rebate to maintain your standing as L-1. Since this aspect can be assessed at the end of execution, necessary adjustment will be effected at the end of execution in final bill. This condition shall not be applicable where the tender is finalised through Reverse Auction.
08	BHEL reserve the right to rationalize the rates, quoted by L-1 bidder against unit rate items and/ or other optional items with respect to item-wise lowest rates (amongst the participating bidders), before placement of order.
09	The rates quoted shall be inclusive of cleaning of site of any vegetation, dressing, clearing of old structures and leveling etc. including fixing of grid pillars, benchmarks etc. required for commencement of site activities. No separate payment will be made towards the same. However, if separate rate for such item is available in the rate schedule, the same shall be considered.
10	Rates shall be quoted in figures and in words in clear legible writing. No overwriting is allowed. All scoring and cancellations should be countersigned and in case of illegibility the interpretation of engineer shall be final. All entries shall be in English language.
11	All works item wise shall be measured upon completion and paid for at the rates quoted and accepted as per BHEL approved payment schedule/billing break-up.
12	The tender shall be deemed to have visited site and made himself aware of all the site conditions, studied the specifications and details of work to be done within the time schedule attached and to have acquainted himself of the conditions prevailing at site.
13	No splitting of the job is envisaged. Decision of BHEL in this regard shall be final and binding to the bidders.
14	Bidders are not allowed to alter the Price Schedule format including item description, quantity etc. and the offer is liable for rejection if the bidders submit their prices in Price Schedules modified by them. BHEL reserves the right to reject the offers of bidders who submit offers in Price Formats which are modified/altered by them. Also putting any comments instead of rates/price in the designated column of the rate schedule shall make the offer liable for rejection.
15	Bidders to note that for Civil & Structural packages, against a particular item against a ST No. appearing in more than one schedule of the BOQ, same rate must be quoted in all schedules for that particular items with same descriptions. If by error, different rates are quoted in different schedules for same ST No. (i.e. item with same description), then the higher of the rates shall be considered for evaluation but awarding shall be done with the lower rate, if the bidder becomes L-1."
16	For Lumpsum Service Contract : The items/components indicated in the tender is indicative and may vary to any extent. No compensation shall be payable in case of any variation in the items/components listed in the bill of quantities if the executed weight remains within the variation limit. However, in case of deletion of any item or addition of new items over and above the items listed or variation of existing quantity beyond variation limit specified, adjustment (i.e. Payment or recovery as the case may be) shall be done on pro-rata basis based on the Rate per MT worked out from the quoted lump-sum Price and the total weight of components listed /indicated in price schedule plus 30% weight variation limit.
17	Engineer's decision shall be final and binding on the contractor regarding clarification of items in the schedule with respect to the other sections/volumes of the contract.
18	In case of tender for Civil and/or Structural works, if the Non-schedule items are not quoted by the bidder, it will be treated at par with rate of corresponding item of CPWD/PWD/DSR/BPWD schedule as prescribed in the tender/BOQ cum Rate Schedule.
19	No interest, whatsoever, shall be payable by BHEL on the security deposit, any bank guarantee submitted or any amount due to successful bidder/contractor.
20	Size and weights of various items are mentioned in the attached BOQ cum rate/price schedule for reference purpose only & these shall not be taken into consideration for quoting/calculating amount in the rate schedule. These shall be utilised as per relevant sections of tender. Bidders shall quote for each item in the rate column, taking unit as mentioned in the quantity column. Rates shall be filled in both figures and words. Amount shall be calculated based upon these rates multiplied by the mentioned quantity for the respective items.
21	Bidder's Total price shall be considered for evaluation unless stated otherwise.
22	In case of BOP packages, if Bidder does not quote/indicate the price for freight charges against indicated rate schedule, the same shall be considered as 2% of basic price and adjusted with the total quoted price against each item keeping the total quoted price unaltered.

VOLUME-III
PRICE SCHEDULE, REV-01

PACKAGE MISC-2 : MISCELLANEOUS CIVIL SUB STRUCTURE AND SUPERSTRUCTURE WORKS FOR DIFFERENT STRUCTURES FOR 2X660 MW MAITREE RAMPAL PROJECT, BANGLADESH.
TENDER NO - MSTPP: MISC-2: KLN-C
SCH-1 : TOTAL PRICE

SL NO	DESCRIPTION	PRICE SCHEDULE REF	TOTAL QUOTED PRICE (IN USD)
1.0	TOTAL PRICE FOR MISCELLANEOUS CIVIL SUB AND SUPERSTRUCTURE WORKS FOR DIFFERENT STRUCTURES FOR 2X660 MW MAITREE RAMPAL PROJECT, BANGLADESH.	SCH 2 - BREAK UP OF TOTAL PRICE	<u>IN FIGURES:-</u> <u>IN WORDS:-</u>

NOTE

1.0	Bidder shall quote total price for total price of SCH-1. Part only at sl no 1 above. All other amounts/ rates of each item of works in respective schedules/ parts will be derived based on allocated percentages. As such, any uncalled figure/ amount noted at any other place/ schedule of Volume-III will not be reckoned & will stand null & void.
2.0	Bidder to note that total price at sl no 1.0 above shall be considered for evaluation & awarding. As such grand total price should be complete in all respect for the full scope defined and considering all terms and conditions.
3.0	Bidder to note that SCH-2 is Break-up of Total Price.
3.1	Bidder to note that SCH-3 covers SERVICE of respective items, unless specified otherwise in the description of items.
3.2	Bidder to note that SCH-4 is Break-up of TOTAL PRICE BREAK UP FOR GROUND IMPROVEMENT WORK unless specified otherwise in the description of items.
3.3	Bidder to note that SCH-5 is Break-up of SUPPLY unless specified otherwise in the description of items.
3.4	Bidder to note that SCH-6 is Break-up of O&M of Solid waste management plant unless specified otherwise in the description of items.
4.0	Bidder's quoted total price at Sl. no 1 above respectively shall be apportioned into amount of various items of works based on allocated percentages against respective item, in respective schedules/ parts. As such, bidder shall not indicate/ quote any amount/ rate in these schedules/ parts and any amount/ rate quoted against any item shall not be taken into cognizance/ account and offer may be liable for rejection.
5.0	Based on the itemwise percentage allocations, the amount for the individual items of the Bill of Quantity shall be arrived at. The rates of individual items shall be derived from the amount against each item after rounded off.
6.0	Bidders to note that this is an item rate contract. Payment shall be made for the actual quantities of work executed at the unit rate arrived at as per Sl No.7 below.
7.0	Unit rates of each item of works of respective schedules/ parts will be derived by dividing derived amount by corresponding quantities. In deriving the unit rates of each item in this manner, figures only upto 2 decimal places will be taken into account. Any adjustment, if required, due to such methodology, will be effected in final bill.
8.0	Successful bidder shall draw a schedule of quantities of various items of work of SCH-5 and obtain BHEL's approval/ clearance in writing before procurement, supply, etc.
9.0	Any item as per scope of work, if not included in the price quoted above and shown separately will not be taken cognizance of and the offer shall be liable for rejection.
10.0	Price format shall not be changed by bidder in any case and it may lead to cancellation of their offer.
11.0	The quantity of items may vary during execution mainly due to actual requirement etc. The unit rates work out from the overall amount quoted & accepted by BHEL shall be considered and no separate unit rates shall be allowed. Unit rates shall be valid throughout the contract period.
12.0	For payment of non schedule items, the rate shall be derived from Schedule of Rates 2014, PWD, Govt. of Bangladesh.

VOLUME-III PRICE SCHEDULE, REV-01			
PACKAGE MISC-2 : CIVIL , ARCHITECTURAL & STRUCTURAL SUB STRUCTURE AND SUPERSTRUCTURE WORKS FOR DIFFERENT STRUCTURES FOR 2X660 MW MAITREE RAMPAL PROJECT, BANGLADESH.			
TENDER NO - MSTPP: MISC-2: KLN-C			
SCH-2 : BREAK UP OF TOTAL PRICE SCHEDULE			
SL NO	DESCRIPTION	<u>PRICE SCHEDULE REF</u>	<u>AMOUNT</u>
1.0	SERVICE	SCH 3 -SERVICE	100.00%
	TOTAL ALLOTTED PERCENTAGE	GRAND TOTAL	100.00%

VOLUME-III				
PACKAGE MISC-2 : MISCELLANEOUS CIVIL SUB STRUCTURE AND SUPERSTRUCTURE WORKS FOR DIFFERENT STRUCTURES FOR				
TENDER NO - MSTPP: MISC-2: KLN-C				
SCH-3 : SERVICE				
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	WEIGHTAGE (Nearest to the 6 decimal points) W.R.T THE TOTAL value
	100 EARTH WORK			
	Earth work In excavation, backfilling and disposal including necessary men/women, materials, equipment, loading, transportation, unloading, dewatering etc as per specification, drawing, relevant laws of Bangladesh, relevant BS (or equivalent international standard) Standards approved by BIFPCL/BHEL and as directed by engineer- in-charge for the following.			
B101	Earth work in excavation in all types of soil including ash which can be excavated by any means including setting out, levelling, dewatering (but excluding special type of dewatering viz. well point method), shoring & strutting (wherever required), dressing the sides & bottom, all lifts, ramming/compacting the excavated bottom, stacking, disposal of surplus excavated materials within a lead upto 1 km, spreading/levelling of disposed materials etc all complete for following depths below ground level. This item is applicable in all the excavation areas except excavation by using of Sheet Pile .			
a	Depth from ground level but not exceeding 2 m	CUM	9000.000	0.033593
b	Depth exceeding 2 m but not exceeding 4 m	CUM	7000.000	0.033894
c	Depth exceeding 4 m but not exceeding 6 m	CUM	2000.000	0.014907
A101	Earth work in excavation in all types of soil including ash which can be excavated by any means including setting out, levelling, dewatering (but excluding special type of dewatering viz. well point method), shoring & strutting (wherever required), dressing the sides & bottom, all lifts, ramming/compacting the excavated bottom, stacking, disposal of surplus excavated materials within a lead upto 1 km, spreading/levelling of disposed materials etc all complete for following depths below ground level. This item is only applicable for excavation by using of Sheet Pile . Payment for Sheet Pile shall be paid as per Item No. 2516			
a	Depth from ground level but not exceeding 2 m	CUM	1500.000	0.005599
b	Depth exceeding 2 m but not exceeding 4 m	CUM	1500.000	0.007263
c	Depth exceeding 4 m but not exceeding 6 m	CUM	1500.000	0.011180
d	Depth exceeding 6 m but not exceeding 8 m	CUM	1500.000	0.012298
e	Depth exceeding 8 m but not exceeding 10 m	CUM	1500.000	0.013538
f	Depth exceeding 10 m but not exceeding 15 m	CUM	500.000	0.004964
A107	Earthwork in back filling upto any depth below ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 250 mm thickness using/with selected approved materials from compulsorily excavated earth available within a lead upto 1 Km and compacted as specified including re-excavation of stacked earth, watering, ramming/compaction by manual/mechanical means, dressing etc all complete for the following.			
e	Each layer compacted so as to achieve at least 85% relative density as per ASTM D-4253 & ASTM D-4254	CUM	7000	0.013509
A108	Earthwork in Back filling upto any depth below ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 250 mm thickness using/with selected earth directly from excavation within a lead upto 1 Km and compacted as specified including watering, ramming/compaction by manual/mechanical means, dressing etc all complete for the following.			
e	Each layer compacted so as to achieve at least 85% relative density as per ASTM D-4253 & ASTM D-4254	CUM	8000	0.008135
A109	Extra over ST No. A101, B101 and A107 to A108 for carriage of material/earth for every 500 m or part thereof beyond an initial lead of 1 Km.	CUM	1500.000	0.000260
C 200	CONCRETE WORKS			

VOLUME-III				
PACKAGE MISC-2 : MISCELLANEOUS CIVIL SUB STRUCTURE AND SUPERSTRUCTURE WORKS FOR DIFFERENT STRUCTURES FOR				
TENDER NO - MSTPP: MISC-2: KLN-C				
SCH-3 : SERVICE				
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	WEIGHTAGE (Nearest to the 6 decimal points) W.R.T THE TOTAL value
	Placing of concrete work including cost of labour, materials (unless otherwise specified in BOQ/contract specification) and equipment for handling, transportation, placing, vibrating and curing, cleaning and rendering the exposed surface with cement sand mortar to give a smooth and even surface (excluding cost of centering, shuttering and reinforcement) with mechanised equipments like transit mixer, concrete pump etc, preparation of scheme for concreting, getting it approved by engineer, maintaining and submitting records of concreting. complete as per drawing, specifications, relevant laws of Bangladesh, manufacturer's recommendation, relevant BS standards/equivalent international standards and as approved by BIFPCL/BHEL and as per direction of engineer in charge for the following. (RMC SHALL BE PROVIDED BY BHEL AT BATCHING PLANT IN PROJECT PREMISES . TRANSPORTATION FROM THE BATCHING PLANT UP TO THE POURING POINT SHALL BE UNDER THE SCOPE OF CONTRACTOR)			
	SUBSTRUCTURE WORK			
C-1A	(i) PCC of any Grade below plinth level	CUM	1000	0.022742
	(ii) RCC of any Grade below plinth level	CUM	6500	0.223914
	SUPERSTRUCTURE WORK			
C-1B	(i) Screed Concrete/DPC of any Grade FOR superstructure above plinth level	CUM	150	0.006533
	(ii) RCC of any Grade for superstructure above plinth level.	CUM	500	0.021777
	Misc Concrete related work			
216	Chipping of concrete in reinforced concrete work, cutting pockets, making openings at all levels and according to shapes, disposal of waste materials upto a lead of 2 km as directed by engineer including equipment, safety precautions, making good the broken surface etc all complete as per specification, drawing, instructions of engineer in charge but excluding cutting of reinforcement .	CUDM	40.000	0.000047
	300 FORM WORKS			
	Providing, fixing and removing formwork at any elevations for all structures, as per specifications and including all labour, material, scaffoldings and centering complete including pockets etc. complete as per drawing, specifications, relevant laws of Bangladesh, relevant BS Standards or Equivalent International standards approved by BIFPCL/BHEL and as per direction of engineer in charge for the following.			
A301	Fairface form work with good quality water proof ply wood OR good quality steel shutter with angle stiffner(Plywood lining for form shall be of timber, which is resin bonded and water repellant) of minimum 12 mm thickness and smooth surface below finished ground floor level for foundations, footings, base of columns, walls, columns, pilasters, beams, mass concrete, trenches etc including providing 25mmx25mm chamfer at all exterior corners.	SQM	11000.000	0.126607
A302	Fairface form work with good quality water proof ply wood or Good quality steel shutter with angle stiffner(Plywood lining for form shall be of timber, which is resin bonded and water repellant) of minimum 12 mm thickness and smooth surface above finished ground floor level for columns, beams, suspended floors, roofs, lintels, cantilevers, staircases, landings, balconies etc. for all heights including rubbing the concrete surface with carborundum stone to make smooth finish and providing 25mmx25mm chamfer at all exterior corners.	SQM	2000.000	0.028936
A304	Providing, fixing and removing formwork in block-outs/pockets and openings (below 0.1 sqm plan area) at all elevations including cutting, formation of all shapes and all other operations required for making the required shape and size all complete as per specification, drawing and instruction of engineer in charge.			
a	Upto 150 mm depth	Each	65.000	0.000387
b	Pockets of depths more than 150mm and upto 300 mm depth	Each	325.000	0.003524
c	Pockets of depths more than 300mm and upto 600 mm depth	Each	75.000	0.001536
	400 REINFORCEMENT			

VOLUME-III				
PACKAGE MISC-2 : MISCELLANEOUS CIVIL SUB STRUCTURE AND SUPERSTRUCTURE WORKS FOR DIFFERENT STRUCTURES FOR				
TENDER NO - MSTPP: MISC-2: KLN-C				
SCH-3 : SERVICE				
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	WEIGHTAGE (Nearest to the 6 decimal points) W.R.T THE TOTAL value
	Reinforcement work including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, transportation, handling etc at all level as per specification, relevant laws of Bangladesh, relevant BS Standards or Equivalent International standards approved by BIFPCL/BHEL drawings and as directed by engineer - in - charge for the following			
402	Straightening, cutting, bending, placing in position at any level, binding in position of steel reinforcements of grade B500B confirming to BS 4449:2005+A:2009 including cost of reinforcement steel, binding wire, labour, scaffolding, transportation to & from stores etc complete all as per specifications, drawings and as directed by Engineer. (REINFORCEMENT STEEL SHALL BE SUPPLIED BY BHEL AS FREE OF COST AS PER TCC)	MT	720.000	0.139498
	500 WATER PROOFING WORKS			
A509	Providing and applying two coats of bitumen of suitable grade as per relevant BS or equivalent international code @ 1.7kg/sqm with 1% antistripping compound in foundation, wall, column etc on concrete surfaces exposed to soil / ash including surface preparation etc. all complete.	SQM	11000.000	0.064120
606	Providing and fixing PVC water stops in joints conforming to relevant BS code or equivalent international code all complete for the following:			
b	230 mm wide and 8 mm thick	RM	100.000	0.000881
c	150 mm wide and 6 mm thick	RM	100.000	0.000875
d	230 mm wide and 6 mm thick	RM	100.000	0.001267
	700 MS EMBEDMENTS			
	Embedments including all labour, material (unless otherwise specified in BOQ/specification), equipment, transportation, handling etc. at any level as per specification, drawings, relevant laws of Bangladesh, relevant BS Standards or Equivalent International standards approved by BIFPCL/BHEL and as directed by engineer - in - charge.			
703	Same as above items with BHEL supplied material free of cost including loading, transportation, unloading etc. all complete from BHEL store to plant site.			
a	Mild steel embedments, inserts, pipe sleeves, angle pieces, rungs of various diameters, plates of dimensions as required etc.	MT	5.000	0.001830
b	Mild steel foundation bolt assembly conforming to relevant BS or equivalent international code in concrete along with nuts, lock nuts (as per relevant BS or equivalent international code), washers, anchor plates, stiffener plates, protective tape, pipe sleeves, templates etc.	MT	10.000	0.003529
704	Fabricating, erecting and installing following items in concrete/brickwall for all kind of works, including setting material in concrete, layout, scaffolding, cutting, forming, grinding, drilling, bolting, welding, jointing, testing etc. all complete.			
a	MS pipes of all diameters	Quintal	20.000	0.000606
b	PVC pipes / conduits of all diameters	Quintal	5.000	0.000785
c	UPVC pipes / conduits of all diameters	Quintal	5.000	0.000760
	1000 BRICKWORK			
	Brickwork masonry including all labour, material (unless otherwise specified in BOQ/specification), equipment, transportation, handling, scaffolding etc. at all levels as per relevant laws of Bangladesh, relevant BS Standards or Equivalent International standards approved by BIFPCL/BHEL, specification, drawings and as directed by engineer - in - charge.			
1001	Providing brick work in cement mortar 1:6 (1 part cement 6 parts coarse sand) in walls, chambers etc. in thickness varying from 230mm to 460mm at all depths, places and positions below plinth including raking out joints, curing, scaffolding etc. complete excluding plastering and painting.			
c	Using burnt clay bricks as per relevant BS code or equivalent international code with crushing strength of 75 Kg/cm ²	CUM	200.000	0.034101

VOLUME-III				
PACKAGE MISC-2 : MISCELLANEOUS CIVIL SUB STRUCTURE AND SUPERSTRUCTURE WORKS FOR DIFFERENT STRUCTURES FOR				
TENDER NO - MSTPP: MISC-2: KLN-C				
SCH-3 : SERVICE				
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	WEIGHTAGE (Nearest to the 6 decimal points) W.R.T THE TOTAL value
1002	Providing brick work in cement mortar 1:6 (1 cement 6 coarse sand) in walls, chambers etc. in thickness 230mm at all heights, places and position above plinth including raking out joints, curing, scaffolding etc complete excluding plastering and painting.			
c	Using burnt clay bricks as per relevant BS code or equivalent international code with crushing strength of 75 Kg/cm2	CUM	200.000	0.037586
1006	Breaking of existing brick work at all levels including plastering, removing the rubbish up to a distance of 500 m including transportation, loading, unloading etc. all complete as directed by the engineer.	CUM	20.000	0.000490
	1200 CEMENT MORTAR PLASTER			
	Cement mortar plaster including making grooves wherever required including all labour,material (unless otherwise specified in BOQ /specification),scaffolding,curingetc at any level as per relevant laws of Bangladesh,relavant BS Standards or Equivalent international standards approved by BIFPCL/BHEL ,specification,drawings, and as directed by Engineerr-in-charge.			
1201	Providing 18mm thk plaster in two layers outside the building/boundary wall in cement mortar 1:6 on walls,finished to a smooth finish including providing 3mmx3mm size grooves at junctions of two dissimilar materials all complete.	SQM	200.000	0.001059
1202	Providing 12mm thick plaster inside the building/boundary wall in cement mortar 1:6 on walls finished to a smooth finish as per specification all complete.	SQM	1000.000	0.003714
	1800 MISCELLANEOUS WORKS			
	Miscellaneous works including all labour, material (unless otherwise specified in BOQ/specification), equipment etc. at any level unless otherwise specified as per relevant laws of Bangladesh, relavant BS Standards or Equivalent International standards approved by BIFPCL/BHEL, specification, drawings and as directed by engineer - in - charge.			
1801	Providing and Filling in trenches, plinths, area paving and other underground structures with graded stone aggregate of size range 63 mm to 45 mm in layers not exceeding 230 mm in thickness including breaking of stone boulders to required sizes, filling the interstices with selected sand and compacting to 85 % of original volume of stone stack for all lifts etc. all complete. Payment shall be made for the measurement of the volume of the compacted fill.	CUM	100.000	0.008239
1812	Laying of earthing mats/rods in concrete (pile, pile cap, pedestals, columns, slabs, beams etc.) including risers, transportation from yard stores, loading, unloading, cutting to length, welding, connection to reinforcement by GI wire (supply of GI wire included in the item), protective painting of joints etc. all complete. (Excavation & Back filling shall be paid separately under respective item of earth work. Earthing mats/rods shall be supplied by BHEL free of cost)	MT	2.000	0.000391
2516	Design, supplying, installing of sheet pile for earth protection around foundation as per accepted scheme including material, labour, equipment, consumable etc. all complete complying all safety norms and removal of sheet pile after completion of foundation work. this item to be executed after approval of execution scheme by BHEL Engineer. [mode of measurement : Area shall be calculated on the basis of exposed sheet pile area above founding level inside excavated pit]. Payment shall be made 70% after installation and 30% after removal of sheet pile.	SQM	200.000	0.051505

VOLUME-III				
PACKAGE MISC-2 : MISCELLANEOUS CIVIL SUB STRUCTURE AND SUPERSTRUCTURE WORKS FOR DIFFERENT STRUCTURES FOR				
TENDER NO - MSTPP: MISC-2: KLN-C				
SCH-3 : SERVICE				
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	WEIGHTAGE (Nearest to the 6 decimal points) W.R.T THE TOTAL value
M-5	Providing cleaning of sludge/ silty clay from foundation pit,trenches,tank pit etc complete either by manually or by deploying machine and required tools as per direction of engineer.	CUM	300.000	0.001120
M-7	Breaking of RCC or PCC member in shape by using pneumatic hammer and saw cutting tools in all respect including labour, T & Ps all complete as per direction of engineer in charge.	CUM	75.000	0.004323
M-8	Providing treatment of crack in RCC member at any height by using necessary crack filling bonding chemical from approved vendor like Fosroc/Sika/BASF/Thermax etc in all respect including materials, labour, T & Ps, scaffolding, etc all complete as per direction of engineer in charge.	RM	75.000	0.001495
M-9	Providing surface smoothening / rendering preparation of RCC member at any elevation by necessarily removing of the Tie Rod,cutting of additional uneven joint concrete by grinding /cutting wheel and final finishing by carborundum stone (Renderoc Plus of Fosroc make / BASF/Thermax make) till the surface is exposed with glossy finish, including all labour, materials, T & Ps, scaffolding, etc all complete as per direction of engineer in charge.	SQM	100.000	0.002350
M-10	Providing and fixing of inspection grouting nipple up to depth of 120mm to 200mm inside the concrete at any elevation.The item is inclusive of plugging ,cutting of nipple after grouting is completed and necessary grinding shall be carried out matching the exposed finish concrete surface including all labour, T & Ps, scaffolding, etc complete as per direction of engineer in charge.	NOS	1500.000	0.013954
M-11	Supply of high viscous epoxy material of approved brand for injection grouting including grouting of concrete structure including labour, T&Ps, grouting pumps, all complete as per direction of engineer in charge. [Actual consumption of grouting material shall be measured. Supply & Fixing of nipple shall be paid as per M-10]	Litres	150.000	0.004984
M-12	Supply of high viscous cementitious grout material of approved brand for injection grouting including grouting of concrete structure including labour, T&Ps, grouting pumps, all complete as per direction of engineer in charge.[Actual consumption of grouting material shall be measured. Supply & Fixing of nipple shall be paid as per M-10]	Litres	100.000	0.000133
M-14	Installation of borewell of shallow depth up to maximum 250 Feet with stainer pipe of 4.5 inch dia and supply of submersible pump of sufficient capacity to supply water up to distance of 100m including supply of pipeline all complete.	NOS	2.000	0.012890
M-15	Providing and fixing of heavy duty GI Pipe line with necessary bend valve etc including labour, tools & tackles etc all complete as per direction of engineer in charge			
(i)	1" Dia pipe	RM	200.000	0.002038
(ii)	2" Dia pipe	RM	200.000	0.003236
M-18	Construction of embankment /bund by using sand filled geo bags for earth protection works. Volume of embankment / bund shall be measured	CUM	250.000	0.007098
TOTAL WEIGHTAGE				1.0000000