



BHARAT HEAVY ELECTRICALS LIMITED
(A Govt. Of India Undertaking)
POWER SECTOR, EASTERN REGION
BHEL BHAWAN, PLOT NO. DJ-9/1 , SECTOR II ,
SALT LAKE CITY, KOLKATA, WEST BENGAL, INDIA
Phone : 033-23216130-31,033-23216130 FAX : 033-23211960

NOTICE INVITING TENDER (NIT)

OFFERS are invited from **REPUTED AND EXPERIENCED BIDDERS** (meeting pre-qualification criteria as mentioned) **through E-PROCUREMENT PORTAL <https://eprocurebhel.co.in> ONLY** for the subject job by the undersigned on behalf of BHARAT HEAVY ELECTRICALS LIMITED as per the tender document.

ISSUE OF TENDER TO ANY BIDDER SHALL NOT CONSTRUED THAT THE BIDDER IS CONSIDERED TO BE QUALIFIED. FOLLOWING POINTS RELEVANT TO THE TENDER MAY PLEASE BE NOTED AND COMPLIED WITH:

Salient Features of NIT

SL NO	ISSUE	DESCRIPTION
i	E-TENDER NUMBER	PSER: PUR:PMX:373(III):063 (ENQ:22:PP:0015:PUR:84) dated 19/10/2022
ii	Broad Scope of job	Design, Supply, handling during materials receipt, storage and execution including erection, testing and all associated services for fixing of Borosilicate Glass Block Lining, expansion compensator joints etc. along with providing Expert Supervision services during installation including Wet Stack Flow Model Study for 275 mtr. tall single flue chimney at 1x660 MW Sagardighi Unit#5, Murshidabad, West Bengal.
iii	DETAILS OF TENDER DOCUMENT	
a)	PART – B	GENERAL CONDITIONS OF CONTRACT (GCC) Applicable
b)	PART – C	TECHNICAL SCOPE AND SPECIAL TERMS AND CONDITIONS (SCC) Applicable
c)	PART – F	GENERAL TERMS & CONDITIONS OF REVERSE AUCTION Applicable
d)	PART – E	PRICE SCHEDULE and UNPRICED PRICE SCHEDULE Applicable
e)	PART – H	FORMS AND PROCEDURES ETC. Applicable
iv	ISSUE OF TENDER DOCUMENTS	a) Online through e-procurement platform at https://eprocurebhel.co.in/ b) in BHEL website (www.bhel.com , CPP Portal): For tender view purpose only. START DATE: 19/10/2022 a) Applicable b) Applicable
v	DUE DATE & TIME OF OFFER SUBMISSION	Date: 31/10/2022, Time: 14-00 Hrs. (Offer to be submitted online only through e-procurement platform at https://eprocurebhel.co.in/) Applicable
vi	TECHNO-COMMERCIAL BID OPENING OF TENDER	Date: 31/10/2022, Time: 16-30 Hrs. (Online only through e-procurement platform at https://eprocurebhel.co.in/ , participating bidders may witness the same online only) Applicable
vii	CURRENCY	INDIAN RUPEES ONLY Applicable
viii	EMD AMOUNT	NIL Not Applicable
ix	COST OF TENDER	- Not Applicable
x	LAST DATE FOR SEEKING CLARIFICATION	Date: 27/10/2022 (UP TO 17:00 Hrs.IST) Applicable
xi	SCHEDULE OF Pre Bid Discussion (PBD)	Not Applicable (In case BHEL decides to conduct PBD, date, time & venue of PBD will be intimated suitably thru TCN). Not Applicable
xii	INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)	IP SHALL BE APPLICABLE .DETAILS OF IEM IS AS UNDER 1) NAME : Shri Otem Dai,IAS (Retd.) EMAIL: iem1@bhel.in 2) NAME : Shri Bishwamitra Pandey, IRAS(Retd) EMAIL: iem2@bhel.in 3) NAME: Shri Mukesh Mittal, IRS (Retd.) Email : iem3@bhel.in Applicable

xiii	Latest updates	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com →Tender Notifications →View Corrigendums & CPP portal →Tender Notice & E-PROCUREMENT PORTAL https://eprocurebhel.co.in) and not in the newspapers. Bidders to keep themselves updated with all such information.	Shall be intimated to bidder

The offer shall be submitted as per the instructions of tender document. Only One set of tender document (in original, downloaded from website) signed by authorised company rep. of bidder and stamped on each page shall be submitted as detailed further, as given below. Bidders to note specifically that all pages of tender document, including these NIT pages etc. appearing in the website for this particular tender shall be submitted by them (after signing/stamping on each page) as a part of their offer. **Price shall not be mentioned by them anywhere in the techno-commercial portion of offer. Price shall be mentioned in the relevant price schedule only and to be submitted in e-procurement portal/platform in the form and manner mentioned in tender.**

For E-Procurement Assistance & Training, NIC PORTAL Helpdesk Contacts as per following: -

For any technical related queries please call at 24x7 Help Desk Number
0120-4001 002, 0120-4200 462, 0120-4001 006, 0120-6277 787

Email Support

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

Technical - support-eproc@nic.in

For any difficulty in downloading the tender from internet website, they should contact this office (Manager, Purchase or DGM, Purchase Phone no. 033-23398224/8220). No alteration/changes by bidders is permitted in the tender/NIT appeared in the website.

1. Successful bidder shall have to submit additional set of tender/sign on tender document provided by BHEL, if so decided by BHEL.
2. This is an e-tender floated online through our E-Procurement Site <https://eprocurebhel.co.in>. The bidder should respond by submitting their offer online only in our e-Procurement platform at <https://eprocurebhel.co.in>. Offers are invited in two-parts only. No Hard copy bid or bids through email/ fax shall be accepted. Bids are invited in two parts & shall be submitted as described below:

OFFER DESCRIPTION	DOCUMENTS TO BE UPLOADED & MODALITY OF UPLOADING
TECHNICAL OFFER	1. Scanned copy of Covering letter of offer (To be attached in Attachment section) 2. Scanned copy of Entire tender documents signed & stamped in each page by authorized representative of the bidder except price bid (To be attached in Attachment section). 3. Scanned copy of Techno-Commercial Offer (To be attached in Attachment section) 4. Duly filled all annexures except price & unpriced format (To be attached in Attachment section). 5. Copy of records notes of Pre-Bid Conference, if applicable/ pre-bid MOM. (To be attached in Attachment section) 6. Copy of Tender change notice (TCN), if applicable (To be attached in Attachment section) 7. All supporting documents/ Annexures etc. as applicable (To be attached in Attachment section). 8. No deviation certificate in bidder's letterhead as per format given in Tender (To be attached in Attachment section).
PRE-QUALIFICATION PART	9. Pre-qualifying documents with all credentials as per tender. (To be attached in PQ Attachment section)
UNPRICED PRICE BID	10. Price schedule –Unpriced but mentioning only quoted / unquoted against each item as per tender.(To be attached in Unpriced Bid attachment section)
PRICE BID	11. Duly filled in Price Schedule as per tender (To be attached in Price Bid attachment section) Any other document uploaded in the price bid, apart from tendered Price schedule, shall not be taken into cognizance for evaluation of offer.

4. **EARNEST MONEY DEPOSIT (EMD)** of **NIL**, in the form & manner prescribed in tender, shall be submitted by bidder as mentioned below, failing which the bidder's offer is liable for rejection.

4.1 Every tender must be accompanied by the prescribed amount of Earnest Money Deposit in any one of the following forms:

- a) **Cash deposit as permissible under the extant Income Tax Act** (Before tender opening) - The amount should be remitted by the party to the Cashier of Bharat Heavy Electricals Limited, PS-ER, Kolkata between 14.00 hours and 16.00 hours on working days and cash receipt issued by him shall be enclosed along with the tender.
- b) **Electronic Fund Transfer** credited in Bharat Heavy Electricals Limited, PS-ER's account (before tender opening). RTGS details of BHEL-PSER is available in tender.
- c) **Banker's Cheque/Pay Order/Demand Draft** payable at Kolkata duly pledged in favour of Bharat Heavy Electricals Limited, Kolkata (along with offer).
- d) **Any other mode as per latest guidelines issued by Govt. of India.**

In case total EMD amount is more than INR 20 LAKH, the amount in excess of INR 20 LAKH may be accepted in the form of Bank Guarantee from scheduled bank. The bank Guarantee in such cases shall be valid at least for six months.

4.2 Tenders received without Earnest Money in full in the manner prescribed above are liable to be rejected.

4.3 The Earnest Money Deposit of the successful tenderer will be retained as part of Security Deposit.

4.4 EMD given by all unsuccessful tenderers shall be refunded on acceptance of award/LOI/PO by successful tenderer. The EMD of the successful bidder shall be returned after submission of Security Deposit BG (SDBG).

4.5 EMD shall not carry any interest.

4.6 BHEL reserves the right of forfeiture of Earnest Money Deposit submitted by the tenderer if:-

EMD by the tenderer shall be forfeited as per tender documents if -

- a) After opening the tender and within the offer validity period, the tenderer revokes his tender or makes any modification in his tender which is not acceptable to BHEL.
- b) The contractor fails to deposit the required Security Deposit or commence the work within the period as per LOI/contract.
- c) The successful bidder/vendor refuses to honour the order after award of the same on him and/or withdraws his bid and/or unilaterally changes the offer and/or any of its items and conditions within the validity period.

EMD by the tenderer shall be withheld in case any action on the tenderer is envisaged under the provisions of extant "Guidelines on Suspension of business dealings with suppliers/contractors" and forfeited/released based on the action as determined under these guidelines".

Scan copy of documents in support of submission of EMD to be uploaded along with techno-commercial offer in e-procurement portal/platform. In case of EMD submission through banker's cheque/pay order/demand draft, same to be submitted in sealed envelope (superscribing tender reference) to Head-Purchase/Manager/Purchase, BHEL Bhawan, DJ-9/1, Sector-2, Karunamoyee, Salt Lake City, Kolkata-700091, West Bengal prior to latest due date of submission of offer- (EMD -NOT APPLICABLE)

SPECIAL NOTE:

A) Your offer & documents submitted with the offer shall be signed and stamped in each page by your authorized 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) All documents/annexure submitted with the offer shall be properly annexed and placed in respective places of the offer as per enclosure list mentioned in the covering letter. BHEL shall not be responsible for any missing documents.

C) Integrity Pact

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

Sl	IEM	Email
1.	Shri Otem Dai, IAS (Retd.)	iem1@bhel.in
2.	Shri Bishwamitra Pandey, IRAS(Retd)	iem2@bhel.in
3.	Shri Mukesh Mittal, IRS (Retd.)	iem3@bhel.in

(b) The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with techno-commercial bid (Part-1, 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:

Name : 'Anuruddha Sarkar

Deptt : Purchase

Address : BHEL Bhawan, DJ 9/1 Sec-II, Salt Lake, Kol-91

Phone : (Landline/ Mobile):033-23398220

Email : a_sarkar@bhel.in

Fax : 033-23211960

Name : Sriparna Mukherjee

Deptt : Purchase

Address : BHEL Bhawan, DJ 9/1 Sec-II, Salt Lake, Kol-91

Phone : (Landline/ Mobile):033-23398224

Email : sriparna@bhel.in

Fax : 033-23211960

- No deviation with respect to tender clauses and no additional clauses/ suggestions/clarification in Techno-commercial bid/Price bid shall normally be considered by BHEL. Bidders are requested to positively comply with the same. Offers with deviation are liable for rejection.
- BHEL reserves the right to accept or reject any or all offer without assigning any reasons thereof. BHEL also reserve the right to cancel the offer wholly or partly without assigning any reason thereof. BHEL also reserve the right to split/part award the job. Also BHEL shall not entertain any correspondence from bidders in this matter (except for the refund of EMD).
- Bidders are free to visit the site and study the prevailing site condition including law & order etc. before quoting (if applicable). They may also consult this office before submitting their offers, for any clarifications regarding scope of work, facilities available at sites or on terms and conditions. No additional claim shall be entertained by BHEL in future, on account of non-acquaintance of site/machine conditions at the time of bidding.
- For any clarification on the tender document, you may seek the same in writing or through e-procurement portal/platform as per specified format within the last date of seeking clarification as per tender. BHEL shall not be responsible for receipt of queries after due date of seeking clarification due to postal delay, and receipt of any query after due date shall not be entertained.
- BHEL may decide holding Pre-bid Discussion [PBD] with all intending bidders. On such communication from BHEL, the bidder shall ensure participation for the same at the appointed time, date and place as may be decided by BHEL. Outcome of PBD (if any) shall also form part of tender.
- In case of absence of any queries from bidder(s), their quoted price will be PRESUMED to be final and complete with reference to the tender documents (including Tender change notes (TCNs), clarifications, corrigendum issued by BHEL, if any). Bidders are requested to study the tender documents in detail and prepare their queries/clarifications accordingly. All such queries / clarifications shall be cleared/replied by BHEL. Such clarification letters, corrigendum and/or Tender change notes (TCNs), if issued by BHEL, shall form part of tender document.
- In the event of any conflict between requirement of any clause of this specification/ documents /drawings /data sheets etc. or requirements of different codes/ standards specified/ contradictions between any two clauses of tender document, the same to be brought to the knowledge of BHEL by bidders in writing for clarification before due date of seeking clarification, otherwise, more stringent requirement as may be interpreted by BHEL shall

- prevail and shall be binding on you. Any typing error/missing pages/other clerical errors in the tender documents, noticed by you must be pointed out before submission of offer, or else, BHEL's interpretation shall prevail & binding on you.
12. Unless specifically mentioned otherwise, bidder's quoted price shall be deemed to be in compliance with tender including PBD.
13. Tender document containing above mentioned volumes shall be signed & stamped in all pages including this covering letter. Price bid shall be furnished in the specified format enclosed with the tender. Any additional copy, if required, may be taken by photocopying from the tender document given in the web.
14. 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.
15. **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 qualify for the subject job on the basis of pre-qualification evaluation & Techno-Commercial bids etc. BHEL reserves the right to reject the bidders with unsatisfactory past performance in the execution of a contract. BHEL's decision in this regard shall be final & binding.**
16. The bidder shall submit documents in support of possession of 'Pre-Qualifying Requirements' duly self-certified and stamped/digitally signed (as applicable) by the authorized signatory, indexed and properly linked in the format for PQR. In case BHEL requires any other documents/proofs, these shall be submitted immediately .
17. **The bidder may have to produce original document for verification if so decided by BHEL.**
18. While BHEL reserve the right to open the price bid of the offers in camera, the date & time to open the PRICE BID, tender opening shall be intimated to the bidders in case BHEL decides it to be 'Public opening' and in such a case, **price bid (Volume-III) uploaded in E-Procurement Site <https://eprocurebhel.co.in> will be opened.**
19. Validity of the offer shall be for SIX (06) MONTHS from the due date of offer submission (including extension, if any).
20. Bidders are required to submit their BEST price as per tender Price Schedule format in e-procurement portal/platform in the form & manner as mentioned in tender.
21. Price Bids shall be evaluated in the manner as prescribed in Price Schedule. However, Unit Rates shall also be furnished if applicable in the Price Schedule.
22. 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.
23. On submission of offer, further consideration will be subject to compliance to tender & qualifying requirement and customer's acceptance, as applicable.
24. Deleted
25. The bidders shall not enter into any undisclosed M.O.U. or any understanding amongst themselves with respect to tender.
26. ***"BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) for this tender. RA shall be conducted among the techno-commercially qualified bidders.***
Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered for RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking."
27. Bidders are requested to note that the accepted / agreed tender terms (technical, commercial or on Reverse Auction) in their original offer cannot be altered / withdrawn by their own during the processing of tender.
28. Unsolicited discounts received after opening of techno commercial bid shall not be considered for evaluation. However, if the party who has submitted the unsolicited discount/rebate becomes the L-1 party, then the awarded price shall be after considering the discount.
29. ***"The offers of the bidders who are on the banned list as also the offer of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site www.bhel.com".***
- i. Integrity commitment, performance of the contract and punitive action thereof:
- a) Commitment by BHEL:
- BHEL commits to take all measures necessary to prevent corruption in connection with the tender process and execution of the contract. BHEL will during the tender process treat all Bidder(s) in a transparent and fair manner, and with equity.
- b) Commitment by Bidder/ Supplier/ Contractor:

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

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

30. **The Bidder along with its associate/collaborators/sub-contractors/sub-vendors/consultants/service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website <http://www.bhel.com> and shall immediately bring to the notice of BHEL management about any fraud or suspected fraud as soon as it comes to their notice.**
31. Suspension of Business dealings: BHEL reserves the right to take action against contractors who fail to perform or indulge in malpractices, by suspending business dealings with them as detailed in Annexure-VII.
32. MSE suppliers can avail the intended benefits in respect of the procurements related to the Goods and Services only (Definition of Goods and Services as enumerated by Govt. of India vide Office Memorandum F. No. 21(8)/2011-MA dtd. 09/11/2016 office of AS & DC, MSME) if they submit along with the offer, attested copies of either Udyam Registration Certificate or EM II certificate having deemed validity (five years from the date of issue of acknowledgement in EM II) or valid NSIC certificate or Udyog Aadhar Memorandum (UAM) & Acknowledgement or EM II certificate along with attested copy of a CA certificate (Format enclosed at Annexure – B where deemed validity of EM II certificate of five years has expired) applicable for the relevant financial year (latest audited). Date to be reckoned for determining the deemed validity will be the date of bid opening (Part 1 in case of two part bid). Non submission of such documents will lead to consideration of their bid at par with other bidders. No benefit shall be applicable for this enquiry if any deficiency in the above required documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal. Documents should be notarized or attested by a Gazetted officer.

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

Type under MSME	SC/ST owned	Women owned	Others
Micro			
Small			
Medium			

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

33. Indian suppliers, falling under the purview of Public procurement (preference to make in India) order 2017 by Govt. of India, vide order no. P-45021/2/2017-B.E.-II dated 15th June, 2017 & all subsequent clarifications can avail the intended benefits, as per provisions of the order subject to minimum local content shall be 50%, margin of Purchase preference shall be 20% & modality of preference to make in India shall be as per aforesaid order.

34. "For this procurement, the local content to categorize a supplier as a Class-I local supplier/ Class-II local

supplier/ Non-Local supplier and purchase preference to Class-I local supplier, is as defined in Public Procurement (Preference to Make in India), Order 2017 dated 04-06-2020 issued by DPIIT. In case of subsequent orders issued by the Nodal Ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before opening of Part-II bids against this NIT".

Duly filled & signed Annexure-III (Format for local content), as applicable, to be submitted by bidders along with their techno-commercial offer.

35. Bidder shall submit duly filled & signed Form-2 along with their techno-commercial offer towards compliance of Department of Expenditure's (DoE) Public Procurement Division Order vide ref. F.No.6/18/2019-PPD dated 23.07.2020 & 24.7.2020 and subsequent orders issued, as applicable. In this connection, following may be noted:

Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority.

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

III. "Bidder from a country which shares a land border with India" for the purpose of this order means: -

An entity incorporated, established or registered in such a country; or

A subsidiary of an entity incorporated, established or registered in such a country; or

An entity substantially controlled through entities incorporated, established or registered in such a country; or

An entity whose beneficial owner is situated in such a country; or

An Indian (or other) agent of such an entity; or

A natural person who is a citizen of such a country; or

- a. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above.

IV. The beneficial owner for the purpose of (iii) above will be as under:

1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.

Explanation-

- a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent. of shares or capital or profits of the company;

- b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements;

2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;

3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;

4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;

5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.

36. GeMAR and PTS Report ID: GEM/GARPTS/14102022/XWJ9XNUVS4L1

37. The GeM Seller ID shall be mandatory before placement of order / award of contract for goods and services to the successful bidder(s).

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

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

Bidder shall submit duly filled & signed Annexure-VII along with their techno-commercial offer.

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

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

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

41.0 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 SCHEDULE:
- d. TECHNICAL SPECIFICATION/SCOPE AND SPECIAL CONDITIONS OF CONTRACT (SCC)
- e. GENERAL CONDITIONS OF CONTRACT (GCC)
- f. FORMS AND PROCEDURES

for BHARAT HEAVY ELECTRICALS LTD

Manager/ (PUR)

All the bidders are requested to note that all the errata / technical clarifications / corrigendum / extension etc. shall be published THROUGH E-PROCUREMENT PORTAL (<https://eprocurebhel.co.in>) and in website www.bhel.com & <http://eprocure.gov.in> . As such, all the bidders are requested to be in continuous touch with these websites.

Agency	Contact details	
BHEL, PSER, Kolkata	Address	BHARAT HEAVY ELECTRICALS LIMITED, POWER SECTOR – EASTERN REGION 2ND FLOOR, BLOCK-DJ, PLOT- 9/1, SECTOR, SALT LAKE CITY, KOLKATA – 700 091
	Phone no.	033-23398224, 23398220, 23398226, 23211690
	FAX no.	033-23211960
	E-mail ID	sriparna@bhel.in , a_sarkar@bhel.in , bsandipan@bhel.in
NIC E-PROCUREMENT PORTAL	For E-Procurement Assistance & Training, NIC PORTAL Helpdesk Contacts as per following: - For any technical related queries please call at 24 x 7 Help Desk Number 0120-4001 002, 0120-4200 462, 0120-4001 006, 0120-6277 787 Email Support Address: A) For any Issues or Clarifications relating to the published tenders, bidders are requested to contact the respective Tender Inviting Authority Technical - support-eproc@nic.in	

Enclosures:

01. ANNEXURE-I: Pre qualifying Criteria.
02. ANNEXURE-II : No Deviation Certificate
03. ANNEXURE-III: Format for Certification regarding Local content (LC) for Product/ Services/ Works
04. ANNEXURE-IV: CERTIFICATE (regarding bidder from a country which shares a land border with India)
05. ANNEXURE-V: Certificate by Chartered Accountant
06. ANNEXURE-VI: Format for seeking clarification
07. ANNEXURE-VII: Suspension of business dealing with Suppliers/Contractors
08. ANNEXURE-VIII: Declaration for Relation in BHEL
09. ANNEXURE-IX: Details of related firms and their area of activities
10. ANNEXURE-X: Declaration Regarding Insolvency/ Liquidation/ Bankruptcy Proceedings
11. PART – F: General Terms & conditions for Reverse Auction.
12. Tender documents as per this NIT.

PRE-QUALIFICATION CRITERIA

JOB	Design, Supply, handling during materials receipt, storage and execution including erection, testing and all associated services for fixing of Borosilicate Glass Block Lining, expansion compensator joints etc. along with providing Expert Supervision services during installation including Wet Stack Flow Model Study for 275 mtr. tall single flue chimney at 1x660 MW Sagardighi Unit#5, Murshidabad, West Bengal.
TENDER NO	PSER:PUR:PMX:373(III):063 (ENQ:22:PP:0015:PUR:84) DATE: 19/10/2022

SL NO	CRITERIA
1.0	FINANCIAL CRITERIA :
(a)	BIDDER SHOULD HAVE AVERAGE MINIMUM ANNUAL FINANCIAL TURNOVER OF INR 338.63 LAKH DURING LAST THREE (3) FINANCIAL YEARS ENDING ON EITHER 31.03.2021 OR 31.03.2022. BIDDER SHOULD SUBMIT THEIR AUDITED BALANCE SHEET AND PROFIT & LOSS ACCOUNT FOR THE ABOVE MENTIONED FINANCIAL YEARS, IN SUPPORT OF THE ABOVE.
(b)	IN CASE AUDITED BALANCE SHEET AND PROFIT & LOSS ACCOUNT HAS NOT BEEN SUBMITTED FOR ALL THREE (3) FINANCIAL YEARS INDICATED ABOVE, THEN THE APPLICABLE FINANCIAL AUDITED STATEMENTS SUBMITTED BY THE BIDDERS AGAINST THE REQUISITE THREE YEARS WILL BE AVERAGED FOR THREE YEARS.
(c)	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 (a)	THE BIDDER MUST BE THE MANUFACTURER / MANUFACTURER'S AUTHORIZED SUPPLIER OF "LINING SYSTEM CONSISTING OF MINIMUM 38 MM THICK CLOSED CELL BOROSILICATE GLASS BLOCKS APPLIED WITH A FLEXIBLE, CHEMICALLY RESISTANT ADHESIVE" FOR APPLICATION ON STEEL FLUE CHIMNEY OF WET FGD PROJECT (WET STACK) WHERE THE FLUE GAS IS NOT REHEATED DOWNSTREAM OF THE FGD SYSTEM AND IS AT WATER DEW POINT DURING IT'S PRESENCE IN THE CHIMNEY.
2.1 (b)	IF THE MANUFACTURER DIRECTLY PARTICIPATING IN THE BID, THEN AUTHORISED SUPPLIER OF THE MANUFACTURER CANNOT BE CONSIDERED AS THE BIDDER.
2.1 (c)	IF AUTHORISED SUPPLIER OF MANUFACTURER IS PARTICIPATING, THEN MANUFACTURER SHOULD HAVE GIVEN AN AUTHORIZATION LETTER TO HIS AUTHORISED SUPPLIER FOR THE SUPPLY OF FULL QUANTITY MENTIONED IN BID OF "BOROSILICATE GLASS BLOCK LINING SYSTEM".
2.1 (d)	ONE MANUFACTURER CAN ONLY GIVE AUTHORIZATION LETTER TO ONLY ONE AUTHORISED SUPPLIER.
2.2 (a)	BIDDER SHALL SUBMIT PERFORMANCE CERTIFICATE IN SUPPORT OF SATISFACTORY OPERATION OF THE LINING SYSTEM, MANUFACTURED BY BIDDER'S OEM WITH MINIMUM 38 MM THICK BOROSILICATE GLASS BLOCK AND ADHESIVE INSTALLED ON STEEL FLUE CHIMNEY OF THE WET FGD PROJECT IN AT LEAST TWO (2) COAL FIRED POWER STATIONS AT DIFFERENT LOCATIONS FOR MORE THAN TEN (10) YEARS ON THE DATE OF BID OPENING WHERE THE FLUE GAS IS NOT REHEATED DOWNSTREAM OF THE FGD SYSTEM AND IS AT WATER DEW POINT DURING IT'S PRESENCE IN THE CHIMNEY.

	<u>Notes:</u> BIDDER SHALL FURNISH RELEVANT PERFORMANCE CERTIFICATE ISSUED BY THE OWNER OF THE RESPECTIVE POWER PLANT. ANY ADDITIONAL DOCUMENT REQUIRED IN SUPPORT OF THE ABOVE DOCUMENTS TO ESTABLISH THE CORRELATION BETWEEN THE ABOVE DOCUMENTS AND THE LINING SYSTEM AS DESCRIBED IN 2.1(A) SHALL BE PROVIDED BY THE BIDDER.
2.3 (a)	BIDDER SHALL SUBMIT CERTIFICATE IN SUPPORT OF SATISFACTORY OPERATION OF THE LINING SYSTEM AS DESCRIBED IN 2.1(A) WHICH SHOULD BE PRESENTLY OPERATING AS WET FLUE GAS CHIMNEY IN AT LEAST FIVE (5) COAL FIRED POWER STATIONS LOCATED IN A COUNTRY OTHER THAN THE COUNTRY OF ORIGIN OF THE SUBJECT LINING SYSTEM, WHERE THE FLUE GAS IS NOT REHEATED DOWNSTREAM OF THE FGD SYSTEM AND IS AT WATER DEW POINT DURING IT'S PRESENCE IN THE CHIMNEY. <u>Notes:</u> BIDDER SHALL SUBMIT CERTIFICATE ISSUED BY OWNERS OF POWER PLANT FOR OPERATION OF WET FLUE CHIMNEY WITH THE LINING SYSTEM, MANUFACTURED BY SAME PROPOSED OEM. ANY ADDITIONAL DOCUMENT REQUIRED IN SUPPORT OF THE ABOVE DOCUMENTS TO ESTABLISH THE CORRELATION BETWEEN THE ABOVE DOCUMENTS AND THE LINING SYSTEM AS DESCRIBED IN 2.1(A) SHALL BE PROVIDED BY THE BIDDER.
2.4 (a)	THE BIDDER/BIDDER'S AGENCY SHOULD HAVE CARRIED OUT WET STACK FLOW STUDY IN AT LEAST TWO (2) PROJECTS WITH MINIMUM 275MTR HEIGHT OF CHIMNEY & MINIMUM 660 MW CAPACITY OF POWER PLANT. THE BIDDER SHALL FURNISH THE FOLLOWING SUPPORTING DOCUMENTS FOR ASSESSMENT OF BIDDER W.R.T. PQ CRITERIA 2.4 (a)
2.4 (b)	IN CASE, THE BIDDER ENGAGES AN AGENCY FOR CONDUCTING THE WET STACK FLOW MODEL STUDY THEN AN AUTHORIZED LETTER FROM THAT AGENCY MUST BE PROVIDED CITING THE AGREEMENT BETWEEN THE BIDDER AND AGENCY AND SUCH LETTER SHALL COMPRISE OF ALL THE PROJECTS THAT REQUIRES WET STACK FLOW MODEL STUDY
2.4 (c)	BIDDER SHALL FURNISH THE ORDER COPY/ STUDY REPORTS/ SUPPORT DOCUMENTS OF TWO EXECUTED CONTRACTS AS INDICATED IN SI No 2.4(a)
2.4 (d)	BIDDER SHALL FURNISH THE DOCUMENT IN SUPPORT OF SUCCESSFUL COMPLETION OF WET STACK FLOW MODEL STUDY AND DESIGN OF THE CONDENSATE COLLECTION SYSTEM FOR JOBS AS INDICATED IN SL NO 2.4(a)

GENERAL NOTES:

A	CONSIDERATION OF BIDDER IS SUBJECT TO CUSTOMER'S APPROVAL / ACCEPTANCE.
B	BIDDER SHOULD SUBMIT VALID PAN OF INDIA.
C	PURCHASE ORDER COPY AND DOCUMENTS/ TECHNICAL DETAILS ETC. ARE TO BE SUBMITTED ALONG WITH THE BID, FOR WHICH THE BIDDER INTENDS TO FURNISH THE PERFORMANCE FEEDBACKS, FOR REFERENCE PURPOSE ONLY.
D	CONSORTIUM/JV BIDDING IS NOT ALLOWED.
E	BIDDER TO SUBMIT ALL SUPPORTING DOCUMENTS IN ENGLISH. IF DOCUMENTS SUBMITTED BY BIDDER ARE IN LANGUAGE OTHER THAN ENGLISH, A SELF-ATTESTED

	ENGLISH TRANSLATED DOCUMENT CERTIFIED BY ANY REPUTED AGENCY SHOULD ALSO BE SUBMITTED.
F	NOTWITHSTANDING ANYTHING STATED ABOVE, BHEL RESERVES THE RIGHT TO ASSESS THE CAPABILITIES AND CAPACITY OF THE BIDDER TO PERFORM THE CONTRACT, SHOULD THE CIRCUMSTANCES WARRANT SUCH ASSESSMENT IN THE OVERALL INTEREST OF BHEL.
G	AFTER SATISFACTORY FULFILMENT OF ALL THE ABOVE CRITERIA/ REQUIREMENT, OFFER SHALL BE CONSIDERED FOR FURTHER EVALUATION AS PER NIT AND ALL OTHER TERMS OF THE TENDER SUBJECT TO CUSTOMER'S APPROVAL.
H	BIDDER MUST NOT BE UNDER BANKRUPTCY CODE PROCEEDINGS (IBC) BY NCLT OR UNDER LIQUIDATION / BIFR, WHICH WILL RENDER HIM INELIGIBLE FOR PARTICIPATION IN THIS TENDER, AND SHALL SUBMIT UNDERTAKING TO THIS EFFECT.

NO DEVIATION CERTIFICATE

(TO BE SUBMITTED IN BIDDER'S LETTERHEAD)

To
BHARAT HEAVY ELECTRICALS LIMITED,
Power Sector - Eastern Region,
Plot no 9/1, DJ Block, Sector – II, Salt Lake City,
Kolkata – 700 091

Sub	NO DEVIATION CERTIFICATE	
Job	Design, Supply, handling during materials receipt, storage and execution including erection, testing and all associated services for fixing of Borosilicate Glass Block Lining, expansion compensator joints etc. along with providing Expert Supervision services during installation including Wet Stack Flow Model Study for 275 mtr. tall single flue chimney at 1x660 MW Sagardighi Unit#5, Murshidabad, West Bengal.	
Ref	1.0	TENDER NO - PSER:PUR:PMX:373(III):063 (ENQ:22:PP:0015:PUR:84) DATE: 19/10/2022
	2.0	Other references (if any).

Dear Sir,

With reference to above tender, this is to confirm you that we have gone through each and every terms and conditions mentioned in the enquiry (Terms and Conditions) and we offer our unqualified acceptance of the same. This is also 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/newspapers and in case of 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 *and confirm our acceptance to **reverse auctioning process*** and we hereby convey our unqualified acceptance to all terms and conditions as stipulated in the tender and NIT.

It is also confirmed that the price has been quoted in the format received with the enquiry. We confirm that, we do not have any objections to splitting the quantity among the different bidders by BHEL and price shall remain firm till the completion supply of full ordered quantity.

Any deviation found subsequently at any time during execution of order shall be treated null and void.

Thanking you,

Yours faithfully,

(Signature, date & seal of authorised
representative of the contractor

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

(To be typed and submitted in the Letter Head of the statutory auditor or cost auditor of the company (in the case of companies) or a practising cost accountant or practicing chartered accountant (in respect of suppliers other than companies)

To,

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

Dear Sir,

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

Ref : 1) NIT/Tender Specification No: **PSER: PUR: PMX: 373(III): 063 (ENQ: 22: PP: 0015: PUR: 84) DATE: 19/10/2022**.....
2) All other pertinent issues till date

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

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

1. _____	2. _____
3. _____	4. _____

...

...

...

Thanking you,
Yours faithfully,

(Signature, Date & Seal of Authorized Signatory of Statutory Auditor/Cost Auditor/ practicing Cost Accountant/practicing Chartered Accountant)

** - Strike out whichever is not applicable.

Note:

1. Bidders to note that above format Duly filled & signed by authorized signatory, shall be submitted along with the techno-commercial offer.
2. In the event of false declaration, actions as per the above order and as per BHEL Guidelines shall be initiated against the bidder.

CERTIFICATE

(regarding bidder from a country which shares a land border with India)

(To be submitted in the bidder's letter head)

In-line with Department of Expenditure's (DoE) Public Procurement Division Order vide ref. F.No.6/18/2019-PPD dated 23.07.2020 & 24.07.2020

Job: DESIGN, SUPPLY, HANDLING DURING MATERIALS RECEIPT, STORAGE AND EXECUTION INCLUDING ERECTION, TESTING AND ALL ASSOCIATED SERVICES FOR FIXING OF BOROSILICATE GLASS BLOCK LINING, EXPANSION COMPENSATOR JOINTS ETC. ALONG WITH PROVIDING EXPERT SUPERVISION SERVICES DURING INSTALLATION INCLUDING WET STACK FLOW MODEL STUDY FOR 275 MTR. TALL SINGLE FLUE CHIMNEY AT 1X660 MW SAGARDIGHI UNIT#5, MURSHIDABAD, WEST BENGAL.

Tender No.: PSER:PUR:PMX:373(III):063 (ENQ:22:PP:0015:PUR:84) DATE: 19/10/2022

"I have read the tender clauses pertaining to Department of Expenditure's (DoE) Public Procurement Division Order (Public procurement no 1, 2 & 3 vide ref. F.No.6/18/2019-PPD dated 23.07.2020 & 24.7.2020) regarding restrictions on procurement from a bidder of a country which shares a land border with India. I hereby certify that this bidder is not from such a country or, if from such a country, has been registered with the Competent Authority. I hereby certify that this bidder fulfills all requirements in this regard and is eligible to be considered. [Where applicable, evidence of valid registration by the Competent Authority shall be attached]"

For and behalf of _____ (Name of the bidder)

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

Certificate by Chartered Accountant on letter head

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

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

1. **For Manufacturing Enterprises:** Investment in plant and machinery (i.e. original cost excluding land and building and the items specified by the Ministry of Small Scale Industries vide its notification No.S.O.1722(E) dated October 5, 2006:
Rs Lacs
2. **For Service Enterprises:** Investment in equipment (original cost excluding land and building and furniture, fittings and other items not directly related to the service rendered or as may be notified under the MSMED Act, 2006:
Rs Lacs
3. **For Enterprises (having EM-Part-II / UAM):** Investment in plant and machinery or equipment is Rs..... Lacs and turnover is Rs. Lacs {as notified in MSME notification no. S.O. 2119 (E) dated 26-06-2020}.
4. **For Enterprises (Udyam, registered under Udyam Registration Portal):** Investment in plant and machinery or equipment is Rs.....Lacs and turnover is Rs.....Lacs {as notified in MSME notification no. S.O. 2119 (E) dated 26-06-2020}.

(Strike off whichever is not applicable)

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

Or

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

Date:

(Signature)

Name-

Membership number –

Seal of Chartered Accountant

पावर सेक्टर पूर्वी क्षेत्र (मुख्यालय) POWER SECTOR EASTERN REGION, DJ-9/1, SALT LAKE CITY, KOLKATA - 700 091 फैक्स/Fax: (033) 23211960 फ़ोन/Phone: बोर्ड/EPABX: 23398220	Page - 16 of 39

FORMAT FOR SEEKING CLARIFICATION

Job	Design, Supply, handling during materials receipt, storage and execution including erection, testing and all associated services for fixing of Borosilicate Glass Block Lining, expansion compensator joints etc. along with providing Expert Supervision services during installation including Wet Stack Flow Model Study for 275 mtr. tall single flue chimney at 1x660 MW Sagardighi Unit#5, Murshidabad, West Bengal.			
Tender No	PSER:PUR:PMX:373(III):063 (ENQ:22:PP:0015:PUR:84) DATE: 19/10/2022			
Sl. no	Reference clause of tender document	Existing provision	Bidder's query	BHEL's clarification

SUSPENSION OF BUSINESS DEALINGS WITH SUPPLIERS/ CONTRACTORS

1.0	<u>Suspension of Business dealings with Suppliers/ Contractors</u>
1.1	BHEL reserves the right to take action against Suppliers/ Contractors who fail to perform or indulge in malpractices, by suspending business dealings with them.
1.2	Suspension of business dealings with Suppliers/ Contractors could be in the form of following: -- a) Hold within the unit for specific item(s)/ material category(ies)/ type of work(s) for one year. b) Hold within the unit for all item(s)/ material category(ies)/ type of work(s) for two years c) Banning across BHEL for all items/ material category(ies)/ type of work(s) for three years. The Supplier may be either put on hold or banned, as detailed hereinafter on the basis of one or more of the category wise reasons as enumerated hereunder.
1.3	Hold within the unit for a specific item(s)/ material category(ies)/ type of work(s) shall be imposed in the following cases, if i) In the last three consecutive supplies of a specific material category, average quality rating, as provided in the supplier performance rating (SPR) as per SEARP, falls below 80% of the quality weightage. This is irrespective of supplies against PO(s) having single/ multiple delivery schedules. Note: Not applicable in cases for erection works of Power Sector Regions, where separate guidelines for evaluation of capacity of bidders is being followed. ii) Two consecutive delays, for reasons of delay attributed to the Supplier, in execution of the contracts where delay occurred is such that a) prescribed maximum LD time limits of the contracts is exceeded or b) delay period has equaled/ exceeded half the original delivery period specified in the contracts whichever among the above is earlier. iii) a) Overall SPR (Supplier Performance Rating) in that particular Unit in line with SEARP falls below 60% of the specific material category. b) Bids of contractors (in PS-MSX portal) shall not be considered (if average score of last six months falls 60% or below as per guidelines for evaluation of capacity of bidders formula). Note: – for (b), No specific period of hold shall be applicable. iv) Supplier works are under strike/ lockout for a period of more than three months. Hold within the unit for all item(s)/material category(ies)/ type of work(s) shall be put in the following cases, if i) Supplier tampers with tendering procedure affecting ordering process. ii) Supplier has misused BHEL documents/ drawings/ technical information or has breached the confidentiality agreement with BHEL. iii) after placement of order, Supplier fails to execute the contract. iv) within warranty period as per contract, Supplier continues to supply low/ less/ non-performing equipment/ services, repetitive failures, remains non-responsive. v) Wherever risk purchase clause (amounting to more than 5% of contract value) has been invoked. vi) After price bid opening but before placement of order, Supplier withdraws his offer or varies it in any manner within the validity period.
1.4	Banning across BHEL shall be imposed in following cases, if
1.4.1	i) Supplier is found to be responsible for submitting fake/ false/ forged documents, certificates, or information or misrepresentation/ wilful suppression of facts, or has resorted to unethical, illegal means or has forged BHEL documents, certificates etc. for securing business, meeting PQR or for enlistment in BHEL or with customers other than BHEL. ii) In spite of warnings, the Supplier persistently violates or circumvents the provisions of labour laws/ regulations/ rules or other statutory requirements. iii) Supplier is found to be involved in cartel formation or in any other act so as to influence the bidding process or influence the price. iv) The Supplier has indulged in malpractices or misconduct such as bribery, corruption and fraud, pilferage, coercion etc. v) The Supplier is found guilty by any court of law for criminal activity/ offences involving moral turpitude in relation to business dealings. vi) Supplier is found to have obtained any internal information/ documentation of BHEL by unauthorized means. vii) The foreign Principals along with the representing Agent shall be banned together if information submitted by them about their precise relationship, commission/ remuneration etc. payable/ receivable and other particulars as asked by BHEL, as per the extant guidelines regarding dealing with Agents of Foreign Suppliers is found false/ incorrect, at any stage. viii) Supplier has substituted, damaged, failed to return, or unauthorizedly disposed off free issue materials/ tools etc. of BHEL.
1.4.2	A Supplier can also be banned with the approval of Director (E, R&D) provided a direction to this effect has been received from the administrative ministry of the Government.

Note: Above shall be applicable along with Guidelines for “Suspension of Business dealings with Suppliers/ Contractors” available in BHEL website <http://www.bhel.com>. These shall form part of tender documents.

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: **PSER:PUR:PMX:373(III):063 (ENQ:22:PP:0015:PUR:84) DATE: 19/10/2022**

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 Authorized 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.

=====

ANNEXURE-IX

DECLARATION

Date: -----

Job: "DESIGN, SUPPLY, HANDLING DURING MATERIALS RECEIPT, STORAGE AND EXECUTION INCLUDING ERECTION, TESTING AND ALL ASSOCIATED SERVICES FOR FIXING OF BOROSILICATE GLASS BLOCK LINING, EXPANSION COMPENSATOR JOINTS ETC. ALONG WITH PROVIDING EXPERT SUPERVISION SERVICES DURING INSTALLATION INCLUDING WET STACK FLOW MODEL STUDY FOR 275 MTR. TALL SINGLE FLUE CHIMNEY AT 1X660 MW SAGARDIGHI UNIT#5, MURSHIDABAD, WEST BENGAL."

E-Tender No.: PSER:PUR:PMX:373(III):063 (ENQ:22:PP:0015:PUR:84) DATE: 19/10/2022

To: -----
Address: ----- BHEL, -----

Email: -----

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

Dear Sir/Madam,

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

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

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

Regards,

(-----)

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

ANNEXURE-X

UNDERTAKING

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

To,

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

Dear Sir/Madam,

Sub: DECLARATION REGARDING INSOLVENCY/ LIQUIDATION/ BANKRUPTCY PROCEEDINGS

Ref: NIT/Tender Specification No:

I/We,

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

(With Name, Designation and Company seal)

Sign. of the Authorised Signatory

Place:

Date:

PART - F

GENERAL TERMS & CONDITIONS OF REVERSE AUCTION

Against this enquiry for the subject item/ system with detailed scope of supply/service as per tender specifications, BHEL shall be resorting to "REVERSE AUCTION PROCEDURE" i.e., ON LINE BIDDING (THROUGH A SERVICE PROVIDER). The philosophy followed for reverse auction shall be English Reverse (No ties).

1. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
2. Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered for RA.
3. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.
4. In case of reverse auction, BHEL will inform the bidders the details of Service Provider to enable them to contact & get trained for participation in the reverse auction.
5. Business rules like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.
6. Bidders have to fax /e-mail the Compliance form (annexure III) before start of Reverse auction. Without this, the bidder will not be eligible to participate in the event.
7. In line with the NIT terms, BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at "Total Cost to BHEL" which is inclusive of all cost elements in line with terms & conditions of the tender for each of the bidder to enable them to fill-in the price and keep it ready for keying in during the Auction.
8. Reverse auction will be conducted on scheduled date & time.
9. At the end of Reverse Auction event, the lowest bidder value will be known on auction portal.
10. The lowest bidder has to fax/e-mail the duly signed and filled-in prescribed format for price breakup including that of line items, if required, (Annexure VI) as provided on case-to-case basis to Service provider within two working days of Auction without fail.
11. Bidders shall be required to read the "Terms and Conditions" section of the auctions site of Service provider, using the Login IDs and passwords given to them by the service provider before reverse auction event. Bidders should acquaint themselves of the "Business Rules of Reverse Auction", which will be communicated before the Reverse Auction.
12. The Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action as per extant BHEL guidelines for suspension of business dealings (as available on www.bhel.com), shall be initiated by BHEL and the results of the RA scrapped/ aborted.
13. Reverse Auction will be conducted if two or more bidders are techno-commercially qualified. In case of two or three qualified bidders, there shall be no elimination of H1 bidder (whose quote is highest in sealed envelope price bid). In case of four qualified bidders, the H1 bidder shall be eliminated whereas in case of five qualified bidders, H1 & H2 bidders shall be eliminated. However, in case of six or more qualified bidders are available, RA would be conducted amongst first 50% of the bidders arranged in the order of prices from lowest to highest. Number of bidders eligible for participating in RA would be rounded off to next higher integer value if number of qualified bidders is odd (e.g. if 7 bids are qualified, then RA will be conducted amongst lowest four bidders). However, there will be no elimination of qualified bidders who are MSE or qualifying under PPP-MII, Order 2017, irrespective of the number of bidders qualifying techno-commercially.

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

SL. NO.	BHEL STANDARD TERMS	Bidder's confirmation
1.	Our requirement is for <u>use at 1x660 MW Sagardighi Unit#5, Murshidabad, West Bengal.</u> <u>Offers are invited to submit in two-parts.</u> <u>Part-I : TECHNICAL-CUM-COMMERCIAL AND UN PRICED BID :</u> Consisting of complete technical details, catalogues, drawings and all commercial terms. (Money values shall not be indicated i.e; un price bid). Following formats are to be filled and submitted in a single cover super scribing as Technical - cum - Commercial and Un Priced Bid, Tender Enquiry No. and Due Date. (i) Technical Specification (Catalogues to be enclosed if any) (ii) BHEL Standard Terms & Conditions (iii) No deviation certificate (Part-D) (iv) Un Price Bid <u>Part-II : PRICE BID</u> Price to be indicated in the format enclosed. (Any preconditions for price will not be accepted and the tender will be rejected). The Technical-Cum-Commercial offer will be opened first, scrutinized, finalized and only then the price bid of technically acceptable offers will be opened. Tenders will be received up to 14.00 Hours on the said due date.(Refer NIT for details) <u>If the vendor submits offer i.e. Technical & Price bid together in single envelope, the offer will be liable for rejection.</u>	
2.	If any vendor sought to quote through their agents "They have to inform to BHEL in advance, before opening date. Otherwise the offer will be treated as Unsolicited Offer and same will not be opened".	
3.	BHEL keeps its right to reject / load any offer which is having deviations to BHEL Specifications, Standard Terms & Conditions. All the bidders shall submit their offers only by filling the original BHEL tender documents. No other offer will be entertained. In case of Technical-Cum-Commercial bid, copy of the price bid has to be used to indicate commercial terms without price.	
4.	Your offer shall be strictly conforming to the specification and for complete unit, as per tender.	
5.	No offer for individual accessories or part machinery will be accepted. No revision in rates shall be entertained after opening of the tenders.	
6.	<u>PAYMENT TERMS:</u> Shall be as per SCC(Supply+Service) of tender. No advance shall be paid. Payment shall be paid in INR , in line with relevant clause of SCC.	
7.	<u>WARRANTY/GUARANTEE:</u> As specified in SCC (Supply +Service)/TCC OF TENDER.	
8.	<u>DELIVERY TERMS:</u> As specified in TCC/ SCC OF TENDER.	
9.	<u>DISCOUNTS:</u> Discounts offered by the vendor in price shall not be entertained by BHEL. The vendor should factor in his discount in the price offer only. In-spite of the same, if a discount is offered by the bidder, the same	

	shall not be considered for evaluation of the offer, but purchase order shall be issued on bidder's final discounted price.	
10.	<u>LIQUIDATED DAMAGE/PENALTY CLAUSE:</u> As per SCC (Supply + Service) of tender document	
11.	a. <u>SECURITY DEPOSIT BANK GUARANTEE(SDBG):</u> Not Applicable b. <u>PERFORMANCE BANK GUARANTEE (PBG):</u> Not Applicable	
12.	The sealed tenders super scribing tender number and due date should be addressed to: NOT APPLICABLE	
13.	<u>INSPECTION:</u> As specified in TCC/SCC(Supply +Service) OF TENDER.	
14.	<u>CONSIGNEE DETAILS OF THE EQUIPMENT :-</u> As specified in TCC/SCC (Supply+Service) OF TENDER. All documents / correspondences must bear the Tender no. / Purchase Order No. & Date.	
15.	The manufacturing/job progress will have to be furnished to us periodically in the form and manner required by us.	
16.	Supplier must submit with their offer list of customers (with their full address and their purchase reference number) to whom they have supplied similar machine/material in the past five years. The year of supply should also be indicated.	
17.	The quotation should be valid at least for a period of 180 DAYS from the tender due date of submission (extended, if any).	
18.	<u>FORCE MAJEURE :</u> The vendor shall be subject to force majeure clause defined as under : This force majeure is herein defined as any cause which is beyond the control of the tenderer which they would not have foreseen or with a reasonable amount of diligence could not have foreseen and which subsequently affect the performance of the contract such as SRCC (strike riot and civil commotion), earthquake, flood, acts of god, acts of any government, domestic or foreign including but not limited to war. The tenderer shall not be liable for delay in performing his obligation resulting from any force majeure clause as referred to and/or defined above. The date of completion will be subject to hereinafter provided be extended by a reasonable time even though such cause may occur after tenderer's performance of his obligation has been delayed for other causes.	
19.	<u>ARBITRATION & CONCILIATION</u>	
19.1	<u>ARBITRATION :</u>	
19.1.1	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 19.2 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 19.1.1 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.	
19.1.2	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.	
19.1.3	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.	
19.1.4	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.	
19.2	CONCILIATION: If at any time (whether before, during or after the arbitral or judicial proceedings), any Disputes (which term shall mean and include any dispute, difference, question or disagreement arising in connection with construction, meaning, operation effect, interpretation or breach of the agreement, contract), which the Parties are unable to settle mutually, arise inter-se the Parties, the same may, be referred by either party to Conciliation to be conducted through Independent Experts Committee (IEC) to be appointed by competent authority of BHEL from the BHEL Panel of Conciliators. Notes: 1. No serving or a retired employee of BHEL/Administrative Ministry of BHEL shall be included in the BHEL Panel of Conciliators. 2. Any other person(s) can be appointed as Conciliator(s) who is/are mutually agreeable to both the parties from outside the BHEL Panel of Conciliators. The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided in Procedure 2.3 Procedure for conduct of conciliation proceedings" (as available in www.bhel.com). The Procedure 2.3: "Procedure for conduct of conciliation proceedings" (as available in www.bhel.com) together with its Formats (as available in www.bhel.com) will be treated as if the same is part and parcel hereof and shall be as effectual as if set out herein in this GCC.	

	The Contractor hereby agrees that BHEL may make any amendments or modifications to the provisions stipulated in the Procedure 2.3 : "Procedure for conduct of conciliation proceedings" (as available in www.bhel.com) from time to time and confirms that it shall be bound by such amended or modified provisions of the Procedure 2.3 : "Procedure for conduct of conciliation proceedings" (as available in www.bhel.com) with effect from the date as intimated by BHEL to it.	
19.3	<u>No Interest payable to Contractor</u> 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.	
20.	<u>JURISDICTION :</u> All disputes or differences arising out of or in connection with the Purchase Order shall be subject to the exclusive jurisdiction of Courts (pecuniary or territorial) viz Commercial Court Rajarhat/ District Court Barasat (24 PGN North) as the case may be and Calcutta High Court at Kolkata	
21.	<u>RIGHTS OF BHEL:</u> (A) To withdraw any portion of work/supply and/or to restrict / alter the quantum of work/supply as indicated in the contract during the progress of work/supply and get it done through other agency and/or to suit BHEL's commitment to its customer or in case BHEL decides to advance the date of completion due to other emergency reasons / BHEL's obligation to its customer. (B) To terminate the contract or withdraw portion of work/supply 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/Supplier's poor progress of the work vis-à-vis execution timeline as stipulated in the Contract, backlog attributable to contractor/supplier including unexecuted portion of work/supply 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/Non-supply by the Contractor / Supplier within scheduled completion/delivery period as per Contract or as extended from time to time, for the reasons attributable to the contractor/supplier. iv) Termination of Contract on account of any other reason (s) attributable to Contractor/Supplier. v) Assignment, transfer, subletting of Contract without BHEL's written permission resulting in termination of contract or part thereof by BHEL. vi) Non-compliance to any contractual condition or any other default attributable to Contractor/ Supplier. (#) In-case inputs from BHEL/Customer are likely to be delayed or are actually delayed, this delay may also be taken into account while considering balance period available for execution of Contract. (C) <u>Risk & Cost Amount against Balance Work:</u> Risk & Cost amount against balance work shall be calculated as follows: Risk & Cost Amount= [(A-B) + (A x H/100)] Where, A= Value of Balance scope of Work/Supply (*) as per rates of new contract B= Value of Balance scope of Work/Supply (*) as per rates of old contract being paid to the contractor / supplier 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 / supply (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 / Supply 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: In-case portion of work is being withdrawn, contract quantities pertaining to portion of work withdrawn shall be considered as 'Balance scope of work / supply' for calculating Risk & Cost amount. (D) LD against delay in executed work/ supply in case of Termination of Contract : LD against delay in executed be work / supply shall calculated in line with LD clause as per GCC/SCC/TCC/Special note/any other annexure of tender document (in compliance with order of precedence), for the delay attributable to contractor / supplier. For this purpose, contract value shall be taken as Executed Value of work / supply for the purpose of limiting the maximum LD value. Method for calculation of "LD against delay in executed work / supply" 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 / supplier = T1 ii) Let the value of executed work / supply till the time of termination of contract= X iii) Let the Total Executable Value of work / supply for which inputs/fronTS were made available to contractor / supplier and were planned for execution till termination of contract = Y iv) Delay in executed work / supply attributable to contractor/supplier i.e. $T2 = [1 - (X/Y)] \times T1$ v) LD shall be calculated in line with LD clause [as per GCC/SCC/TCC/Special note/any other annexure of tender document (in compliance with order of precedence)] of the Contract for the delay attributable to contractor / supplier taking "X" as Contract Value and "T2" as period of delay attributable to contractor/ supplier. (E) Recoveries arising out of Risk & Cost and LD or any other recoveries due from Contractor. Following sequence shall be applicable for recoveries from contractor / supplier on whom risk & cost has been invoked, after informing the contractor / supplier of the total proposed recovery : a) Dues available in the form of Bills payable to contractor / supplier, SD, BGs against the same contract. b) Demand notice for deposit of balance recovery amount shall be sent to contractor/ supplier, if funds are insufficient to effect complete recovery against dues indicated in (a) above. c) If contractor / supplier 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 / supplier against other contracts in the same Region / Unit shall be considered for recovery. ii) If recovery cannot be made out of dues payable to the contractor / supplier 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 / supplier. iii) In-case recoveries are not possible with any of the above available options, Legal action shall be initiated for recovery against contractor / supplier.	
22.		
i)	Bank Guarantee: Non submission of 10% BG (if applicable) will attract 10% loading on the offers.-Not Applicable	
ii)	Penalty Clause: Non acceptance of penalty clause will attract maximum 10% loading on the offer and accordingly proportionate percentage will be loaded for accepting less percentage of penalty clause. Ex: If the supplier has accepted for maximum 5% penalty clause, then balance 5% will be loaded.	
iii)	For all other Terms & Conditions, if the offer is not confirming to the same, BHEL at its discretion shall load the same and the loading pattern shall be intimated to the bidders before price bid opening. However BHEL reserves the right to cancel a bid in case of non-acceptance of any terms and conditions finally arrived before price bid opening.	
23	Note: The offers not complying the above Terms & Conditions will not be accepted.	

Note:

01. In case of any conflict / inconsistency in any clause of the tender or between various sections of the tender, bidder should bring the same in writing to BHEL for clarification before submission of the bid, failing which the most stringent interpretation of the clause in favour of BHEL shall be adopted and the same shall be binding to the bidder.
02. Any deviation sought by the bidder should be indicated in the techno-commercial offer.
- 03. Bidder should write “accepted” in the column “Bidder’s confirmation” for each clause.**
04. If any clause left blank, shall be presumed that the clause is accepted by the bidder.

SIGNATURE OF THE BIDDER WITH SEAL AND DATE

PART-E

PRICE SCHEDULE (UNPRICED) - VOLUME-III

PLEASE REFER
E-PROCUREMENT PORTAL <https://eprocurebhel.co.in>

PART-E

PRICE SCHEDULE - VOLUME-III

PLEASE REFER
E-PROCUREMENT PORTAL <https://eprocurebhel.co.in>

ABOVE TO BE READ ALONG WITH SCHEDULE-2 (WEIGHTAGE/PERCENTAGE
ALLOCATION) OF PRICE SCHEDULE (VOLUME-III)

VOLUME-III, PRICE SCHEDULE, REV-00						
Design, Supply, handling during materials receipt, storage and execution including erection, testing and all associated services for fixing of Borosilicate Glass Block Lining, expansion compensator joints etc. along with providing Expert Supervision services during installation including Wet Stack Flow Model Study for 275 mtr. tall single flue chimney at 1x660 MW Sagardighi Unit#5, Murshidabad, West Bengal.						
<u>E-TENDER NUMBER - PSER:PUR:PMX:373(III):063 (ENQ:22:PP:0015:PUR:84) DATE: 19/10/2022</u>						
SCH-1-TOTAL PRICE						
SL. NO.	DESCRIPTION OF EQUIPMENT/ITEM	PRICE SCHEDULE REF	QUANTITY	UOM	UNIT PRICE (IN INR)	TOTAL PRICE (IN INR)
1.0	MAIN JOB: "Design, Supply, handling during materials receipt, storage and execution including erection, testing and all associated services for fixing of Borosilicate Glass Block Lining, expansion compensator joints etc. along with providing Expert Supervision services during installation including Wet Stack Flow Model Study for 275 mtr. tall single flue chimney at 1x660 MW Sagardighi Unit#5, Murshidabad, West Bengal."	SCH 2 - BREAK UP OF TOTAL PRICE	1	LOT	TO BE FILLED ONLINE ONLY	TO BE FILLED ONLINE ONLY
2.1	OPTIONAL ITEMS/SERVICES Optional Price for Storage of Physical Model per Month after 1 Year of No Cost Storage (Not to be considered for Bid evaluation)		1	PER MONTH		
2.2	OPTIONAL ITEMS/SERVICES Optional Price for site inspection and supervision beyond 7 days (w.r.t. above srl. No.3f of SCH-2) on per day basis (Not to be considered for Bid evaluation)		1	PER MAN- DAY		
NOTE:-						
1.0	Bidder shall quote TOTAL PRICE for SCH-1- Part for Main Job at SI no 1.0 above. All other amounts/ rates of each item at SCH-2, BREAK UP OF TOTAL PRICE (For Main Job) 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 of this SCH-1(Main Job) shall be considered for evaluation & awarding.The Total Price for MAIN JOB shall be All Inclusive FOR DESTINATION PRICE ,including all taxes and duties but excluding GST and BOCW Cess (if any) .As such grand total price should be complete in all respect for the full scope defined and considering all terms and conditions.GST and BOCW Cess shall be paid extra as applicable.					
3.0	Bidder to note that SCH-2 is Break- up of Total Price at SI No 1.0 (Except Optional Items/Services)					
4.0	Bidder to quote Price for Optional Items/Services mandatorily at SI. No. 2.1 & 2.2 of SCH-1 .However , Optional items/Services shall not be considered for Evaluation purpose .Optional item/services may or may not be ordered depending on the actual requirement at site during execution. BHEL reserves the right to rationalize the rates for Optional items/services , quoted by L1 bidder , against item wise lowest rates for Optional items /services (among the participating bidders) , before placement of order .					
5.0	Bidder's quoted total price at SI. no 1.0 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.					
6.0	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 items after rounding off .					
7.0	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 SI No.8 below.					

E-TENDER NUMBER - PSER:PUR:PMX:373(III):063 (ENQ:22:PP:0015:PUR:84) DATE: 19/10/2022

8.0	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 4 decimal places will be taken into account. Any adjustment, if required, due to such methodology, will be effected in final bill.
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	Rates shall remain Firm for any increase or decrease in the Order/ Contract value both for supply and services up to plus or minus 15% (for any amendment) within two years from the date of original PO

Project-1x660 MW Sagardighi Unit#5, Murshidabad, West Bengal.				
PRICE SCHEDULE				
Design, Supply, handling during materials receipt, storage and execution including erection, testing and all associated services for fixing of Borosilicate Glass Block Lining, expansion compensator joints etc. along with providing Expert Supervision services during installation including Wet Stack Flow Model Study for 275 mtr. tall single flue chimney at 1x660 MW Sagardighi Unit#5, Murshidabad, West Bengal.				
<u>E-TENDER NUMBER - PSER:PUR:PMX:373(III):063 (ENQ:22:PP:0015:PUR:84) DATE: 19/10/2022</u>				
SCH-2 -BREAK UP OF TOTAL PRICE				
SL No.	Description of Item	Unit	Quantity	WEIGHTAGE
MAIN JOB				
1	Supply & Works			
1.1	Design and supply of borosilicate glass block lining system consisting of minimum 38 mm thick closed cell borosilicate glass block, two component adhesive membrane having a minimum thickness of 3 mm and suitable epoxy primer (as per TCC Clause No. 7.6 & 7.8) including testing of material, getting approval of design/drawings and installation procedure from BHEL/owner, ten years full replacement guarantee (including cost of material, installation and arrangement for installation etc. required for replacement) etc. all complete as per specification, drawings and as directed by the Engineer-in-charge. Quantity for payment shall be the area covered by the borosilicate glass block lining system.	SQM	5800	0.761172105
1.2	Transportation from store and installation of closed cell borosilicate glass block lining system at all elevations, on ground or in erected position, with minimum 38 mm thick borosilicate glass block, adhesive membrane, grit blasted of substrate to a cleanliness of Sa 2 ½ finish and application of suitable primer, in supervision and as directed by and satisfaction of borosilicate glass block manufacturer (paid vide item no 2.1), required testing, getting approval of design/drawings and installation/working procedure as required from BHEL/customer etc all complete as per specification, drawings and as directed by the Engineer-in-charge including cost of skilled labour, material, tools & tackles, equipments etc all complete. Installation of borosilicate lining shall be done under controlled temperature and humidity conditions, as mentioned in specification, including providing all equipments required to create controlled temperature & humidity conditions inside chimney during installation, hot air blow cleaning of internal surface before application etc. all complete. Note: Surface preparation will be in the scope of application agency as per item specification	SQM	5800	0.146057329

1.3	Design, Providing, fabricating and installing expansion compensator joints in the flue liner, comprises of acid resistant elastomeric fabric, suitable for wet stack operations, shall be acid resistant to withstand acidic flue gas condensates arising out of flue gas parameters & operating conditions as per specification and shall also prevent dust accumulation including all labour, material and equipment transporting, hoisting, fixing in position, drilling, cutting, bolts and bolting, etc. along with the user handbooks (giving details of installation, dismantling and maintenance procedures for the expansion joints), testing, approval from BHEL/customer etc complete as per drawings and specifications. Design of expansion joint shall be duly approved by BHEL/owner and the same shall comply EPRI guideline to avoid contact of condensate with expansion joint material and to ensure drainage of condensate. Note: Fixing of expansion compensator with necessary arrangement shall be in the sope of borrosilicate application agency.	SQM	90	0.041586249
1.4	Design & Supplying ,Fabricated Ready to Install, spare expansion compensators along with bolster as specified in item no. 1.3 including the cost of all labour, material and equipment, accessories, transporting, proper packaging (for several years of storage), and delivery to site store (BHEL/Owner) complete in all respects as per drawings and specification	SQM	15	0.005885511
2	Expert Supervision			
2.1	Expert supervision by manufacturer/supplier during surface preparation of substrate, application of primer, mixing of two components adhesives membrane, application of adhesive membrane, installation of borosilicate, acid resistant materials etc. all complete. Note : Mixing Machine, special T&P and all other miscellaneous equipment and accessories shall be provided by Manufacturer / Supplier on Free of Cost (FOC) basis.	Man-Days	50	0.015694719
3	Conducting Wet Stack Flow Model Study with following:			
3a	Condensation Calculations	Lumpsum	1	0.029604086
3b	Design of Condensate collection system			
3c	CFD Plume Downwash Study			
3d	Design of Optimum Choke Geometry (if required)			
3e	Physical Wet Stack Study			
3f	Site Inspection and Supervision for 7 days			
	Grand Total			1.000000000
OPTIONAL ITEMS /SERVICES				
SL No.	Description of Item	UOM		RATE IN Rs.
4.1	Optional Price for Storage of Physical Model per Month after 1 Year of No Cost Storage (Not to be considered for Bid evaluation)	Per Month		TO BE FILLED ONLINE ONLY IN SCH -1
4.2	Optional Price for site inspection and supervision beyond 7 days (w.r.t. above srl. No.3f) on per day basis (Not to be considered for Bid evaluation)	Per Manday		TO BE FILLED ONLINE ONLY IN SCH-1

PART-H:
FORMS AND PROCEDURES

F-01

RTGS FORMAT

Form for getting payment through RTGS (Real Time Gross Settlement)

01. NAME OF VENDOR:
02. ADDRESS:
03. VENDOR'S BANK A/C NAME:
04. VENDOR'S BANK A/C NO.:
05. NAME OF BANK:
06. NAME OF BRANCH:
07. BRANCH PH. NO.:
08. CITY:
09. IFSC CODE OF THE BRANCH:

THE CHARGES IF ANY FOR PAYMENT THROUGH RTGS MAY BE RECOVERED FROM THE BILL SUBMITTED BY US.

SIGNATURE OF AUTHORISED
REPRESENTATIVE OF VENDOR WITH DATE
& SEAL

CONFIRMATION BY BANKER WITH
OFFICE SEAL

Note: Incorrect information will create accounting complications and payment will be delayed.

VENDOR DETAILS

1. **Name & address of the vendor/company:**
2. **PAN No. of the vendor/company (scan copy of PAN Card):**
3. **Contact Person for the vendor/company:**
4. **Mobile number & E-mail of the contact person:**
5. **VAT / TIN:**
5. **CST:**

SIGNATURE OF THE BIDDER WITH DATE & SEAL

FORMAT FOR DETAILS OF BIDDER

NAME OF BIDDER	
FAX NO.	
Registration Number*	
Name of Partners / Directors	
Bidder Type Indian/ Foreign*	
City*	
State*	
Country*	
Postal Code*	
PAN/TAN Number*	
Company's Establishment Year	
Company's Nature of Business*	
Company's Legal Status* {limited company/ undertaking/joint venture/partnership/other}	
Company Category* {micro unit as per MSME/small unit as per MSME/medium unit as per MSME/Ancillary unit/project affected person of this company/ssi/ other}	
Enter Company's Contact Person Details Title(Mr. / Mrs. / Ms. / Dr. / Shri)*	
Contact Name*	
Date Of Birth*	
Correspondence Email* (Correspondence Email ID can be same as your Login ID. All the mail correspondence will be sent only to the Correspondence Email ID.)	
Designation	
Phone*	
Mobile*	

SIGNATURE OF THE BIDDER WITH DATE & SEAL

DECLARATION OF THE BIDDERS

Job: Design, Supply, handling during materials receipt, storage and execution including erection, testing and all associated services for fixing of Borosilicate Glass Block Lining, expansion compensator joints etc. along with providing Expert Supervision services during installation including Wet Stack Flow Model Study for 275 mtr. tall single flue chimney at 1x660 MW Sagardighi Unit#5, Murshidabad, West Bengal.

- 01.** I, ...hereby certify that all the information and data furnished by me with regard to this Tender No. **PSER:PUR:PMX:373(III):063 (ENQ:22:PP:0015:PUR:84) DATE: 19/10/2022** are true and complete to the best of my knowledge.
- 02.** I have gone through the tender specifications, scope of work, terms and conditions mentioned in Annexure as well as General and Special conditions of contract and various stipulations in detail and agree to abide by them and comply with the requirements and intent of specifications.
- 03.** I also certify that there have been no deviations from the tender requirements in the bid submitted against this tender.
- 04.** I further certify that I am duly authorized representative of the under mentioned tenderer and hold a valid power of attorney to this effect, a copy of which is enclosed.

Signature:

Name :

Date :

Designation:

Seal:

Tenderers Name and address

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 No: **PSER:PUR:PMX:373(III):063 (ENQ:22:PP:0015:PUR:84) DATE: 19/10/2022**
- 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:

INTEGRITY PACT**Between**

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

and

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

Preamble

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

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

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

Section 1 - Commitments of the Principal

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

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

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



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

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

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

Section 4 - Compensation for Damages

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



Section 5 - Previous Transgression

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 (three) years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
- 5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason or action can be taken as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

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

- 6.1 The Principal will enter into Integrity Pacts with identical conditions as this Integrity Pact with all Bidders and Contractors.
- 6.2 In case of Sub-contracting, the Principal Contractor shall take the responsibility of the adoption of Integrity Pact by the Sub-contractor(s) and ensure that all Sub-contractors also sign the Integrity Pact.
- 6.3 The Principal will disqualify from the tender process all Bidders who do not sign this Integrity Pact or violate its provisions.

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

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

Section 8 -Independent External Monitor(s)

- 8.1 The Principal appoints competent and credible panel of Independent External Monitor (s) (IEMs) for this Integrity Pact. The task of the IEMs is to review independently and objectively, whether and to what extent the parties comply with the obligations under this Integrity Pact.
- 8.2 The IEMs are not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The IEMs shall be provided access to all documents/ records pertaining to the Contract, for which a complaint or issue is raised before them as and when warranted. However, the documents/records/information having National Security implications and those documents which have been classified as Secret/Top Secret are not to be disclosed.
- 8.4 The Principal will provide to the IEMs sufficient information about all meetings among the parties related to the Contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the IEMs the option to participate in such meetings.



- 8.5 The advisory role of IEMs is envisaged as that of a friend, philosopher and guide. The advice of IEMs would not be legally binding and it is restricted to resolving issues raised by a Bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some Bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.
- 8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process or during execution of Contract, the matter should be examined by the full panel of IEMs jointly, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.
- 8.7 The IEMs would examine all complaints received by them and give their recommendations/ views to the CMD, BHEL at the earliest. They may also send their report directly to the CVO, in case of suspicion of serious irregularities requiring legal/ administrative action. Only in case of very serious issue having a specific, verifiable Vigilance angle, the matter should be reported directly to the Commission. IEMs will tender their advice on the complaints within 30 days.
- 8.8 The CMD, BHEL shall decide the compensation to be paid to the IEMs and its terms and conditions.
- 8.9 IEMs should examine the process integrity, they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the Principal should be looked into by the CVO of the Principal.
- 8.10 If the IEMs have reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code / Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the IEMs may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- 8.11 After award of work, the IEMs shall look into any issue relating to execution of Contract, if specifically raised before them. As an illustrative example, if a Contractor who has been awarded the Contract, during the execution of Contract, raises issue of delayed payment etc. before the IEMs, the same shall be examined by the panel of IEMs. Issues like warranty/ guarantee etc. shall be outside the purview of IEMs.
- 8.12 However, the IEMs may suggest systemic improvements to the management of the Principal, if considered necessary, to bring about transparency, equity and fairness in the system of procurement.
- 8.13 The word 'Monitor' would include both singular and plural.



Section 9 - Pact Duration

- 9.1 This Integrity Pact shall be operative from the date this Integrity Pact is signed by both the parties till the final completion of contract for successful Bidder, and for all other Bidders 6 months after the Contract has been awarded. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings.
- 9.2 If any claim is made/ lodged during currency of this Integrity Pact, the same shall be binding and continue to be valid despite the lapse of this Pact as specified above, unless it is discharged/ determined by the CMD, BHEL.



Section 10 - Other Provisions

- 10.1 This Integrity Pact is subject to Indian Laws and exclusive jurisdiction shall be of the competent Courts as indicated in the Tender or Contract, as the case may be.
- 10.2 Changes and supplements as well as termination notices need to be made in writing.
- 10.3 If the Bidder(s)/ Contractor(s) is a partnership or a consortium or a joint venture, this Integrity Pact shall be signed by all partners of the partnership or joint venture or all consortium members.
- 10.4 Should one or several provisions of this Integrity Pact turn out to be invalid, the remainder of this Integrity Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- 10.5 Only those bidders / contractors who have entered into this Integrity Pact with the Principal would be competent to participate in the bidding. In other words, entering into this Integrity Pact would be a preliminary qualification.
- 10.6 In the event of any dispute between the Principal and Bidder(s)/ Contractor(s) relating to the Contract, in case, both the parties are agreeable, they may try to settle dispute through Mediation before the panel of IEMs in a time bound manner. In case, the dispute remains unresolved even after mediation by the panel of IEMs, either party may take further action as the terms & conditions of the Contract. The fees/expenses on dispute resolution through mediation shall be shared by both the parties. Further, the mediation proceedings shall be confidential in nature and the parties shall keep confidential all matters relating to the mediation proceedings including any settlement agreement arrived at between the parties as outcome of mediation. Any views expressed, suggestions, admissions or proposals etc. made by either party in the course of mediation shall not be relied upon or introduced as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the dispute that is the subject of mediation proceedings. Neither of the parties shall present IEMs as witness in any Alternative Dispute Resolution or judicial proceedings in respect of the dispute that was subject of mediation.


 For & On behalf of the Principal
 (Office Seal)
 Place Kolkata
 Date _____

Witness: Abhijit DE
 (Name & Address) ABHIJIT DE,
BHEL BAAWAN, KOLKATA

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

Witness: _____
 (Name & Address) _____

TECHNICAL CONDITIONS OF CONTRACT (TCC)

“Design, Supply, handling during materials receipt, storage and execution including erection, testing and all associated services for fixing of Borosilicate Glass Block Lining, expansion compensator joints etc. along with providing Expert Supervision services during installation including Wet Stack Flow Model Study for 275 mtr. tall single flue chimney at 1x660 MW Sagardighi Unit#5, Murshidabad, West Bengal.”.

BHARAT HEAVY ELECTRICALS LIMITED

POWER SECTOR EASTERN REGION



Technical Conditions of Contract (TCC)

Contents

Project: 1x660 MW Sagardighi TPP, West Bengal.

S. No.	Description
Volume-IA	Part-I: Contract specific details
1	Project Synopsis And General Information
2	General Scope of Works
3	Facilities at Site
4	Time Schedule
5	Terms of Payment
6	General
7	Technical specification for Borosilicate Glass Block Lining System
8	Technical specification for Wet Stack Flow Model Study
9	Annexures
10	HSE Documents: HSE Plan, HSEOCP_61 Rev01 and HSEOCP_61A Guidelines for Prevention of COVID-19 Infection in Labor Colony

Technical Condition of Contract (TCC)

Chapter –I Project Synopsis & General Information

Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

These Technical conditions shall be construed as part of tender document and shall be read along with General Conditions of Contract. In case of any conflict or inconsistency between the general and these special conditions, the same shall be brought out by the bidder in writing to BHEL for clarification during pre-bid discussions; failing which most stringent interpretation / clause in favor of BHEL shall be adopted and the same shall be binding to the contractor.	
1.0	PROJECT SYNOPSIS AND GENERAL INFORMATION Project name: Sagardighi Thermal Power Extension Project, unit # 5, 1x660 MW. No of unit x capacity: 1 x 660 MW (Super-critical). Project setting up by: West Bengal Power Development Corporation Limited. Design ambient dry bulb temp: 500 C maximum & 50 C minimum. Max relative humidity: 84%. Average rainfall: 1389 mm.
1.1	APPROACH TO SITE The site is located at Manigram, about 13 km north of Sagardighi town by the side of the SMGR (Sagardighi – Manigram – Gankar - Raghunathgunj) road at a distance 20 km. from National Highway 34 in Murshidabad district in W.B and around 240 km from Kolkata. Nearest railway station is Manigram adjacent to the site on Bandel - Barhawara branch line and 6.5 km from Sagardighi Railway Station on Sainthia - Azimgunj line of Eastern Railway. From Sagardighi railway station a railway line will branch off to the site for material unloading and coal marshalling. Nearest Airport: NSC Bose Air Port, Kolkata. Nearest Seaport: Haldia / Kolkata.
1.2	SITE VISIT The bidder must visit the work site of 1x660 MW Sagardighi Thermal Power Project, site, to acquire full knowledge and information about the conditions prevailing at site as well as, in and around the project site, together with the statutory, obligatory, mandatory requirements of various authorities before submission of the bid. Site visit confirmation will be required to be submitted by the bidder with the technical bid.
2.0	GENERAL SCOPE OF WORK
2.1	Scope of this tender covers Design, Supply, handling during materials receipt, storage and execution including erection, testing and all associated services for fixing of Borosilicate Glass Block Lining, expansion compensator joints etc. along with providing Expert Supervision services during installation including Wet Stack Flow Model Study for 275 mtr. tall single flue chimney at 1x660 MW Sagardighi Unit#5, Murshidabad, West Bengal.
2.2	BRIEF SCOPE OF WORK:

Technical Conditions of Contract (TCC)

Chapter- II General Scope of Work

Project: 1x660 MW Sagardighi TPP, West Bengal.

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2.2.1	SUPPLY: The scope of work includes but not limited to design, engineering, supply of material and supervision services required for completion of the work scope as follows:
2.2.2	Supply of Borosilicate Glass Block Lining of minimum 38 mm thickness confirming to physical & chemical properties mentioned in specifications FOR Site with adequate packing including Epoxy Primer and Adhesive Membranes etc. all complete, for application of borosilicate glass block lining over steel flue can of chimney. And Supply of expansion compensator joints comprises of acid resistant elastomeric fabric, suitable for wet stack operations, shall be acid resistant to withstand acidic flue gas condensates arising out of flue gas parameters & operating conditions as per specification and shall also prevent dust accumulation It is bidder's responsibility to assess the supply qty. of Borosilicate by considering transportation damage including extra quantity for wastage etc. as necessary to complete the work. BHEL shall make payment only for the final executed qty. of installed Borosilicate lining. No cost is payable for the damaged items including wastage qty.
2.2.3	Supply of required adhesives / membrane, epoxy primer and special T&P (as mentioned in clause no. 2.9) exclusively required for installation of Borosilicate Glass Blocks shall also be in the scope of vendor. Nominal adhesive/ membrane thickness shall be minimum 3 mm behind & between each block. A 1.5 mm thick layer should be trowelled onto the liner as well as to the sides and back of each block before installation (No extra payment shall be made for supplying Epoxy Primer, Adhesive / Membrane and special T&Ps required for application of borosilicate glass block lining system over steel flue cans). Required Epoxy primer shall be supplied prior to supply of Borosilicate Glass block lining for readiness of Steel flue can at ground level. BHEL shall intimate for supplying Epoxy primer and vendor has to complete supply of Epoxy Primer within three (03) months from the date of BHEL intimation. Although Epoxy Primer is a composite item of Borosilicate Glass block lining but for earlier requirement of Epoxy primer, part payment could be released as per payment break-up (refer payment terms of the tender) for supplying Epoxy primer. Supply quantity of Epoxy primer will be jointly decided with BHEL for effecting payment of Epoxy Primer supply. Application of Epoxy primer also to be taken up by deploying required manpower for application and supervision including required T&P/equipment/instruments for doing Epoxy primer application and checking as per FQP. This application job to be done during fabrication of flue can immediately after sand blasting of fabricated flue can.

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2.2.4	The lining supplier shall provide ten (10) year full replacement guarantee with cost of replacement including material, application-manpower, supervision and T&P and full-time onsite QA supervision for the erected & commissioned lining system supplied by them.
2.2.5	Submission of drawings and getting it approved from BHEL / WBPDCCL for borosilicate glass block lining system, condensate extraction system.
2.2.6	The lining system (borosilicate glass block and adhesive) is expected to be offered by a supplier with demonstrated capabilities in the area of on-site technical support and QA/QC supervision, who employs QA/QC supervisors with a demonstrated experience of at least 5 years in technical support and QA/QC supervision of the subject lining system.
2.2.7	During the entire period of performance guarantee periodic supervision/ monitoring to be provided by expert of borosilicate glass lining system supplier as per requirement intimated by BHEL/ Customer.
2.2.8	A. The square meter area indicated for application of borosilicate glass block is tentative and may vary in case of change in design/application requirements. In case of any increase/decrease in the area in square meters the same shall be intimated before supply of borosilicate glass block, adhesives, membranes and primer etc. and the Lump Sum Price quoted shall be adjusted in proportion to the decrease/increase in the surface area. However, the pro-rata rate worked out for per square meter surface area shall be firm. The Adjustment in price of BOQ item no. 1 shall be made by excluding the price of Mixing Machine and Special T&P /Tools/Tackles (If any). The price of Mixing Machine and Special T&P /Tools/Tackles shall be considered as 0.5% of the total cost of BOQ Item no. 1 for payment purpose. B. The bidder shall provide details of total quantities of borosilicate glass block, adhesives, membranes and primer required for installation of borosilicate glass block lining over the indicated surface area of the chimney (as per details furnished in tender specifications/subsequent variations, if any) according to their detailed engineering. The Bidder shall submit the Billing Break-up (BBU) indicating the total quantities and Unit of Measurement for the indicated surface area for approval of BHEL. The Bidder shall also intimate the per square meter quantities of borosilicate glass, adhesives, membranes and primer required for application as per specifications. C. In case of any increase/decrease in the quantities for the specified area, the bidder shall be responsible for its supply without any price implication within the indicated supply schedule. D. The Manufacturer/supplier shall also provide ten (10) years full replacement guarantee for the system, and bear the cost of replacement, supply, installation all complete, if the lining system deteriorates or fails to protect the chimney flue liner. E. Supply of special T&Ps (as mentioned in clause 2.9) exclusively required for installation of Borosilicate Glass Block lining system shall also be in the scope of vendor. Nominal adhesive/ membrane thickness shall be minimum 3 mm behind & between each block. A 1.5 mm thick layer

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	should be trowelled onto the steel liner as well as on the sides and back of each block before installation <u>NOTE: No extra payment shall be made for special T&Ps required for application of borosilicate glass block lining system over steel flue can.</u>
2.3	<u>SERVICES:</u> The scope of work includes but not limited to Receipt of materials at site and storage at the identified location to be provided by BHEL, handling and shifting of materials during erection, installation of supplied Borosilicate glass block along with expansion compensator joints for erection completion of Glass block lining system of Wet stack chimney. Scope also covers performing all the tests as per specification, submission and getting approval of FQP and providing user handbook for installation, dismantling and future maintenance activities.
2.4	Expert Supervision: A. Expert Supervision and technical support shall be provided by bidder during INSTALLATION of Borosilicate glass block lining system inside steel flue cans. The Bidder shall submit procedure of Borosilicate lining application and demonstrate the application methodology and train the Purchaser and its erection agency with a view to ensure its installation as per specifications and guaranteed parameters. The installation of Borosilicate Glass Lining Blocks, mixing of two components adhesive membrane by automatic mixing machine etc. all complete shall be executed by erection agency under the expert supervision of Borosilicate Glass Lining Blocks supplier. B. Any defect/non-conformity which may have potential impact on the guaranteed parameters shall be pointed out and cleared by the supervising experts through the erection agency. Once, the borosilicate glass block lining is installed under the supervision of the Experts deputed by the Bidder, protocol for completion of installation is to be jointly signed with BHEL/Customer wherefrom Seller shall be under obligation of Guarantee in line with Clause 8.0 of the SCC and 2.2.8 (D) of TCC. C. Number of supervisors as to be deployed and period of deployment should be as per site requirement duly agreed with BHEL. D. Representatives to co-operate with other agencies at site and coordinate in association with BHEL and customer's engineers at site.

Technical Conditions of Contract (TCC)

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	E. All travelling expenses / Visa fees / Medical fees to be borne by bidder. F. Representative to follow the Health, Safety and Environment (HSE) regulations in force at project under the scope of bidder. Refer Document Number: HSEP:14-SGD Rev.: 02, DATE: 01.09.2020, Document Title: Health, Safety and Environment Plan for Site Operation by Subcontractors for Sagardighi. G. Working Hours: To work under local site applicable requirements. No overtime payable. The Man days for payment purpose shall be calculated from the day when bidder reports at site for commencement of borosilicate execution work. H. Medical: Vendor to arrange for medical insurance coverage for their representative. I. Deployment Schedule: Deployment needs to be planned in phased manner depending upon the progress at site. Further review meetings shall be held at site to discuss work progress and deployment program. J. Personnel deputed to site shall be an expert in their field / responsible for direct supervision / execution of field activities. They should be able to interact with their parent division at their HQ for trouble shooting operations / Engg. Clarifications etc. K. Visits as indicated shall be required for deputation. Expert to complete assignment for each phase / visit as per BHEL's requirement. In case of site non-readiness / mutual agreement with construction manager / BHEL, the deputation programme shall be mutually discussed and agreed upon. L. Vendor to indicate their check list with detailed activity network with recommended manpower along with general tool and plants needed for site readiness for deputation of their personnel. M. Project Management meetings shall take place before start of deputation and during course of execution (as per requirement). Responsible representatives from vendor shall attend these meetings on BHEL's call. N. Protocols for applying / erection of Borosilicate shall be signed by vendor's representative at BHEL Site.

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	O. Vendor's representative at site shall be under the administrative control of construction manager / BHEL Site. P. Vendor representative at site shall co-ordinate for their materials availability at site / report shortage / discrepancies of materials and associate himself for coordination / compressing of application / erection of Borosilicate schedule. Q. All out efforts are to be made by both parties to complete site works within the most reasonable time / earliest possible. R. Payment shall be made for visit of vendor representative as per the time count start from reporting at site, leaving the site with the time sheet verified by construction manager / BHEL Site for actual number of man-days utilized and satisfactory completion of works at site. S. Payment shall be released by BHEL on monthly basis against invoices raised by vendor to BHEL Site with certified time sheets. All payment will be in Indian Rupees (INR) as applicable. T. Supply of special tools requirements must be ensured by vendor. U. Under force majeure conditions experts are to be repatriated by the vendor at their own cost. V. All misc. expenses required by vendor's representative at BHEL site are to be borne by vendor itself W. Rates quoted / agreed shall remain firm till the completion of contract. X. Expected period of supervision for applying / erection of Borosilicate shall be as per tender. Note: The installation of Borosilicate Glass Lining Blocks, mixing of two components adhesive membrane by automatic mixing machine etc. all complete shall be executed by erection agency under the expert supervision of Borosilicate Glass Lining Blocks manufacturer / supplier.
2.5	<u>WET STACK FLOW MODEL STUDY</u> The scope of work includes carrying out the Wet stack flow model study for complete duct system from absorber outlet to minimum of three (3) diameter of the stack liner above the top of the stack breaching duct, design and optimization of gas flow and liquid collection system to mitigate stack liquid discharge (SLD) and shell corrosion. Preparation of final report and recommendations, preparation of drawings/ documents for execution of collection system, obtaining approval of design and documents from BHEL/ Customer/ customer's consultant, Preparation of BOQ, preparation of bought out item specification, procurement assistance for specialized items, site visit as specified later in the specification & as necessary for completeness in

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	all respects and for efficient & trouble free operation of chimney and liquid collection system as per the Technical Specification for Wet Stack Flow Model Study.
2.6	The Customer / Consultant and "BHEL" may depute their representative for checking and supervision of important stages of work. The bidder shall be required to provide all facilities for inspection of works at no extra cost to BHEL. Any defect in quality of work or deviations from drawings / specifications pointed out during such inspection shall be made good by the bidder as it pointed out by the BHEL Engineer, without any cost implication to BHEL.
2.7	The work under this contract shall be carried out as per BOQ Cum Rate Schedule annexed as Price Bid. The description / specifications as per BOQ (Bill of Quantities) shall be read along with technical specifications. Quantities mentioned in the BOQ cum Rate schedule are approximate only and liable for variation due to change of scope of work / variation in schedule of quantities, changes in design etc. The rate quoted by the bidder for the individual item of BOQs shall remain firm irrespective of any variation in quantities. The tenderers shall undertake to execute actual quantities required for completion of works as per advice of BHEL Engineer and accordingly the final contract price shall be worked out on the basis of quantities actually executed and payments will also be regulated for the same. The quantities indicated against each item may vary to any extent and no compensation will be payable in variation of Individual quantity.
2.8	Any activity which is necessarily required for satisfactory execution of any item of BOQ in line with technical specifications shall be deemed to be included in BOQ item even if it is not described in the item description and no extra payment shall be made against such activity.
2.9	Bidder's scope also includes following:
2.9.1	Bidder will work in close coordination with Customer / Consultant / BHEL Engineering Representative. The Customer / Consultant / BHEL Representative is authorized to verify that supply has been performed in accordance with Customer / Consultant / BHEL design documents and drawings.
2.9.2	Bidder shall coordinate all Works with the erection contractor and Customer / Consultant / BHEL Work Force to ensure maximum efficiency and safety.
2.9.3	Bidder shall perform all interrelated collateral and incidental Works as required but not specifically covered elsewhere to produce the desired intention of this Contract. The

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	intended final result of this project is a sealed chimney liner in which neither flue gas nor moisture can escape in the chimney annulus space.
2.9.4	Bidder shall submit daily work progress monitoring report, inspection reports and other relevant documentation.
2.9.5	Drawings and additional information pertinent to the work are in the scope of bidder.
2.9.6	For Supervision Work: The schedule of execution of work and required supervision services shall be intimated by BHEL.
2.10	Special T&Ps 1. Mixing Machine: Mixing machine shall be used for preparing the 2 component Adhesive Membrane on site. In order to ensure consistent, high quality mixing of the components of the lining system adhesive, (an) automated mixing machine(s) shall be provided with a min. 3,200 W mixer motor and fail-safe protection against the operator error of mixing the main adhesive component without its hardener. The mixing machine SHALL be CE – approved. The mixing machine MUST have thermal motor protection to minimize failure and fire risk. Adequate number of mixing machines shall be employed for completion of the installation works within the scheduled time. - Bidder shall provide all special equipment, tools and instruments required for handling and storage, and for test and maintenance of borosilicate lining system provided under this Contract. Any special tools/tackles, machinery required to maintain the controlled environment during installation of borosilicate glass block shall be in the scope of bidder. Note: No extra payment shall be made for Mixing Machine and special T&Ps required as mentioned above. - The Supply of Mixing machine, special tools/tackles etc. shall also be completed along with Borosilicate Glass Block Lining materials in line with the Time schedule specified under Clause No 4.1 of TCC. Two-year Guarantee/ Warranty from the date of commissioning of mixing machine shall be bidder's responsibility. All spares (if any) required during the Guarantee/ Warranty period shall be in the scope of bidder. - All other miscellaneous equipment and accessories required for a complete functional system which meets the intent and requirements of this specification shall also be furnished by the bidder within their contractual scope of work without any extra cost to BHEL.

Technical Conditions of Contract (TCC)

Chapter- II General Scope of Work

Project: 1x660 MW Sagardighi TPP, West Bengal.

Job:

2.11	DISCREPANCIES AND ADJUSTMENT OF ERRORS
2.11.1	Order of precedence shall be as per NIT. However relevant technical specification of Customer (WBPDCCL) shall supersede all other specifications of the tender.
2.11.2	If there are varying or conflicting provisions made in any one document forming part of the contract, the BHEL Engineer shall be the deciding authority with regard to the document.

Technical Conditions of Contract (TCC)

Chapter – III Facilities at Site

Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

3.0	Facilities at site
3.1	1. Storage facility for Borosilicate Glass Block Lining System, expansion compensator joints and Adhesives shall be provided by BHEL free of charge. 2. Information Regarding any special requirement of storage i.e dry area, temperature and humidity limit etc. shall be provided by the bidder in advance.

Technical Conditions of Contract (TCC)

Chapter – IV Time Schedule

Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

4.0	TIME SCHEDULE
4.1	SUPPLY: The Borosilicate Glass Block lining material and expansion compensator joints should be dispatched within 04 (Four) months from the date of issuance of Dispatch Clearance by BHEL/ owner or their authorized representative prior to dispatch so as to reach the BHEL Project Site within 15 days from the date of dispatch. The date of LR/GR/RR shall be considered the date of dispatch for levying LD in line with the provisions of SCC clause no. 10.1. The date of delivery of Goods at BHEL Project Site shall be considered the date of arrival of goods. Note: The Bidder shall <i>dispatch the Borosilicate Glass Block lining materials only after issuance of Material Dispatch Clearance Certificate (MDCC) by BHEL/owner or their authorized representative. MDCC shall be issued within one month of submission of Material Test Certificate.</i> Erection and Testing: Borosilicate glass block lining with all associated items shall be completed within 03 (Three) month time from the date of written intimation from BHEL site authority for start of chimney lining job. However, preparation work for Borosilicate application shall be taken up in advance in coordination with Chimney job agency.
4.2	SUPERVISION: Expert Supervision for installation works of Borosilicate Glass Block Lining Schedule of supervision works shall be intimated by BHEL Construction Manager separately, in advance as per actual site requirement. Bidder/Seller shall arrange for deputation of supervisors within 2 weeks of BHEL intimation. Adequate number of supervisors shall be deployed by bidder at a time to meet the requirement for supervision of installation works of borosilicate glass block lining at Site.
	WET STACK FLOW MODEL STUDY: ‘Wet Stack Flow Model Study’ shall start within four weeks of PO and to be completed in 90 days.

Technical Conditions of Contract (TCC)

Chapter – IV Time Schedule

Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

	Bidder has to mobilize adequate resources to meet BHEL's commitments to their customer as indicated from time to time. In the event the bidder fails to respond to these requirements, BHEL shall take appropriate actions to meet customer's commitments in line with the provisions of Contract.
4.3	The work under the scope of this contract is deemed to be completed in all respects as per satisfaction of BHEL. The decision of BHEL on completion date shall be final and binding on the contractor.
4.4	In order to meet above schedule in general, and any other intermediate targets set to meet customer/ project schedule requirements, bidder shall arrange & augment all necessary resources from time to time on the instructions of BHEL without any extra cost to BHEL.

Technical Conditions of Contract (TCC)

Chapter – V Terms of Payment

Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

5.0	TERMS OF PAYMENT
5.1	PAYMENT TERMS: 1. For supply of Borosilicate Glass Block Lining: As per Clause 6.0 of SCC (supply part). 2. For Expert Supervision & Erection of Borosilicate Glass Block Lining system with expansion compensator (supply & erection): As per Clause 6.0 of SCC (service part). 3. For Wet Stack Flow Model study: As per Clause 6.0 of SCC (supply part).

Technical Conditions of Contract (TCC)

Chapter VI - General

Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

6.1	EXECUTION OF WORK
6.1.1	The work shall be executed in a workman like manner and to the entire satisfaction of BHEL Engineer and as per technical specification issued in tender. In case of conflict, the decision of BHEL Engineer shall be final & binding.
6.2	DISCREPANCIES AND ADJUSTMENT OF ERRORS
6.2.1	In case of discrepancies between schedules of quantities, the specification and / or the drawings, the following order of preference shall be observed. (a) Amendments/Clarifications/Corrigenda/Errata etc. issued in respect of the tender documents by BHEL (b) Description in BOQ cum Rate Schedule. (c) Technical Conditions of Contract. (d) Special Conditions of Contract. (e) General conditions of Contract. Note: Customer (WBPDCCL) technical specification shall supersede all other specifications of the tender.
6.2.2	If there are varying or conflicting provisions made in any one document forming part of the contract, the BHEL Engineer shall be final deciding authority with regard to the document.
6.3	PROGRESS REPORTING :
6.3.1	Manufacturer / authorized Supplier of OEM is required to draw mutually agreed monthly program in consultation with BHEL well in advance. Contractor shall ensure achievement of agreed program and shall also timely arrange additional resources considered necessary at no extra cost to BHEL.
6.3.2	The progress report shall indicate the progress achieved against planned, with reasons indicating delays, if any, and shall give the remedial actions which the MANUFACTURER / SUPPLIER of OEM 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.
6.4	DRAWING AND DOCUMENTS
6.4.1	The detailed drawings, specifications available with BHEL engineers will form part of this tender specification. These documents will be made available to

Technical Conditions of Contract (TCC)

Chapter VI - General

Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

	the contractor during execution of work at site. The contractor will also ensure availability of all drawings / documents at work place.
6.4.2	The data furnished in various annexures 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.
6.4.3	Any error or ambiguity be discovered in the specification or information the supplier 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.
6.4.4	Deviation from design dimensions should not exceed permissible limit. The supplier shall not correct or alter any dimension / details, without specific approval of BHEL.
6.5	Job site Safety and Scrap Disposal
6.5.1	Safety programs and procedures shall be within the scope of this Specification, it should be noted that the all materials that are potentially flammable materials and must be handled in keeping with good industry practice and in compliance with the manufacturer's recommendations. Successful bidder should issue necessary instruction to the installation bidder during the application.
6.5.2	Successful vendor shall provide to the installation vendor/BHEL the disposal procedure of scrap and waste materials in line with International/Indian applicable rules and regulations
6.6	Safety and protection of work and property
	The Bidder shall provide procedures for safety and protection of the work and of materials and equipment to be incorporated therein, whether in storage on or off the site. Provide protection guild line at all times against rain, wind, storms, condensation, or heat so as to maintain all work and equipment and materials free from injury of damage. Bidder in coordination with the installation agency should ensure that at the end of each day, all new work likely to be damaged shall be appropriately protected.
6.7	SAFETY, NOISE AND ENVIRONMENT REQUIREMENTS
6.7.1	SAFETY The equipment supplied under this Specification shall meet the U.S. "OCCUPATION, SAFETY, AND HAZARD ADMINISTRATION" (OSHA) requirements or equivalent.

Technical Conditions of Contract (TCC)

Chapter VI - General

Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

6.7.2	Jobsite Safety and Scrap Disposal: Safety programs and procedures shall be within the scope of this Specification, It should be noted that the all materials that are potentially flammable materials and must be handled in keeping with good industry practice.
6.7.3	Environmental Data
6.7.3.1	Should the lining system to be furnished by the Bidder have discharge points to the environment and/or generate waste materials that must be discharged to the environment, the Bidder shall provide, upon Purchaser's request, a plan for the treatment of the discharge/waste to meet current regulations of the Indian government/ regulatory authorities.
6.7.3.2	The Bidder shall submit, within thirty (30) days of demand, additional information on noise and/or other environmental data. All information shall be prepared in a manner acceptable by Indian government/ regulatory authorities.
6.8	HANDLING, STORAGE AND PROTECTION
	Bidder shall furnish working procedure indicating the storage and handling guidelines and supervision requirement to BHEL/Customer during execution of supply.
6.9	JOB SITE INSPECTION AND PREPARATION
	In coordination with the borosilicate installation agency, successful bidder should submit a Field Quality Plan & Installation Instructions / Manual for installation of borosilicate lining system, detailing the application sequence and methods to be employed, including moving, handling, storage, erection, fit up and the methods to be used for environmental protection, for approval of BHEL/WBPDCL. Installation of borosilicate lining system shall be done as per technical guidance & required supervision by the successful bidder and the protocols shall be signed by the QA/QC personnel of the successful bidder.
6.10	QUALITY CONTROL & QUALITY ASSURANCE
6.10.1	The Bidder shall submit upon request a copy of Its Manufacturing Quality Assurance Plan including Quality Procedures.
6.10.2	The Bidder shall conduct an inspection and testing program which shall record and verify the essential properties of the constituent materials and the finished liner.

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Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

6.10.3	The Bidder shall conduct test to verify the mechanical properties of borosilicate bricks and adhesive/mortar and the tests shall be documented during the course of design and fabrication and shall be made available to BHEL / Owner.
6.10.4	Unless otherwise specified the bidder's standard tests shall be performed on all batches of materials furnished. The BHEL may or may not elect to witness tests, but the bidder shall notify the BHEL's Quality Assurance Department no later than 10 days in advance of all scheduled tests.
6.10.5	TEST CERTIFICATES
	Necessary test certificates of all materials supplied by contractor are to be produced to BHEL/WBPDCL prior to use of materials.
6.11	MATERIAL DESPATCH CLEARANCE CERIFICATE (MDCC)
6.11.1	MDCC shall be issued by BHEL/ owner or their authorized representative prior to dispatch. In case the tests are not witnessed by BHEL/ owner's representative, the test certificates shall be submitted to owner through BHEL and MDCC will be issued thereafter.
6.11.2	Copy of MDCC and other dispatch document shall accompany with every dispatch, failing which the consignment shall not be allowed to enter the project premises.
6.12	MATERIAL RECEIPT CERTIFICATE (MRC)
6.12.1	MRC shall be issued by BHEL/ owner or their authorized representative after the material is received at site in good condition.
6.13.1	STANDARDS AND CODES
6.13.1.1	The borosilicate lining system to be provided under this Specification, including all appurtenances and accessories, shall be designed, fabricated, inspected, tested, stamped and preserved to the extent indicated in said referenced Standards and Codes. Where this Specification does not include such reference, the system, or any of its components, shall be designed, fabricated, inspected, tested and preserved, as applicable, to comply with currently recognized International and/or manufacturer's specification, whichever are tighter and more restrictive.
6.13.1.2	In all cases Bidder shall adhere to and comply with the requirements of Indian standards, which are found to be more restrictive than those specified herein.

Technical Conditions of Contract (TCC)

Chapter VI - General

Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

Technical Conditions of Contract (TCC)
 CHAPTER VII - Technical specification for Borosilicate Glass Block Lining System
 Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

Clause No	Description
7.0	Scope of Supply and Technical Requirements
7.1	Supply Scope: - Borosilicate Glass block internal lining materials for the entire height of steel flue can/windshield, inspection door area, soot hopper area, manhole/access door area etc. of 275 Mtr. single flue chimney. - Borosilicate Cellular Glass block min. 38 mm thick, as required. - Flexible, chemically resistant adhesive membrane, as required. - Acid resistance material like Elastomeric for Expansion Bellow.
7.2	Design parameters
7.2.1	Liner considerations The borosilicate glass block liner will have a thickness of 38mm, for all its entire length. Proper provisioning should be made for borosilicate lining system for lining around gas sampling ports, expansion joints, man holes and other appurtenances.
7.3	Operating conditions
7.3.1	Operating conditions shall be as per Annexure-I and specification.
7.3.2	A margin of 15 deg centigrade above the operating conditions mentioned in Annexure-I shall be taken while selecting the appropriate material and thickness for design of the lining system.
7.4	Performance Requirements
7.4.1	- Borosilicate brick lining system will be designed in such a way that it will not require unscheduled outages for repair except for planned and scheduled routine maintenance and inspections. - Borosilicate brick lining system and all of the required components will be designed for a safe, useful life of thirty (30) years (minimum).
7.4.2	Ten (10) year full replacement guarantee, including cost of supply, erection, enabling works, all labor, material, adhesive, primer, surface preparation, arrangement for application etc. all complete, and fulltime onsite QA supervision during erection & commissioning. During the guarantee period if the lining system fails to protect the chimney flue from deterioration, the borosilicate glass block lining manufacturer/supplier shall replace the partially affected portion or complete borosilicate lining system without any additional cost, including all labor, material, surface finish (SA 2 1/2),

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CHAPTER VII - Technical specification for Borosilicate Glass Block Lining System
Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

	supply and application of primer, supply and application of two component adhesive membrane, supply and application of closed cell borosilicate glass blocks, arrangement for application on ground or erected flue cans etc. all complete with onsite QA supervision of borosilicate glass block supplier.
7.4.3	The lining system (borosilicate glass block and adhesive) shall be tested for its wet stack surface properties by Alden Research Laboratory or equivalent, subject to acceptance by the project Owner, and the maximum flue gas velocity in the chimney must under all conditions remain below the velocity where minimal liquid re-entrainment occurs, with a safety margin of 1.5 m/s to avoid stack liquid discharge or acid spitting from the chimney. The supplier of such proposed lining system, must submit the test report, meeting the following conditions: • The test must be conducted by the same institute that conducted the testing described in the EPRI Revised Wet Stack Design Guide 2012 document. • The test must be conducted by the same test method, as used to obtain the test results described in the EPRI Revised Wet Stack Design Guide 2012 document • The test specimen must be prepared at the location of the testing institute, under supervision of the engineers performing the test, the recommendation issued by the test institute must include a suitable safety margin, as recommended by the test institute itself
7.4.4	The lining system (borosilicate glass block and adhesive) shall be offered by a supplier with demonstrated capabilities in the area of onsite technical support and QA/QC supervision, who employs QA/QC supervisors with a demonstrated experience (of at least 5 years) in technical support and QA/QC supervision of the subject lining system.
7.4.5	The supplied lining system (borosilicate glass block and adhesive) shall be capable of withstanding fire risk for a minimum period of 2 hours as per ASTM E-119. Proper certification from an independent institute of sufficient knowledge and experience shall be submitted by supplier subject to acceptance by the project owner, showing the capability of the lining system (borosilicate glass block and adhesive) to protect the steel chimney flues from structural damage by fire of said rating.

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 CHAPTER VII - Technical specification for Borosilicate Glass Block Lining System
 Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

7.4.6	The lining system (borosilicate glass block and adhesive) has to be tested for worker health and safety on an actual large scale installation project by an independent institute of sufficient knowledge and experience, subject to acceptance by the project owner, and it has demonstrated through such testing that it can be used by teams of workers safely, without adverse health effects, and such without requiring excessive protective measures.
7.4.7	the lining system has, through documented testing, been proven resistant to thermal shock, for a minimum of 1.000 cycles, where each cycle results in the lining surface temperature to rise from ambient temperature to 160 °C, and back to ambient temperature
7.4.8	Heat cycling resistance The lining system shall, through documented testing, have been proven resistant to thermal shock, for a minimum of 1000 cycles, where each cycle results in the lining surface temperature to rise from ambient temperature to 1624back to ambient temperature, where each heating cycle has a duration of 24 minutes The lining system shall also withstand occasional excursion of flue gas temperature of more than 200°C
7.5	Design Requirements
7.5.1	Design of the borosilicate lining system must be performed by a professional engineer with a minimum of 5 years' experience in the design of such system for chimney flues. Technical specification provided by Customer (WBPDCI) may be referred vide Annexure- II of tender document.
7.5.2	Specified requirements of this specification are to be regarded as minimum requirements. If the Fabricator's design and/or experience dictate these minimum requirements should be exceeded, the design, supply and application shall be performed accordingly, without any extra cost implication.
7.6	Materials Requirements The steel chimney flues, made of minimum 8 mm thick MS steel, shall be internally protected with a lining system consisting of minimum 38 mm thk borosilicate glass blocks, applied with a flexible, chemically resistant adhesive, using a lining system that meets all of the following requirements:

7.6.1	The lining system shall use closed cell borosilicate glass blocks with the following physical properties: • Minimum density of $0.144 \times 10^3 \text{ kg/m}^3$ • coefficient of linear thermal expansion not greater than $5.5 \times 10^{-6} / ^\circ\text{C}$ as per ASTM E228 • Compressive strength of at least 1.51 Mpa / 1.1 N/Sq.mm as per ASTM C.165 • Flexural strength of at least 0.62 Mpa / 0.8N/Sq.mm as per ASTM C.203/C.240 • Thermal conductivity of 0.087 W/m²K at a mean temperature of 51 °C as per ASTM C177 and ASTM C8
7.6.2	The blocks shall be resistant to thermal cyclic loading under FGD bypass/ hot gas service conditions, and sudden temperature changes, including high temperature spikes.
7.6.3	The borosilicate glass block system shall use a flexible, chemically resistant adhesive, with all required surface preparation, primer, labor, equipment etc. all complete. The adhesive membrane shall be a 2-component urethane asphalt mastic having excellent elastomeric properties and be acid & heat resistant. The adhesive membrane shall be applied in between and behind the blocks in a 3 mm thick layer ensuring a proper bond and adhesion. A 1.5 mm thick layer should be troweled onto the liner as well as to the sides and back of each block before installation. Double buttering technique shall be used to ensure full bond of each block to the liner and to each other. Contractor shall and got installation procedure approved by BHEL/WBPDCL/Consultant before installation and must ensure implementation of installation procedure & workmanship standards of the lining system. The adhesive membrane shall have the following properties. • Tensile strength at 23°C of 1.0 N/mm² as per ASTM D.412 • Elongation at 23° C of 147.0 % as per ASTM D.412 • Moisture vapor transmission of 0.0048 Perm inches as per ASTM C.96 Method E • The adhesive shall show no slump after 5 hours conditioned at 60°C with a film thickness of 3/32" as per ASTM 61, standard test methods for solvent bearing bituminous compounds, section 12 behavior at 60°C.
7.6.4	Resistant to corrosive flue gas environments.

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 CHAPTER VII - Technical specification for Borosilicate Glass Block Lining System
 Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

7.6.5	Remain elastomeric and flexible under hot gas conditions and sudden temperature changes.
7.6.6	The adhesive shall be suitable for trowel application.
7.7	The steel surface shall be grid blasted to a cleanliness of SA 2 ½ and approved by the supplier of the lining system. The substrate shall thereafter be primed using a high performance epoxy primer within a short time window approved by the supplier. The lining system manufacturer shall demonstrate a proven Quality Control system that monitors and documents the key physical properties, as described above.
7.8	Specification of primer
	Primer to be applied on steel substrate receiving borosilicate glass block lining system shall have the following properties including thickness, physical & chemical properties. • The primer shall be a high performance epoxy primer. The primer shall be applied in 1 layer with a WFT of 3 to 5 mils. • The primer shall be applied either by rolling or spray gun Welds and joints shall receive an additional layer of primer by brush prior to rolling or spraying. • The solids by volume of the high performance epoxy primer shall be no less than 50%. • The bonding of the primer to the steel/ concrete shall be at least 1400 psi. as per ASTM D4541.
7.9	Specification of Flue Expansion Compensator
	Materials to be used for fabrication of Flue expansion compensator shall be suitable for the flue gas temperature and shall be acid resisting. The expansion compensator shall comprise several layers of materials given below in order from the gas side: - Two layers of insulation, each consisting of heavy weight texturized glass cloth impregnated with graphite suspension, having an approximate weight of 1.00 kg/Sq.m. - A continuous filament glass cloth coated both side with flouro-elastomer having an approximate weight of 1.5 kg/Sq.m. - Two layers of PTFE (Poly Tetra Flouro-Ethylene) film of minimum thickness 0.15 mm each. - A layer of glass felt of minimum thickness 10 mm and an approximate weight of 1.5 kg/Sq.m.

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 CHAPTER VII - Technical specification for Borosilicate Glass Block Lining System
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	For installation of Expansion Compensators, the manufacturer's instruction should form the basis of the Contractor's method. This method, in a statement, should be submitted to the Engineer for approval. Once approved it has to be followed throughout the installation sequence. Expansion Compensators should be prevented from distortion during transportation, handling, erection and jointing, by more stringent tolerances than specified by the manufacturer.
7.10	The lining system Manufacturer shall demonstrate a proven Quality Control system that monitors the documents of key physical properties as described above.
7.11	Inspection
7.11.1	Inspection and testing including adhesion shall be as per approved QAP.
7.11.2	The mixing, curing and adhesion characteristics of the adhesive membrane shall be evaluated by applying it onto a test area of the same material and surface preparation of the substrate. Work life and initial set time may be visually observed. Cure shall be uniform.
7.11.3	The installation procedure of the lining system shall be verified by installing the system on a transparent panel. Visual inspection shall be made of back, end and side joints.
7.11.4	Block whose edge is broken shall not be used.
7.11.5	Arranging the borosilicate glass blocks such that there is no blank space between the block and surface. The adhesive should fill the side joint and flow out to the edge. The block shall completely stick to adhesive applied on the surface.
7.12	Mixing of Adhesive Membrane
	- The Adhesive membrane shall be mixed according to the direction for the product use in the correct mixing ratio. - The temperature for mixing the main material and hardener shall be about 24 deg C. Appropriate mixing method shall be used for equal mixing and should be blended for the required appropriate time. - Sufficient time shall be allowed for curing
7.13	Mixing of Epoxy Primer
	- Epoxy primer shall be mixed according to the direction for the product use mixing ratio shall be as recommended by OEM. - Epoxy Primer shall be blended by using Mechanical Mixer for the required minimum time.
7.14	Scope of Erection and Testing.

	• Scope covers required pre-erection preparedness as per specification, erection and testing of all the supplied items like: Epoxy Primer, Expansion compensator, Borosilicate Glass Block and other associated items as per specification by deployment of required and expert manpower including expert supervision service during installation job. • Arranging necessary T&P, winch machines, wire rope, scaffolding etc. required for erection activities. • Compliances of all statutory norms as required for performing erection activities and deployment of manpower. • For pre-erection preparedness of installing Borosilicate glass block lining; surface preparation and primer application on the fabricated flue can shall be done at ground level simultaneously with the fabrication of flue can by Chimney job agency. BHEL site shall intimate the requirement for this job and vendor has to take up the activities within 15 days from the date of BHEL intimation. • Surface preparation & surface cleaning The bidder shall carry out the following as a minimum to prepare the steel flue surface for the lining job. Sandblasting of flue can for surface preparation. Near white metal blast finish shall be achieved in preparing the steel surface to receive the lining All surface must be free from dust and grease. Any foreign material which will interfere with adhesion must be removed. All weld spatter slag and old anchor welds shall be removed from the substrate and the area ground flush with the parent metal. All edges and fillets and similar abrupt contours shall be round off smoothly • The Adhesive membrane shall be applied as per the instructions of OEM. • The borosilicate glass blocks shall be arranged in such manner so that there is no blank space between the block and surface. The adhesive should fill the side joint and flow out to the edge. The block shall completely stick to adhesive applied on the surface. • Block whose edge is broken shall not be used. • Expansion compensators shall be erected as per drawing and specification.

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CHAPTER VII - Technical specification for Borosilicate Glass Block Lining System
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	• All the equipment & tools required to install Borosilicate glass block lining system including Polyethylene film, Rag, Wire brush, Plastic sink, Electric drill, Jiffy mixer blade, Insulated saw, Float, Paint brush, hand cleaner, Cleansing glove, Hygrometer, Surface thermometer, white chalk, white spray etc. as required shall be arranged by the bidder.

Technical Conditions of Contract (TCC)
Chapter-VIII: Technical specification for Wet Stack Flow Model Study
Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

Clause no	Description
8.1	INTENT OF SPECIFICATION
	The scope of work includes carrying out the Wet stack flow model study for complete duct system from absorber outlet to minimum of three (3) diameter of the stack liner above the top of the stack breaching duct design and optimization of gas flow and liquid collection system to mitigate stack liquid discharge (SLD) and shell corrosion, Preparation of final report and recommendations, preparation of drawings/ documents for execution of collection system, obtaining approval on documents from BHEL/ Customer/ customer's consultant, Preparation of BOQ, preparation of bought out item specification, procurement assistance for specialized items, site visit as specified later in the specification & as necessary for completeness in all respects and for efficient & trouble free operation of chimney and liquid collection system for project.
8.2	SCOPE OF WORK
8.2.1	Wet stack model study shall consist of the following:
8.2.1.1	Condensation calculations & design of condensate collection system for the entire flue path as per the following details: a) Ducts from FGD bypass damper outlet to Chimney inlet transition pieces. Lining inside the ducts shall be 1.5 mm glass flake lining (600 Sq. Mtr. Area approximately). Refer Annexure – VII, VIII, IX, X and XI for reference of general idea. b) Entire length of Flue can having borosilicate lining.
8.2.1.2	A minimum 1:12 scale physical flow model for liquid collector system (LCS) design.
8.2.1.3	A computational flow model for plume downwash analysis.
8.2.1.4	A physical or computational flow model for continuous emissions monitoring system (CEMS) elevation flow performance.
8.2.1.5	Design of optimum choke geometry if required.
8.2.1.6	Review & Approval of liquid collector system construction drawings
8.2.1.7	Site inspection & supervision for 7 days to verify and evaluate LCS system performance prior to commissioning.
8.2.2	Wet stack study shall be performed with a wet stack installation where there does not exist an identical or mirror image installation. The objective of the wet stack study shall be to maximize liquid collection downstream of the mist

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Chapter-VIII: Technical specification for Wet Stack Flow Model Study
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	eliminators and to preclude ground level rainout from the stack by recommending experimentally developed, tested, and optimized liquid collection devices and drainage systems to return collected liquid to the absorber with minimum re-entrainment. Liquid collector shall be designed and developed experimentally using a physical model. The model shall begin at outlet of absorber mist eliminator(s), include the absorber outlet and ducting, the stack breaching duct and a minimum of three (3) diameters of the stack liner above the top of the stack breaching duct. Physical model shall include any internal devices that may affect the gas flow, such as structural members, flow controls and expansion joints. Liquid collector shall be located where needed in the absorber outlet, the ductwork between the absorber outlet and the chimney liner, in the chimney liner and in the exit nozzle. These collector shall collect liquid from surfaces ,prevent re-entrainment, and guide the liquid the locations where it can be drained out of the system and prevent the discharge of droplets from the top of the stack that are large enough to rain out to the ground before evaporation.
8.2.3	The following codes and standard shall be followed for the conductance of this study
8.2.3.1	Revised wet stack design guidelines, 2012 by EPRI
8.2.3.2	ACI 307 (American concrete institute code requirement for RC chimney
8.2.3.3	EPRI report CS-2520 Entrainment in wet stack 1982
8.2.3.4	EPRI report TR 107099 Wet stack deign guide 1996
8.2.3.5	EPRI report TR-109380 guidelines for fluid dynamic design of power plant ducts, 1998
8.2.3.6	EPRI report GS-6984 FGD mist eliminator system design and specification guide
8.2.3.7	CICIND, ICAC, US EPA and other international and other latest codes and standards.
8.2.4	The study shall be carried out by design methods and tools:
8.2.4.1	Preliminary design review based on experience
8.2.4.2	Laboratory flow modelling -3-D

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Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

8.2.4.3	Computer flow modelling -3-D
8.2.4.4	Computer program calculations – 2-D
Note:	The results of the complete model study will be incorporated into a final report that includes, but not limited to, sections detailing modelling theory, model development, test procedures, observations, results, and conclusions regarding the condensate calculations, A scale physical model study and a computational flow model.
8.2.5	Preliminary design review based on experience.
	Based on the inputs furnished as per enclosed Annexure- IV, V and VI with this specification for the duct work and stack. Preliminary design review needs to be carried out to estimate the liquid collection requirements, predict the condensation rate in the duct & stack and perform the preliminary system design.
8.2.6	Condensation calculations using analytical / numerical tools.
8.2.6.1	Gas flow study should include the calculation for the condensate formed and / or condensate carry over. The condensate flow study should include condensate quantity formed due to:
8.2.6.1.1	Thermal condensation on the liners
8.2.6.1.2	Adiabatic condensation
8.2.6.1.3	Turbulence of flue gas flow near entry of the stack
8.2.6.1.4	At the outlet duct from absorber mist eliminator outlet
8.2.6.1.5	Contribution from mist eliminator carryover in case of normal wash cycle or mist eliminator become fouled with time.
8.2.6.2	Detailed calculations along with the design basis for condensation rate in the duct from absorber outlet to the top of the chimney for the worst operating case, minimum boiler load and design conditions shall be furnished as a function of ambient air temperature, wind velocity and liner design variables in the report with an accuracy of $\pm 10\%$.
8.2.7	Design of Condensate collection & drainage system
8.2.7.1	Size of gutter(s) along with inner surface of Chimney flue can and inlet duct from absorber outlet to inlet of chimney flue can, such that condensate is collected efficiently and drained off with a drainage system till its terminal point at ground outside the duct & Chimney shell.

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8.2.7.2	As the gutter shall be made of Titanium/C-276 as compatible with inner surface, suitable shape, size and thickness is to be recommended so that gas flow occurs efficiently.
8.2.7.3	The size, thickness, location and material of condensate drainage pipe shall be included in recommendation. It is envisaged that pipe from gutter to outside of Chimney liner shall be of Titanium/C-276 and thereafter the drainage pipe shall be of FRP up to the collection pit. Routing of the drain pipes shall be provided.
8.2.7.4	After the flow-model study is performed, accordingly design of liquid-collection devices for the full scale Wet Stack is to be carried out and detailed drawings, design basis and calculations shall be submitted.
8.2.8	Computational 3-D fluid-dynamic-model study (CFD Analysis)
8.2.8.1	Performance of a computational 3-D fluid-dynamic-model study of the minimum upper one third of the stack liner and shell to evaluate downwash of the wet plume. CFD model shall include the surrounding structure which are significant to wind/ plume flow patterns preferably minishell, external handrails and floor at the stack outlet. A computational model of the stack shell and liner(s) shall be constructed for the plume downwash study. The plume downwash study shall include analysis of the local wind/temperature data to identify the occurrence of critical wind and temperature conditions. The plume downwash study shall identify the stack velocity and ambient wind conditions that produce downwash and the maximum extent of expected downwash throughout the year for shell corrosion protection. For sites where ambient temperatures reach freezing, a “winter” period shall be simulated to evaluate icing potential on the stack. Depending on the results of the downwash study, there may be a need to develop an optimum choke geometry, if required, to minimize the plume downwash & liquid impingement of the shell. This includes evaluation of liquid collectors and drains to prevent re-entrainment and discharge of large droplets from the top of the choke. Bidder to use the latest software for the CFD modelling and shall submit the model along with results in form of contours and vector plots of velocity,

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	pressure, concentration and temperature at various test locations and summarized in tabular format. The model shall be tested with various simulated operating, minimum and design flow conditions, maximum wind speed, wind orientations, to evaluate the potential of the downwash. The Bidder shall review Minishell details (Liner extension above roof) vide Annexure-VI of this Tender. and confirm the liner-extension design with their recommendation. In case of the excessive downwash or reversed flow at stack exit or liquid exiting the stack liner and forming on the top of the concrete shell, bidder to provide the corrective actions, design modifications and evaluate the modified geometry.
8.2.9	Physical model of the system
8.2.9.1	An experimental gas-flow-model study to design and develop collectors for the duct and stack downstream of the mist eliminator that will collect and drain liquid from the walls to prevent re-entrainment.
8.2.9.2	Laboratory Physical model study shall include the following details for wet stack design.
8.2.9.2.1	Estimation of the total liquid load on the liner surface as a result of thermal and adiabatic condensation. This estimate shall be based on the liner and shell geometry, thickness, materials of construction and the flue gas-flow rate and properties over a range of expected plant-operating conditions and worst-case ambient weather conditions considering the mist eliminator fouling / wash cycles.
8.2.9.2.2	Design and optimization of liquid collectors in the absorber-outlet hood, absorber outlet ducts, stack-liner entrance region and stack liner outlet to prevent stack liquid discharge (SLD) . The collectors will collect liquid from surfaces, re-entrainment, and guide the liquid to locations where it can be drained out of the system. This development work shall be conducted on a scale model of the wet duct and stack system, from the outlet of each absorber's mist eliminator include the absorber outlet and ducting, the stack breaching duct and a minimum of three (3) diameters of the stack liner above the top of the stack breaching duct. Model scales shall be minimum

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	1:12 and to be selected to ensure accurate modelling results for all tested parameters. The same shall be finalized after the award of the contract. The design should be of integrated complete system of liquid collectors from absorber outlet to chimney top for each unit.
8.2.9.2.3	The laboratory test includes details of liquid re-entrainment and drainage behaviour over the expected range of unit operating conditions and confirm the stack-liner design velocity.
8.2.9.2.4	Physical model shall include any internal devices larger than 3 inches in diameter/protrusion that may affect the flow, such as structural members, internal dampers, flow controls, and expansion joints. The model shall be mainly constructed from transparent acrylic or plastic, sheet metal, or coated rigid tubing such that it is suitable for wet testing. Modeled flow control and liquid collection devices may be constructed with sheet metal, or other suitable construction materials, so long as the scaled liquid flow performance is not adversely modified.
8.2.9.2.5	The physical model shall be tested for pressure and velocity profiles at selected cross sections through the ducts and liner. A velocity traverse shall be conducted within the modeled liner to ensure that the cyclonic flow levels are within the U.S. EPA Method 1 recommended limitations for CEMS operation. In the event testing indicates that cyclonic flow could be a concern at the continuous emissions monitoring system (CEMS) elevation, a simulation, either by extension to the physical model or using a computational fluid dynamic model, shall be performed to evaluate this flow at the CEMS level. If needed, corrective devices shall be designed and tested to reduce stack swirl at the CEMS elevation.
8.2.9.2.5	The physical model shall be tested by introducing liquid in a size and quantity such that the model shall approximately match the two-phase flow modelling requirements for droplet trajectory and loading. This testing shall be used to locate and design the liquid collection devices and drains.
8.2.9.2.6	Evaluation of re-entrainment at liner-expansion joints in the laboratory test rig and development of a unit-specific liquid-collector geometry to collect and drain the liquid from the liner-expansion joints.
8.2.9.2.7	Using this model effective internal liquid collection devices shall be developed and optimized to improve the droplet deposition and liquid

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	collection in the stack as well as to prevent the re-entrainment of droplets from liquid pools and films.
8.2.9.2.8	Bidder shall submit the detailed standard procedure for carrying out the physical model study at vendor lab for customer information / approval before the conductance of physical model study at lab.
8.2.9.3	Site inspection & supervision
8.2.9.3.1	Bidder to perform an onsite inspection as per the EPRI Revised Wet Stack Design Guideline, 2012. Site visit should occur for 7 days' time during the construction phase, when liquid collection system is nearing completion, to inspect the liquid collection system as installed to ensure that the designed flow controls, liquid collectors, drains, and drain protection are installed properly and shall perform as intended. Bidder to provide the site inspection report to validate the design and installation.
8.2.9.3.2	The onsite inspection should confirm that the liquid-collection system has been fabricated and installed correctly and to identify any deviations to the recommended design as a result of field modifications made to ease installation. The bidder shall also ensure the liquid collection system is installed properly.
8.2.10	The key deliverables from this study are:
8.2.10.1	Bidder to furnish the total quantity of condensate formed from absorber mist eliminator outlet to top of the stack.
8.2.10.2	Bidder to furnish the number, sizing and location of required various liquid collectors/ gutters, their shape, design of its evacuation piping from inside the chimney to outside and their Influence on the flow in the chimney liner.
8.2.10.3	Flow model study shall minimize system pressure losses and optimize collection and drainage and provide expected field wet stack system pressure loss across expected load range.
8.2.10.4	Bidder to achieve minimum stack liquid discharge. In case of excessive stack liquid discharge, possible means of modification to duct and stack geometry need to be proposed by bidder for improvement.
8.2.10.5	Bidder to ensure the design of effective liquid collection system for various plant load operating conditions and absorber combinations.
8.2.10.6	Bidder to furnish the comparison of the experimental and computer modelling.

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8.2.10.7	Bidder to recommend modifications to prevent the chimney liquid discharge issues and to make the geometry more favorable for liquid collection.
8.2.10.8	Bidder to furnish the fabrication/installation drawings after the completion of model study for fabrication.
8.2.10.9	Bidder to identify appropriate liner system and gas inlet geometries (including flow control devices) to ensure homogeneous gas flow conditions and achieve cyclonic free flow distribution at the CEMS location.
8.2.10.10	Bidder to provide recommendations and design for sealing drain piping/ seal pots to inhibit backflow.
8.2.10.11	Bidder to recommend drain protection devices to minimize pluggage occurrences an flow and recommend method for monitoring liquid collection drainage flow in case of liquid collection system pluggage and SLD problems.
8.2.10.12	Bidder to provide stack outlet modifications, such as liner extensions or chokes, to minimize stack icing occurrences and to provide Stack shell coating requirements to protect concrete shells from corrosion due to plume downwash.
8.2.10.13	Bidder to evaluate the plume downwash and recommend modifications to minimize downwash using CFD model preferably at reduced unit load operation and high wind speed conditions.
8.2.10.14	Bidder to provide the drawings/documents for the necessary provisions in Chimney during the course of this study, if applicable, to carry out the performance test for wet stack at site in future.
8.2.11	Customer Specific Technical Requirements
8.2.11.1	GENERAL
8.2.11.1.1	Bidder to furnish the detailed Master drawing list for wet stack flow model study for BHEL and customer approval.
8.2.11.1.2	Bidder to provide technical advice/ recommendations/ assistance & solutions regarding site related construction problems related to condensate collection and drainage system in the duct and chimney as and when required including site visits, participation in meetings through VC/WEB with BHEL/ customer/ customer's consultant.
8.2.11.1.3	The physical model study may be witnessed by BHEL / Plant Owner for approximately 3 days. Intimation for the witnessing shall be provided by the

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	bidder 4 weeks prior to conductance of physical model test at vendor lab. Video streaming facility shall also be provided for witnessing the physical model test from India. In addition, complete physical model test including the flow patterns and droplets trajectory shall be recorded on video CD which shall be provided after the physical model study.
8.2.11.1.4	The physical model shall be stored at the vendor lab at no cost for a period of 1 year after the submission of final report and completion of the study. Thereafter its further disposal or storage shall be decided after the award of the contract on the cost basis. Optional prices may be quoted for the same and this shall not be considered for the evaluation of bid.
8.2.11.1.5	The bidder is advised to take care all information that may be necessary for preparing the bid and entering into the contract. Claims of any kind due to variation or ignorance of site conditions and environmental conditions after award of works will not be entertained.
8.2.11.1.6	All revisions/changes required as per BHEL/ Project owners, comments/ requirements, site requirement etc. shall be carried out by the bidder.
8.2.11.1.7	Three hard copies of approved reports/documents/drawings shall be submitted by the bidder. Electronic copies of the CFD model, analysis and report shall be submitted in primary original format as well as in printable non-proprietary formats (e.g. .pdf).
8.2.11.1.8	Change in recommendation / design after the analysis shall be taken care by bidder without any commercial implication in this contract value.
8.2.11.1.9	Bidder shall furnish detailed activity schedule, report generation schedule and list of inputs required for successful execution of Wet stack flow model study.
8.2.11.1.10	The Purchaser/ Customer however also reserve the rights to check the detailed calculations in the event of order and their interpretation shall be final in the event of any conflict.
8.2.11.1.11	Bidder shall furnish all the documents in English and SI units shall also be followed in the calculations and reports wherever used.
8.2.11.2	Technical specification provided by Customer (WBPDCL) may be referred vide Annexure- III of tender document.
8.3.0	SUGGESTIVE DRAWINGS/ DOCUMENTS SUBMISSION

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8.3.1	Following Basic drawings/documents to be submitted within 2 weeks from LOI date.
8.3.1.1	MASTER DRAWING /DOCUMENT LIST (to be finalized after order)
8.3.1.2	WET STACK STUDY SCHEDULE, PLANNING AND MILESTONES
8.3.1.3	LIST OF CODES AND STANDARDS TO BE FOLLOWED.
8.3.1.4	DETAILED STANDARD PROCEDURE FOR PHYSICAL MODEL & CFD STUDY, DRAWINGS & DOCUMENTS SUBMISSION.
8.3.1.5	DESIGN DRAWINGS OF CONDENSATE COLLECTION AND DRAINAGE SYSTEM
8.3.1.6	THERMAL AND ADIABATIC CONDENSATION CALCULATIONS WITH DESIGN BASIS
8.3.2	Following Basic drawings/documents to be submitted and duly approved within 12 weeks from LOI date. This is not an exhaustive list of drawings/ documents for WET STACK STUDY. Bidder shall furnish all applicable drawings /documents other than as mentioned below which is/are required for successful execution of condensate collection and drainage system after the absorber outlet to stack outlet.
8.3.2.1	TECHNICAL DATASHEETS
8.3.2.2	BILL OF QUANTITIES
8.3.2.3	WET STACK STUDY REPORT WITH RECOMMENDATIONS
8.3.2.4	CFD MODEL, ANALYSIS AND RESULTS
8.3.3	Subsequent revisions of above drgs/docs to be submitted within 7 days of comments received from BHEL/ CUSTOMER.
8.3.4	Drawings submitted shall be complete in all respects with revised drawing submitted incorporating all comments. Any incomplete drawing submitted shall be treated as non-submission with delays to bidder's account.
8.4	OTHER TERMS OF CONTRACT
	The reports / design and drawings prepared by the bidder may be required to be revised / modified due to various reasons including site condition, engineering inputs, layout changes and CUSTOMER's requirement. The quoted rate shall be inclusive of additional effort to take care of such revisions.
8.5	DOCUMENTS TO BE SUBMITTED ALONG WITH BID

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8.5.1	Detailed procedure adopted for the conductance of the study.
8.5.2	Wet stack study planning and scheduling.
8.5.3	Computer program to be used for the 3D modelling and analysis.
8.5.4	Mathematical tools & codes / programs used for the analytical calculations.
8.5.5	Technical deviation schedule (if reqd.) (enclosed herein)

Technical Conditions of Contract (TCC)

ANNEXURES

Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

ANNEXURES:

- 1) Annexure-I, Design Parameter- Supply of Borosilicate- SDG Chimney
- 2) Annexure-II, Customer specification of Borosilicate-SDG Chimney
- 3) Annexure-III, Customer specification of Wet stack model study- SDG Chimney
- 4) Annexure-IV, CHIMNEY- GENERAL ARRANGEMENT- SDG Chimney
- 5) Annexure-V, CHIMNEY LINER-GA- SDG Chimney
- 6) Annexure-VI, MINISHELL DETAILS CAN TYPE-SS1&SS2- SDG Chimney
- 7) Annexure- VII, LAYOUT OF ID-ELEV-Rev05- SDG Chimney
- 8) Annexure-VIII, LAYOUT OF ID-PLAN-Rev05- SDG Chimney
- 9) Annexure-IX, Layout of FGD Ducting- FGD Chimney
- 10) Annexure-X, NMEJ Location for Absorber to Chimney Ducting- FGD Chimney
- 11) Annexure-XI, Expansion Joint Detail- FGD Chimney

Annexure-I

GENERAL DATA								
Boiler Application	Utility	No. of Chimneys		Customer scope				
Boiler Capacity	2070 t/h	Type of Chimney						
No. of Boilers	One (01)	Chimney Arrangement						
Fuels Fired	Coal	Height of Chimney						
OPERATING CONDITIONS (Per Boiler) @ FGD Not in operation.								
DESCRIPTION / LOAD	BMCRC	TMCRC	BMCRC					
Flue Gas Flow t/h	2980	2726	3101					
Flue Gas Volume m³/s	1000	888	1051					
Flue Gas Temperature °C	137	125	140					
Flue Gas Density kg/m³	0.828	0.853	0.820					
FLUE GAS COMPOSITION % BY WEIGHT - WET BASIS								
CO₂	17.317	17.253	16.038	13.715				
N₂	68.784	68.809	68.255	66.718				
O₂	4.904	4.970	4.879	6.694				
SO₂	0.159	0.158	0.227	0.194				
H₂O	8.837	8.809	10.6	12.678				
*DUST SIZE DISTRIBUTION AT CHIMNEY INLET - % MICRONS								
Below 3	97.16	Between 10 - 20		0.17				
Between 3 - 5	1.18	Between 20 - 30		0.03				
Between 5 - 10	0.78	Between 30 - 40		0.68				
OTHER DATA								
Elevation of Breaching Line of the Duct	m	34.790 # - Duct will be terminated outside chimney shell at this elevation (As per Post bid resolution S.No. 4 Pg 2 of 45 to Vol-IIA, Sec-IV, P-13 of 16 of specification)						
Duct Opening Dimensions	mm x mm	6400 x 11720 #						
Flue Gas Pressure at Chimney Entry Level	mmwc	+ 10						
REMARKS: *APPLICABLE ONLY FOR COAL FIRING								
a) Suitable margins may be added over and above the given operating conditions for chimney design. b) The temperature at Chimney inlet (when FGD is not in operation) can vary within the range of 110°C to 150°C (corresponding density will be in the range of 0.886 kg/m³ to 0.790 kg/m³). # - Preliminary based on Layouts/PE/FB email Dt 27.06 2020								
Sheet 1 of 2								
Customer / Plant: WBPDCCL / Sagardighi TPP, Phase-III, 1x660 MW								
Cont. No.-1731	Rev. 00		Rev. 01		Rev. 02		Rev. 03	
	Sign	Date	Sign	Date	Sign	Date	Sign	Date
Engineer : VRK/GS	-sd-	17.07.19	-sd-	26.08.19	-sd-	01.07.20		
Reviewer : BMM	-sd-	17.07.19	-sd-	26.08.19	-sd-	01.07.20		
Approver : BMM/ACR	-sd-	17.07.19	-sd-	26.08.19	-sd-	01.07.20		

Annexure-I

GENERAL DATA

Boiler Application	Utility	No. of Chimneys	Customer scope
Boiler Capacity	2070 t/h	Type of Chimney	
No. of Boilers	One (01)	Chimney Arrangement	
Fuels Fired	Coal	Height of Chimney	

OPERATING CONDITIONS (Per Boiler) @ FGD in operation.

DESCRIPTION / LOAD	BMCRC	TMCR-DC	BMCRC-WC
Flue Gas Flow t/h	2999	2726	3093
Flue Gas Volume m ³ / s	812	735	858
Flue Gas Temperature °C	59.5	58.9	62.4
Flue Gas Density kg / m ³	1.02605	1.03083	1.00171

FLUE GAS COMPOSITION % BY WEIGHT - WET BASIS

CO ₂	16.69	16.85	15.40	13.22
N ₂	66.34	66.64	65.67	63.95
O ₂	04.81	04.76	04.84	6.43
SO ₂	0.0068	0.0069	0.0066	0.0057
H ₂ O	12.15	11.75	14.096	16.39

*DUST SIZE DISTRIBUTION AT CHIMNEY INLET - % MICRONS

Below 3	97.16	Between 10 - 20	0.17
Between 3 - 5	1.18	Between 20 - 30	0.03
Between 5 - 10	0.78	Between 30 - 40	0.68

OTHER DATA

Elevation of Breaching Line of the Duct	m	34.790 (approx) * - Duct will be terminated outside chimney shell at this elevation (As per Post bid resolution S.No. 4 Pg 2 of 45 to Vol-IIA, Sec-IV, P-13 of 16 of specification)
Duct Opening Dimensions	mm x mm	6400 x 11720 *
Flue Gas Pressure at Chimney Entry Level	mmwc	+ 40

REMARKS:

*APPLICABLE ONLY FOR COAL FIRING

- Suitable margins may be added over and above the given operating conditions for chimney design.
- The temperature at Chimney inlet (when FGD in operation) can vary within the range of 54°C to 65°C (corresponding density will be in the range of 1.06 kg/m³ to 0.975 kg/m³).

- Preliminary based on Layouts/PE/FB email Dt 27.06 2020. Refer sketch-1 for details.

Sheet 2 of 2

Customer / Plant: WBPCL / Sagardighi TPP, Phase-III, 1x660 MW

Cont. No.:-1731	Rev. 00		Rev. 01		Rev. 02		Rev. 03	
	Sign	Date	Sign	Date	Sign	Date	Sign	Date
Engineer : VRK/BS	-sd-	17.07.19	-sd-	26.08.19	-sd-	01.07.20		
Reviewer : BMM	-sd-	17.07.19	-sd-	26.08.19	-sd-	01.07.20		
Approver : BMM/ACR	-sd-	17.07.19	-sd-	26.08.19	-sd-	01.07.20		



SECTION-II

PART-B

SUBSECTION-IV

TECHNICAL SPECIFICATION

FOR

CHIMNEY LINING

1.0.0 GENERAL PROJECT INFORMATION

1.1.0 INTRODUCTION

In order to comply with the MOEF norms for flue gas emission, a Flue gas desulphurization plant (Wet FGD) has been proposed to be installed in Unit #5 at Sagardighi Thermal Power Plant. Borosilicate Glass Block Lining of inner surface of flue can / windshield shall be applied, as the case may be for the Chimney to protect them from wet flue gas.

1.2.0 INTENT OF SPECIFICATION

The intent of this technical specification is to provide a complete Chimney Lining system to protect the flue cans or wind shield, as the case may be, from wet flue gas from Flue gas desulphurization system.

The bidder shall study the specification and satisfy himself thoroughly regarding the workability and suitability of the equipment and system offered by him. He shall take full responsibility for guaranteed and satisfactory operation of the system as regards its performance and smooth and reliable working of supplied equipment.

All work to be carried out as per the above guidelines shall be read in conjunction with the drawings and annexure. The bidder shall be responsible for providing all material, equipment and services, which are required to complete the project and fulfill the objective of safe and trouble free operability, maintainability and the reliability of the complete work covered under this specification.

The bidder shall fulfill all the features of their work as per the relevant codes and standards and adhere to all the local regulations, as applicable. Design, manufacture, supply, construction, erection, and commissioning will be as per the state of the art technology and satisfy all the statutory and mandatory laws and regulations to its fullest extent.





2.00.0 SCOPE OF WORK

2.01.00 The Scope of work for providing Borosilicate Glass Block Lining on the steel flue can / RCC windshield of Chimney of Unit #5 at Sagardighi TPS includes the following.

2.02.00 The flue shall be internally protected with a lining system consisting of borosilicate glass blocks of required thickness (38mm/ 51mm thick), applied with a flexible, chemically resistant adhesive membrane applied over epoxy primer and the scope of works also include modifications required if any on flue to accommodate expansion joints, providing additional support structures, lining in the inspection door area, soot hopper area. All the items, though not specifically mentioned but needed to make the system complete and for reliable performance and safe working, shall also be included, unless otherwise specifically excluded elsewhere.

- i) Complete engineering, procurement and installation of Borosilicate Glass Block Internal Lining.
- ii) Wet Stack design study.
- iii) Complete engineering, procurement and installation of the lining to flue can / wind shield, as the case may be
 - a) Manhole / access door with acid resistant material or with borosilicate glass block lining.
 - b) Provision of suitable Condensate collecting system & drain to condensate collection tank.
- iv) Supervision of complete installation by the OEM's QA Inspector to perform comprehensive QA program for the requirements of this project.
- v) Submission of comprehensive QA documentation after the completion of the lining process in the flue can/ wind shield.

2.02.00 The bidder shall be responsible for the quality of the material, manufacturing, transport, storage, handling, erection and documentation.

2.03.00 The bidder shall also provide all required equipment and services which may not be specifically stated herein but are required to meet the intent of ensuring completeness, operability, maintainability and reliability of the total work covered under this specification within his quoted price.

2.04.00 The successful bidder shall be responsible for providing qualified personnel to collect the required data from Purchaser by way of hard copy, drawings, soft copy etc.

2.05.00 The bidder shall be responsible for bringing the required tools, tackles,





machines, erection spares for erection to make up for the damages during execution etc. for completing the scope of the work as per this specification.

- 2.06.00 It may be noted that the requirements, conditions, annexure, appendices etc. stated in Technical Specification shall be read together in conjunction with the other volumes while interpreting the specification.
- 2.07.00 In the event of conflict between requirements of any two clauses of specification documents, the more stringent requirements shall apply unless otherwise confirmed by the Purchaser in writing before the award of this contract, based on a written request from the Bidder for such clarification.
- 2.08.00 In case Bidder is getting qualified through an Associate as per the Tender Specification the work division between Bidder and the Associate shall be as per the Deed of Joint Undertaking (DJU).

3.00.0 SCOPE OF SUPPLY

- 3.01.00 The bidder or his Associate shall design, manufacture and furnish equipment / system including but not limited to the following.
- a) Borosilicate Glass Block Internal lining material for the entire height
 - ✓ Borosilicate Cellular Glass Block, 38mm / 51 mm thick, as required
 - ✓ Epoxy Primer
 - ✓ Adhesive membrane
 - ✓ Acid resistant material like Elastomeric for the Expansion bellow
 - ✓ Acid resistant material like Hastalloy for Flue gas Sample points / sampling ports
 - ✓ Acid resistant material or borosilicate glass block lining for Manhole / access door
 - ✓ Suitable Condensate drain arrangement at the bottom
 - b) Documentation shall, as a minimum, comprise the following.
 - ✓ All drawings for the above works and supply
 - ✓ O&M Manual & Instruction Manual
 - ✓ Submission of comprehensive QA documentation after the completion of the lining process in the flue can.
 - c) All other miscellaneous equipment and accessories required for a complete functional system which meets the intent and requirements of this specification shall also be furnished by the bidder.

4.00.0 TECHNICAL SPECIFICATIONS

4.01.00 Specification of borosilicate blocks





(a) The lining system shall use closed cell borosilicate glass blocks with the following physical properties:

- ✓ A coefficient of linear thermal expansion not greater than $5.5 \times 10^{-6}/^{\circ}\text{C}$, as per ASTM E228
- ✓ Compressive strength of at least 1.51 Mpa / 1.1 N/Sq.mm as per ASTM C.165
- ✓ Flexural strength of at least 0.62 Mpa / 0.8N/Sq.mm as per ASTM C.203/C.240
- ✓ Thermal conductivity of 0.087 W/m²K at a mean temperature of 51 °C as per ASTM C177 and ASTM C8

4.02.00 Specification of adhesive membrane

The adhesive membrane shall be 2-component urethane asphalt mastic having excellent elastomeric properties and be acid & heat resistant. The adhesive membrane shall be applied in between and behind the blocks in a 3 mm thick layer ensuring a proper bond and adhesion. The adhesive membrane shall have the following properties.

- ✓ Tensile strength at 23°C of 1.0 N/mm² as per ASTM D.412
- ✓ Elongation at 23° C of 147.0 % as per ASTM D.412
- ✓ Moisture vapor transmission of 0.0048 Perm inches as per ASTM C.96 Method E
- ✓ The adhesive shall show no slump after 5 hours conditioned at 60°C with a film thickness of 3/32" as per ASTM 61, standard test methods for solvent bearing bituminous compounds, section 12 behavior at 60°C.

4.03.00 Specification of primer

Primer to be applied on steel substrate receiving borosilicate glass block lining system shall have the following properties including thickness, physical & chemical properties.

- i) The primer shall be a high performance epoxy primer. The primer shall be applied in 1 layer with a WFT of 3 to 5 mils.
- ii) The primer shall be applied either by rolling or spray gun. Welds and joints shall receive an additional layer of primer by brush prior to rolling or spraying.
- iii) The solids by volume of the high performance epoxy primer shall be no less than 50%.
- iv) The bonding of the primer to the steel/ concrete shall be at least 1400 psi. as per ASTM D4541.

4.04.00 Specification for surface preparation

- ✓ The steel surface shall be grit blasted to a cleanliness of SA 2 1/2 and approved by the supplier of the lining system





- ✓ The substrate shall thereafter be primed using a high performance epoxy primer within a short time window approved by the supplier

4.05.00 Wet stack properties of the lining system

The lining system (borosilicate glass block and adhesive) shall be tested for its wet stack surface properties by an independent approved institute, subject to acceptance by the Purchaser, and has during such testing been shown to allow, without any significant re-entrainment of flue gas condensate, a flue gas velocity of maximum 18.3 m/s.

Bidder shall provide a project specific "Wet Stack" study, performed by an independent approved institute, subject to acceptance by the Purchaser, indicating the correct placement and design of liquid collection gutters and liquid drains to ensure minimization of liquids and condensates entering the chimney.

- (a) the lining system manufacturer can demonstrate a proven Quality Control system that monitors and documents the key physical properties, as described under (a) above, of all lining system components and furthermore the lining system manufacturer will be willing and able to show to the end customer, during a manufacturing plant visit, the Quality Control results achieved for the project specific materials manufactured for the subject end customer.
- (b) The lining supplier shall provide a ten (10) year full replacement guarantee and full-time onsite QA supervision, during erection & commissioning, by the supplier of the lining system.
- (c) The lining system (borosilicate glass block and adhesive) is offered by a supplier with demonstrated capabilities in the area of on-site technical support and QA/QC supervision, who employs QA/QC supervisors with a demonstrated experience of at least 5 years in technical support and QA/QC supervision of the subject lining system.
- (d) The lining system (borosilicate glass block and adhesive) has been tested for fire risk by an independent institute of sufficient knowledge and experience, subject to acceptance by the project Owner, and it has through this testing demonstrated the ability to protect the steel chimney flues from structural damage during a period of 2 hours, as per ASTM E-119,



- (e) the lining system (borosilicate glass block and adhesive) has been tested for worker health and safety on an actual large scale installation project by an independent institute of sufficient knowledge and experience, subject to acceptance by the project Owner, and it has demonstrated through such testing that it can be used by teams of workers safely, without adverse health effects, and such without requiring excessive protective measures,
- (f) the lining system has, through documented testing, been proven resistant to thermal shock, for a minimum of 1.000 cycles, where each cycle results in the lining surface temperature to rise from ambient temperature to 160 °C, and back to ambient temperature.

5.00.00 INSTALLATION OF BOROSILICATE BLOCK LINING SYSTEM

5.01.00 Surface Preparation & Surface Cleaning

The bidder shall carry out the following as a minimum to prepare the concrete / steel flue surface for the lining.

- ✓ Sandblasting of flue for surface preparation. Near-white metal blast finish shall be provided by the bidder for preparing the steel surfaces to receive the lining.
- ✓ All surfaces must be free from dust, dirt, and grease. Any foreign material which will interfere with adhesion must be removed.
- ✓ All weld spatter slag and old anchor welds shall be removed from the substrate, and the area ground flush with the parent metal.
- ✓ All edges and fillets and similar abrupt contours shall be rounded off smoothly.

5.02.00 Mixing of Adhesive Membrane

- ✓ The Adhesive membrane shall be mixed according to the direction for the product use in the correct mixing ratio.
- ✓ The temperature for mixing the main material and hardener shall be about 24 deg C. Appropriate mixing method shall be used for equal mixing and should be blended for the required appropriate time.
- ✓ Sufficient time shall be allowed for curing

5.03.00 Mixing machine

Mixing machine shall be used for preparing the 2 component Adhesive Membrane on site.

- ✓ In order to ensure consistent, high quality mixing of the components of the lining system adhesive, (an) automated mixing machine(s) should





be provided using a 3,200W mixer motor, with fail-safe protection against the operator error of mixing the main adhesive component without its hardener.

- ✓ The mixing machine must be CE – approved.
- ✓ The mixing machine shall have thermal motor protection to minimize failure and fire risk. Adequate number of mixing machines shall be employed for completion of the installation works within the scheduled time.

5.04.00 Mixing of Epoxy Primer

- ✓ Epoxy Primer shall be mixed according to the direction for the product use Mixing ratio shall be as recommended by OEM
- ✓ Epoxy Primer shall be blended by using Mechanical Mixer for the required minimum time.

5.05.00 Installation of Borosilicate Block

- ✓ The Adhesive membrane shall be applied as per the instructions of OEM.
- ✓ Arrange the borosilicate glass blocks such that there is no blank space between the block and surface. The adhesive should fill the side joint and flow out to the edge. The block shall completely stick to adhesive applied on the surface.
- ✓ Block whose edge is broken shall not be used.
- ✓ All the equipment and tools required to install Borosilicate Glass Block lining system including Polyethylene film, Rag, Wire brush, Plastic sink, Electric drill, Jiffy Mixer Blade, Insulated saw, Float, Paint brush, hand cleaner, Cleansing glove, Hygrometer, Surface thermometer, white chalk, white spray etc as required shall be arranged by the bidder.

5.06.00 Inspection

- ✓ Inspection and testing including adhesion shall be as per approved QAP.
- ✓ The mixing, curing and adhesion characteristics of the adhesive membrane shall be evaluated by applying it onto a test area of the same material and surface preparation of the substrate. Work life and initial set time may be visually observed. Cure shall be uniform.
- ✓ The installation procedure of the lining system shall be verified by installing the system on a transparent panel. Visual inspection shall be made of back, end and side joints.

5.07.00 Heat cycling resistance

The lining system shall, through documented testing, have been proven resistant to thermal shock, for a minimum of 1000 cycles, where each cycle results in the lining surface temperature to rise from ambient temperature to 180 °C, and back to ambient temperature, where each heating cycle has a duration of 24 minutes.





The lining system shall also withstand occasional excursion of flue gas temperature of more than 200°C.

5.08.00 On site supervision and QA/QC services

The lining system (borosilicate glass block and adhesive) supplier shall provide on-site technical support and QA/QC supervision, and shall employ QA/QC supervisors with a demonstrated experience of at least 5 years in technical support and QA/QC supervision of the subject lining system.

5.09.00 Performance, safety and fire risk

The lining system (borosilicate glass block and adhesive) shall be tested and certified for fire risk by an approved institute subject to acceptance by the Purchaser, and through testing as per relevant ASTM standards.

6.00.00 WARRANTY

Ten (10) years warranty for the Borosilicate glass Block Lining System of the chimney flue shall be provided. Under this warranty, the bidder shall repair or replace the lining system (Both application and material) at his own cost, if the lining system should fail to protect the chimney flue from internal deterioration. The manufacturer/ supplier/ executor of the lining system shall provide a warranty for 10 (Ten) years Borosilicate glass Block Lining System (Material & workmanship) in a non-judicial stamp paper which shall be duly notarized and registered and authenticated and agreed by the main chimney vendor. The warranty shall include full replacement of materials and FQA supervision and execution of the Borosilicate glass Block Lining System. Periodical supervision/ monitoring by expert of Borosilicate glass Block Lining System must be ensured. Necessary repair/ rectification/ replacement of Borosilicate glass Block Lining System have to be taken care of the vendor.

7.00.00 QUALIFICATION CRITERIA FOR LINING SUPPLIER/ EXECUTOR/ MANUFACTURER

The chimney shall be internally protected against corrosion with a lining system consisting of 38 mm / 51mm thick closed cell borosilicate glass blocks applied with a flexible, chemically resistant adhesive and meets below qualification criteria:

(1) the lining system supplier shall submit performance certificate in support of satisfactory operation of the lining system manufactured by same proposed OEM with 38 mm /51mm thick borosilicate glass block and adhesive installed on steel flue chimney of the Wet FGD project in at least two (2) coal fired power stations at different locations for more than ten (10) years on the date of Bid (NIT date), where the flue gas is not reheated downstream of the flue gas desulphurization system and is at it's water dew point during it's presence in the chimney.



WBPDCL

**Chimney Bid Document
Sagardighi Thermal Power Project
1x660 MW Unit No. 5, Phase - III**

(2) the above described lining system should be presently operating as wet flue gas chimney in at least five (5) coal fired power stations located in a country other than the country of origin of the subject lining system, where the flue gas is not reheated downstream of the flue gas desulphurization system and is at its water dew point during its presence in the chimney.

(3) the lining system (borosilicate glass block and adhesive) shall be tested for its wet stack surface properties by Alden Research Laboratory or equivalent, subject to acceptance by the project Owner, and the maximum flue gas velocity in the chimney must under all conditions remain below the velocity where minimal liquid re-entrainment occurs, with a safety margin of 1.5 m/s to avoid stack liquid discharge or acid spitting from the chimney. The supplier of such proposed lining system, must submit the test report, meeting the following conditions:

(a) The test must be conducted by the same institute that conducted the testing described in the EPRI Revised Wet Stack Design Guide 2012 document.

(b) The test must be conducted by the same test method, as used to obtain the test results described in the EPRI Revised Wet Stack Design Guide 2012 document,

(c) The test specimen must be prepared at the location of the testing institute, under supervision of the engineers performing the test, the recommendation issued by the test institute must include a suitable safety margin, as recommended by the test institute itself.





chimney flue liner projecting over the chimney roof shall be wrapped with 2 mm thick Titanium sheet. The design & construction of chimney liners shall be based on the guidelines of EPRI Revised Wet Stack Design guide.

ii) Wet Chimney Condensate Collection System.

To avoid the carryover of the condensate/acidic dews/water droplets/ coming out of the wet chimney a condensate collection system shall be provided. Design of the condensate system should be such that the liquid condensate film near the exit of the stack is collected in the chimney and preventing falling of the acidic dews/water droplet/gypsum from the chimney in the nearby area.

iii) Wet stack model study

A wet stack study shall be performed by the approved Vendor with a wet stack installation. A wet stack model study shall consist of the following:

- a) Condensation calculations.
- b) Minimum 1:12 scale physical flow model for liquid collector design.
- c) Computational flow model for plume downwash analysis.
- d) Physical or computational flow model for CEMS elevation flow performance.

The vendor should have an experience of similar works in at least two (2) projects with similar height of Chimney & similar capacity of Power Plant. The selection of the vendor shall be subject to approval of the owner.

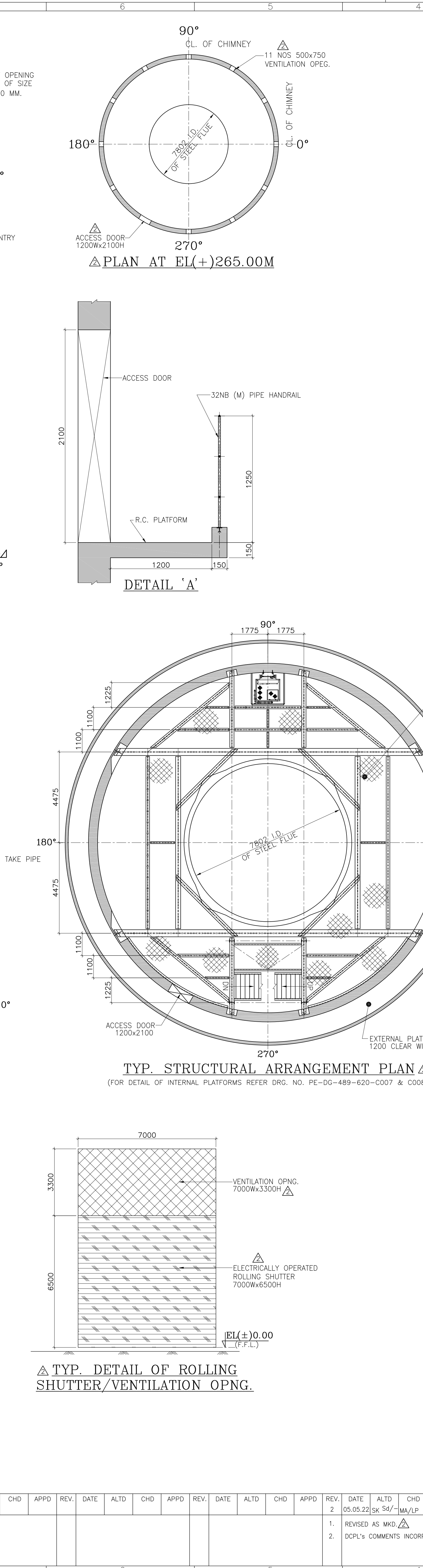
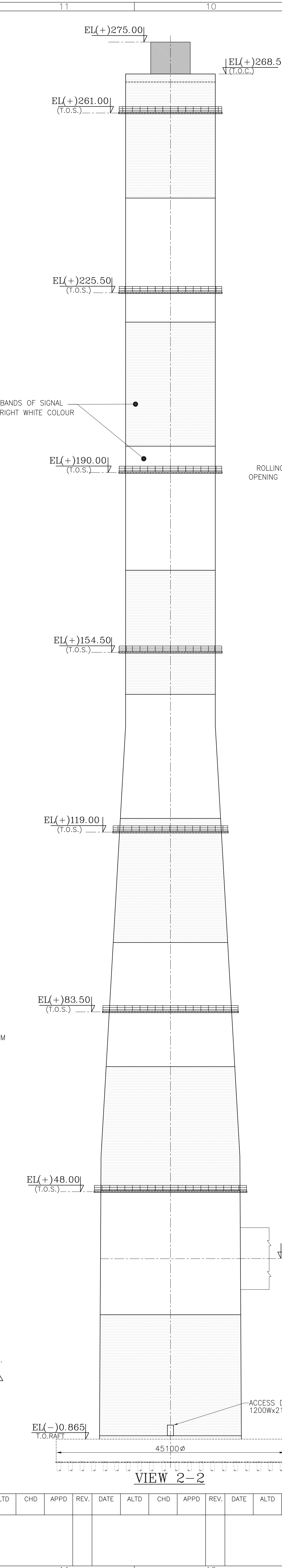
- iv) Liquid collectors shall be designed and developed experimentally using a physical model. The model shall begin at the outlet of the absorber mist eliminator(s), including the absorber outlet and ducting, the stack breaching duct and a minimum of three (3) diameters of the stack liner above the top of the stack breaching duct. Physical model shall include any internal devices that may affect the gas flow, such as structural members, flow controls, and expansion joints. Liquid collectors shall be located where needed in the absorber outlet, the ductwork between the absorber outlet and the chimney liner, in the chimney liner, and in the exit nozzle. These collectors shall collect liquid from surfaces, prevent re-entrainment, and guide the liquid to locations where it can be drained out of the system and prevent the discharge of droplets from the top of the stack that are large enough to rain out to the ground before evaporation.

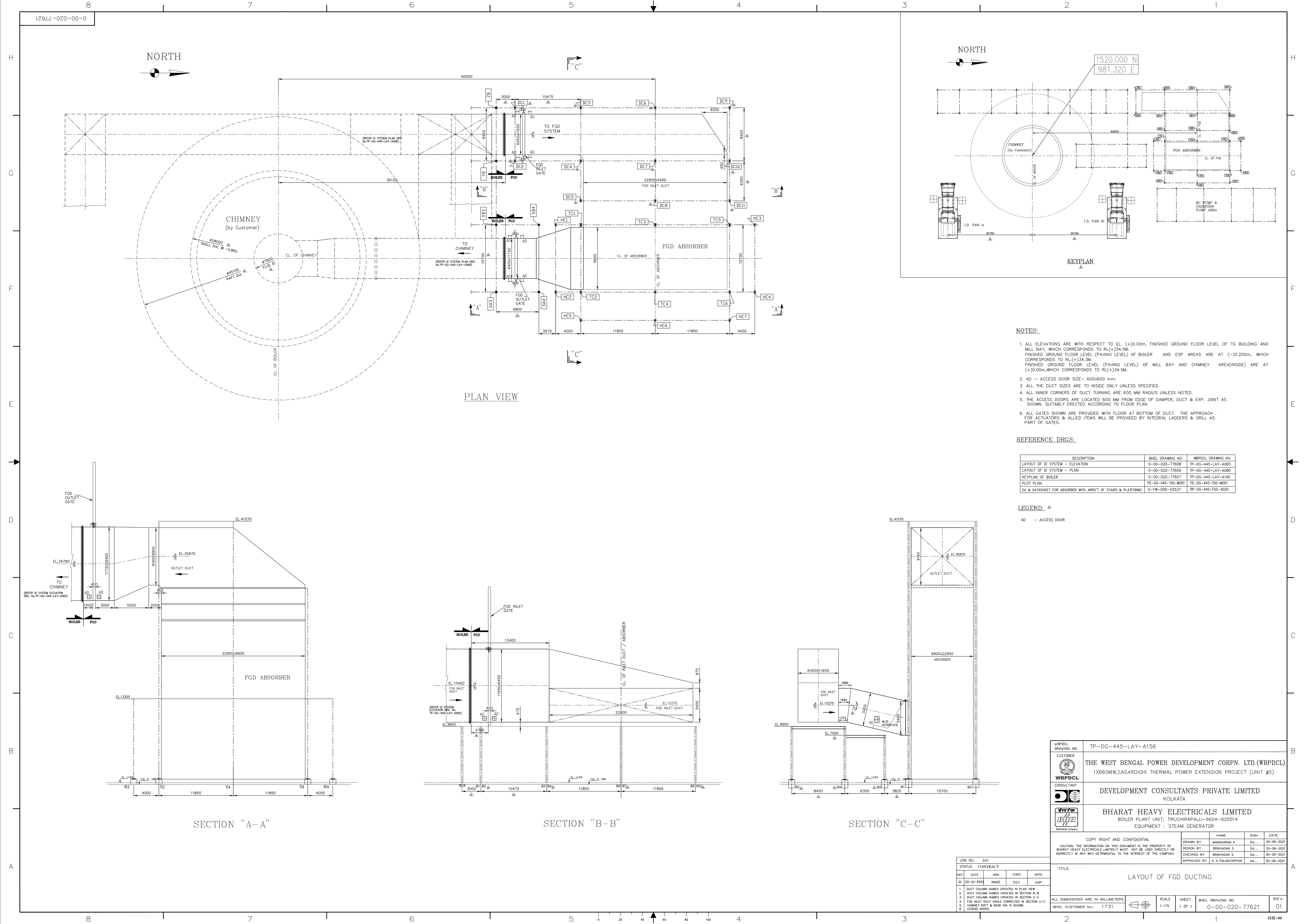
Necessary reiteration of model study shall be done for finalizing the ducting and flue can design.

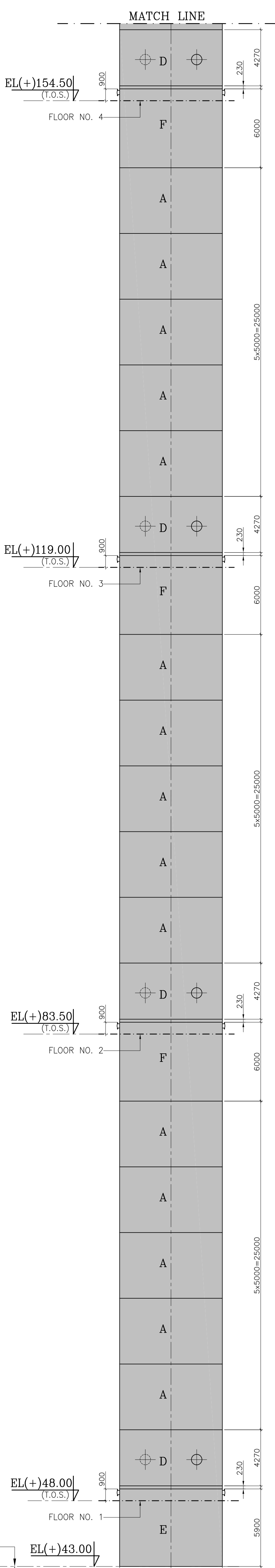
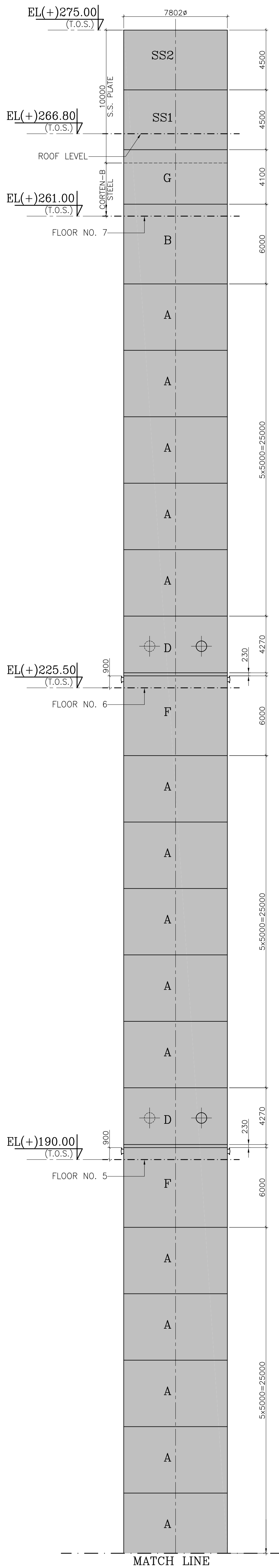
- v) A common Nickel based alloy material storage/neutralizing tank for the the unit of storage capacity as per the mechanical requirement of



No.	OUTSIDE PROFILE OF SHELL (mm)		UNIFORM LINEAR TAPER (°)	UNIFORM LINEAR TAPER (°)	CYLINDRICAL
	DATE	AI			
1.			 300 258.95 30°	 481.5 85.00 48°	







REFERENCE DRAWINGS

1. GENERAL LAYOUT	PE-DG-489-620-C001
2. LAYOUT OF INTERNAL PLATFORM	PE-DG-489-620-C002
3. DETAILS OF INTERNAL PLATFORM	PE-DG-489-620-C008
4. DETAIL OF LINER SUPPORT BEAMS	PE-DG-489-620-C009
5. DETAIL OF LINER RESTRAINT	PE-DG-489-620-C010
6. DETAIL OF LINER EXPANSION JOINTS	PE-DG-489-620-C015

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS IN METERS.

2. FLUE DIMENSIONS AS GIVEN ARE FOR THE LINER AT AMBIENT TEMPERATURE.
3. THE LINER SHALL BE SEGMENTALLY SUPPORTED FROM THE INTERNAL PLATFORMS.
4. EACH LINER SEGMENT AFTER ERECTION AT PLATFORM LEVEL SHALL IMMEDIATELY BE LATERALLY RESTRAINED AT THE RESPECTIVE LOWER PLATFORM LEVEL BY PROVIDING LINER RESTRAINT.

5. REFER TO BHEL (TRICHY) DRAWING FOR TRANSITION DUCT AND FLUE LINER INTERFACE, AND FOR TRANSITION DUCT SUPPORTING ARRANGEMENT.
6. BOROSILICATE LINING OF 38mm THK. IS TO BE PROVIDED ON INNER SIDE OF STEEL FLUE LINERS AFTER SURFACE PREPARATION AS PER MANUFACTURE'S RECOMMENDATIONS.
7. EXTERNAL FACE OF FLUE LINER PROJECTING OVER THE CHIMNEY ROOF SHALL BE WRAPPED WITH 2mm THK. TITANIUM SHEET.

8. CONDENSATE COLLECTION AND EXTRACTION SYSTEM SHALL BE PROVIDED AS PER WET STACK STUDY REPORT. DRAWING FOR THE SAME SHALL BE SUBMITTED SEPARATELY.

6. BOROSILICATE LINING OF 38mm THK. IS TO BE PROVIDED ON INNER SIDE OF STEEL FLUE LINERS AFTER SURFACE PREPARATION AS PER MANUFACTURE'S RECOMMENDATIONS.
7. EXTERNAL FACE OF FLUE LINER PROJECTING OVER THE CHIMNEY ROOF SHALL WRAPPED WITH 2mm THK. TITANIUM SHEET.

7. EXTERNAL FACE OF FLUE LINER PROJECTING OVER THE CHIMNEY ROOF SHALL BE WRAPPED WITH 2mm THK. TITANIUM SHEET.

- STUDY REPORT. DRAWING FOR THE SAME SHALL BE SUBMITTED SEPARATELY.

[illegible]

CUSTOMER		 THE WEST BENGAL POWER DEVELOPMENT CORPN. LTD. (WBPDCL) 1x660 MW WBPDCL SAGARDIGHI TPP UNIT 5 CHIMNEY									
CONSULTANT		 BIHARTI HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NODA (U.P.)									
		DEVELOPMENT CONSULTANTS PRIVATE LIMITED									
		KOLKATA									
TITLE		CHIMNEY									
LINER GENERAL ARRANGEMENT											
MPL	ELEC	C&I	MSE	MAX	DEPT.	SCALE 1:1.75			DRAWING NO.		
					SIGN	 			P.E.-DC-489-620-CO20		
		SHEET 1		OF 1		REV.		0			

CAN TYPE	NOS. REC'D.	BHEL DRG. NO.
CAN TYPE 'A'	30	PE-DG-489-620-C021
CAN TYPE 'D'	6	PE-DG-489-620-C022
CAN TYPE 'F'	5	PE-DG-489-620-C023
CAN TYPE 'G'	1	PE-DG-489-620-C024
CAN TYPE 'B'	1	PE-DG-489-620-C025
CAN TYPE 'E'	1	PE-DG-489-620-C026
CAN TYPE 'S31'	1	PE-DG-489-620-C027
CAN TYPE 'S52'	1	PE-DG-489-620-C027

BHEL-PROJECT ENGINEERING MANAGEMENT (CIVIL)	
THIS DRAWING MARKED ☒ IS RELEASED FOR	
☒	COMMENTS / APPROVAL
☐	PLANNING / INFORMATION
☐	CONSTRUCTION
STAMP ALL PREVIOUS REVISION AS SUPERSEDED	
NAME	ISSUED BY
SIGNATURE	S. K. Mahato
DATE	25/05/2022



SECTION 4-4

TITLE		<u>CHIMNEY</u>									
LINER DETAILS - CAN TYPE										'SS1' & 'SS2'	
MPL	ELEC	C&I	MSE	MAX	DEPT	SCALE 1:60		DRAWING NO.			
					SIGN			PE-DG-489-620-C027			
				DATE	SHEET 1 OF 1			REV. 0			

DETAIL AT 'A'

Diagram showing a cross-section of a roof structure. Key components and dimensions include:

- CAN 'SS1'
- 7802 I.D.
- 8 THK. STIFF. PLATE (TYP.)
- 170 Nos. GRADE 8.8 M16x60 H.T. BOLTS ALONGWITH HIGH TENSILE NUT, WASHERS & HELICAL SPRING LOCKING WASHERS.
- 100x100x8 F/F 8 THK. S.S. PLATE
- 8 THK. S.S. PLATE
- 120 VENT HOLE AT 7920 P.C.D.
- 2 MM THK. TITANIUM SHEET WRAPPING
- 7930 P.C.D.
- CAN 'G'

DETAIL AT 'C'

Diagram showing a cross-section of a roof structure. Key components and dimensions include:

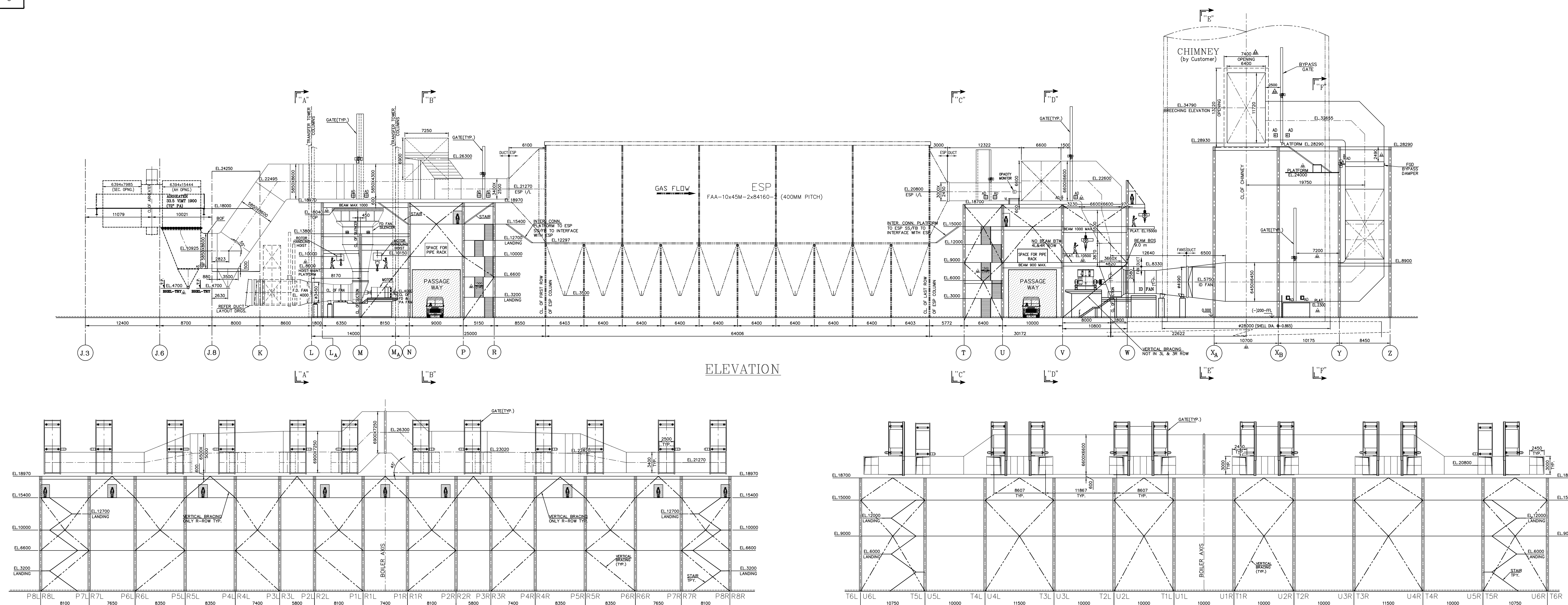
- 7802 I.D. OF LINER
- 8 THK. S.S. PLATE
- 120 VENT HOLE 20 NOS AT 7920 P.C.D.
- 8 THK. S.S. PLATE RAIN SIGHTING (TYP.) WRAPPED WITH 2MM THK. TITANIUM SHEET
- 2 MM THK. TITANIUM STRIP 100 WIDE
- TIG WELD
- Ti COUNTERSUNK SCREW ϕ 500 C/C
- 685
- 8 THK. S.S. PLATE AT EVERY 15'
- CAN 'SS1'
- 7802 I.D.
- 460
- 60
- 50
- 100
- 75
- 50
- 299

Section View

Diagram showing a cross-section of a roof structure. Key components and dimensions include:

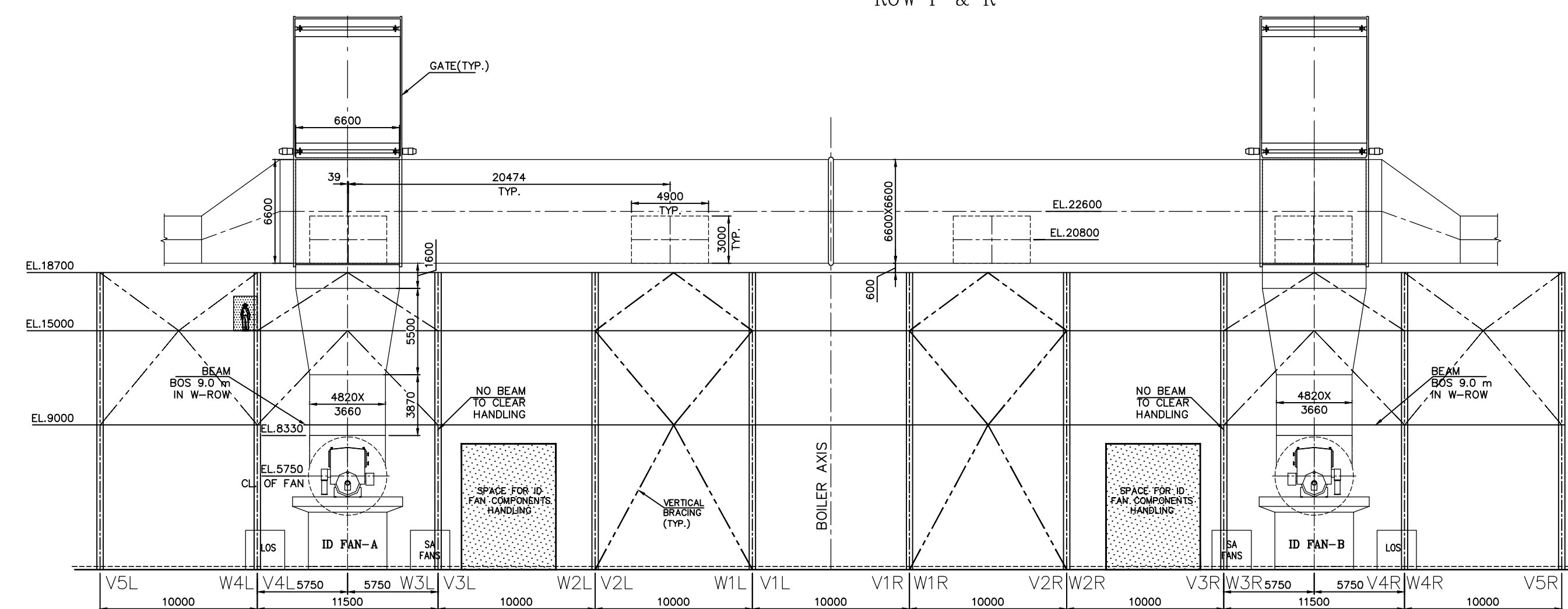
- EL(+)267.00 (T.O.C.)
- M12 BOLTS WITH WASHER (GALVANIZED) (COVERED UNDER ROOF FINISHING)
- 8 THK. S.S. PLATE
- 8 THK. S.S. PLATE
- 299

[illegible]

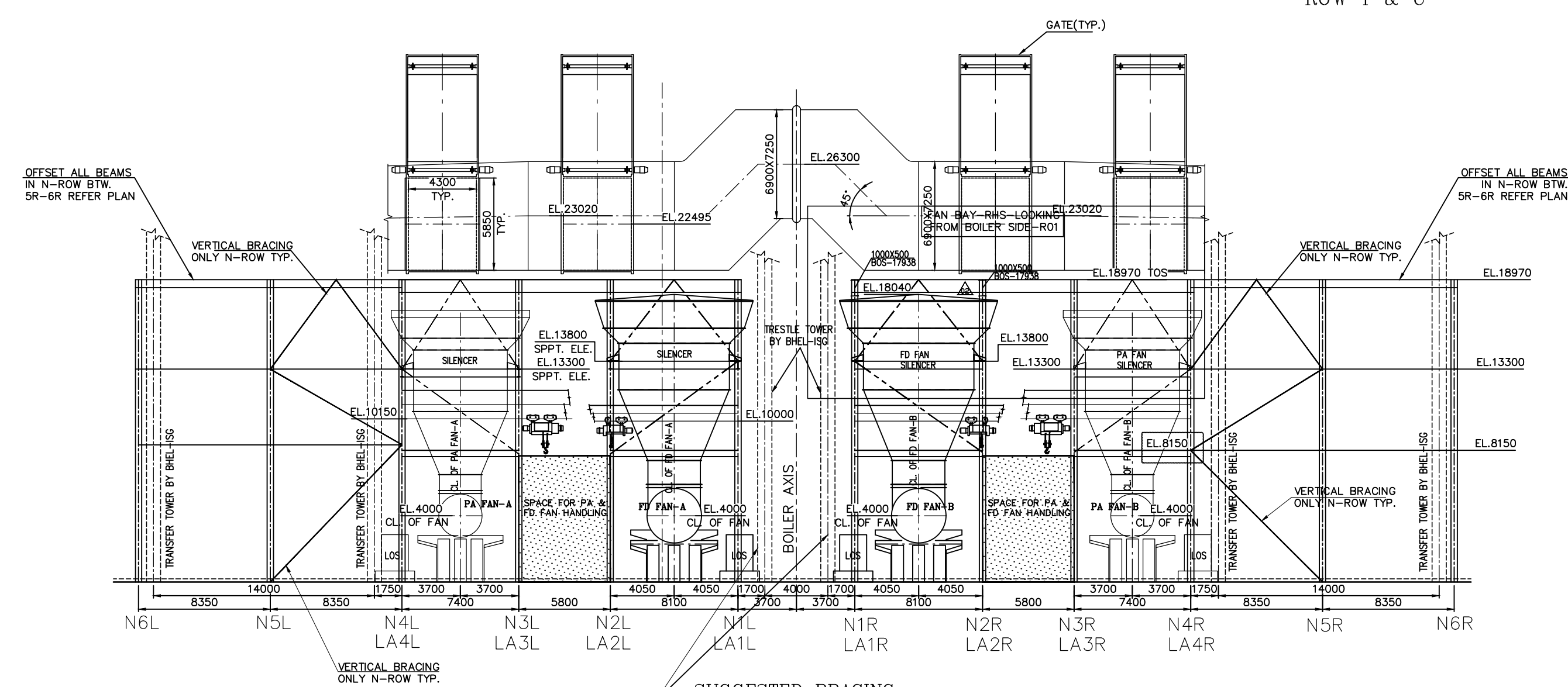


SUGGESTED BRACING
SECTION—"B-B"
ROW P & R

SUGGESTED BRACING
SECTION—"C-C"
ROW T & U



SUGGESTED BRACING
SECTION—"D-D"



SUGGESTED BRACING
SECTION—"A-A"
ROW LA & N

- NOTES:

1. ALL ELEVATIONS ARE WITH RESPECT TO EL. (+0.00)m. FINISHED GROUND FLOOR LEVEL OF TO BUILDING AND MILL BAY, WHICH CORRESPONDS TO RL(+34.5M).
FINISHED GROUND FLOOR LEVEL (PAVING LEVEL) OF BOILER AND ESP ARES ARE AT (-0.200m, WHICH CORRESPONDS TO RL (-0.200m).
FINISHED GROUND FLOOR LEVEL (PAVING LEVEL) OF MILL BAY AND CHIMNEY AREA(INSIDE) ARE AT (+0.00)m,WHICH CORRESPONDS TO RL(+34.5M).
2. AD - ACCESS DOOR SIZE= 600x600 mm.
3. ALL THE DUCT SIZES ARE TO INSIDE UNLESS SPECIFIED.
4. ALL INNER CORNERS OF DUCT TURNING ARE 600 MM RADIUS UNLESS NOTED.
5. THE ACCESS DOORS ARE LOCATED 600 MM FROM EDGE OF DAMPER, DUCT & EXP. JOINT AS SHOWN. DAMPERS ARE TO BE ERECTED ACCORDING TO THE DRAWING.
6. ALL GATES SHOWN ARE PROVIDED WITH GATE AT BOTTOM OF DUCT. THE APPROX. FOR ACTUATORS & ALLIED ITEMS WILL BE PROVIDED BY INTEGRAL LADDERS & GRILL AS PART OF GATES.
7. APPROACH FOR FGD BYPASS DAMPER IS PROVIDED WITH FLOOR AT BOTTOM OF DUCT. THE APPROACH FOR ACTUATORS & ALLIED ITEMS SHALL BE PROVIDED BY INTEGRAL LADDERS & GRILL AS PART OF GATES.

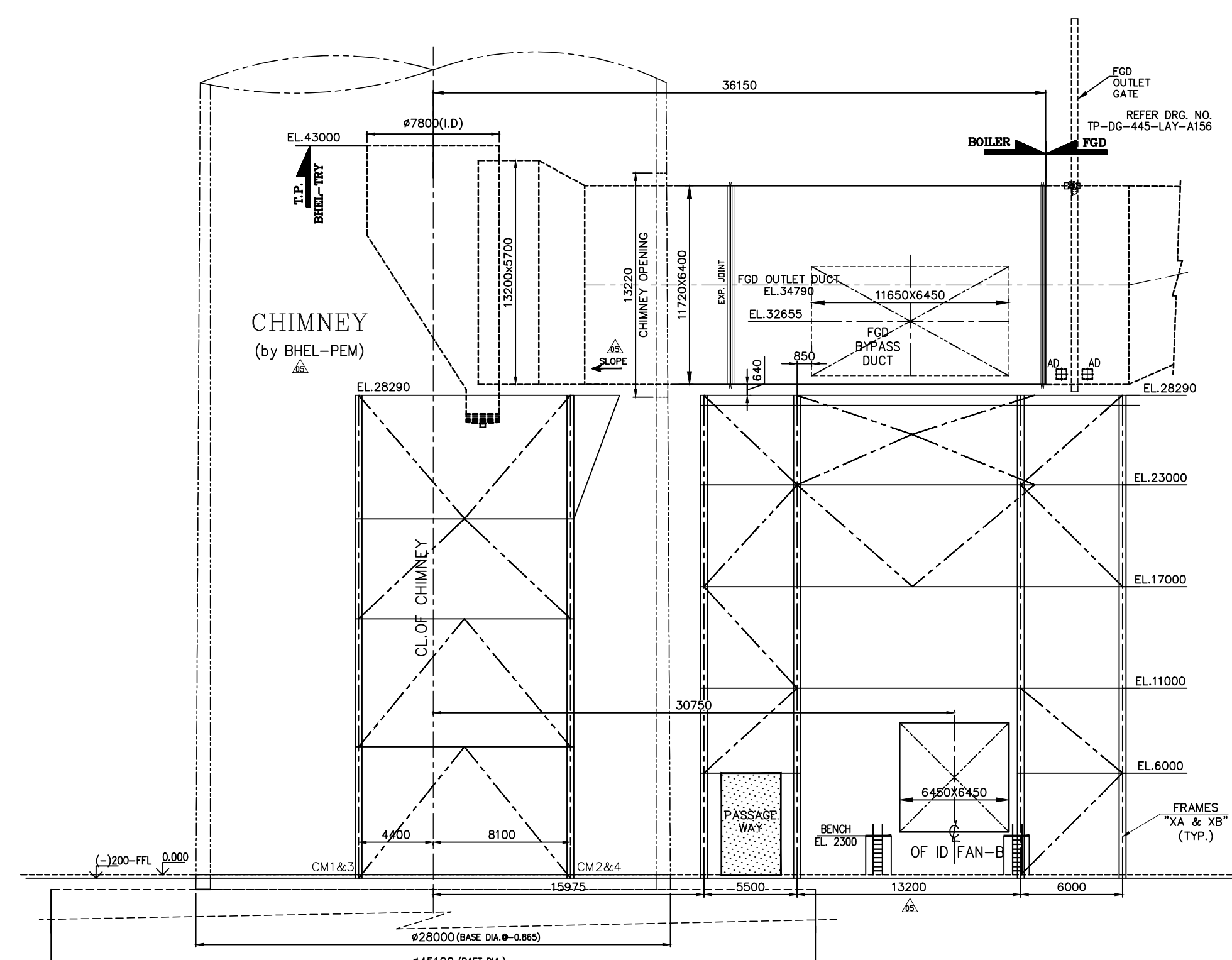
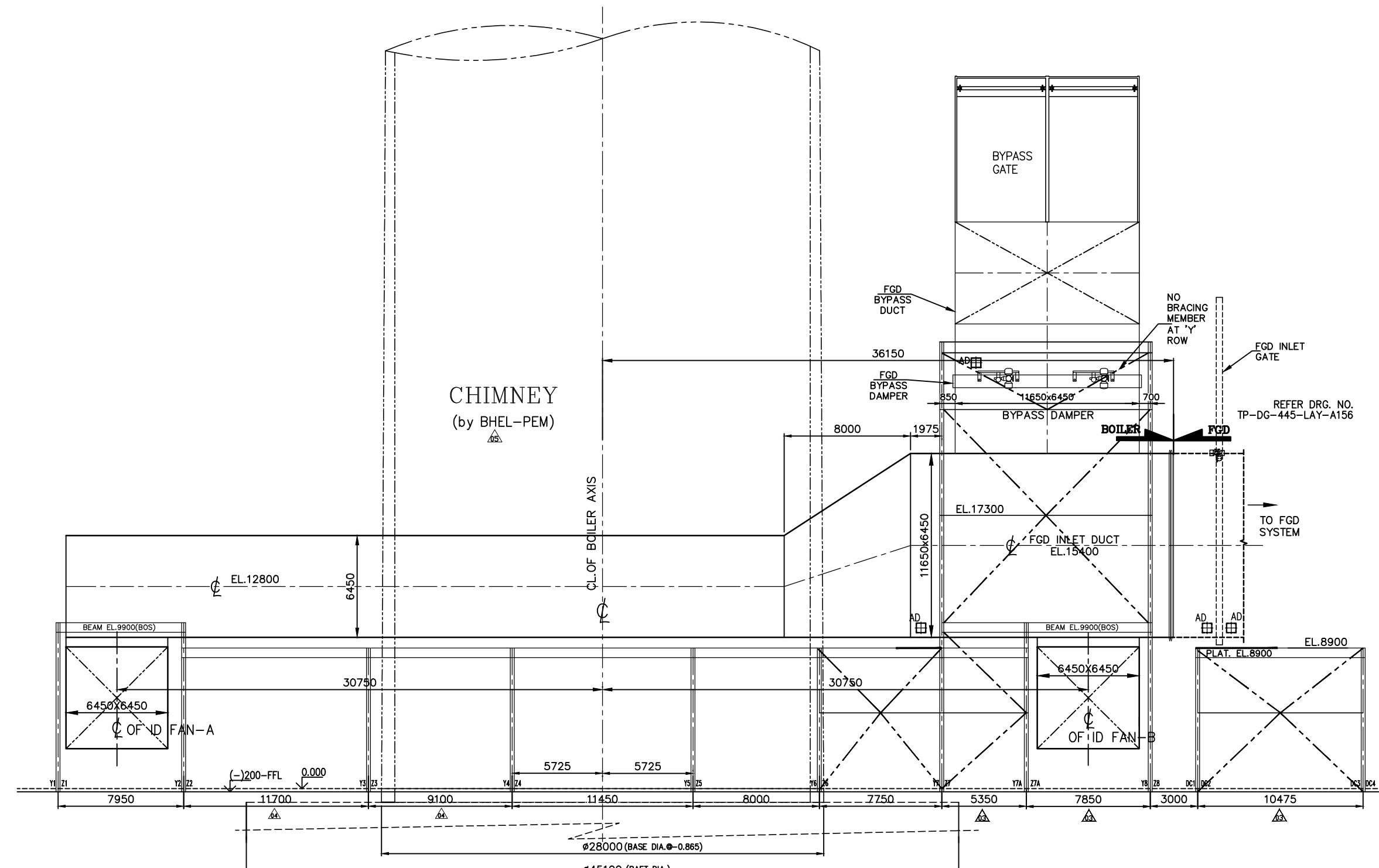
LEGEND:

- PA FAN - PRIMARY AIR FAN
FD FAN - FORCED DRAFT FAN
ID FAN - INDUCED DRAFT FAN
ESP - ELECTROSTATIC PRECIPITATOR
T.P. - TERMINAL POINT
AD - ACCESS DOOR

REFERENCE DRGS:

1. REFER GA DRG. NO. 0-00-022-77600 FOR BOILER PARAMETERS, LEGEND, NOTES, REFERENCE DRGS. & UNIT DESCRIPTION.

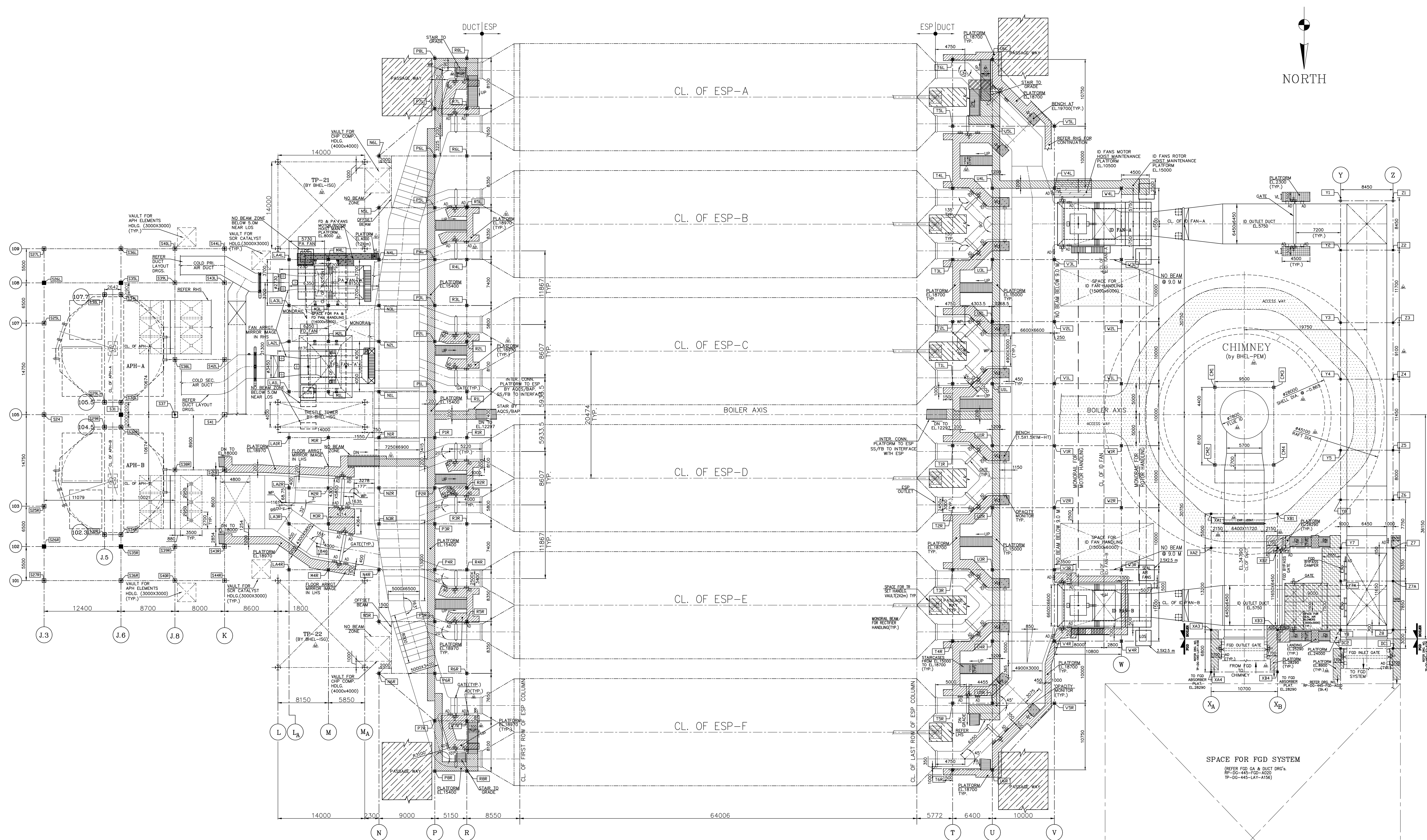
DESCRIPTION	SHEL DRAWING NO.	IMPPOOL DRAWING NO.
CA OF BOILER SECTIONAL SIDE ELEVATION - SECTION "E-E"	0-00-0222-77600	TP-DG-445-LAY-A050
GENERAL ARRD. OF BOILER SECTIONAL PLAN-SECTION "B-B"	0-00-0222-77601	TP-DG-445-LAY-A050
LAYOUT OF ID SYSTEM - PLAN	0-00-0220-77609	TP-DG-445-LAY-A066
LAYOUT OF FLUE GAS DUCTING - GAS DUCT FROM AIRHEATER	0-00-0220-77620	TP-DG-445-LAY-A070
KEYPLAN OF BOILER	0-00-0220-77607	TP-DG-445-LAY-A100
PLOT PLAN	PE-DG-445-100-M000	PE-DG-445-100-M000
CA & DATASHEET FOR ABSORBER WITH ARRD. OF STAIRS & PLATFORMS	0-FW-000-03537	RP-DG-445-LAY-A020
LAYOUT OF FGD DUCTING	0-00-0220-77621	TP-DG-445-LAY-A156
CA OF CHIMNEY	PE-DG-489-620-C001	PE-DG-489-620-C001

SECTION-"E-E"₂

SECTION—"F-F"

						JOB NO. 445					
						STATUS CONTRACT					
REV	DATE	DRN	CHKD	APPRO		REV	DATE	DRN	CHKD	APPRO	
05	06-08-2020	MAND	SSV	KAP		05	06-08-2020	SASI	SSV	KAP	
						1. DRAWING UPDATED.					
JOB NO. 445						JOB NO. 445					
STATUS CONTRACT						STATUS CONTRACT					
REV	DATE	DRN	CHKD	APPRO		REV	DATE	DRN	CHKD	APPRO	
04	20-10-2021	MAND	SSV	KAP		02	30-06-2021	KR	SSV	KAP	
1. P3 & 23 COLUMN LOCATION RE-SECURED IN SEC-7F.						1. SECTION E-C UPDATED.					
2. REV. ADJUST IS SHOWN IN CHINNEY INLET DUCT.						2. SECTION F-C UPDATED.					
3. REF. DRY-NO. CORRECTED IN SEC-8E.						3. ELEVATION VIEW - POND DOME UPDATED.					
4. SECTION C-E UPDATED.						4. POND INLET DUCT LEGEND IS SHOWN.					
5. LEGEND UPDATED.						5. DRAWING UPDATED.					
JOB NO. 445						JOB NO. 445					
STATUS CONTRACT						STATUS CONTRACT					
REV	DATE	DRN	CHKD	APPRO		REV	DATE	DRN	CHKD	APPRO	
04	30-10-2021	MAND	SSV	KAP		01	15-12-2020	KR	SSV	KAP	
1. XA & XB COL. SPAN REVISED AS 1070mm.						1. DRAWING UPDATED.					
2. D/FAN OUTLET DUCT LOCATION REVISED.											
3. CHINNEY FUEL GAS D/A SHOWN.											
4. CHINNEY BAG D/A & RAY D/A SHOWN.											
5. CHINNEY BREATHING OPGING WITH REVISED AS 740mm.											

WBPDCL DRAWING NO.		TP-DG-445-LAY-A065	
CUSTHER		THE WEST BENGAL POWER DEVELOPMENT CORPN. LTD.(WBPDCL)	
WBPDCL		1X660MW,SAGARDIGHI THERMAL POWER EXTENSION PROJECT (UNIT #5)	
CONSULTANT		DEVELOPMENT CONSULTANTS PRIVATE LIMITED	
		KOLKATA	
		BHARAT HEAVY ELECTRICALS LIMITED	
Ministry Company		BOILER PLANT UNIT; TIRUCHIRAPPALI-INDIA-620014	
		EQUIPMENT : STEAM GENERATOR	
COPY RIGHT AND CONFIDENTIAL			
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TITLE		LAYOUT OF ID SYSTEM	
		ELEVATION	
ALL DIMENSIONS ARE IN MILLIMETERS		SCALE	
BHEL CUSTOMER No.: 1731		1:250	
		SHEET	
		1 OF 1	
		BHEL DRAWING NO.	
		0-00-020-77608	
		REV.	
		05	



NOTES:

- ALL ELEVATIONS ARE WITH RESPECT TO EL. (+)0.00m, FINISHED GROUND FLOOR LEVEL OF TG BUILDING AND MILL BAY, WHICH CORRESPONDS TO RL(+34.5M). FINISHED GROUND FLOOR LEVEL (PAVING LEVEL) OF BOILER AND ESP AREAS ARE AT (-)0.200m, WHICH CORRESPONDS TO RL(+34.3M). FINISHED GROUND FLOOR LEVEL (PAVING LEVEL) OF MILL BAY AND CHIMNEY AREA(INSIDE) ARE AT (+)0.00m, WHICH CORRESPONDS TO RL(+34.5M).
- AD - ACCESS DOOR SIZE - 600x600 mm.
- ALL THE DUCT SIZES ARE TO INSIDE ONLY UNLESS SPECIFIED.
- ALL INNER CORNERS OF DUCT TURNING ARE 600 MM RADIUS UNLESS NOTED.
- THE ACCESS DOORS ARE LOCATED 600 MM FROM EDGE OF DAMPER, DUCT & EXP. JOINT AS SHOWN. SUITABLY ERECTED ACCORDING TO FLOOR PLAN
- ALL GATES SHOWN ARE PROVIDED WITH FLOOR AT BOTTOM OF DUCT. THE APPROACH FOR ACTUATORS & ALLIED ITEMS WILL BE PROVIDED BY INTEGRAL LADDERS & GRILL AS PART OF GATES.

LEGEND:

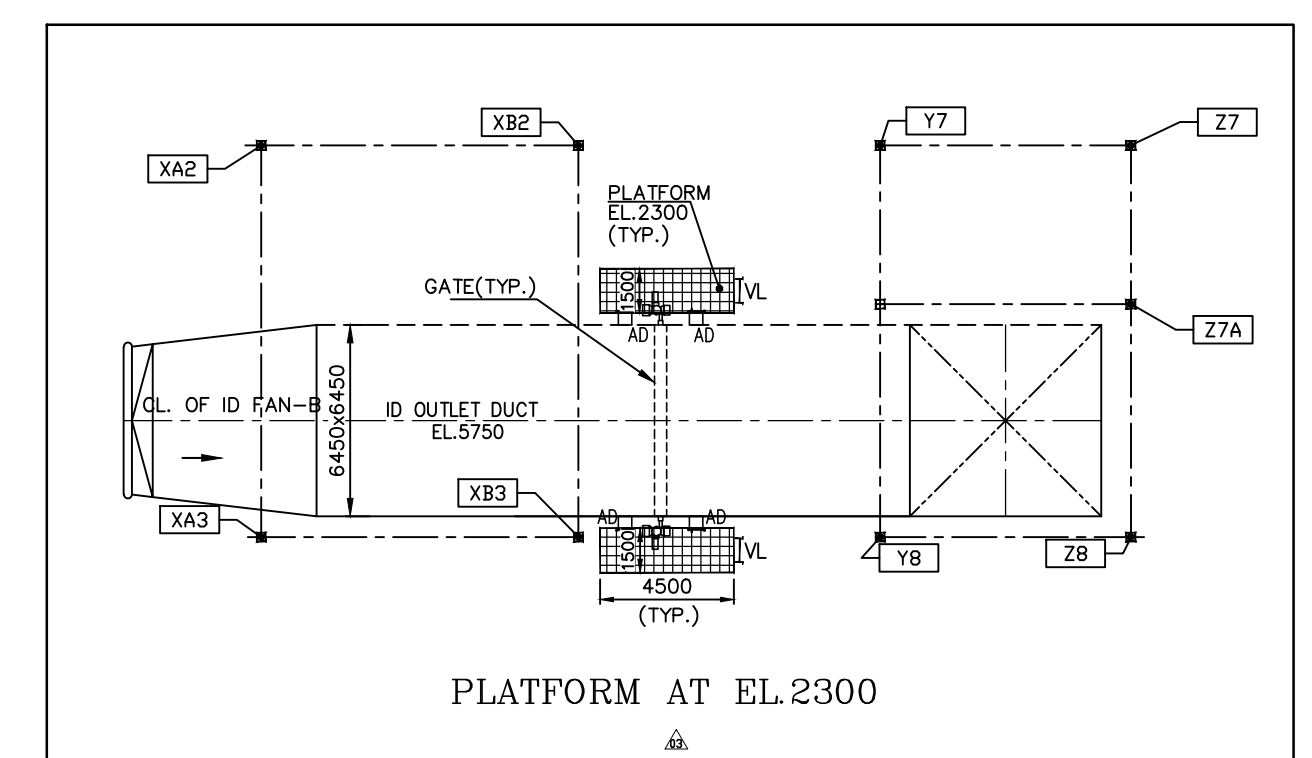
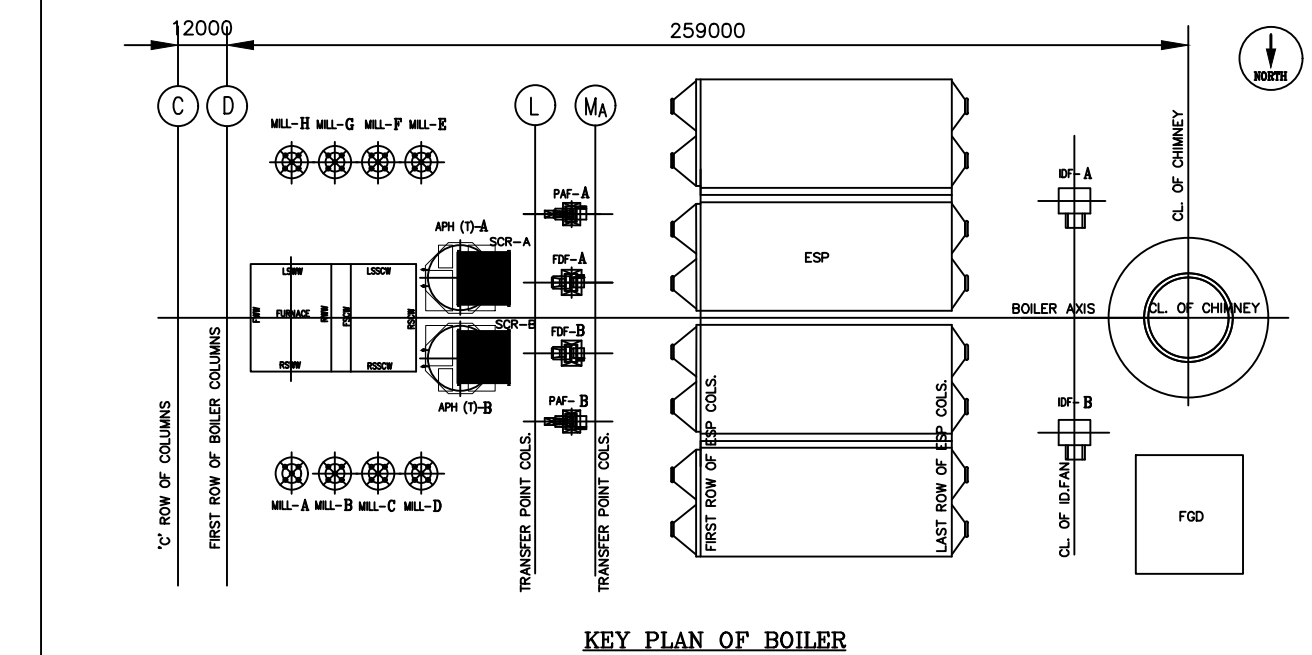
- PA FAN - PRIMARY AIR FAN
FD FAN - FORCED DRAFT FAN
ID FAN - INDUCED DRAFT FAN
ESP - ELECTROSTATIC PRECIPITATOR
T.P. - TERMINAL POINT
AD - ACCESS DOOR

REFERENCE DRGS:

1. REFER GA DRG. NO. 0-00-022-77600 FOR BOILER PARAMETERS, LEGEND, NOTES, REFERENCE DRGS. & UNIT DESCRIPTION.

DESCRIPTION	BHEL DRAWING NO.	MBPDCL DRAWING NO.
GA OF BOILER SECTIONAL SIDE ELEVATION - SECTION "C-E"	0-00-022-77600	TP-DG-445-LAY-A057
GENERAL ARRGT. OF BOILER SECTIONAL PLAN-SECTION "B-B"	0-00-022-77602	TP-DG-445-LAY-A059
LAYOUT OF ID SYSTEM - PLAN	0-00-020-77609	TP-DG-445-LAY-A066
LAYOUT OF FLUE GAS DUCTING - GAS DUCT FROM AIRHEATER	0-00-020-77620	TP-DG-445-LAY-A075
KEYPLAN OF BOILER	0-00-020-77607	TP-DG-445-LAY-A140
PLOT PLAN	PE-DG-445-100-M001	PE-DG-445-100-M001
GA & DATASHEET FOR ABSORBER WITH ARRGT OF STAIRS & PLATFORMS	0-FW-000-03537	RP-DG-445-FGD-A020
LAYOUT OF FGD DUCTING	0-00-020-77621	TP-DG-445-LAY-A156
GA OF CHIMNEY	PE-DG-489-620-C001	PE-DG-489-620-C001

PLAN VIEW



SPACE FOR FGD SYSTEM

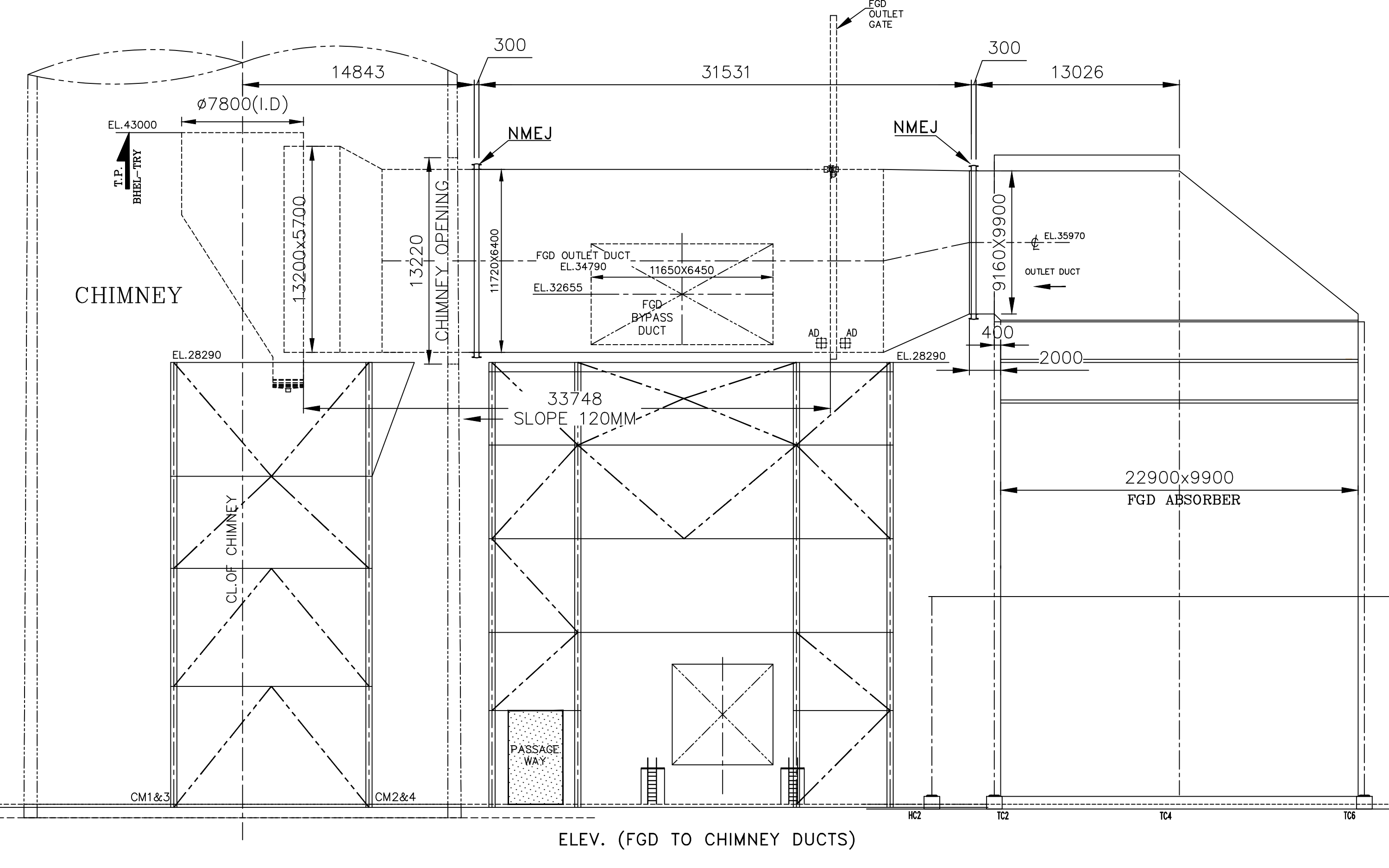
REFER FGD GA & DUCT DRG'S

BP-DG-445-FGD-A020

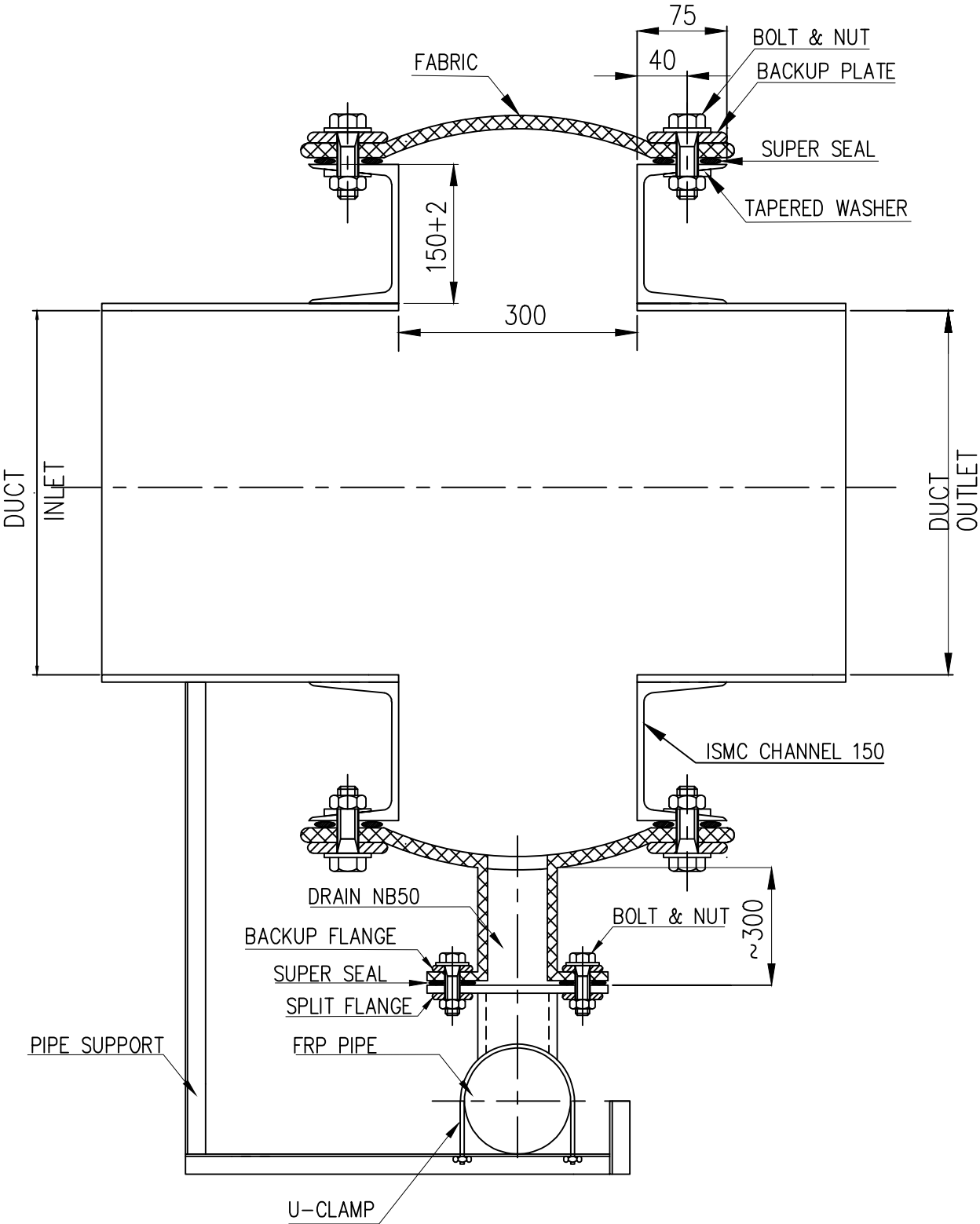
TP-DG-445-LAY-A156

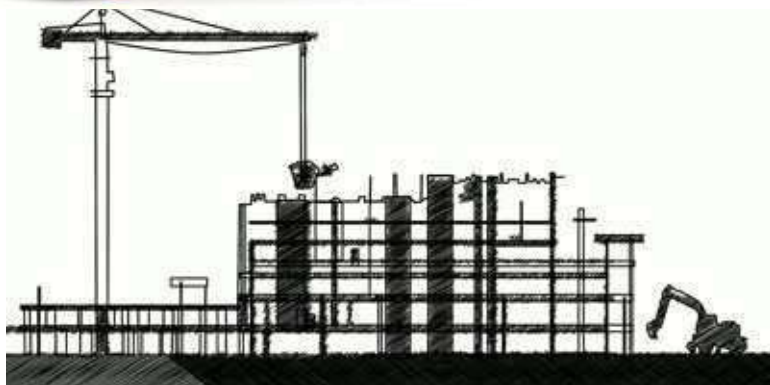
WBPDCL DRAWING NO.		TP-DG-445-LAY-A066	
CUSTOMER		THE WEST BENGAL POWER DEVELOPMENT CORPN. LTD.(WBPDCL)	
		1X660MW,SAGARDIGHI THERMAL POWER EXTENSION PROJECT (UNIT #5)	
CONSULTANT		DEVELOPMENT CONSULTANTS PRIVATE LIMITED	
		KOLKATA	
 Bharat Heavy Electricals Limited		BHARAT HEAVY ELECTRICALS LIMITED	
		BOILER PLANT UNIT; TRICHURPALLI-INDIA-620014	
		EQUIPMENT : STEAM GENERATOR	
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TITLE		LAYOUT OF ID SYSTEM PLAN	
ALL DIMENSIONS ARE IN MILLIMETERS		SCALE	SHEET
BHEL CUSTOMER No.: 1731		1:250	1 OF 1
		BHEL DRAWING NO. 0-00-020-77609	
		REV. 05	

SKETCH: NMEJ LOCATION FGD OUTLET TO CHIMNEY DUCTING
PROJECT: SAGARDIGHI 1X660MW



DUCT EXPANSION JOINT (NMEJ) DETAIL





HEALTH, SAFETY and ENVIRONMENT PLAN

For
SITE OPERATIONS

By
SUB-CONTRACTORS

For
SAGARDIGHI

POWER SECTOR- EASTERN REGION



HEALTH, SAFETY AND ENVIRONMENT PLAN
FOR SITE OPERATION
BY SUB-CONTRACTORS FOR SAGARDIGHI
(GENERAL)

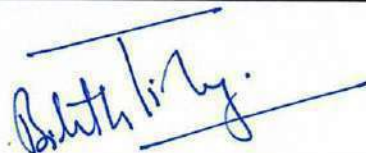
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DOCUMENT ISSUE SHEET

	PREPARED BY	APPROVED BY
NAME	SASWAJEET ROUT	BISHWANATH TIRKEY
DESIGNATION	DEPUTY MANAGER (HSE), PSER-HQ, KOLKATA	ADDL. GM (HSE), PSER-HQ, KOLKATA
SIGNATURE		
ISSUED BY: SASWAJEET ROUT, DEPUTY MANAGER (HSE), PSER-HQ, KOLKATA		
ISSUED TO: SAGARDIGHI PROJECT, PSER		
COPY NO: E-Copy		
DATE OF ISSUE: 01.09.2020		

THIS PLAN IS EXCLUSIVELY FOR SAGARDIGHI PROJECT AND IT SUPERSEDES THE STANDARD HSE PLAN



HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION BY SUB-CONTRACTORS FOR SAGARDIGHI (GENERAL)

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HSE PLAN FOR SITE OPERATIONS FOR SAGARDIGHI AT A GLANCE

BEFORE START	SIGNING OF MOU	
	Agree to comply to HSE requirement- Statutory and BHEL's	Agree to accept BHEL's decision on release of 1.5% (as specified in the contract) of Gross bill amount or part thereof or otherwise (non-release), based on our HSE performance as evaluated by BHEL during the execution period.
PLAN	HSE ORGANISATION	
	Manpower (As per Cl. 7.1) 1 (one) safety officer for every 300 workers or part thereof 1(one) safety-supervisor for every 150 workers or part thereof 1(one) safety-steward/ supervisor for every 50 workers of part thereof	HSE Roles and responsibilities - All employees as per 7.2.1 - Site In-charge & Package In-charges- As per clause 7.2.2 - Safety officer- As per clause 7.2.3
	HSE PLANNING	
	For Man, Machinery/ Equipment/ Tools & Tackles	
PROVIDE	HSE INFRASTRUCTURE	
	- PPEs - Drinking Water - Washing Facilities - Latrines and Urinals - Provision of shelter for rest - Medical facilities	- Canteen facilities - Labor Colony - Emergency Vehicle - Pest Control - Scrapyard - Illumination - Crèches (if required)
TRAIN	HSE TRAINING, AWARENESS & PROMOTION	
	Training - Induction training - Height work and other critical areas - Tool Box talk & Pep Talk - Job Specific Training	Awareness & Promotion - Posters & Signage - Emergency Contact/Information Display - Banner - Competition & Awards
COMMUNICA TE	HSE COMMUNICATION	
	Incident Reporting - Accident- Fatal, Major & Minor - Property damage - Near Miss Safety Performance Reporting	Event Reporting - Celebrations - Training - Medical camp - Motivational Activities



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EXECUTE SAFELY	SAFETY DURING WORK EXECUTION	
	PERMIT TO WORK	
	General Work, Height work (above 2 meters), Hot Work, Confined Space, Radiography, Excavation (More than 1.22 meters), Radiography, Heavy/ Critical Lifting, Night/ Holiday Work, Material loading/ unloading, Grating/ Safety Net/ Safety facility removal, Lockout / Tag out, Beam/ Truss/ Duct/ Structure Alignment	
	OPERATIONAL CONTROL	
	• Welding, Gas Cutting Grinding • Rigging, Signaling • Cylinder- Storage & Movement • Demolition work • T&Ps • Chemical Handling • Electrical works • Painting	• Fire • Scaffolding • Height work • Working Platform • Excavation / Civil Work • Ladder • Lifting • Hoisting appliance • Hard Barricading
	HOUSE KEEPING	
	WASTE MANAGEMENT	
	TRAFFIC MANAGEMENT	
	ENVIRONMENTAL CONTROL	
	EMERGENCY PREPAREDNESS AND RESPONSE PLANNING	
CHECKS	HSE AUDITS & INSPECTION	
	• Daily Checks • Inspection of Height work • Inspection of PPEs • Inspection of T & Ps	• Inspection of Cranes & Winches • Inspection of Welding and Gas cutting • Inspection of elevators etc.
NON-CONFORMANCE	HSE PERFORMANCE EVALUATION PARAMETERS	
	PENALTY FOR NON-CONFORMANCE	
	Refer Clause 16 Incremental penalty For repeated violation by the same person, the penalty would be double of the previous penalty. For repeated fatal incident in the same contract/ package, incremental penalty to be imposed. The sub-contractor will pay 2 times the penalty compared to the previously paid in case there are repeated cases of fatal incidents under the same sub-contractor for the same package in the same unit.	
NON-CONFORMANCE	COMPENSATION TO ACCIDENT VICTIMS	
	Refer Clause 17	
	Employee Compensation Act, 1922 Other Acts and Guidelines relevant to employee compensation	



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ORGANIZATION OF THIS DOCUMENT

- **GENERAL SECTION**
- **SECTION A:**
MAIN REQUIREMENTS APPLICABLE IN FULL
- **SECTION B:**
SPECIAL REQUIREMENTS
- **ANNEXES**



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1. PURPOSE

- 1.0** 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.
- 1.1** This document shall be followed by BHEL as well as BHEL's Sub-Contractors at all installation and servicing sites. In case BHEL has contractual HSE obligations towards customer, this document will be followed in conjunction with (BHEL's) customer specific requirements, ensuring that applicable systems, controls and checks of both are implemented in letter and spirit.
- 1.2** In case the customer has any specific requirement, the same is to be fulfilled but may not include financial inclusion.
- 1.3** Although every effort has been made to make the procedures and guidelines in line with statutory requirements, in case of any discrepancy relevant statutory guidelines must be followed.

2. SCOPE

Project Highlights:

- Name of the project : Construction of 1X660MW U#5 EXTENSION Power plant (EPC Package)
- Client : WEST BENGAL POWER DEVELOPMENT CORPORATION LIMITED
- Location : SAGARDIGHI TPS, DIST- MURSHIDABAD, WEST BENGAL
- Contractor : Bharat Heavy Electricals Ltd.

The document is applicable for installation and commissioning of Boiler, Turbine, Electrical Systems, AHP, CHP, Misc. BOP areas, FGD of 1x660MW rating as per the relevant contractual obligations, and provides the minimum HSE requirements to be followed at the project site and at labour colony. It will be applicable for all the managerial, supervisory, professional, technical, clerical and other workers including contract laborers; and equipment operating under the control of BHEL's Subcontractors at site as per the relevant contractual obligations. As an item of note, this HSE Plan is considered a living document and will be revised as/if necessary, to ensure contract and regulatory compliance requirements are met during the performance of work on the project.

3. OBJECTIVES

The HSE Plan reflects that BHEL places high priority upon the Occupational Health, Safety and Environment at workplaces. BHEL and its sub-contractor are committed to:



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Health & Safety

- Prevent injury and ill health of all persons at site ('Persons' refers to all personnel including managerial, supervisory, professional, technical, clerical and other workers including contract laborers)

Environment

- Prevent pollution to environment and ensure protection of environment taking into account interested party concern and conservation of resources and reduction of wastage

Legal Requirements

- Comply at all times with the relevant statutory and contractual HSE requirements.

Planning & Resources

- Ensure that all work planning takes into account all persons that may be affected by the work.
- Ensure timely provision of resources to facilitate effective implementation of HSE requirements.

Competency, Training & Awareness

- Provide trained, experienced and competent personnel. Ensure medically fit personnel only are engaged at work.
- Provide all personnel with adequate information, instruction, training and supervision on the safety aspect of their work.

Maintenance of Equipment

- Ensure fitness testing of all T&Ps. Lifting appliances like cranes, chain pulley blocks etc. are certified by competent authority.

Safety during Operations

- Provide and maintain plant, places and systems of work that are safe and without risk to health and the environment.
- 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.

HSE Improvement

- 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.
- Ensure continual improvement in HSE performance



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GOALS AND TARGETS

- ❖ To achieve “Zero Incident at Site” (LTI)
- ❖ 100% compliance of all legal/statutory requirements related to HSE.
- ❖ 100% Health, Safety and Environmental Induction training attendance for all workers.
- ❖ 100% High Risk activities to be carried out only after approved Method Statement, HIRA / Aspect-Impact / JSA / OCP and Permit to Work are implemented.
- ❖ 100% PPEs compliance in high and medium risk activities.
- ❖ 100% monitoring of all Work Areas
- ❖ 100% detection of non-conformities in work area and 100% closure within specified time
- ❖ 100% incident (near miss, minor, major, other) reporting, recording and reviewing for corrective actions.
- ❖ Regular Safety Reviews to assess HSE program compliance and 100% closure of any recognized gaps to continually improve safety management and incident prevention.

4. REFERENCES

1. ALL CONTRACTUAL HSE REQUIREMENTS INCLUDING THIS DOCUMENT
2. ALL APPLICABLE ACTS, RULES & REGULATIONS
3. BHEL POWER SECTOR HSE MANAGEMENT SYSTEM
 - I. HSE PROCEDURES (13.1.1)
 - II. WORK PERMITS (See Clause 13.1.2)
 - III. OPERATIONAL CONTROL PROCEDURES (See Clause 13.1.3)
 - IV. FORMATS (See Clause 21)
4. BHEL CORPORATE STANDARD PPE GUIDELINES
5. RELEVANT INDIAN STANDARDS FOR SAFETY (See Annexure 01)

(Note: Wherever, the date or revision number of a document is not mentioned, latest revision is implied)



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5. BHEL HEALTH, SAFETY & ENVIRONMENT POLICY:

In BHEL, Health, Safety and Environment (HSE) responsibilities are driven by our commitment to protect our employees and people we work with, community and environment. BHEL believes in zero tolerance for unsafe work/non-conformance to safety and in minimizing environmental footprint associated with all its business activities. We commit to continually improve our HSE performance by:

- Developing safety and sustainability culture through active leadership and by ensuring availability of required resources.
- Ensuring compliance with applicable legislation, regulations and BHEL systems.
- Taking up activities for conservation of resources and adopting sound waste management by following Reduce/Recycle/Reuse approach.
- Continually identifying, assessing and managing environmental impacts and Occupational Health & Safety risks of all activities, products and services adopting approach based on elimination/substitution/reduction/control.
- Incorporating appropriate Occupational Health, Safety and Environment criteria into business decisions, design of products & systems and for selection of plants, technologies and services.
- Imparting appropriate structured training to all persons at workplace and promoting awareness amongst customers, contractors and suppliers on HSE issues.
- Reviewing periodically this policy and HSE Management Systems to ensure its relevance, appropriateness and effectiveness.
- Communicating this policy within BHEL and making it available to interested parties.

Date: 05.06.2018

Atul Sobti
Chairman & Managing Director



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6. TERMS AND DEFINITIONS

6.0 INCIDENT

Work- related or natural event(s) in which an injury or ill health (regardless of severity) or fatality, damage to property/environment occurred, or could have occurred.

6.1 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 incident".

6.2 MAN-HOURS 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 laborers.

Man-hours worked shall be calculated from the payroll or time clock recorded including overtime. When this is not feasible, the same shall be estimated by multiplying the total man-days worked for the period covered by the number of hours worked per day. The total number of workdays for a period is the sum of the number of men at work on each day of period. If the daily hours vary from department to department separate estimate shall be made for each department and the result added together.

6.3 FIRST AID CASES

First aid cases include:

1. Visit to a physician or a licensed health care professional solely for observation or counselling
2. 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)
3. 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);
4. Administering tetanus immunizations (other immunizations, such as Hepatitis B vaccine or rabies vaccine, are considered medical treatment);
5. Cleaning, flushing or soaking wounds on the surface of the skin;
6. Using wound coverings such as bandages, Band-Aids TM, gauze pads, etc.; or using butterfly bandages or steri-strips TM (other wound closing devices such as sutures, staples, etc., are considered medical treatment);
7. Using hot or cold therapy;
8. 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);



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9. Using temporary immobilization devices while transporting an accident victim (e.g., splints, slings, neck collars, back boards, etc.).
 10. Drilling of a fingernail or toenail to relieve pressure, or draining fluid from a blister;
 11. Using eye patches;
 12. Removing foreign bodies from the eye using only irrigation or a cotton swab;
 13. Removing splinters or foreign material from areas other than the eye by irrigation, tweezers, cotton swabs or other simple means;
 14. Using finger guards;
 15. Using massages (physical therapy or chiropractic treatment are considered medical treatment for recordkeeping purposes); or
 16. Drinking fluids for relief of heat stress.
- No other treatments are considered first aid.

6.4 MEDICAL TREATMENT CASES

An incident involved with an injury or illness that needs medical attention beyond First-aid as per 6.3 above.

6.5 TYPE OF INCIDENT / ACCIDENT & THEIR REPORTING:

The categories of Incident / accident are as follows:

Non-Reportable Cases:

An accident, where the injured person is given first aid and discharged for work without counting any lost time.

Reportable Cases (LTI or Loss Time Injury Cases):

Minor: In this case the injured person resumes duty within 48 hours of incident

Major: In this case the injured person is disable for 48 hours or more and is not able to perform his duty. (As per IS 3786)

6.6 TOTAL REPORTABLE FREQUENCY RATE

Frequency rate is the number of Reportable Lost Time Injury (LTI) per one Million Man hours worked. Mathematically, the formula read as:

$$\frac{\text{Number of Reportable LTI}}{\text{Man Hours Worked}} \times 1,000,000 \text{ Total}$$

6.7 SEVERITY RATE

Severity rate is the Number of days lost due to Lost Time Injury (LTI) per one Million Man hours worked. Mathematically, the formula reads as:

$$\frac{\text{Days lost due to LTI}}{\text{Total Man Hours Worked}} \times 1,000,000$$

6.8 FREQUENCY SEVERITY INDEX (FSI)

Frequency Severity Index, $FSI = \sqrt{FR \times SR / 1000}$



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6.9 INCIDENCE RATE

Incidence Rate is the Number of LTI per one thousand manpower deployed. Mathematically, the formula reads as:

$$\frac{\text{Number of LTI} \times 1000}{\text{Average number of manpower deployed}}$$

6.10 JOB SAFETY ANALYSIS

A job safety analysis (JSA) is a procedure which helps integrate accepted safety and health principles and practices into a particular task or job operation. In a JSA, each basic step of the job is to identify potential hazards and to recommend the safest way to do the job. Other terms used to describe this procedure are job hazard analysis (JHA) and job hazard breakdown.

6.11 SAFETY WALK

It's a walk (conducted periodically) by an official through a portion or whole of a site as an HSE officer, noting down HSE observations, speaking to concerned workmen and supervisor on observation, recording and reporting to in charges of agencies, getting the same rectified with personal follow up - to send out a strong message on Management's commitment to safety.

6.12 HEAVY & COMPLEX LIFTING

A heavy and complex lifting activity includes:

1. Lifting above 20 Tons
2. Tandem Lifting using multiple cranes
3. Total load exceeding 85% of capacity of crane
4. Lift of unusual difficulty or geometry or rigging
5. Lift over operating units
6. Any other lift as decided by site HSE / Erection

In any case, Job Safety Analysis to be carried out for any lifting activity.

6.13 SAFETY COMMITTEE

As per the BOCW, Safety Committee shall be constituted if there are more than five hundred or more construction workers are employed at any site. As per the Factories Act, 1948 it is for 250 workers. It shall be represented by equal number of representatives of employer and construction workers.

6.14 NIGHT WORK

Work conducted after sunset when only a fraction of total manpower is available



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Section-A

Main Requirements

(Applicable in Full)



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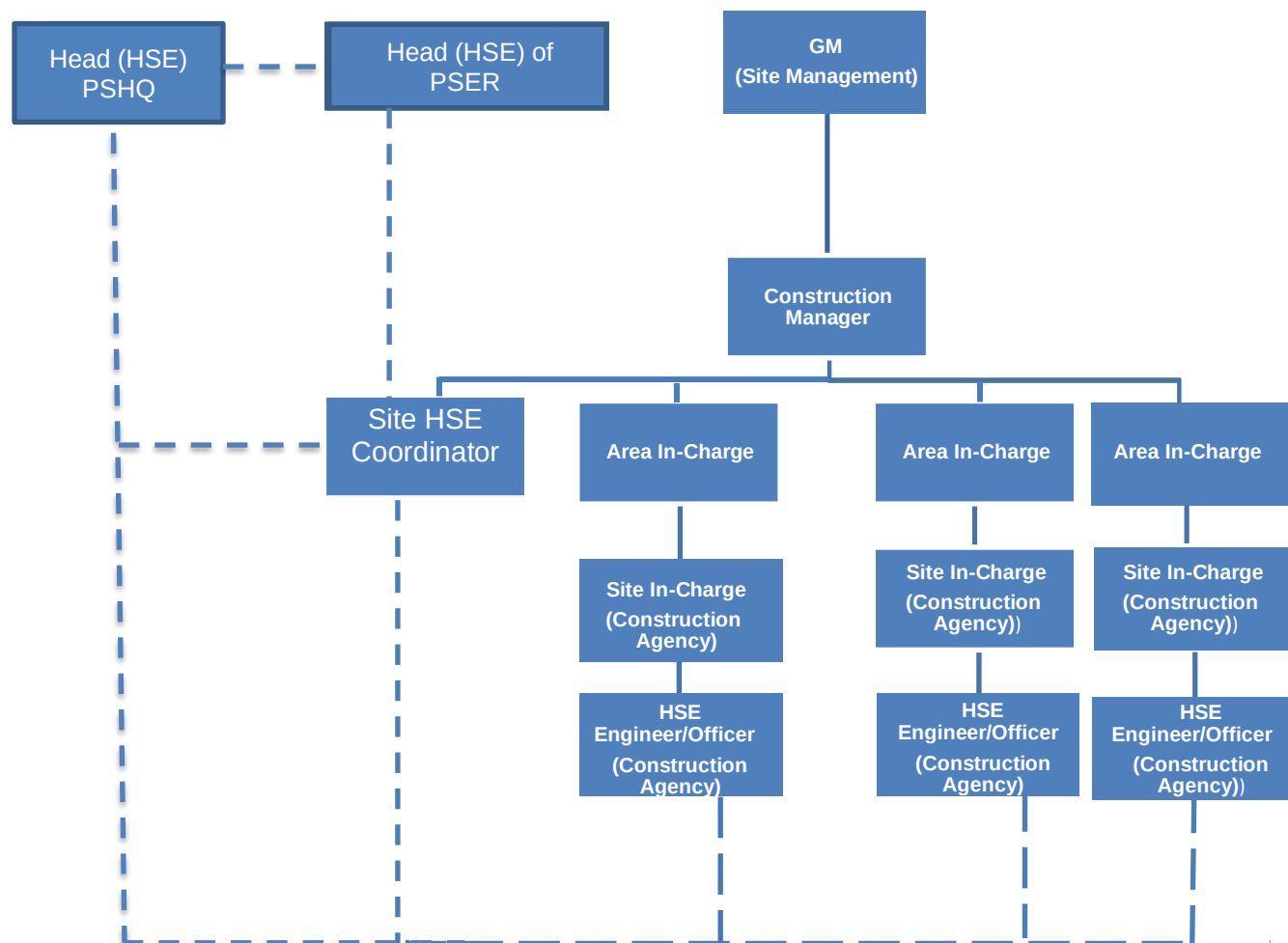
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7. HSE ORGANISATION

7.1 ORGANIZATION CHART



7.2 DEPLOYMENT:

7.2.1 Minimum Number (Availability per contract/ package per working shift)

7.2.1.1 HSE Officer	7.2.1.2 HSE Supervisor	7.2.1.3 HSE Steward / Observer
1 per 300 workers or part thereof as a minimum or as mandated by applicable legal requirements, whichever more stringent	1 per 150 workers or part thereof	1 per 50 workers or part thereof

- 7.2.1.4 The safety officers shall be engaged directly by the sub-contractor, whereas safety supervisors and safety stewards may be from the agencies engaged by the sub-contractor.

7.2.1.5 Deployment Plan:

- 7.2.1.5.1 These shall be minimum one HSE officer along with HSE supervisor and HSE steward in the aforesaid ratio for every shift for each unit of Boiler/ESP/Power House & TG/ Chimney/ Whole of Cooling Tower.
- 7.2.1.5.2 For Civil works and other BOP items, deployment shall be broadly as specified in the above table. But BHEL shall finally approve the deployment based on nature and volume of jobs, Risks and hazards associated etc.
- 7.2.1.5.3 The deployment plan of Safety manpower at various locations shall be submitted to BHEL for approval by subcontractor

BHEL reserves the right to demand more safety personnel than what is stipulated here and change the deployment pattern.

7.2.2 QUALIFICATION & EXPERIENCE

All Degrees/ Diplomas shall be recognized by State Council for Technical Education & Vocational Training (SCTE & VT) / All India Council for Technical Education (AICTE) / University

7.2.2.1 HSE Officer	7.1.2.2 HSE Supervisor	7.1.2.3 HSE Steward / Observer
A. i. Recognized degree in any branch of Engg. or Tech. or Architecture with practical experience of working in a building or other construction work in supervisory capacity for a period of not less than two years, or Recognized diploma in any branch of Engg. or Tech with practical experience of working in a building or other construction work in supervisory capacity for a period of not less than five years. ii. Recognized degree or diploma in Industrial safety ii. (Preferably) have adequate knowledge of the language spoken by majority of the workers at the construction site. Alternatively:	As a minimum, (s)he shall possess: A recognized graduation Degree in Science (with Physics & Chemistry) or a recognized diploma in Engg. or Tech. with: a. Minimum Two years of practical experience in construction work environment and b. Should possess requisite skills to deal with construction safety & fire related day-to-day issues.	As a minimum, (s)he shall possess: 1. Class XII pass certificate and 2. Trained in fire-fighting as well as in safety / occupational health related subjects, with: a. Minimum two year of practical experience in construction work environment and b. Should have adequate knowledge of the local language spoken by majority of the workers at the construction site.



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B.

Graduation Degree in Science with Physics & Chemistry and degree or diploma in Industrial Safety (from any Indian institutes recognized by AICTE or State Council of Tech. Education of any Indian State) with practical experience of working in a building, plant or other construction works (as Safety Officer, in line with Indian Factories Act, 1958) for a period of not less than five years.

7.2.3 HSE IN-CHARGE

In case there are more than one HSE officers with any sub-contractor, one of them, who is senior most by experience (in HSE discipline), may be designated as HSE In-Charge. Duties & responsibilities of such person shall be commensurate with that of relevant statute and primarily to coordinate with top management of Client and sub-contractors.

7.2.4 AVAILABILITY AND PENALTY FOR NON-DEPLOYMENT:

Subcontractor shall ensure physical availability of safety personnel at the place of specific work location including where Height Work Permit is required/granted. No work shall be started in any area until above safety personnel & concerned Site Engineer of subcontractor are physically deployed at site.

The Subcontractor shall prepare an organization chart identifying the areas of operations, responsibilities and reporting structure of all safety personnel and submit the same to BHEL.

The subcontractor shall deploy sufficient safety officers, supervisors and safety-stewards, as per numbers & qualifications mandated in this Section since mobilization of first batch of manpower and add more in proportion to the added strength in work force. Any delay in deployment will attract a penalty at following rates:

Non-deployment of HSE Officer	–	Rs. 50,000 per man-month
Non-deployment of HSE Supervisor	–	Rs. 30,000 per man-month
Non-deployment of HSE Steward	–	Rs. 20,000 per man-month

Penalty shall be collected for the period of non-availability of safety personnel after allowing a grace period of 15 days for finding a replacement.

7.2.5 COMPETENCY OF OPERATORS/ DRIVERS OF CRANE, WINCH, CONSTRUCTION/ LIFTING EQUIPMENT ETC.:

The Operators/ Drivers of crane, winch, construction/ lifting equipment etc. shall be experienced and have valid driving license for the class of vehicle / machinery as applicable (like Crane/ Forklift/ Rig driving license etc.). Minimum HMV driving license is required for all heavy equipment operators at site. The sub-contractor shall certify competence of these persons in writing as and when they join. Crane, Winch, Construction & lifting equipment operator should have certificate on subject course or owner experience certificate in letterhead.



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- 7.2.6 In case the statutory requirements i.e. State or Central Acts and / or Rules as applicable like the Building and Other Construction Workers' Regulation of Employment and Conditions of Service-Act,1996 or State Rules (wherever notified), the Factories Act, 1948 or Rules (wherever notified), etc. are more stringent than above clarifications, the same shall be followed.
- 7.2.7 **BILLING:** Deployment of Safety manpower as per this clause **shall be** a billable item.
- 7.2.8 The Subcontractor shall verify & authenticate credentials of the HSE personnel detailed in this Section and furnish Bio-Data/Resume / Curriculum Vitae of the safety personnel as above for BHEL / Owner's approval, at least 1 month before the mobilization. The Subcontractor, whenever required, shall arrange submission of original testimonials / certificates of their Safety personnel, to BHEL / Owner (for verification/scrutiny, etc.)
- 7.2.9 Prior approval of CVs by BHEL for Safety Officer and Safety Supervisor is mandatory, however BHEL has right to check suitability of Safety Stewards as well.

7.3 RESPONSIBILITIES

The subcontractors shall communicate the HSE responsibilities as indicated in this section to relevant employees in written Form and ensure awareness of the same

7.3.1 ALL EMPLOYEES

1. To be aware of, get involved in and ensure implementation of all HSE related Systems and Procedures including but not limited to:
 - a) BHEL HSE Management System including HSE Procedures and OCPs
 - b) Work Permit System
 - c) Emergency Preparedness Response Plans
 - d) Contractual HSE requirements
 - e) Legal Requirements
 - f) Penalty System
 - g) Training requirements
2. To ensure that the persons engaged in respective area follow the safety rules like using appropriate PPEs.
3. To keep track of repetitive minor or major incident observation/ report and submit to BHEL.
4. To prepare HIRA / JSA as required and submit to BHEL for verification.
5. To record all incidents including near miss and report to BHEL.
6. To adopt safe working practices at all times and act as role model for Safety
7. To take immediate corrective action actions in case any non-conformity is observed on product / process / system with respect to Occupational Health, Safety and Environment.
8. In case any particular activity / work has extremely high consequential risk or high environmental impact, same shall be brought to the notice of BHEL Package In-charge before starting the work.
9. To interfere/ stop work as & when identified unsafe.
10. To maintain & promote improved level of house-keeping all the time at site.
11. To support/co-operate with audit team members as & when safety audits are carried out.
12. To involve in investigation, if any incident occurs in his work area.
13. To participate in safety promotional programs.
14. To attend the safety committee meeting, if member/ invitee



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15. To ensure that only fit T&Ps and qualified persons are engaged for all activities.
16. Shall ensure that person working above 2.0 meter should use Safety Harness tied to a life line/stable structure.
17. Shall ensure that materials are not thrown from height. Cautions to be exercised to prevent fall of material from height.
18. Shall ensure that all T&Ps engaged are tested for fitness and have valid certificates from competent authorities.

7.3.2 SITE IN –CHARGE & PACKAGE IN-CHARGES OF SUBCONTRACTOR

1. All requirements as per 7.3.1
2. Shall ensure fulfillment of HSE requirements of BHEL contract as given in this document.
3. Shall engage qualified safety manpower as per this document at all times.
4. Shall adhere to the rules and regulations mentioned in this document, practice very strictly in his area of work in consultation with his concerned engineer and the safety coordinator.
5. Shall screen all workmen for health and competence requirement before engaging for the job and periodically thereafter as required.
6. Shall ensure that all the workers are engaged after undergoing induction training.
7. 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.
8. Shall ensure that provisions stipulated in contract Labor Regulation Act 1970, Chapter V C.9, canteen, rest rooms/washing facilities to contracted employees at site.
9. Shall report all incidents (Fatal/Major/Minor/Near Miss) to the Site engineer /HSE officer of BHEL.
10. Shall conduct Safety Walks and safety inspections, and act as a role model for Safety.
11. Shall ensure that Horseplay is strictly forbidden.
12. Shall ensure that adequate illumination is arranged during night work.
13. Shall ensure that all personnel working under subcontractor are working safely and do not create any Hazard to self and to others.
14. Shall ensure display of adequate signage/posters on HSE.
15. Shall ensure that mobile phone is not used by workers while working.
16. Shall ensure conductance of HSE audit, mock drill, medical camps, induction training and training on HSE at site
17. Shall ensure full co-operation during Client/External /Customer HSE audits.
18. Shall ensure submission of look-ahead plan for procurement of HSE equipment's and PPEs as per work schedule.
19. Shall ensure adequate valid fire extinguishers are provided at the work site.
20. Shall ensure availability of sufficient number of toilets /restrooms and adequate drinking water at work site and labor colony.
21. Shall ensure adequate emergency preparedness
22. Site In-charge also involve in the induction training so as to share knowledge of some incident and guide the worker to perform work safely.
23. Shall ensure power source for hand lamps shall be maximum of 24 v.



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24. Shall ensure temporary fencing should be done for open edges if Hand – railings and Toe-guards are not available.
25. Shall be responsible for the periodic testing of T&Ps (winches / crane /hydra/tools/equipment so on.) and Pressure Vessels as per applicable codes and submit report to BHEL
26. Shall be member of site HSE committee and attend all meetings of the committee

7.3.3 HSE OFFICER OF SUBCONTRACTOR

1. All requirements as per 7.3.1
2. Carry out safety inspection of Work Area, Work Method, Men, Machine & Material, P&M and other tools and tackles.
3. Facilitate HIRA and Aspect/Impact Study in the area and ensure control measures.
4. Highlight the requirements of safety through Tool-box / other meetings.
5. Help concerned HOS to prepare Job Specific instructions for critical jobs.
6. Maintain record and conduct investigation of all incident/dangerous occurrences & recommend appropriate safety measures.
7. Advice & co-ordinate for implementation of HSE permit systems, OCPs & MPs.
8. Convene HSE meeting & minute the proceeding for circulation & follow-up action.
9. Plan procurement of PPE & Safety devices and inspect their healthiness.
10. Report to BHEL on all matters pertaining to status of safety and promotional programmes at site level.
11. Encourage raising Near Miss Report on safety along with, improvement initiatives on safety.
12. Facilitate administration of First Aid
13. Facilitate screening of workmen and safety induction.
14. Conduct fire Drill and facilitate emergency preparedness
15. Design campaigns, competitions & other special programs to promote safety in the workplace.
16. Notify non-conformance to safety norms observed during site visits / site inspections.
17. 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.
18. To decline acceptance of such PPE / safety equipment that do not conform to specified requirements.

7.3.4 HSE SUPERVISOR OF SUBCONTRACTOR

1. All requirements as per 7.3.1
2. To assist Safety officer

7.3.5 HSE STEWARD / OBSERVER OF SUBCONTRACTOR

1. All requirements as per 7.3.1
2. To monitor allotted area for Safety violations, take required action and inform the concerned Safety Supervisor / Officer
3. To assist Safety Officer and Safety Supervisor

7.3.6 HSE DOCUMENTS, SYSTEMS & PROCEDURES:

BHEL shall provide the subcontractor soft copies of all applicable HSE Procedures, Work Permits, Operational Control Procedures, Formats and any other instructions required for the implementation of HSE Management System before commencing operations at site.



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Subcontractor shall ensure the availability of the same.

7.3.7 IMPORTANT SITE EHS RULES RESULTING IN POSSIBLE EXPULSION FROM SITE

- ❖ Pre-employment Medical fitness is compulsory for all workers.
- ❖ EHS induction is mandatory for all new workers, supervisor and engineers, subcontractor managers etc.
- ❖ No visitors are allowed for site visit without safety induction.
- ❖ **Mandatory PPEs are**
 - ✓ Safety helmet with company logo
 - ✓ Hard toe safety shoes,
 - ✓ Safety goggles
 - ✓ Reflective vest
 - ✓ Full/half sleeve (at least 4-inch-long) shirt
 - ✓ Full length pant/trousers for male and preferably Salwar Kameez for female
 - All PPEs shall be ISO/EN standard compliant.
- ❖ **Zero Tolerance Safety Rules (Following are strictly prohibited)**
 - ✓ Violation of Fall protection / not anchoring & wearing safety harness above 6 feet,
 - ✓ Work without PTW
 - ✓ Child labor at site (<18 years)
- ❖ Use of cell phone particularly in hazardous/high risk jobs like height work, crane operation, etc. is strictly prohibited. Cell phone use in general while in the working areas on site is limited to designated mobile talking booths only. Encourage the people not to bring mobile phones inside the project premises, particularly smart phones.
- ❖ All vehicle being used at site to be in good condition in all respect.
- ❖ All electrical installations should have individual 30 mA ELCBs
- ❖ **Fighting:** Fighting anywhere on the Project site, including in parking areas, is strictly forbidden; violators will be barred from site and possibly subjected to legal action by local authorities.
- ❖ **Horseplay:** Running, pushing, practical jokes, and other horseplay are forbidden on the project site, including in parking areas.
- ❖ **Gambling:** Gambling on the Project site is not permitted
- ❖ **Alcohol & Drugs:** Intoxication or possession of alcohol or illegal drugs is strictly forbidden. Workmen under influence of liquor or drug or any other intoxication shall not be permitted to work and sent out of the work area.
- ❖ **Weapons:** Possession of weapons on the Project site is strictly prohibited
- ❖ **Asbestos Material:** No asbestos material is allowed to use in Project Site
- ❖ **Hair:** Anyone working on site property with scalp hair longer than the top of his/her shoulders must tie-up and restrains the hair within the hard hat or coveralls, shirt or jacket collar.
- ❖ **Jewelry:** Loose necklaces, dangling earrings and bracelets shall not be worn when working on the Project site.
- ❖ **Contact Lens:** While the site does not prohibit the wearing of contact lens, BHEL Project does not recommend their use.



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- ❖ **Use of Empty Drums:** Use of empty drums to climb up and work is banned. Proper stool/ ladder/ stage required to be used if intended to work at height.
- ❖ Projects must comply in full with all applicable EHS local and national legislation. In circumstances where there is a conflict between local or national legislation and client requirements, the higher (more protective) requirement must prevail.
- ❖ All persons working on suspended scaffolds/cradles/gondolas must wear and use appropriate fall prevention equipment so as to protect them effectively at all times when they are at risk from any failure of any part of the scaffold/cradle/gondola, including its suspension system
- ❖ **Construction Trucks/Vehicles**
 - ✓ All the vehicles must have automatic back camera and back horn which should be connected with reverse gear.
 - ✓ Vehicles must be equipped with proper seat belts for driver and passengers. All persons riding in vehicles must be advised of the requirement that seat belts are to be used whenever the vehicles are being operated.
 - ✓ The subcontractor is responsible for assuring the overall safe condition of vehicles assigned to its projects.
 - ✓ The speed limit on the project site is a maximum of 20 Km/hr.
 - ✓ Any person found operating or driving in a reckless or careless manner without regard for the safety of other employees or the general public will be immediately removed for the equipment they were operating and permanently prohibited from operating or driving any equipment on the project.
 - ✓ Any mobile equipment found to be unsafe or defective must be immediately removed from service and sent for repair or replacement. The subcontractor must ensure that the proper repairs have been made prior to putting the equipment back into service.
- ❖ **Construction Material Handling Heavy Equipment**
 - ✓ All these equipment must have automatic back camera and back horn which should be connected with reverse gear.
 - ✓ No equipment may be modified without equipment manufacturer's authorization.
 - ✓ Rollover Protective Structures must be provided for all equipment as required.
 - ✓ Seat belts must be provided and used by operators of all equipment that has a Rollover Protective Structure.
 - ✓ All bi-directional equipment must be equipped with an operable horn that must be used as needed when the machinery is moving in either direction.
 - ✓ All bi-directional equipment must also have an operable alarm in addition to the horn.
 - ✓ All equipment must be provided with a multi-purpose (class A, B, and C) fire extinguisher mounted in an easily accessible location.
 - ✓ Braking systems, controls, safety devices must be maintained in effective operating condition.
 - ✓ The operator must inspect the equipment at the beginning of the shift and test for acceptable
 - ✓ Operation as per the equipment's manufacturer's instructions. Inspections must be documented and filed.
 - ✓ Only qualified personnel must be allowed to operate equipment. Qualification must be documented and filed.



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In case any worker violates any of the EHS rules identified by BHEL as above, following punitive action shall be taken:

First Offence	Second Offence	Third Offence	Fourth Offence
Oral warning	Gate Pass Punched	Gate pass punched (second)	Gate Pass Punched(third) and person sent out of the gate Photo of concerned worker to be displayed on Notice boards and prominent locations.

BHEL has the right to send out such person even earlier than fourth offence after considering the severity of the offence and/or the person's track record related to following general/EHS rules. BHEL reserves right to expel even concerned supervisor or engineer as well in case of repeat of such cases of indiscipline.

Note:

The appellate authority in this case shall be the BHEL Site In-charge whose decision shall be final on the matter and binding on all parties.

8. PLANNING FOR HSE

A. Identifying Hazards / Risks & Aspects / Impacts and implementing control measures

1. Subcontractor shall identify all OHS Hazards and Risks applicable to all activities in scope as per *HSEP01: HSE Procedure for OHS Hazards and Risks*, and plan & implement the required control measures.
2. Subcontractor shall identify all Environmental Aspects and Impacts applicable to all activities in scope as per *HSEP02: HSE Procedure for Environmental Aspects and Impacts*, and plan & implement the control measures.

B. Register of Regulations:

Subcontractor shall prepare a register of applicable rules and regulations in the scope as per *HSEP03: HSE Procedure for Register of Regulations* and plan to ensure compliance.

The detailed plans and registers in A and B to be submitted to BHEL for review and approval within 60 days of start of work at site.

Note: The plans above are dynamic and shall be periodically reviewed as per BHEL requirement.

8.1 MOBILISATION OF MACHINERY / EQUIPMENT / TOOLS

1. Subcontractor shall furnish to BHEL, the Test Certificates issued by the jurisdictional competent persons of machinery, equipment and other T&Ps to be deployed at site, before deployment. BHEL reserves the right to disallow the same if found non-conforming to HSE / legal requirements



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2. As a further 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 comply with legislative and owner requirement, inspection shall be arranged by in-house expert / competent authority (preferable) for acceptance. **(Report Format: HSEP:13-F15)**
3. **The equipment considered for this purpose shall include all those in the T&P list in the tender document. Conventional Hydra crane with carriage in front shall not be permitted. Other models like FX or TRX series of Escorts or equivalent shall be permitted.**
4. In the course of work, the subcontractor shall notify the BHEL 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.
5. 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.
6. 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. Following items to be deployed should be only ISO/IS certified, fit for the intended work and **shall not more than 2 yr. from the purchase date at the time of deployment at site**
 - i. All lifting tools & tackles such as wire rope/web sling, D shackle/ Bow shackle etc. including chain pulley block. All chain pulley blocks should be with load indicators.
 - ii. Grinding machine and wheel and buffing wheel
 - iii. Gas cutting equipment
8. Following items to be deployed should be only ISO/IS certified, fit for the intended work and **shall not more than 3 yr. from the purchase date at the time of deployment at site**
 - i. Modern Power Distribution Board/ Electrical Panel Board
9. Following items to be deployed should be only ISO/IS certified, fit for the intended work and **shall not more than 5 yr. from the purchase date at the time of deployment at site**
 1. Welding machine (Inbuilt VRD)
 2. Vibrator Machine
 3. Concrete cutter
 4. Electrically operated winch machine
10. **Office Infrastructure** - subcontractor shall arrange a computer / Laptop with Network connection, chair and table for HSE Staff to facilitate HSE reporting and recordkeeping.

8.2 MOBILISATION OF MANPOWER

1. 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-contractor to ensure fulfillment of contractual as well as legislative requirement by:
 - i. Ensuring the required qualification/ training/ certification/ license and experience for the job as per Section 7 of this document & applicable legal requirements
 - ii. **Medical Checkup:** Examination of medical fitness shall be conducted through qualified medical professional for all workers to be deployed. (Record: Format No. HSEP13:F02). For height workers, height phobia test to be carried out as qualification criteria.

- iii. **Induction Training:** Induction training of all workers to be ensured as per clause 9.1 and HSEP04: *HSE Procedure for Training & Awareness (Record: Format No. HSEP13:F03)*
Only on successfully meeting above criteria, permanent gate passes to be issued.

2. The subcontractor shall strictly adhere to the maximum daily working hours and other requirements as per applicable laws and shall not engage any employee below 18 years of age.
3. The subcontractor shall take special care of the employees affected with occupational diseases under rule 230 and schedule II of BOCW Rules. The employees not meeting the fitness requirement should not be engaged for such job.
4. 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.
5. System for Issue of Gate Passes to authorized personnel only shall be ensured at site
6. The subcontractor shall keep accurate and updated records of all manpower preferably in soft form
7. The subcontractor shall ensure appropriate infrastructure for workers as per Clause 8.4.

8.3 PROVISION OF PPEs

1. Adequate numbers of Personnel Protective Equipment (PPEs), will be made available at site & their effectiveness and regular use by all will be ensured
2. The PPEs shall conform to the relevant standards as listed in Annexure 01, and bear ISI mark.
3. The following matrix recommends usage of minimum PPEs against the respective job. For details, the respective OCPs to be referred.
4. The exact PPEs required for a particular task shall be chosen to ensure there are multiple lines of defense against accident or injury. All applicable safety precautions for a job shall be ensured notwithstanding the duration or perceived importance of the task.
5. Additionally, the BHEL safety officer may demand additional PPEs based on specific requirement
6. The applicability of PPEs shall be as per the concept of Hierarchy of controls, i.e.:
Elimination->Substitution->EngineeringControls->AdministrativeControls-PPEs
7. Relying solely on PPEs without other applicable controls to be strictly avoided.
8. The issuing agency shall maintain register for issue and receipt of PPEs (Format No. HSEP: 13-F06). All the PPEs shall be checked for quality before issue and shall be periodically re-checked. The users shall be advised to check the PPEs themselves for any defect before putting on. The defective ones shall be replaced.
9. The body harnesses shall be serial numbered.
10. All worker should wear reflecting Jacket during both shift Day/Night.
11. 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
12. Besides the PPEs mentioned above, the persons shall use helmet, safety shoe and reflective vest at all times. The visitors shall use Helmet and any other PPEs as deemed appropriate for the area of work.
13. Following color scheme for Helmets to be maintained:



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- a. Workmen: Yellow/ Orange
- b. Safety staff: Green or white with green band
- c. Electrician: Red
- d. Others including visitors: White

14. The Helmets shall have logo or name (abbreviation of agency name permitted) affixed or printed on the front along with the person's gate pass no. & blood group. All the workers should be affixed with "Project" on their helmet. An awarded worker shall have reflective logo.

Sl. No	Type of work	Suggested PPEs
1	Work at height	Double lanyard full body harness having shock absorber (mandatory) with rope grab (as applicable), retractable Fall arrestor (specific cases), Safety nets (single / double)
2	Concrete and asphalt mixing	Nose mask, hand glove, apron, gum boot, goggles
3	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, safety goggles
4	Stone/ concrete breakers	Ear muffs, safety goggles, hand gloves
5	Electrical Work	Rubber hand glove, Electrical Resistance shoes, For LV electrical operations: LV arc-flash resistant suit/jacket
6	Insulation Work	Respiratory mask, Hand gloves, safety goggles
7	Grit/Sand blasting	Blast suit, blast helmet, respirator, leather gloves, safety goggles
8	Painting	Plastic gloves, Respirators (particularly for Spray painting)
9	Radiography	As per BARC guidelines
10	General	Helmets, Safety Shoes Reflective vests, ear plugs, nose masks, safety goggles

8.4 ARRANGEMENT OF INFRASTRUCTURE

The subcontractor is responsible for ensuring and maintaining the required HSE infrastructure at site as described in this Section

8.4.1 DRINKING WATER

1. Drinking Water Storage Tanks shall be provided and maintained at suitable places at different elevations / locations to ensure easy accessibility. The tank/container shall be kept on a platform at an elevation of at least 2 feet and should be covered:



2. **Construction and Quantity:** The design of Drinking Water Storage Tank (DWST) shall be submitted to BHEL for approval prior to initiating construction. Provision of 5-liter water daily for each worker to be maintained.
3. **Labelling:** DWST should be labeled as “Drinking Water”. Date of last cleaning, next due date shall be indicated on the container besides Date of source testing as per IS 10500.
4. Cleaning of the DWST shall be ensured at least once in a week. 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.
5. Suitability of the water source should be tested as per IS10500.
6. For all tanks containing water unsuitable for drinking, prominent “Do Not Drink” signage shall be pasted in English, Hindi and local language.
7. In Hot Work and other critical areas, drinking water shall be made available near the activity
8. Provision of supplying drinking water to height workers and those working in difficult to reach areas shall be made available through dedicated personnel.
9. **Cleaning & disinfecting the water tank (Procedure):** It is necessary to clean and disinfect the water holding tank on regular basis. This is to remove algae (plant growth which produces bad tastes and odours), silt, and bacteria which may be harmful.

A) If the Water Holding Tank is Accessible:

Precaution is to be taken when using a strong chlorine solution. A water holding tank is a confined space.

- a) Empty the tank.
- b) Scrub or pressure wash the interior walls to remove dirt and grime.
- c) Rinse out the tank.
- d) Mix a solution of household bleach and water (1 tablespoon or 15 ml of bleach for every gallon of water).
- e) Scrub or pressure wash the interior walls of the tank with this solution, and leave it sit for 2 hours.
- f) After 2 hours, thoroughly rinse the tank with clean water.
- g) Refill with potable water.

B) Not Accessible for Cleaning:

- a) Ensure the tank is full of water.
- b) Add the required amount of household bleach (see table below to the water in holding tank.



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If possible, mix the bleach and water.

- c) To disinfect the plumbing lines and fixtures, turn the tap(s) on. Once you smell the chlorine odor at each outlet, close the tap.
- d) Leave for 12 hours (generally done overnight).
- e) Drain the water tank (but not into a septic tank).
- f) Refill with potable water.

Dosage of Household Bleach (5% chlorine) required for the Cleaning and Disinfecting of Water Holding Tanks Not Accessible for Cleaning				
Tank Size		Amount of Household Bleach to Obtain 50 ppm of Chlorine		
Litres	Imp. Gallons	mL	Imp. Ounces	Cups
277	50	227 mL	8	1
455	100	511 mL	16	2
909	200	909 mL	32	4
1137	250	1136 mL (1.2 L)	40	5
2273	500	2273 mL (2.3 L)	80	10
4546	1000	4546 mL (4.5 L)	160	20
6819	1500	6818 mL (6.8 L)	240	30
9092	2000	9091 mL (9.1 L)	320	40
11365	2500	11340 mL (11.5 L)	400	50

8.4.2 PROVISION OF LATRINES AND URINALS AT SITE:

Ref: Inter-state Migrant Workmen (Regulation & Employment and Act, 1979) read with The Inter-State Migrant Workmen (Regulation of employment and conditions of service) central rules, 1980 (PI refer rule no. 42)

A) LATRINES

1. Latrines shall be provided in every establishment on the following scale, namely: -
 - a. Where females are employed, there shall be at least one latrine for every 25 females;
 - b. Where males are employed, there shall be at least one latrine for every 25 males:

Provided that where the number of males or females exceeds 190, it shall be sufficient if there is one latrine for 25 males or females, as the case may be, up to the first 100, and one for every 30 thereafter
2. Every latrine shall be under cover and so partitioned off as to secure privacy, and shall have a proper door and fastenings.
3. Where workers of both sexes are employed there shall be displayed outside each block of latrine and urinal a notice in the language understood by the majority of the workers '**For Men Only**', or **For Women Only**', as the case may be.
4. The notice shall also bear the figure of a man or of a woman, as the case may be.

B) URINALS

1. There shall be at least one urinal for male workers up to fifty and one for female up to fifty employed at a time:



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2. Provided that where the number of male or female workmen, as the case may be, exceeds 500 it shall be sufficient if there is one urinal for every fifty females up to the first 500 and one for every 100 or part thereof thereafter.
3. The urinals shall be designed and located so as to ensure privacy.
4. In case a structure encompasses multiple floors, urinals shall be provided suitably for quick access
5. The latrines and urinals shall be conveniently situated and accessible to workers at all times at the establishment.
6. The latrines and urinals shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times.
7. Latrines and urinals other than those connected with a flush sewage system shall comply with the requirements of the public health authorities.
8. Water shall be provided by the means of tap or otherwise so as to be conveniently accessible in or near the latrines and urinals.

8.4.3 WASHING FACILITIES

1. In every workplace, adequate and suitable facilities for washing shall be provided and maintained.
2. 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.
3. Overalls shall be supplied by the subcontractor to the workmen and adequate facilities shall be provided to enable the painters and other workers to wash during the cessation of work.

8.4.4 PROVISION OF REST SHELTER FOR WOKERS

Proper Sheds & Shelters big enough to accommodate all possible workers shall be provided for workers to rest during break. Taking rest at height, in activity area and other hazardous locations shall not be allowed.

The drawing of such sheds shall be submitted to BHEL for approval before construction.

8.4.5 MEDICAL FACILITIES

Refer Section B for applicability of requirements pertaining to Clause 8.4.5.1

8.4.5.1 MEDICAL CUM FIRST-AID CENTER

- a) A medical center shall be setup at site with basic facilities for handling medical emergencies. The medical center shall be developed independently by BHEL/an agency as specified in the contract and run jointly by all agencies on proportionate sharing basis as stipulated in the contract. Cost sharing for development of medical center will be as per special requirements (Section-B) of this HSE plan.
- b) A qualified medical professional, not less than MBBS, shall be deployed at medical center as stipulated in the contract. (Part-time or full time as decided at the site).
- c) There shall be a full-time trained first aider and a nurse. Depending upon the working hours at the site, First-aider shall be deployed accordingly.
- d) The center shall have all articles as per Schedule IV of BOCW (Central) Rules'1998. In addition, one Stokes basket stretcher shall be available.



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- e) An ambulance shall be deployed for every 1000 persons along with trained driver and accessories as per schedule V of Central BOCW Rules'1998. Depending upon the working hours at the site, First-aider shall be deployed accordingly.
- f) The center shall be adequately equipped for Resuscitation, Immobilization, Dressing, dealing with poisoning cases including snake and insect-bites and sufficient stock of emergency medicines as prescribed by the qualified medical professional as per point (b)

8.4.5.2 IMPORTANT

- a) If there is no specific mention of responsibility of deployment or setting up of any of the above facilities and operating expenses thereof, BHEL site management shall have the liberty to give this responsibility to any of the contractors on cost sharing basis.
- b) Medical waste shall be disposed as per prevailing legislation (Bio-Medical Waste – Management and Handling Rules, 1998)
- c) Every injury shall be treated, recorded and reported.
- d) All First Aid injuries shall be recorded as per Format No. HSEP:13-F17
- e) List of qualified first aiders and their contact numbers to be displayed at conspicuous places.

8.4.5.3 FIRST AID

A. In addition to 8.4.5.1 &2, the subcontractor with Boiler& ESP, TG and Civil shall:

- 1. Provide necessary first aid facilities for every work place.
- 2. Ensure availability of qualified First-aider throughout the working hours.
- 3. Every injury shall be treated, recorded and reported.
- 4. Refresher course on first aid shall be conducted as necessary.
- 5. List of qualified first aiders and their contact numbers to be displayed at conspicuous places.
- 6. All First Aid injuries shall be recorded as per Format No. HSEP:13-F17

B. FIRST AID BOX

- 1. The first aid box shall be maintained by first aider who shall always be readily available during the working hours of the work place.
- 2. **Details of First Aid Box:**
 - a) Details of contents of first aid box is given in **Annexure 02**
 - b) A slip of contents shall be pasted on the First Aid Box with following details:
Name, Quantity, Expiry Date, Checked by...
 - c) First Aider's name and contact no to be displayed on the box.
 - d) The first aid box shall be distinctly marked with a Green Cross on white background.
 - e) The box shall be properly secured with lock & key to avoid misuse
- 3. The first aid boxes should be placed at various locations so as to make them available within easy reach of hazardous activities and at the quickest possible time.
- 4. The subcontractor shall ensure that the Supervisors and Engineers are adequately trained for attending to any emergency.
- 5. Monthly inspection of First Aid Box to be conducted by the subcontractor as per Format no. HSEP:13-F01

8.4.5.4 HEALTH CHECK UP

The persons engaged at the site shall undergo health checkup as per the **Format no. HSEP: 13-F02** before induction. The persons engaged in the following works shall additionally undergo regular health checkup using same Format at least once in a year:

Height workers	Drivers/crane operators/riggers	Confined space workers
Shot/sand blaster	Welding and NDE personnel	Any person referred by BHEL

8.4.5.4.1 HEIGHT PHOBIA TEST

1. The persons engaged in working at heights (above 2 meters) to be assessed for Height Phobia and associated conditions.
2. Such workers are to be allowed only on successful completion of this test, otherwise they shall be allocated ground-based jobs. IDs / Height passes shall be issued to such workers.

8.4.6 PROVISION OF CANTEEN FACILITY

Minimum or better facilities to be ensured as per BOCW (Rule 244) / Factories Act, specially taking care of the following:

1. Canteen facilities shall be provided for the workmen of the subcontractor inside the project site.
2. Proper cleaning and hygienic condition shall be maintained.
3. Proper care should be taken to prevent biological contamination.
4. Adequate drinking water should be available at canteen.
5. Fire extinguisher shall be provided inside canteen.
6. Regular health check-up and medication to the canteen workers shall be ensured.
7. Canteen waste to be disposed of in compliance with law
8. Domestic LPG cylinder shall not be used
9. Canteen should be periodically inspected using standard checklist finalized along with BHEL

8.4.7 PROVISION OF ACCOMMODATION / LABOR COLONY

1. The subcontractor shall provide to every workman (within fifteen days of the commencement of the employment of migrant workmen):
 - a) In case he is accompanied by any other member of his family, a suitable barrack so as to accommodate one room having at least a floor area of 10 square meters, a verandah and adequate additional covered space for cooking food as well as one common sanitary latrine, one common bathroom for every three such quarters; and
 - b) In case he is unaccompanied by any other member of his family, a suitable barrack so as to accommodate not more than ten such migrant workmen, having at least a floor area of not less than 6.5 square meters for each such migrant workman making use of the barrack, a verandah and adequate additional covered space for cooking food as well as one common sanitary latrine and one common bathroom for every ten such migrant workmen
2. Every quarter and the barrack shall be so constructed as to afford adequate ventilation, protection against heat, wind, rain and shall have smooth, hard and impervious floor surface.



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3. The quarters or the barracks, as the case may be, shall be at a convenient distance from the establishment and shall have adequate supply of wholesome drinking water.
4. The area in which the quarters and/or barracks are located as well as the latrines and bathrooms provided therein shall be kept in a clean and sanitary condition at all times.
5. Regular housekeeping of the labor colony shall be ensured.
6. Availability of Bathing/ washing bay to be ensured
7. Room ventilation and safe electrification to be ensured
8. MSDS of LPG shall be put up prominently and shall be included in the induction training also.
9. The labor colony shall be secure so that only authorized persons have access to it.
10. Availability of local market to be ensured by the Sub-contractor
11. A "Suggestion Register" shall be made available at the labor colony for workers. The feedback shall be reviewed on weekly basis and acted upon.
12. Labor colony shall be inspected fortnightly by Subcontractor Safety Officer & HR executive, and report submitted to BHEL as per Format No. HSEP:13-F16
13. **Facility of Crèches** – to be provided wherein more than fifty female workers are deployed
14. Provisions of Clause 8.4.1, 8.4.2 and 8.4.3 shall be applicable on labor colony as well
15. First aid facility shall be provided in the labour camp under the administration of trained first aiders.
16. Common kitchen facilities to be ensured and cooking inside the room to be avoided. The kitchen should be maintained in hygienic condition.
17. Awareness training shall be organized for the workers regarding fire safety, safe use of LPG, Health & Hygiene, and electrical safety etc. on monthly basis.
18. Perimeter fencing, security and main gate entrance shall be established and maintained.
19. Adequate drainage and approach roads to be done.

8.4.8 PROVISION OF EMERGENCY VEHICLE

Dedicated emergency vehicle shall be made available at workplace by subcontractor for evacuation of victim from site.

However, Ambulance shall be used exclusively for transporting victim to hospital

8.4.9 PEST CONTROL

Regular pest control should be carried out at all offices, mainly laboratories, canteen, labor colony and stores by the subcontractor.

8.4.10 SCRAPYARD

1. Scrapyard shall be developed by subcontractor to store metal scrap, wooden scrap, waste, hazardous waste.
2. Scrap/Waste shall be segregated as Bio-degradable and non-bio-degradable and stored separately.

8.4.11 ILLUMINATION

The subcontractor shall provide adequate lighting facilities e.g. flood lighting, hand lamps, area lights etc. to ensure adequate lighting at all work places & their approaches including passage ways as per IS: 3646 (Part-II) at all times. Indicative recommended values are given below:



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S. No.	Location	Lux Level
A.	Construction Site	
1	Outdoor areas like store yards, entrance and exit roads	20
2	Platforms	50
3	Entrances, corridors and stairs	100
4	General illumination of work area	150
5	Rough work like fabrication, assembly of major items	150
6	Medium work like assembly of small machined parts	300
7	Fine work like precision assembly, precision measurements etc.	700
8	Sheet metal works	200
9	Electrical and instrument labs	450
B.	Office	
1	Outdoor area like entrance and exit roads	20
2	Entrance halls	150
3	Corridors and lift cars	70
4	Lift landing	150
5	Stairs	100
6	Office rooms, conference rooms, library reading tables	300
7	Drawing table	450
8	Manual telephone exchange	200

In case any area is not mentioned above, the applicable illumination for the same shall be specified by BHEL based on applicable standards and international norms

1. Level of illumination shall be checked periodically using a calibrated lux meter and recorded for each work area on minimum weekly basis.
2. Lamp (hand held) shall not be powered by mains supply but either by 24V or dry cells.
3. Lamps shall be protected by suitable guards where necessary to prevent danger, in case of breakage of lamp.
4. Emergency lighting provision for night work shall be made to minimize danger in case of main supply failure.

9. HSE TRAINING & AWARENESS

9.1 HSE INDUCTION TRAINING

1. All persons entering into project site shall be given HSE induction training before being assigned to work, which shall be imparted through audio-visual medium and shall be of minimum 2-hour duration.
2. Any single trainee batch size should not exceed 40.
3. 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.)
 - i. They must arrive fully dressed in safety wear & gear to attend the induction.



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- ii. Any one failing to conform to this safety wear& gear requirement shall not qualify to attend.
- 4. In-house induction training subjects shall include but not limited to:
 - i. Briefing of the Project details and importance of employee for the project and for the nation.
 - ii. Safety related cardinal rules, objectives and targets.
 - iii. Site HSE rules.
 - iv. Site HSE hazards and aspects.
 - v. First aid facility.
 - vi. Emergency Contact No. and procedures
 - vii. Details of Fire prevention and emergency response systems & procedures at site.
 - viii. Requirement of incident / near miss reporting by all.
 - ix. Accident case studies
 - x. Rules to be followed in the labor colony (if applicable)
- 5. Evaluation to be carried out after training and induction training to be repeated in case of failure of participant in evaluation
- 6. On completing subcontractor's in-house HSE induction, each employee shall sign an induction training form (format no. HSEP: 13-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 (provided Health Checkup is over).

9.2 HSE TOOLBOX TALK

- 1. HSE Tool Box talk shall be conducted by frontline foreman/supervisor of subcontractor to specific work groups daily prior to the start of work. The agenda shall consist of the following:
 - i. Visual checkup of workers regarding health, any signs of fatigue, intoxication etc.
 - ii. Details of the job being intended for immediate execution.
 - iii. The relevant hazards and risks involved in executing the job and their control measures.
 - iv. Specific site condition to be considered while executing the job like high temperature, humidity, unfavorable weather etc.
 - v. Recent non-compliances observed.
 - vi. Appreciation of good work and warning for any unsafe acts done by any person.
 - vii. Any doubt clearing session at the end
- 2. Record of Tool box talk shall be maintained as per Format no. HSEP:13-F04

9.3 TRAINING ON HEIGHT WORK

Due to the large percentage of fall from height in incidents, training of minimum 2-hour duration on height work shall be imparted to all height workers by in- house / external faculty for every batch of new inductees. The training shall include following topics:

- 1. Inspection of work area, access and egress w.r.t height hazards
- 2. Use of PPEs; use of fall arrester, retractable fall arrester, life line, safety nets etc.
- 3. Safe climbing through monkey ladders.
- 4. Inspection of PPEs.
- 5. Medical fitness requirements.
- 6. Mock drill on rescue at height.



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7. Dos & Don'ts during height work.

8. Accident case studies

In case, above is organized by BHEL, proportionate cost shall be borne by subcontractors

9.4 HSE TRAINING DURING PROJECT EXECUTION

1. HSE training shall be arranged by subcontractor as per the need of the project execution and recommendation of BHEL.
2. The topics of the HSE training shall be as follows but not limited to:
 - i. Hazards identification and risk analysis & Identification of Environmental Aspects / Impacts
 - ii. Work Permit System
 - iii. Learning from past incidents
 - iv. First aid, Firefighting & Fire-warden training
 - v. EMS and OHSMS
 - vi. T & Ps fitness and operation
 - vii. Electrical & Chemical safety
 - viii. Welding, NDE & Radiological safety
 - ix. Material handling.
3. Safety awareness and on-the-job training programmes shall be carried out at site for all workers periodically. Periodicity to be decided by BHEL but shall be minimum once in six months
4. Penalty Training – In case of any incident, the involved person, group or agency shall undergo a penalty HSE training for a minimum period of 2 hrs. or as decided by BHEL.
5. In case it is not possible to provide training to all workers at once, same shall be imparted in Batch-wise manner so as to cover all workers with specified periodicity.
6. An up-to-date record to be maintained with attendance of participants and trainers preferably in soft copy as per Format No. HSEP: 13-F03.
7. Every employee of agency should be provided at least 2 hr. safety training in every month. In case, above is organized by BHEL, proportionate cost shall be borne by subcontractors

10. HSE PROMOTION: SIGNAGE, POSTERS, COMPETITION, AWARDS ETC

10.1 DISPLAY OF HSE POSTERS AND BANNERS

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

10.2 DISPLAY OF HSE SIGNAGE

Appropriate HSE signage shall be displayed at the work area to enhance awareness of HSE workmen and passersby about the work going on and do's and don'ts to be followed.

10.3 COMPETITIONS ON HSE, AWARDS & REWARDS

1. Subcontractor shall arrange competitions (slogan, poster, essay etc.) on HSE for workers and employees from time to time (Safety day, World Environment Day etc. minimum one such function each month) and winners will be suitably awarded during the functions.



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2. Subcontractor shall identify workers following good HSE practices and reward them from time to time as encouragement to follow good HSE practices.
3. Alternatively, if a common monthly function is organized at site, subcontractor shall participate in the same so that a minimum frequency of one such function per month is maintained.

10.4 HSE AWARENESS PROGRAMMES

Subcontractor shall arrange HSE awareness programmes periodically on different topics including medical awareness for all personnel working at site from time to time including officials involved in execution.

11. HSE COMMUNICATION AND PARTICIPATION

11.1 MONTHLY HSE REPORTING

1. HSE activities shall be reported to BHEL monthly as per Format no. HSEP: 13-F05. The reporting medium can be hard/soft as per BHEL requirement.
2. The period of reporting shall be 25th of the preceding month to 24th of the present month and report shall be submitted by the end of the calendar month or as conveyed by BHEL.
3. BHEL can modify the reporting requirements as per requirement

11.2 HSE EVENT REPORTING

1. Important HSE events like HSE Training, Mock / Fire/Rescue Drills, Medical camp etc. organized by subcontractor shall be reported to BHEL in detail with photographs
2. Celebration of important days like National Safety Day, World Environment Day etc. shall also be reported likewise.

11.3 HSE INCIDENT REPORTING

All incidents (near misses, property damage, first-aid cases, minor, major and fatal incidents) shall be reported to BHEL as they happen through SMS and Hard/Soft copy as per Format No. HSEP: 08-F01 & F02.

11.4 HSE SUGGESTIONS

All workers and employees to be encouraged to provide suggestions for improvement in Health, Safety & Environment at site. The suggestions to be recorded in a "Suggestions Register". Suggestions to be reviewed and those having potential of significant beneficial effects are to be implemented, and recognition / award to be given to the individual.

11.5 CLIENT COMMUNICATON

All HSE related communication from BHEL, customer / external statutory and regulatory agencies to be handled on priority. The relevant issues to be resolved in expeditious manner

11.6 RECORDS OF COMMUNICATON

Records of all communication and their responses as detailed above shall be maintained by subcontractor in hard / soft copy and produced when required.

12. INCIDENT REPORTING, INVESTIGATION & CORRECTIVE ACTION

1. A conducive environment for reporting of near misses and other incidents shall be developed at site through system of rewards etc.
2. Priority to be given to ensure medical treatment of the victim. Victim to be given immediate First Aid and transported to Medical Facility in a well-equipped Ambulance
3. All incidents, as they happen, shall be reported to BHEL immediately over phone/SMS/WhatsApp/mail and then in Format No. HSEP:08-F01 & F02 within 24 hrs. of occurrence. Immediate SMS shall be sent to concerned Package In-charge with following Details:
 - a. Project & Customer Name:
 - b. Subcontractor Name & Scope:
 - c. Incident Area:
 - d. Number of Injured / Fatalities:
 - e. Date & Time of Accident:
 - f. Incident Description in few lines:

No incident shall be hidden

4. Records of all incidents shall be maintained in hard / soft copy.
5. For all incidents:
 - a. The incident area, equipment / tools involved, documents & records etc. shall be maintained as-it-is pending investigation
 - b. Root Cause Analysis (RCA) to be conducted and corresponding Corrective / Preventive Action (CAPA) ensured
 - c. Responsibility shall be assigned and action to be taken against the erring individual
 - d. In case presence of manufacturer of the equipment involved is required, subcontractor will arrange the same
 - e. All expenses pertaining to the RCA / CAPA shall be borne by the subcontractor
6. RCA and CAPA reports of all near misses and minor injuries shall be identified and report submitted to BHEL within 7 days of occurrence.
7. For incidents, where worker does not resume duty within 48 hours of occurrence, Joint investigation along with BHEL shall be conducted within 7 days, and CAPA ensured.
8. Corrective action shall be immediately implemented at the work place. Work shall be put on hold in the area till corrective actions are verified by BHEL
9. All incidents, their Root Cause Analyses and Corrective actions shall be recorded, and analyzed so as to identify weak areas and actions to be taken to reduce the incident trend.

13. SAFETY DURING WORK EXECUTION

13.1 HSE SYSTEMS AND PROCEDURES

BHEL Power Sector HSE Management System (HSEMS) shall be referred for controlling hazards, aspects, and carrying out HSE activities at site. Subcontractor shall get familiar with and follow the



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HSEMS documents provided by BHEL which include the follows:

13.1.1 HSE PROCEDURES:

HSE activities shall be conducted at site based on the HSEMS developed by BHEL Power Sector and issued to site by PSER-HQ. While planning for any activity the following documents shall be referred for infrastructural requirements to establish control measures:

- HSEP01: HSE Procedure for Register of OHS Hazards and Risks
- HSEP02: HSE Procedure for Register of Environmental Aspects and Impacts
- HSEP03: HSE Procedure for Register of Regulations
- HSEP04: HSE Procedure for Training and Awareness
- HSEP05: Operational Control Procedures
- HSEP06: HSE Procedure for Emergency Preparedness and Response Plan
- HSEP07: HSE Procedure for performance measurement, monitoring and review
- HSEP08: HSE Procedure for Incident Investigation, reporting & corrective action
- HSEP09: HSE Procedure for Non-Conformity Handling & Corrective Actions
- HSEP10: HSE Procedures for Control of Records
- HSEP11: HSE Procedure for Contract documents
- HSEP12: HSE Procedure for Permit to Work
- HSEP15: HSE Procedure for Operational Control

13.1.2 PERMIT TO WORK (PTW) SYSTEM

1. The following activities shall be carried out by the subcontractor strictly after obtaining Permit to Work (PTW) from BHEL
 - i. General Work Permit (**Format No. HSEP14-FP01**)
 - ii. Height working (**Format No. HSEP14-FP02**)
 - iii. Hot working (**Format No. HSEP14-FP03**)
 - iv. Confined space Work (**Format No. HSEP14-FP04**)
 - v. Excavation more than 2-meter depth (**Format No. HSEP14-FP05**)
 - vi. Radiography / Radiation Work (**Format No. HSEP14-FP06**)
 - vii. Heavy / Complex / Critical Lifting Activity (**Format No. HSEP14-FP07**)
 - viii. Night / Holiday Work (**Format No. HSEP14-FP08**)
 - ix. Material Loading / Unloading Permit (**Format No. HSEP14-FP09**)
 - x. Grating / Safety Net / Safety Facility Removal Permit (**Format No. HSEP14-FP10**)
 - xi. Live Electrical Maintenance etc. - Lockout / Tag (**Format No. HSEP14-FP11**)
 - xii. Beam/ Truss/ Duct/ Structure Alignment Permit (**Format No. HSEP14-FP12**)
2. The above list is not exhaustive. BHEL reserves right to introduce additional Permits or modify requirements for usage of existing Permits. The conditions for using the Permit are specified in the Format (General Requirements).
3. Where customer is having separate Work Permit System the same shall be followed in conjunction to ensure all activities and checks are covered in all systems.
4. Permit applicant shall apply for work permit of particular work activity at particular location before starting of the work along with Job Hazard Analysis.



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5. All Permit signatories shall physically visit the work area and check that all the safety control measures necessary for the activity are in place. Only then the permit shall be issued.
 - a. Signatory shall physically visit the area of work and ensure all required safeguards before signing the Permit
 - b. Signatory shall periodically visit the area to confirm the availability of required safeguards throughout the currency of the permit
 - c. In case any Permit requirement is not available, work will be stopped till it is made available
6. Permit holder shall implement and maintain all control measures during the period of permit. The permit will be closed after completion of the work and submitted to BHEL.

13.1.3 OPERATIONAL CONTROL PROCEDURES

1. All applicable OCPs (Operational Control Procedures) as identified from outcomes of HIRA, Aspect / Impact studies and BHEL inputs will be followed by subcontractor. This will be done as part of normal scope of work.
2. Illustrative list of such OCPs is given in Table 13.1 and same will be made available to subcontractor by BHEL during work execution at site.
3. In case any other OCPs are required or existing ones need to be modified in order to control the risks / impacts associated with any activity during the execution of work subcontractor shall prepare / update and follow the same with information to BHEL.

Table 13.1 - LIST of Reference OCPs

No.	Topic	No.	Topic	No.	Topic
0	General Safety	22	Steam blowing	44	Material preservation
1	Handling of chemicals	23	Working in confined area	45	Electro-resistance heating
2	Electrical safety	24	Operation of passenger lift, material hoists & cages	46	Blasting
3	Energy conservation	25	Vehicle/ Crane maintenance	47	Transformer charging
4	Welding and gas cutting operation	26	Radiography	48	Handling of battery system
5	Fire safety	27	Waste disposal	49	DG set
6	Use of hand tools	28	Handling & storage of mineral wool	50	Sanitary maintenance
7	First aid	29	Working at night	51	Piling rig operation
8	Food safety at canteen	30	Computer operation	52	Passivation
9	Use of cranes	31	Storage in open yard	53	EDTA Cleaning
10	Storage and handling of gas cylinders	32	Drilling, reaming and grinding(machining)	54	Chemical cleaning of Pre boiler system
11	Manual arc welding	33	Stress relieving	55	Boiler Light up



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12	Use of helmets	34	Hydraulic test	56	Rolling and Synchronization
13	Good house keeping	35	Trial run of rotary equipment	57	Loading of Unit
14	Safe excavation	36	Batching	58	Air compressor
15	Working at height	37	Cable laying/tray work	59	Hydra Operation
16	Filling of hydrogen in cylinder	38	Spray insulation	60	Duct Pre-assembly
17	Illumination	39	Compressor operation	61	Resumption of construction activities after lockdown and prevention of coronavirus infection during site operations
18	Handling and erection of heavy metals	40	Gas distribution test		
19	Acid cleaning	41	Cleaning of Hot well / Deaerator		
20	Oil flushing	42	Electrical maintenance	61A	Prevention of Covid-19 infection in labour colony
21	Alkali boil out	43	O&M of control of AC plant & system	62	Truss/ Structure fit-up and alignment

13.2 ACTIVITY SPECIFIC REQUIREMENTS FOR SAFETY:

All Work shall be commenced only after taking the respective Work Permits (as applicable) and precautions as per relevant codes, systems and OCPs in order to ensure safe conditions throughout the duration of work. Additionally, activity specific safeguards as per this section shall be followed.

13.2.1 WORK AT HEIGHT:

1. All work at height above 2 meter 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 shall follow the checklist religiously by physically verifying the condition of the work area before recommending for approval.
2. Prior to the start of work at elevation, the HSE Officer involved with the work must meet 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 Officer.
3. Whenever a fall hazard or other exposure exists for working at heights more than 2.0m/6ft, 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).
4. All Engineering and Administrative Controls including barricading, safe platform, Safety Nets etc. shall



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be made available at work location. Under no circumstances, there shall be total reliance on PPEs only

5. Safety Nets

- a. Contractor shall maintain sufficient stock of Safety Nets for deployment
 - b. Safety Nets as per IS: 11057:1984 should be used extensively for prevention / arrest men and materials falling from height.
 - c. The safety nets shall be fire resistant, duly tested and shall be of ISI marked.
 - d. Safety Nets shall be deployed below all platforms where height work is envisaged. Duration of work, delay shall be no excuses for non-installation of Safety Net
6. Reaching beyond barricaded area without lifeline support, moving with support of bracings, walking on beams without support, jumping from one level to another, throwing objects and taking shortcut must be discouraged.
7. Monkey Ladder shall be fitted with cages. Rope ladder should be discouraged.
8. In case of pipe-rack, persons should not walk on pipes and walk on platforms only.
9. In case of roof work, walking ladder/ platform should be provided along with lifeline and/ or fall arrestor.
10. For chimney or structure painting, both hanging platform and men should be anchored separately to a firm structure along with separate fall arrestor.
11. The procedures for the safety response to identified fall hazards developed and rescue plans must be reviewed with all individuals exposed to the hazards.
12. The HSE Officer must establish an inspection process of fall protection systems. Some equipment requires documented inspections by its manufacture on a regular schedule. Such 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.
13. 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.
14. Aerial lifting devices, excluding scissor lifts require the use of full body harnesses and lanyards in any elevated position.

13.2.1.1 Personnel fall protection system must include:

a. Safety Harness

All height workers must use Full Body Safety harness with double lanyards with shock absorber (only). The primary lanyard is never unhooked until the secondary lanyard is secure. The design of the working platform should be such that under no circumstances, worker should have both lanyards unhooked while at height.

b. Lanyard

- i. 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.
- ii. 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.

- iii. 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.

c. Lifeline

All lifelines in general are to be made of min 12mm dia. steel rope (plastic coated) and tied to columns with 3 clamps at each end. Wherever columns are not available to tie the lifelines, the vertical posts as per the design below are to be provided after carrying out drop load test initially. A load of 240kg to be dropped off the mid-point of lifeline in this test.

d. Lifeline Post

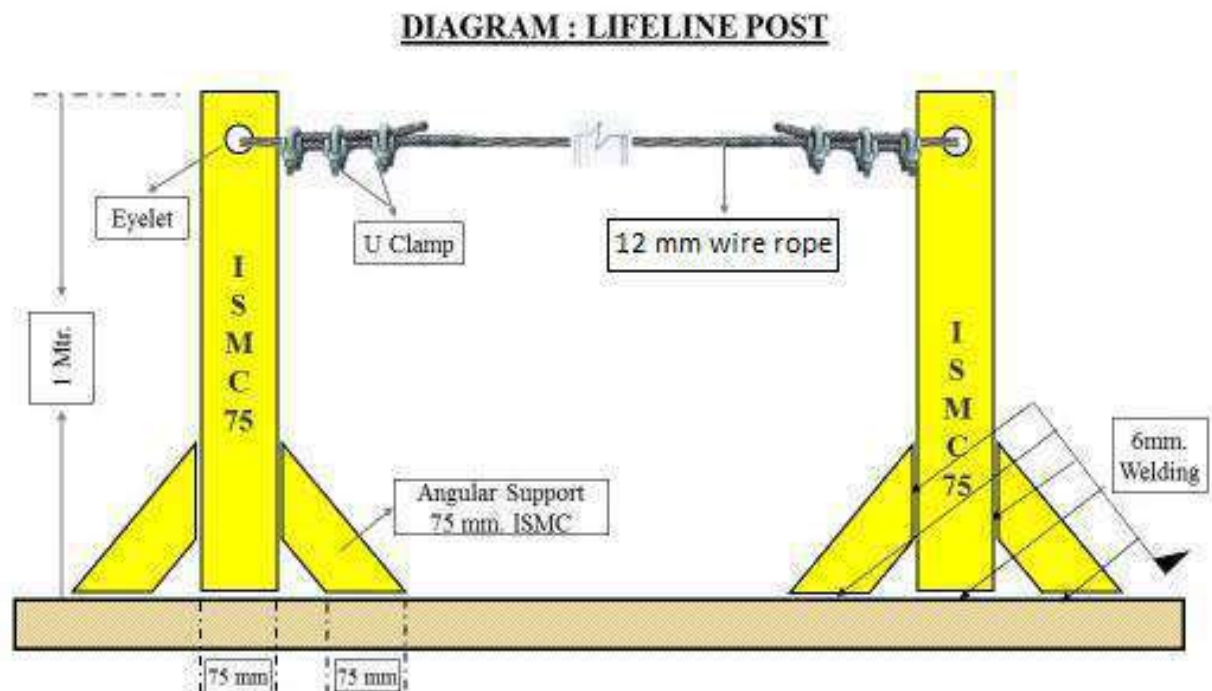


Fig. 13.2.1.1 Lifeline Post

- i. The support at vertical post shall be fixed at end-to-end. The maximum length of one end to another end shall be 6 meters
- ii. If the length of a lifeline is more than 6 meters, then intermediate vertical post(s) are to be used. Such intermediate post(s) will act as supports and the lifeline rope should simply pass through the eyelets (holes) of such supports without being anchored
- iii. The lifeline need not be wrapped / clamped to any intermediate post
- iv. Such intermediate posts must be used at an interval of every 6 meters
- v. The post(s) in which the original lifeline is to be installed should be capable of sustaining a tensile stress of 2268 Kgs.
- vi. In a horizontal lifeline installation, maximum allowable sagging is 500-600 mm



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- vii. For a single spun lifeline, no more than 2 persons are allowed to work; for more than two workers, another lifeline should be installed
- viii. Horizontal lifeline should be so installed that it does not impede safe movement of workers
- ix. All the installation work must be carried out by competent person with adequate knowledge

13.2.1.2 Working Platform

1. 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.
2. **Precautions against the fall of Materials, Persons and Collapse of Structures:**
 - i. Every opening in the floor or a building or in a working platform shall be suitably barricaded to prevent the fall of persons by providing suitable fencing or railing whose minimum height shall be 90 cm.
 - ii. 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. Hard barricading shall be made at such places made of scaffolding pipe & clamps covered with reflective net. 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.
 - iii. 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.
 - iv. Guardrails must be able to withstand a 200-pound force exerted in any one direction.
 - v. 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.
 - vi. All openings through which workers are liable to fall should be kept effectively covered or fenced and indicated in the most appropriate manner.
 - vii. Guardrails and toe-board/barricades and sound platform conforming to IS: 4912-1978 and other Indian laws and regulations as depicted below should be provided.

Guardrail system

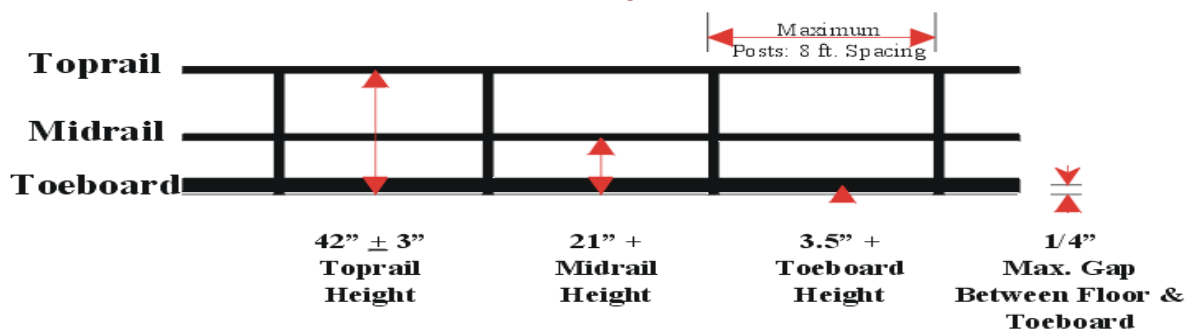


Fig. 13.2.1.2 Guard Rail System

- viii. 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:



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- 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.

- ix. The monkey ladders shall have sufficient fall arrestors. Adequate lifelines of 8mm steel wire rope shall be provided across the work area.
- x. The HSE officer shall recommend appropriate PPEs after analyzing hazards and risks involved.

13.2.1.3 Scaffolding

All scaffolds shall be conformant to the relevant standards including IS 3696 and IS 4014 as applicable. A sketch of the scaffolds proposed to be used shall be prepared and approval of the BHEL Engineer obtained prior to construction / use. Only cup lock type scaffoldings will be allowed in site. Where cup lock type scaffolding arrangement is not feasible by the virtue of the location, in that case only pipe and clamp type scaffolding will be allowed.

General

1. The scaffolding work must be carried out by a competent person, who shall train the scaffold users on safety aspects
2. All scaffolds shall be erected / dismantled by scaffolding crew under direct supervision of competent scaffolding supervisors.
3. 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.
4. 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.
5. Guard rails and toe boards shall be installed on all open sides and ends of platforms more than (2) meters above ground or floor
6. Scaffold planks must be at least 5 cm x 25 cm (2" x 10") full thickness lumber scaffold grade or better.
7. Scaffold planks shall not span distances greater than 2.5 meters (8 feet).
8. 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.
9. All scaffolding must be a minimum of two planks wide. No one may work from a single plank.
10. Scaffold planks must be inspected before use. Planks that have been damaged must be removed from the site.
11. Access ladders must be provided for each scaffold. Climbing the end frames is prohibited unless the design incorporates an approved ladder.
12. Adequate mudsills or other rigid footing capable of withstanding the maximum intended load must be provided.
13. 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.



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14. Do not overload scaffolds. Material should be brought up as needed. Scaffolding must not be loaded in excess of its rated capacity.
15. Barrels, boxes, kegs, blocks or similar unstable object must never be used as work platforms or to support scaffold.
16. 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.
17. Employees exposed to overhead hazards while working on a scaffold will be protected by 5 cm (2") thick planks.
18. 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.
19. Wooden scaffolds shall not be used in areas where fire / fire products are expected
20. Ropes made of jute / Plastic and other fire prone material shall not be used to tie up scaffolding components together
21. The platform should have permanent hand rail and mid rail with Toe board without fail.
22. 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.
23. 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.

24. Requirements for different types of Scaffolds:

A. Suspended Scaffold

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

B. Rolling Scaffolds

- i. The height of rolling scaffolds shall not exceed three times the minimum base dimension.
- ii. The minimum base dimension of rolling scaffold will be 1.25 meters (4 feet).
- iii. Adequate help must be provided when moving a rolling scaffold.
- iv. Secure or remove all loose materials, equipment and tools before moving a rolling scaffold.
- v. 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.

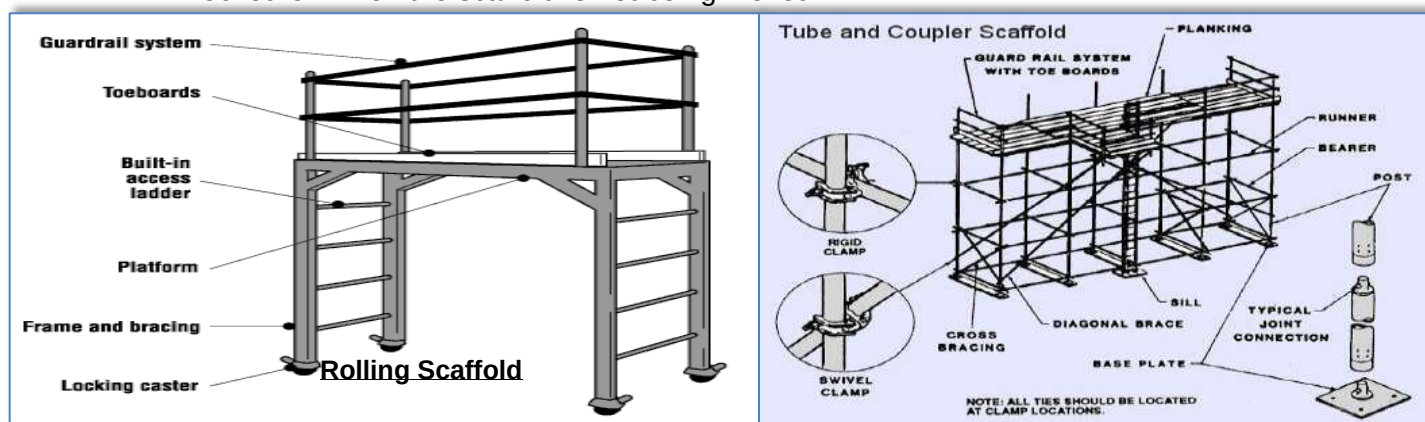


Fig. 13.2.1.3 Types of Scaffolds



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25. 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.

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:



Fig. 13.2.1.4 Scaffold Tagging

13.2.1.4 Ladder Safety

A sketch of the ladders proposed to be used shall be prepared and approval of the BHEL Engineer obtained prior to construction / use

Safe Use of Ladders:

1. Fall protection is required when working on a ladder above 2 meters and when climbing above nearby guardrails.
2. Ladders must be inspected prior to use and by a competent person quarterly, with documentation.
3. Use portable ladders for height up to 4 M only
4. Provide fixed ladders for height above 4 M
5. Place the ladder at an angle of 75 degrees (approx.) from the horizontal (1:4)
6. Extend ladder at least 1 M above the top landing
7. Secure top and bottom of the ladder firmly to prevent displacement- anti skid lining at the bottom
8. Ensure that the width of the ladder is not less than 300 mm and distance between rungs is not more than 300 mm
9. 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
10. 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
11. Do not use ladders of conducting material near power lines, and only use ladders near power line or other energize system with exposed parts if they are confirmed locked-out and de-energized.
12. Stand no higher than the fourth rung from the top for carrying out any job standing on a ladder.
13. Never reach out from a ladder to perform work where your belt buckle protrudes past the ladder rung.
14. Always face the ladder while climbing up or down



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15. 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.
16. Avoid climbing up or down a ladder while carrying anything in hands. Lift tools, equipment and materials with a rope.
17. Work from portable and extension ladders near guardrail where fall expose exists 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

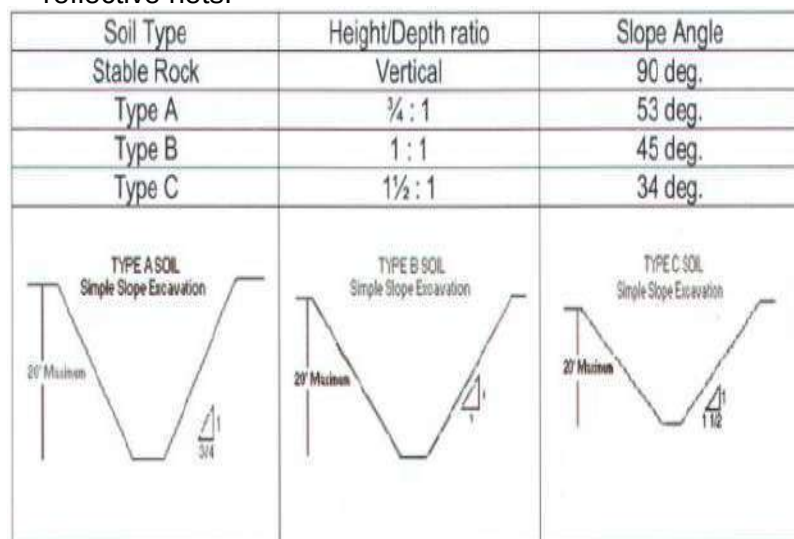
13.2.2 EXCAVATION & CIVIL WORKS

All safety precautions shall be taken for foundation and other excavation marks as per IS-3764.

13.2.2.1 Excavation

The following safety measures are to be ensured before and during excavation:

1. All Excavation activities more than with depth of 1.22 meter or more shall require and Excavation Work Permit
2. Check for underground utilities like electrical / telephone cables, sewage, water lines and proper care has to be exercised to protect and prevent damage to it
3. Proper and adequate slope is maintained while excavating
4. Adequate shoring or sheeting is done wherever require to prevent soil sliding
5. Safe access through ladder or steps for exit & entry to excavation
6. No material /excavated soil is kept within one meter from the edge
7. Safe way is planned and provided for movement of HEM /transport equipment near excavation
8. Safety helmet and shoes/gum boots are provided and worn by the workmen at excavation works
9. Dewatering arrangement is made where water seepage is prevailed.
10. Stop blocks are provided to avoid vehicles reversing into the excavated trenches
11. Danger signs /Caution boards are displayed at work spot
12. Hard Barricading is provided at excavated pits. It should be made of scaffolding pipe and clamp with reflective nets.



Determining Soil Type		
Type	Description	Examples
A	Cohesive soils with an unconfined compressive strength of 1.5 tons per square foot or greater.	Clay, silty clay, sandy clay, clay loam and in some cases: silty clay loam and sandy clay loam.
B	Cohesive soils with unconfined compressive strength greater than 0.5 tsf but less than 1.5 tsf.	Angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases silty clay loam and sandy clay loam.
C	Cohesive soils with unconfined compressive strength greater than 0.5 tsf or less.	Granular soils such as gravel, sand and loamy sand; submerged soil or soil from which water is freely seeping; submerged rock that is not stable.

Fig. 13.2.2.1 Excavation Reference



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13.2.2.2 Piling

Ensure the following precautionary measures before starting piling works:

1. Inspection of piling equipment by responsible person for its condition before initiating piling operation.
2. Checklist and OCP for piling to be prepared using manufacturer's instructions and used
3. Testing and its certification wire rope, slings, D-shackles, chain pulley blocks using in the process of piling work by competent person
4. Adequate support and secured foundation of the piling equipment to avoid toppling
5. Hoses should be lashed and adequately secured
6. Proper work platform is to be provided on piling frame
7. Safe work procedures and close supervision to prevent unsafe acts of operators/any unsafe conditions that may arise
8. Only experienced and trained operators are engaged for the piling operation
9. Provision of Personal Protective Equipment (PPE) like safety shoes/gumshoes/safety helmet/safety belt etc. and its use by their workmen.
10. Special care and precautions If work is near electrical live cables/ electrical equipment
11. Cordoning of work area to prevent un authorized entry
12. Guarding of revolving parts
13. Specific measures to prevent over turning of pile driver/missing of hammer/ hammer movement out of range

13.2.2.3 Batching Plant

Following Safety considerations for batching plant are to be ensured:

1. Modern type batching plant should be used in which all the moving parts are protected and emergency and safety features are incorporated.
2. Installation of external Electric moto-vibrators in the feeding hopper of all batching plants to reduce human intervention.
3. Installation of safety devices like pull-chord on both the sides of conveyor for stopping the conveyor in emergency
4. Workers carrying cement / sand to be given appropriate PPEs like respiratory masks & gloves.
5. Conveyor belt/rotating parts must be guarded properly.
6. Safety awareness shall be inculcated in workmen about the risk involved in rotating parts.
7. The agency shall ensure to erect the batching plant as per drawing including installation of all safety devices as provided by manufacturer and witnessed by BHEL Engineer in charge before starting of machine in future.
8. Safety audit to also focus on Batching plant.
9. The site shall impose penalty on the agency who has violated the safety norms as per contract.

13.2.2.4 Mobile Plant

Mobile plant includes tractors, trailers, dumpers, excavators, bulldozers, road rollers etc. for earthmoving purpose and concrete mixers, concrete transit mixtures, concrete pumps etc for concreting purpose. Due to the very nature of their function and movement in difficult terrains, congested areas, working in tandem with manual work and other operations the danger is inherent.

Automatic reverse camera with reverse horn connected with reverse gear is compulsory for all moving machineries.

Following Safety measures to be ensured for Mobile Plant:

1. Where movement around site is involved, routes should be planned, obstruction free and well maintained
2. Observe specified speed limits
3. Operating personnel should be aware of associated risks and its preventive measures
4. Only experienced, trained and authorized persons with valid license (wherever applicable) should operate the mobile equipment/vehicles
5. Provide and use Warning lights and reverse horn for cautioning the people around
6. Operation should be on level and stable ground with adequate working clearance.
7. Loading of out riggers/stabilizers should be well within safe ground bearing capacity
8. No person should be on equipment or vehicle during loading and unloading of material
9. Operators should be protected by warning barriers or switching off power when working in close proximity of overhead power lines
10. The equipment /vehicles should be well maintained and provided with effective brake system and other safety devices (wherever require)
11. Rotating parts of equipment should be adequately guarded
12. Provide necessary personal protective appliances and ensure its use by the operating personnel
Ensure effective measures at source to control harmful emissions, dust, fumes contaminating atmosphere and cause health hazards to the operators and people in the vicinity.
13. No overloading/over stressing of vehicles/plant is allowed
14. Hoses, pipes, receivers, gauges and valves involved in carrying out hydraulic fluid/ compressed air should be checked for leaks and tested prior to operation.
15. Adequate safe clearance for swing and movement is to be judged during operation of Concrete mixer
16. Setting of machines on firm and level ground with wheel locked to prevent movement of machine
17. Proper instructions and Special precautions are to be ensured to prevent entry in to the danger zone of projectile of bucket while dropping bucket
18. Operator leaving work spot should ensure that the equipment/vehicle is kept in neutral position and place on firm and level ground.
19. The hand brake should be kept in position and block road wheels as additional safety measure
20. Blades/buckets should be kept low while moving
21. The dozer blades should not be used as brakes except in emergency
22. The ground should be examined for its bearing capacity and general safety especially when operating road roller at the edges of slopes, embankments.
23. The roller should not be moved downhill with the engine out of gear
24. If operating near excavations the following precautionary measures are to be ensured
25. Barricading, edge protection to prevent fall of persons/vehicles over running while reversing etc.
26. Suitable support system and adequate allowance to avoid the danger of side collapsing
27. Experienced signaler /attendant should be always accompanied with operator/driver for proper direction /signal and also to caution others in the working Zone during operation of mobile plant



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13.2.2.5 Concrete Vibrators

1. Revolving parts/belt drives should be adequately guarded and Vibrating unit shall be completely enclosed and have suitable overload relays and effectively earthed
2. Ensure sufficient length of cable to the Vibrator.
3. Ensure electric starters and other accessories are firmly fixed adequately supported
4. Ensure locking of needle load while inserting needle in to the vibrator,
5. Ensure periodical lubrication and maintenance

13.2.2.6 Concrete Mixers

1. Setting of machines on firm and level ground with wheel locked to prevent movement of machine
2. Proper instructions and Special precautions are to be ensured to prevent entry in to the danger zone of projectile of bucket while dropping bucket

13.2.3 WELDING & GAS CUTTING SAFETY (HOT WORK)

1. All Hot Work shall require a Hot Work Permit
2. Inbuilt Voltage Reduction Device (VRD) equipped arc welding machine will only be allowed for work.
3. There shall be flash-back arrestors conforming to IS-11006 at both cylinder and burner ends. Damaged tube and regulators must be immediately replaced.
4. All safety precautions shall be taken for welding and cutting operations as per IS-818.
5. 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 ensured 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.
6. Appropriate fire-fighting equipment is to be available in close proximity of any welding and gas cutting operations at all times suitable for the type of Fire.
7. 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.
8. Proper ventilation is required for any welding or torch operations performed in a confined space.
9. 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.
10. 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.
11. 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.

12. 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 employees or conducting objects.
13. Arc welding power supply cable shall be of proper rating and material, e.g. copper.
14. 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.
15. Valve caps shall be in place when cylinders are not in use. Valve caps shall never be used for lifting the cylinder vertically.
16. Torches shall only be lit by approved strikers; never with matches, cigarette lighters, or hot-work.
17. **Splatter / Slag Collector:**

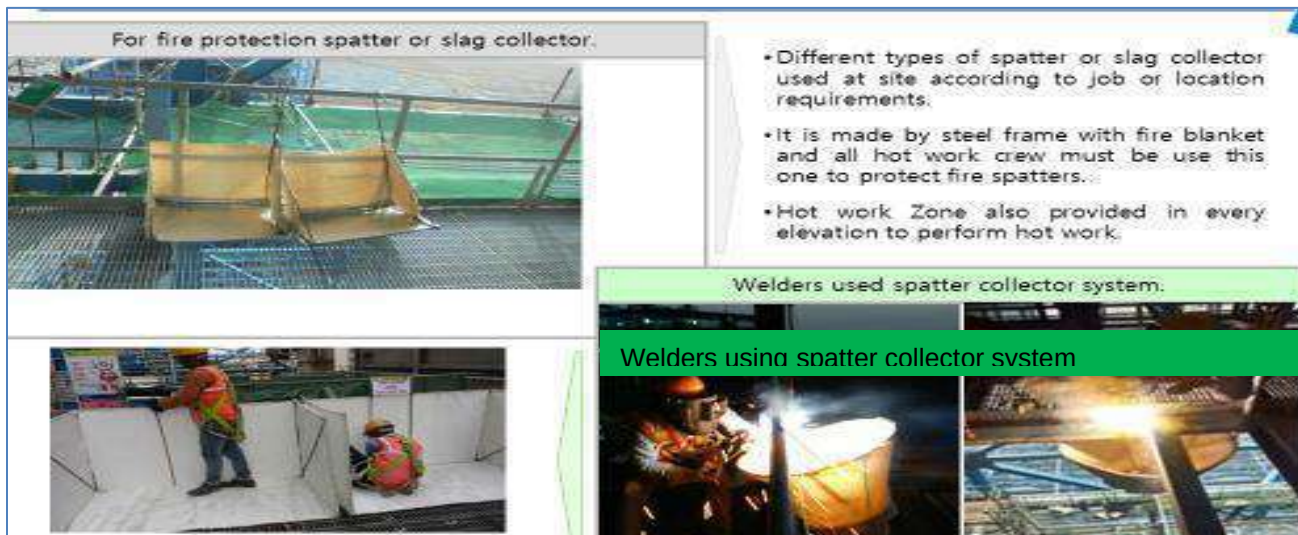


Fig. 13.2.3.1 Splatter / Slag Collector

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 patten/ slag collector or even MS Sheet. The passage of falling sparks or molten slag shall be barricaded till ground floor and any cable/ tubes/ any other objects interfering in the passages hall either be removed or covered with Fire-resistant sheet or MS Sheet.

13.2.4 COMPRESSED GAS

1. 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.
2. Compressed gas cylinders shall be secured in an upright position with chain or appropriate means during storage & use. However, a trolley shall be used for transportation.
3. 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.



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4. When cylinders are transported by powered vehicle they shall be secured in a vertical position.
5. 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.
6. Gas cylinders are not allowed to be used in man-basket when occupied.
7. Cylinders containing oxygen or fuel gasses shall not be taken into confined spaces.
8. Oxygen cylinders shall be stored a minimum of 6 meters from fuel gas cylinders or shall have an approved firewall between them.
9. All cylinders shall be kept at a safe distance from welding or cutting operations or shielded from arc/sparks / slag.
10. All cylinders shall be placed where they cannot become part of the electrical circuit.
11. Oxygen and acetylene shall not be stored together. Oxygen must be separated from acetylene (or ANY fuel gas) or combustible material by at least 20ft or a barrier with a 30-minute fire resistance rating.
12. All Cylinders should be stored upright in a designated area with labels for the type of gas. All applicable precautions to be ensured during storage
13. Oxygen and fuel gas regulators, hoses and associated equipment shall not be altered and shall be in proper working order while in use.
14. 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.
15. All gas cylinders shall be stored in upright position. Suitable trolley shall be used for cylinder movement, the design of which shall be submitted to BHEL Engineer for approval.
16. No of cylinders shall not exceed the specified quantity as per OCP
17. 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.
18. All cylinder should be kept only in cylinder trolley.
19. Cylinder shall be transported in upright vertical position by suitable mean.

13.2.5 LIFTING & RIGGING SAFETY

1. All Heavy / Complex Lifting operations as defined in Clause 6.12 shall require a Lifting Work Permit. A written rigging procedure and plan must be prepared for all individual heavy/ complex lifting operations.
2. All the cranes and lifting tools & tackles shall be inspected on daily / weekly basis as well as monthly by expert as per applicable formats.
3. In addition, inspection / certification as mandated by law shall be carried out wherein these shall be tested and certificates of fitness shall be obtained from 3rd party State Govt. approved competent agency before deploying at site and later periodically. BHEL shall be given advance intimation of any such inspections
4. 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 operator's cabin of all the lifting equipment.
5. Following requirements shall be mandatorily followed, wherever applicable:
 - a. The manufacturer's instruction for maintenance shall also be followed. All safety measures shall be followed.
 - b. All tools tackles, lifting appliances; material-handling equipment etc. used by the subcontractor shall be of safe design and construction.



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- c. The operators, slingers and signalers shall be qualified as per IS 13367 (part-1):2003 "Safe use of cranes- code of practices".
- d. There shall be a person responsible for co-ordination among cranes where multiple cranes are used, and lifting over load chart of the crane to be avoided.
- e. Mobile phone should be banned for crane operator and lifting operation. Only walkie talkie shall be allowed in rigging/Lifting purpose.

Lifts/Movements between 5 Tons and 20 Tons:

- a. Shall include a rigging plan, detailing schematic representation of the handling/lifting operations that must be included on the Method Statement.
- b. When performing similar lifts of identical items, only one rigging plan need be prepared, provided each of the lifts can be performed in accordance with the rigging plan.

Lifts/Movements Less Than 5 Tons:

An equipment rigging plan is not required for lifts less than 5 tons, safety measures are covered in the JSA.

13.2.5.1 Personnel Lifts (Man-Basket / Jhoola):

The design of personnel man basket shall be submitted to BHEL Engineer for approval before use. Relevant permit (Height work & others as applicable) shall be completed prior to lifting any people, along with a rigging plan.

- a. A separate Lifeline / fall arrestor anchored to a fixed structure outside of Jhoola shall be provided for the workers inside the basket. All occupants of the basket shall have Safety Harnesses equipped with rope grabs, which are to be hooked to the vertical lifeline.
- b. Man-basket shall be used where access through ladders or scaffolding is not feasible.
- c. 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.
- d. 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%.
- e. It shall have a door with double latches and shall open inside. Anchor points shall be identified within the man-basket.
- f. The man-basket shall be thoroughly inspected and load tested and a trial run performed without personnel before being put to job.
- g. It shall be treated as a lifting tool (T&P Item) and shall undergo same certification cycle and inspection as other lifting equipment.
- h. An additional sling of required lifting capacity shall be fixed the man-basket main lifting point and attached to the crane above the ball or block.
- i. While lifting man-basket, the crane shall maintain a uniform speed of lift without any swing.
- j. 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.
- k. 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.

- I. Use of Rebar steel for making and monkey-ladder must be avoided.

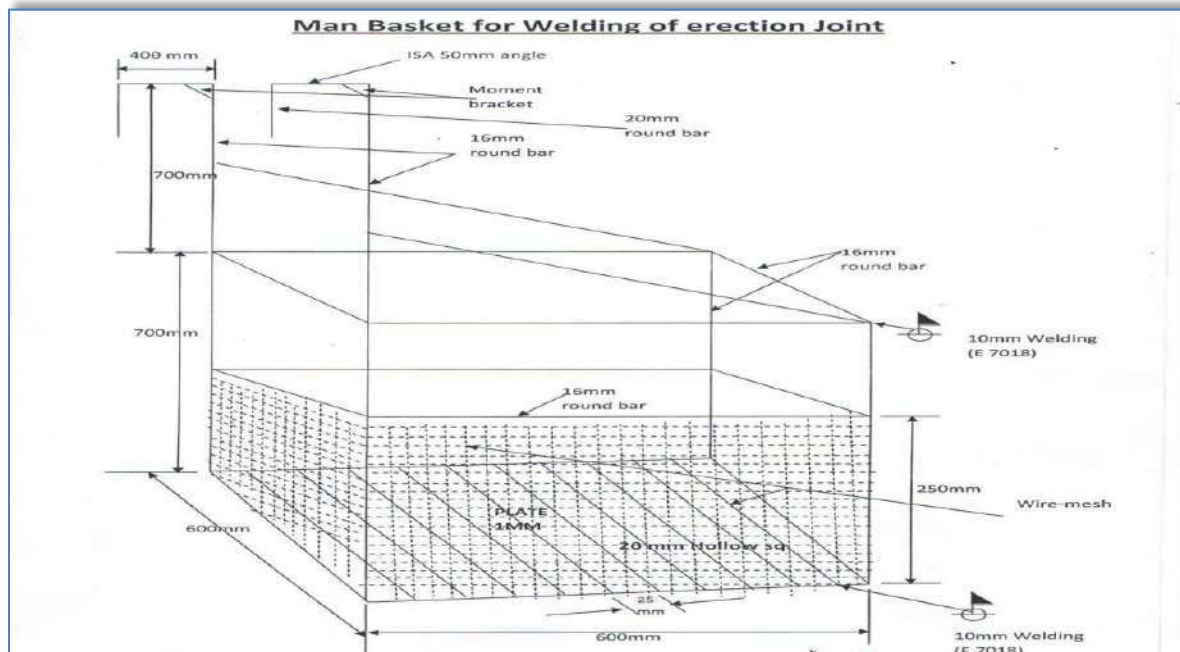


Fig. 13.2.5.1 Man Basket for Welding Erection Joint

13.2.5.2 Cranes & Hoisting Equipment:

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

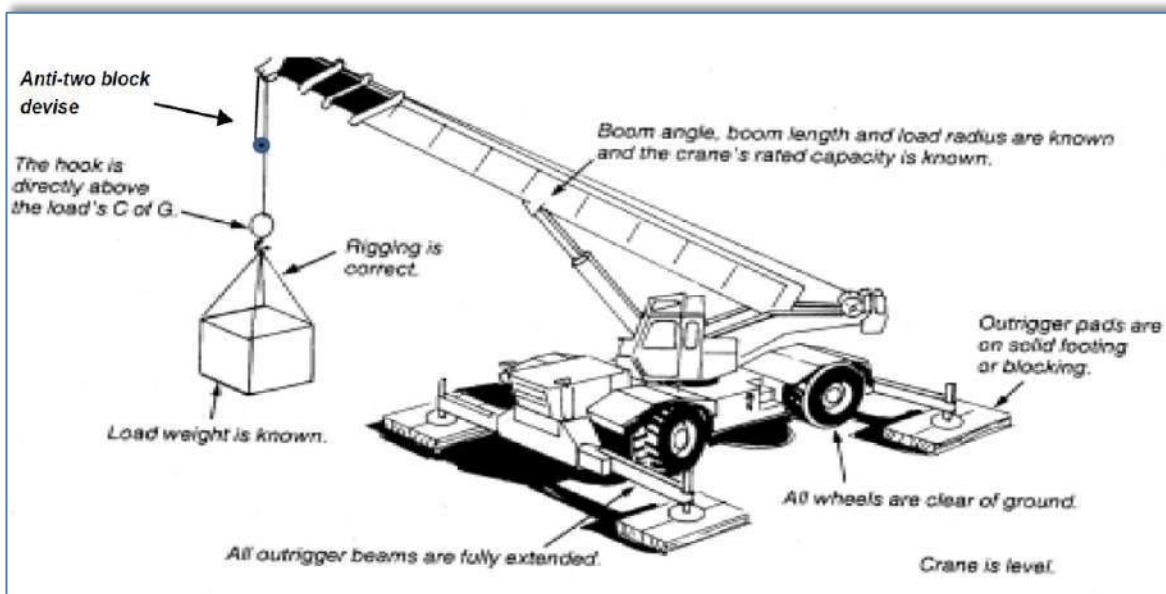


Fig. 13.2.5.2 Proper Crane Setup

- 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 switches
- 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 energized power line

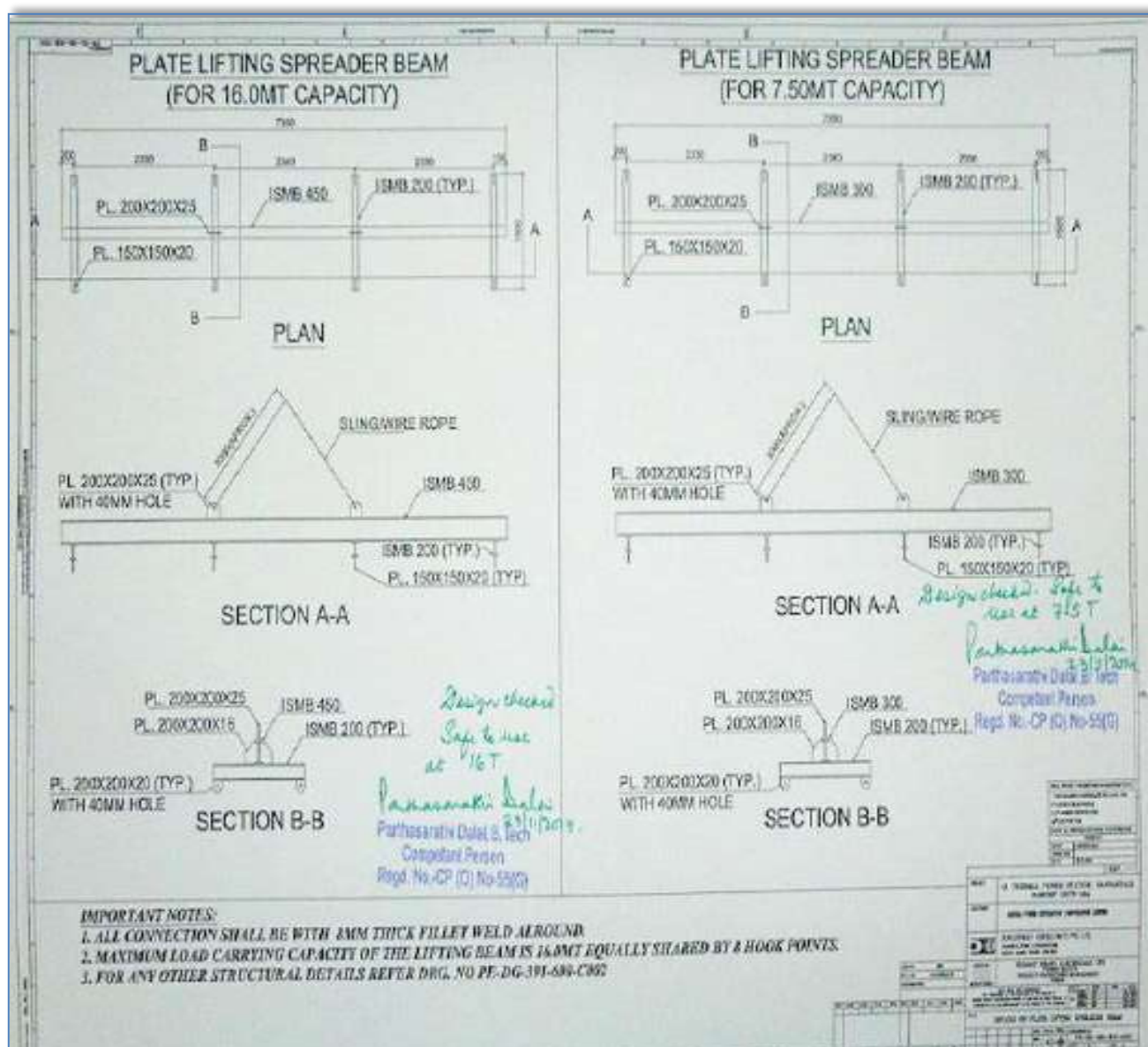


Fig. 13.2.5.3 Typical Plate Lifting Spreader Beam Configuration for 7.5 MT and 15 MT Loads



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- f. 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.
- g. Make certain that the rigging personnel, material, and equipment have the necessary capabilities for the job and are in safe condition.
- h. 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.
- i. Mats/Pads must be used on all lifting equipment, equipped with outriggers.
- j. Pick and carry must have the load secured to the rig in front.
- k. Only BHEL Approved Plate Lifting Spreader Beam configuration shall be used (Sample in Fig. 13.2.4.2)
- l. Crane operators must follow the following:
 1. Pass an annual Operator's Physical examination
 2. Carry a valid training certification card at all time while operating issued by the Govt. or other recognized institute.

13.2.5.3 Safe Rigging Practices

- a. Review the planned operation and requirements with the operator and rigging crew.
- b. Ensure a pre-lift meeting is conducted with crane operator, tagline operator, signal personnel, and Safety Manager.
- c. 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.
- d. Clear the lift area of all unnecessary personnel.
- e. Hydras shall only be allowed for loading & unloading works & shall not be allowed to move with load

13.2.5.4 Rules for Safe Rigging

1. Use loops, thimbles and corner pads to prevent damage to slings when used around corners or on cutting edges.
2. 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.
3. Slings must not be pulled from between or under loads with load resting on the sling.
4. Keep all rope away from flame cutting or welding operations.
5. Never use rope as sling material.
6. Never wrap a wire rope completely around a hook.
7. Do not bend wire rope near any attached fitting.
8. The sling must be selected to suit 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.
9. When using 3 and 4-legged sling configurations, any two legs must be capable of supporting the entire load.
10. 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.



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11. 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.
12. Properly rig all loads to prevent dislodgment of any part.
13. Use guide ropes or tag lines to prevent the rotation or uncontrolled motion of the load when necessary.
14. 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.
15. 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.
16. 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.
17. Multiple part lines must not be twisted around each other.
18. The hook must be brought over the center of gravity of load before the lift is started.
19. 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.
20. Keep hands away from pinch points as the slack is being taken up.
21. Leather gloves are recommended when handling wire rope.
22. Avoid impact loading caused by sudden jerking when lifting or lowering. Lift the load gradually until the slack is eliminated.
23. Never ride on a load that is suspended.
24. Avoid allowing the load to be carried over the heads of any personnel.
25. 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.
26. Never leave a load suspended unless emergency evacuation is required.
27. Never make temporary repairs to sling.
28. The capacity of a sling is determined by its angle, construction, type of hitch and size.
29. Never lift loads with one leg of a multi-leg sling until the unused legs are made secure.
30. Never point load a hook unless it is especially designed and rated for such use.
31. Make certain that the load is broken free before lifting and that all legs are taking the load.
32. When using two or more slings on a load make certain all slings are made from the same materials.
33. Lower the loads on to adequate blocking to prevent damage to the slings.
34. Materials and equipment being hoisted must be loaded and secured to prevent any movement which could create a hazard in transit.
35. The weight of the hook, load block and any material handling devices must be included when determining crane capacity.
36. Calculated weights cannot exceed load chart without written approval.
37. Personnel must be completely clear of loads being picked up or set down by crane. Tag lines will be used to control the loads. Loads must not be touched by hand while placing/ moving.

13.2.5.5 Slings

a. Synthetic Slings

The following are rules for safe use of synthetic slings:

- i. Synthetic slings must be marked to show the rated capacity for each type of hitch and type of web material.



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ii. 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.

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

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

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

- a. 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.
- b. Wear or scraping of one-third the original diameter of outside wires.
- c. Kinking, crushing, bird caging or any other damage resulting in distortion of the wire rope structure such as:
- d. Evidence of heat damage.
- e. End attachments that are cracked, deformed worn.
- f. Corrosion of the rope or end attachments.

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

- a. A broken weld or broken brazed joint along the sling edge.
- b. Reduction in wire diameter of 25 percent due to abrasion or 15 percent due to corrosion.
- c. Lack of flexibility due to distortion or corrosion.

Note: Hand-made slings are not allowed for this project.

13.2.5.6 Requirements of Plate Clamps:

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

13.2.5.7 Signaling Practices:

- The "slinger" is responsible for attaching and detaching the load to and from the crane. He shall:
 - have received appropriate training on general safe lifting operations;
 - be capable of selecting lifting gears suitable for the loads;
 - liaise with the operator and direct the movement of the crane safely.
- The "signaller" is responsible for relaying the signal from the slinger to the crane operator. He shall:
 - have received appropriate training on general safe lifting operations;
 - be able to direct the movement of the crane and loads.

Suggested hand signals



Note: During the lifting operation, either the slinger or signaller shall communicate with the operator. Other communication methods (e.g., wireless walkie-talkies, telephones, etc.) may also be used.

Fig. 13.2.5.7 Recommended Signaling Practices

13.2.6 DEMOLITION WORK

Before any demolition work is commenced and also during the process of the work the following shall be ensured, besides using the Work Permit:

1. All roads and open areas adjacent to the work site shall either be closed, suitably protected or restricted for movement



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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.
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.

13.2.7 T&PS GENERAL

1. All T&Ps/ MMEs should be of reputed brand/appropriate quality & must have valid test /calibration certificates bearing endorsement from competent authority of BHEL.
2. Subcontractor to also submit monthly reports of T&Ps deployed and validity test certificates to BHEL safety Officer as per the format/procedure of BHEL.
3. Tagging and punching in all lifting tool is compulsory with SWL, sr. no. and due date.
4. All T&Ps shall be inspected by authorized Third Party agency as per applicable frequency. BHEL shall be kept informed of any such scheduled inspection
5. All T&Ps shall be internally inspected in each quarter and colour coded as below.

13.2.7.1 T&P Color 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

Table. 13.2.6.1 T&P Color Coding Procedure

- i. The cycle of colors shall be Quarterly as a minimum or as decided by BHEL. The color code tape / Sticker shall be clearly visible to designate the period for which the inspections and tests were conducted.
- ii. Following the initial inspection, the equipment must be color-coded quarterly as per color-coding instructions that will be issued by the subcontractor.
- iii. Fire extinguisher with the current month color-coding inspection sticker must be provided and secured in the platform.
- iv. All slings shall be regularly inspected in accordance with the requirement of the project for frequent and periodic inspections and discard immediately if they fail to meet the minimum requirements of the project.
- v. The Subcontractor's Safety Officer 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.
- vi. 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.

13.2.8 CHEMICAL HANDLING

1. Displaying safe handling procedures & MSDS for all chemicals such as lube oil, acid, alkali, sealing compounds etc. at work place.
2. Where it is necessary to provide and/or store petroleum products or petroleum mixture & explosives, the subcontractor shall be responsible for carrying out such provision / storage in accordance with the rules & regulations laid down in the relevant petroleum act, explosive act and petroleum and carbide of calcium manual, published by the chief inspector of explosives of India. All such storage shall have prior approval if necessary from the chief inspector of explosives or any other statutory authority. The subcontractor shall be responsible for obtaining the same.
3. The used containers of chemicals shall be segregated and disposed of suitably
4. In case the used containers need to be re-used, all traces of the chemical to be removed by thorough cleaning with detergents etc. under trained supervision

13.2.9 ELECTRICAL SAFETY

1. Only electricians licensed by appropriate statutory authority shall be employed by the subcontractor to carry out all types of electrical works. The subcontractor shall maintain adequate number of qualified electricians to maintain his temporary electrical installations.
2. The sub-contractor shall supply modern power distribution board of different combination (1-phase & 3-phase). All the distribution of power should be through modern PDB. Equipment drawing is mentioned below.
3. No PDB or any other distribution board shall be more than 03 (three) years of purchase. Only modern PDB with industrial sockets as shown in layout below to be allowed to use at site.
4. Power supply to all equipment at site to be routed through MCBs of appropriate rating. A 'Power Supply Distribution Plan' shall be prepared and submitted to BHEL Engineer for approval
5. All power supplies through cables shall be underground or overhead with height > 3mtrs.
6. All power distribution boxes shall be locked and the key controlled by site management of concerned subcontractor.
7. All individual equipment & tools at site shall be powered through Earth Leakage Circuit Breakers of 30 mA sensitivity.
8. These MCBs and ELCBs shall be regularly tested as per Clause 14
9. All fuses and fuse wires shall be of standard size and rating.
10. All electrical appliances used in the work shall be in good working condition and shall be properly double earthed other than armour earthing.
11. All extension boards shall have separate switches for all sockets / connections.
12. All portable electric tools used by the subcontractor shall have safe plugging system (industrial top & socket) to source of power and be appropriately earthed.
13. Providing adequate no. of 24 V sources and ensure that no hand lamps are operating at voltage level above 24 Volts especially in confined spaces like inside water boxes, turbine casings, condensers etc.
14. Electrical appliance shall have proper earthing and for appliances equal to & more than 415V shall have two separate earthing (as per IS-3043-1987)
15. Details of earth resource and their test date to be given to BHEL safety officer as per the prescribed formats of BHEL



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16. The subcontractor shall use only properly insulated and armoured cables and conform to the requirement of Indian Electricity Act and Rules for all wiring, electrical applications at site.
17. BHEL reserves the right to replace any unsafe electrical installations, wiring, cabling etc. at the risk & cost of the subcontractor.
18. No maintenance work shall be carried out on live equipment
19. 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
20. The subcontractor shall carefully follow the safety requirement of BHEL/ the purchaser with the regard to voltages used in critical areas.
21. 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.

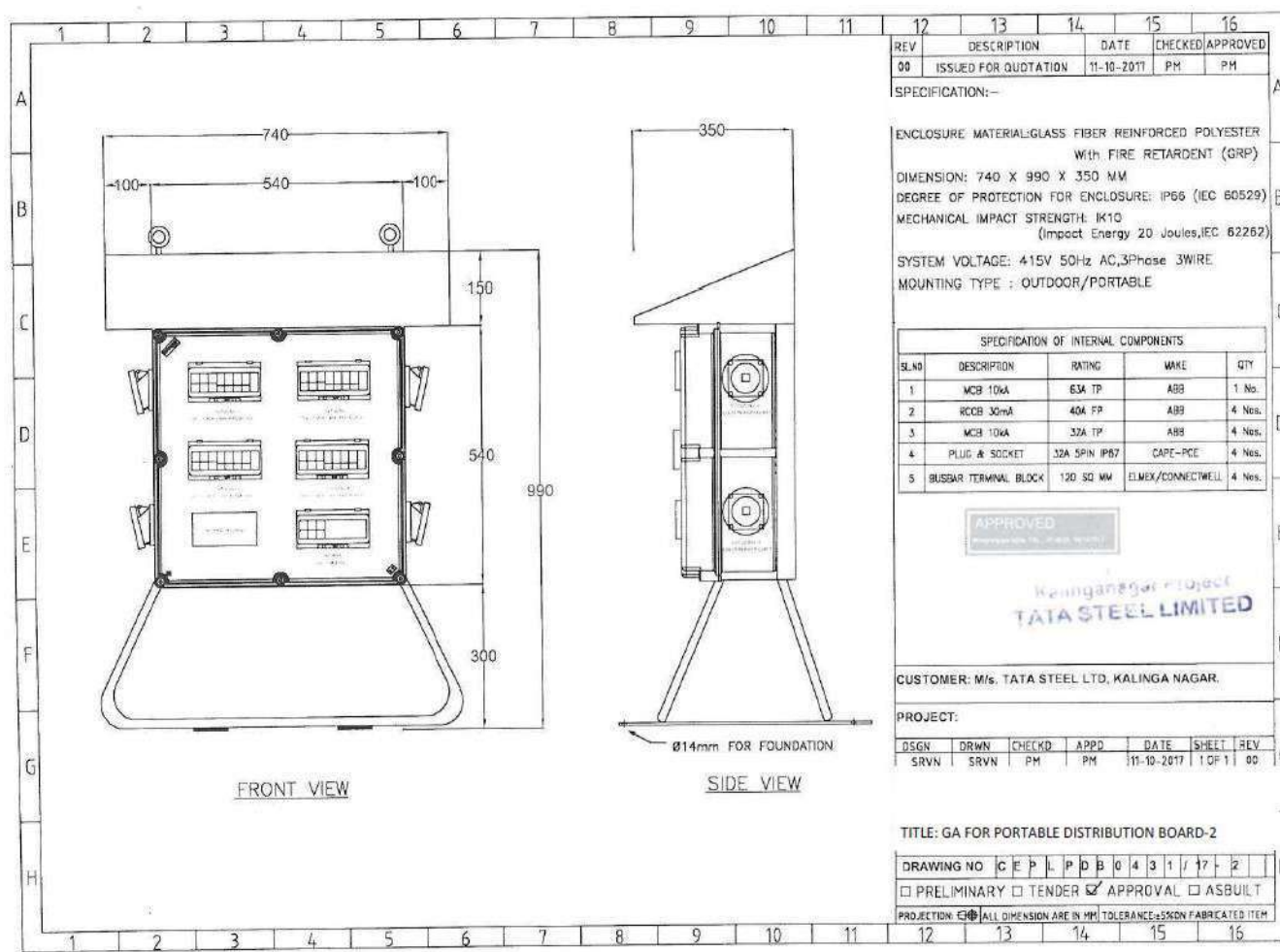


Fig. 13.2.9.1 Layout of a modern Power Distribution Board

13.2.9.1 Portable Electric Lights

- a. 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).



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- b. They must be visually checked before each use and periodically while in use to assure their original integrity is maintained.
- c. Cords with cuts, breaks, deep abrasions, etc. shall be taken out of service immediately.
- d. Repairs to extension cords shall only be performed by qualified/ licensed electricians.
- e. Must not be allowed to lie in wet or potentially wet areas.

13.2.9.2 Underground Cables:

- a. 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.
- b. 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.
- c. Such precautions may include halting the operation if appropriate.
- d. 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.
- e. Any and all underground lines that are discovered or become severed must be considered energized on both sides, and be treated accordingly.

13.2.9.3 General Electrical Safety

- a. In general, equipment or machinery being moved or transported must maintain minimum clearances of 25 ft. to all power lines.
- b. 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
- c. 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.
- d. 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 (industrial top and socket).
- e. 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.
- f. 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.
- g. Only licensed electricians are authorized to repair and work on electrical equipment. Tampering with electric tools or equipment by others could result in termination.
- h. 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.
- i. Energized wiring in junction boxes, circuit breaker panels and similar places must be covered and locked at all times.
- j. Areas with live high voltage wires or terminals must be barricaded against entry and warning signs posted Danger – High Voltage and Authorized Personnel Only.
- k. Personnel should never work on energized equipment, de-energizing (lockout/tag out) the equipment is always the first requirement.



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- l. The lockout and tag out procedure will be used when testing or working on, or around, energized installation.
- m. Working around energized equipment should never be done alone. A second electrician must always be available for assistance.
- n. If lockout/tag out 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, face shields, and other protective equipment like insulated tools, blankets, mats, etc. must be used.
- o. 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.
- p. 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.

13.2.9.4 Qualified Persons for Electrical Works

One who is trained and wiremen licensed to Govt. of W.B. and familiar with the construction, operation and safety hazards of the equipment upon which they are permitted to work.

- a. 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.
- b. 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:
- c. Qualified persons must be capable of working safely on energized circuits;
- d. Must be familiar with the proper use of special precautionary techniques and procedures based on equipment and exposure; and
- e. Must be familiar with required personal protective equipment, insulating and shielding materials, and insulated tools.
- f. 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.
- g. 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 know their limitation and stop work if not qualified on what equipment they were to work on.
- h. 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.

13.2.9.5 Mandatory PPEs of electrical work on LV & HV

- a. HV arc flash suit with protective hood (for protection of face and head) as specified for hazard risk category-4 in NFPA-70E or similar IS specification for working on HT switch gear (for all voltage >690 V) to the concerned licensed electrician or competent person.



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- b. LV arc flash jacket/FR as specified for hazard risk category-4 in NFPA-70E or similar IS specification having ATPV rating of 8.5 to 9 cal/cm² for working on LV (>260V and ≤690V) to the concerned licensed electrician or competent person.



- c. The LV arc flash jacket as shown above shall be worn continuously while working on LV (>260V and ≤690V). The color specification of LV arc flash jacket should be blue.
- d. Electrical hand gloves should have following specification: Flame resistance, arc flash and cut protection of voltage rating (>260V and ≤690V).
- e. Electrical safety over shoe of relevant IS make for foot protection of licensed electrician or competent person while working in HV & LV line or equipment.

13.2.10 USE OF HAND TOOLS AND POWER-OPERATED TOOLS

1. General Provisions

- a. All hands and power tools and similar equipment, shall be maintained in safe condition.
- b. When power operated tools are designed to accommodate guards, they shall be equipped
- c. with such guards, when in use;
- d. Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains and other reciprocating, rotating or moving parts of the equipment shall be similarly guarded;
- e. 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, vapors, or gases shall be provided with the particular personal protective equipment necessary to protect them from the hazards;
- f. 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.
- g. 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.

2. Hand Tools

- a. The subcontractor shall not issue or permit the use of unsafe hand tools;
- b. Wrenches including adjustable pipe end and socket wrenches shall not be used when saws are sprung to the point that slippage occurs;
- c. Impact tools such as drift pins, wedges and chisels shall be kept free of mushroomed heads;



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- d. The wooden handles of tools shall be kept free of splinters or cracks and shall be kept tight on the tools.

3. Power Operated Tools

- a. Electric power operated tools shall be either of the approved double-insulated type or shall be grounded;
- b. The use of electric cords for hoisting or lowering loads shall not be permitted;
- c. Pneumatic power tools shall be secured to the hose or whip by some positive means to prevent the tool from becoming incidentally disconnected;
- d. Safety clips or retainers shall be securely installed or maintained on pneumatic impact (percussion) tools to prevent attachments from being incidentally expelled;
- e. 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;
- f. 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;
- g. The manufacturer's safe operating for hoses, pipes, valves, filters and other fittings shall not be exceeded;
- h. Only personnel who has been trained in the operation of the particular tool shall be allowed to operate power-actuated tools;
- i. 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;
- j. 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;
- k. 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;
- l. Loaded tools shall not be left unattended;
- m. 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;
- n. Driving into materials that can be easily penetrated shall be avoided unless backed by a
- o. substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the other side;
- p. No fastener shall be driven into a palled area caused by an unsatisfactory fastening;
- q. Only non-sparking tools shall be used in an explosive or flammable atmosphere;
- r. All tools shall be used with the correct shield, guard or attachment as recommended by the manufacturer.

4. Abrasive Wheels and Tools

- a. All grinding wheel must be ISO certified only.
- b. All grinding machines shall be supplied with sufficient power to maintain the spindle speed at safe



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levels under all conditions of normal operation;

- c. Grinding machines shall be equipped with suitable safety guards;
- d. The maximum angular exposure of the grinding wheel periphery and sides shall not be more than 900, except that when the work requires contact with the wheel below the horizontal plane of the spindle, the angular exposure shall not exceed 1200. 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;
- e. 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;
- f. Cup type wheels used for external grinding shall be protected by either revolving cup guard or a band type guard;
- g. 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 1800;
- h. Portable abrasive wheel used for internal grinding shall be provided with suitable safety flanges;
- i. When safety flanges are required, they shall be used only with wheels designed to fit the 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;
- j. All abrasive wheels shall be closely inspected and ring tested before mounting to ensure that they are free from cracks or defects;
- k. 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;
- l. All employees using abrasive wheels shall be protected by suitable eye protection equipment.

5. Wood Working Tools

- a. All fixed power-driven woodworking tools shall be provided with a disconnect switch that can either be locked or tagged in the off-position;
- b. 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 re-tensioned for a different speed, the marking shall be corrected to show the new speed;
- c. 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;
- d. 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.



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13.2.11 START UP, COMMISSIONING AND TESTING:

There are various activities involved prior to commissioning- the major ones are -Hydraulic Test, Steam Blowing, Transformers Charging, 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.
- Appropriate Work Permits shall be taken as applicable
- The readiness of upstream and downstream system shall be ensured before taking up.
- These shall be handled strictly by the authorized 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 center 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.

13.2.12 FIRE SAFETY

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.



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- Necessary fire extinguishers shall be kept at accessible area as per the chart below:

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 (CO ₂)	✗ No	✓ Yes	✗ No	✓ Yes	✓ Yes

- All Electrical welding booths shall be equipped with appropriate Fire Extinguisher
- Appropriate Fire Extinguishers shall be made within easy reach of all welding operations
- Fire extinguishers shall be regularly tested and last checked date to be indicated on each.
- Providing appropriate fire-fighting equipment at designated work place and nominate a fire officer/warden adequately trained for his job.
- Subcontractor shall provide enough fire protecting equipment of the types and numbers at his office, stores, temporary structure in 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 subcontractor of any of his responsibility and liabilities to fire incident occurring either to his materials or equipment or those of others.
- Emergency contacts nos. must be displayed at prominent locations
- Tarpaulin being inflammable should not be used (instead, only non-infusible covering materials shall be used) as protective cover while preheating, welding, stress relieving etc. at site.

Note: Due to peculiarities of the power plant construction sites, there would be locations in the construction areas of Boiler, Turbine, Generator, Transformer, etc. where different types of fire risk (classes of fire) may co-exist. Special care shall be taken while selecting and installing portable fire extinguishers for such locations so that all types of fire risk that may co-exist, are adequately covered. Similar special care shall be taken for storage areas.



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Numbers and types of Fire Extinguishers shall be ensured as follows:

Sl. No	Type of Fire Risk (Class of Fire)	Extinguishing Medium & Relevant Indian Standard	Scale of Equipment (Minimum recommended)
1.	CLASS 'A' Fires involving ordinary combustible materials like wood, paper, textiles, rubber etc. (Ordinary hazard or low fire load)	WATER Soda acid type, water type (gas pressure) and water type (constant air pressure) IS: 934 -1976; IS: 940 - 1976; IS: 6234 -1971	For every 600 square meter floor area or part, one 9-litre capacity. Minimum 4 numbers per floor or room; should not be required to travel more than 15 meter to reach any extinguisher.
2.	CLASS 'A' (Extra hazard & high fire load)	-do	-do – (Also, consult local fire authority).
3.	CLASS 'A' (Special hazards)	-do	-do – Extra provision For every 100 square meter floor area or part, one 4.5 Kg. CO ₂ ; minimum 2 numbers per room; should not be required to travel more than 10 meter to reach any extinguisher.
4.	CLASS 'B' (Fires in flammable liquids like oils, solvents, petroleum, products, varnishes, paints, etc. where blanketing effect is essential) (Storage and handling in small quantities)	FOAM / CARBON DIOXIDE / DRY CHEMICAL POWDER IS: 933 -1976; IS: 2878 1976; IS: 2171 1976; IS: 4308 - 1982	For every 50 square meter floor area or part, 2 numbers 9 -liters foam or 5 kg dry powder; should not be required to travel more than 10 m in the area of storage to reach any extinguisher.
5.	CLASS 'B' (Bulk storage other than in tank form)	-do -	-do- (but minimum 3 numbers per room)
6.	CLASS 'C' (Fires involving gaseous substances under pressure where it is necessary to dilute the burning gas at a very fast rate with an inert gas or powder) (locations of storage and handling of gas cylinders)	CARBON DIOXIDE / DRY CHEM. POWDER. The best way to extinguish such fire is by stopping the flow of fuel gas to the fire. Container is kept cool with water spray. IS: 2878 1976; IS: 2171 -1976; IS: 4308 -1982	For every 100 square meter floor area or part; 2 numbers, 10 kg powder extinguisher or 6 kg CO ₂ ; minimum 3 nos. per room; should not be required to travel more than 10 meter to reach any extinguisher.
7.	CLASS 'D' Fires involving metals like magnesium, aluminum, zinc, potassium etc. where the burning metal is reactive to water and which require special extinguishing media or technique	SPECIAL DRY POWDER IS: 2171 -1976 IS: 4861 - 1968	For every 50 square meter floor area or part, 2 nos. 5 kg special dry powder; minimum 3 nos. per room; should not be required to travel more than 10 meter to reach any extinguisher.
8.	MIXED OCCUPANCY (electrical); Generators; Transformers; etc.	CARBON DIOXIDE DRY POWDER, IS: 2878 - 1976; IS: 2171 -1976	For every 100 square meter floor area or part one 10 kg CO ₂ . Minimum 2 numbers for every location should not be required to travel more than 10 meter to reach an extinguisher.



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13.2.13 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 arises 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
- 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.

13.2.14 HAZARDOUS ENERGY CONTROL PROCEDURE

Hazardous Energy Control Procedures, known as "Lockout/Tagout (LOTO)" refers to specific practices and procedures to safeguard employees from the unexpected energization or startup of machinery and equipment, or the release of hazardous energy during service or maintenance activities.



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Contractors must develop and submit a written LOTO program. This requires that a designated qualified individual turns off and disconnects the machinery or equipment from its energy source(s) before performing service or maintenance and that the authorized employee(s) either lock and tag the energy-isolating device(s) to prevent the release of hazardous energy and test the machine or equipment to verify that the energy has been isolated effectively.

Minimum Requirements:

The following are minimum requirements that must be included in the Contractor's LOTO program:

Inspection of equipment by a trained individual who is thoroughly familiar with the equipment operation and associated hazards. Identification and labeling of lockout devices. Purchase of locks, tags, and blocks. Development of a standard written operating procedure, permitted through a controlling authority that is followed by all workers.

General Requirements

The following steps must be taken to protect workers that install or service equipment and systems:

Follow the hazardous energy procedures and statutory regulations. Follow the manufacturer's service/repair instructions. Identify and label all sources of hazardous energy. Before beginning work, accomplish the following:

- De-energize all sources of hazardous energy:
- Disconnect or shut down engines or motors.
- De-energize electrical circuits.
- Block fluid (gas or liquid) flow in hydraulic or pneumatic systems.
- Block or secure machine parts against motion.
- Block or dissipate stored energy.
- Discharge capacitors.
- Release or block springs that are under compression or tension.
- Vent fluids from pressure vessels, tanks, or accumulators—but never vent toxic, flammable, or explosive substances directly into the atmosphere

Lockout and tag out all forms of hazardous energy including electrical breaker panels, control valves, etc. Make sure that only one key exists for each of your assigned locks and that access to the key is controlled. Verify by test and/or observation that all energy sources are de-energized.

After completion of the work, accomplish the following:

- Inspect repair work before removing the lock and activating the equipment.
- Make sure that only the worker that installed the lock removes his/her assigned lock.
- Make sure that all workers are clear of danger points before re-energizing the system.

LOTO Procedure:

PURPOSE AND SUMMARY

This procedure provides the requirements and responsibilities of Hazardous Energy Control and the process



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for Lockout / Tag out (LOTO) of energy isolating devices (valves, circuit breakers, disconnect, etc.). Its use shall ensure that machinery, equipment, or systems are isolated from all potentially hazardous energy to prevent unexpected energization, startup, or release of stored energy which may cause personnel injury or property damage.

This procedure applies to all BHEL personnel and subcontractors working on the WBPDC (1X660MW) STAGE- III projects where equipment must be taken out of service for the performance of work activities such as installation, maintenance, repair, construction, or equipment removal. The procedure may also be used to isolate equipment of which the energization or operation may present danger to personnel or property.

Lockout / tag out are not required for electrical equipment that can be unplugged from the source and the person performing the work has control of the plug.

This procedure shall be applied to prevent injury or damage caused by the unexpected release of active or stored energy. Hazardous energy sources could be in the form of the following:

- Electrical
- Hydraulic
- Chemical
- Thermal
- Mechanical
- Pneumatic

Preplanning of work activities includes the identification of all potential hazardous energy sources so that they may be properly controlled and isolated, locked, and tagged out.

Prior to initiating work activities on or around locked out / tagged out equipment, the equipment must be tested and tried by or in the presence of the person(s) performing the work activities.

RESPONSIBILITIES

- The Engineers in Charge is responsible for implementing and enforcing this procedure and approving lockouts /tag outs that impact the operation of the project.
- The Engineer in Charge is responsible for authorizing Lockout /Tag out Requests.
- The Lockout / Tag out Coordinator is responsible for maintaining the Lockout / Tag out Log. Each shift should have a designated Lockout / Tag out Coordinator.
- The Isolator is responsible for determining the proper isolation devices and device positions required to isolate all potential energy sources so that the work stated on the Lockout /Tag out Request Permit may be safely performed. The Isolator must be familiar with the equipment and energy type(s) that require isolation. For this reason, in some cases the Isolator may be more than one person (i.e. Engineer, System Operator and/or Electrician). The Isolator shall position the specified device points, and apply locks and tags, and sign the tags and the LOTO Permit isolation point blocks.
- The Safety Manager is responsible for conducting an annual audit that is documented to ensure all procedures and requirements are current and being followed as written.



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DEFINITIONS

Affected Employee: -

An employee whose job requires him/her to operate or use machinery or equipment on which servicing or maintenance is being performed under a lock out/tag out procedure or whose job requires him/her to work in an area in which servicing or maintenance is being performed under a lockout/tag out procedure

Authorized Employee: -

An employee who implements a lockout/tag out procedure on machinery, equipment, or systems in order that servicing or maintenance may be performed. Often an authorized employee and an affected employee may be the same person.

Danger "Do Not Operate" Tag

A tag used to identify energy isolation devices and specify the required position of the device. The tag should be affixed to the isolation device such that it is in plain view of anyone attempting to operate the device. The tags shall be sequentially numbered and shall specify the lockout/ tag out request number. The tag shall also state the purpose, and the expected duration of the lockout /tag out

Isolation Device

A device that is designed and intended to prevent the passage of energy. These devices, usually located at the energy source, are typically valves, circuit breakers, etc. Isolation devices should have a means of being locked in position

Lockout Device

A device that uses a positive physical means such as a lock, either key or combination type to maintain an energy isolation device in the safe position and prevent the inadvertent energization of machinery, equipment, or systems. Device locks should serve no other purpose other than hazardous energy control isolation

Lockout Tag out Request Permit

A pre numbered form used to request that machinery, equipment or systems be taken out of service. A Lockout/Tagout Request Permit may be initiated by any one requiring energy isolation for work activities or for taking faulty equipment out of service

Lockout / Tag out Request Log

A record of all Lockout /Tag out Request Permits shall be maintained by the Lockout /Tag out Coordinator.

PROCEDURE

1. REQUESTING A LOCKOUT / TAGOUT PERMIT

When machinery, equipment, or systems are partially or completely taken out of service for work activities or equipment protection, a lockout / tag out shall be requested. The requestor shall be familiar with scope of work required and shall provide a brief description of the work on the Lockout / Tag out Request Permit. The requestor shall also provide the proposed start time and estimated duration of lockout / tag out. If familiar with



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the machinery, equipment, or system to be taken out of service, the requestor may identify the devices that are required to be isolated. The LOTO Request Permit shall be forwarded to the Authorized Lockout / Tag out Coordinator for reviewed and signature, along with Permit to Work number to be entered on the LOTO Request Permit.

- The Lockout / Tag out Coordinator shall record the necessary information on the Lockout / Tag out Request Log and forward the request to the Engineer in Charge for approval.
- The Safety Manager or Engineer in Charge shall review the Lockout / Tagout Request Permit for impact on project operations. Project operations could be impacted by the equipment being taken out of service or by the required isolation to take the equipment out of service. If project operations are impacted by the Lockout / Tagout, the request shall be forwarded to the Engineer in Charge for approval.

The Engineer in Charge shall provide the lockout / tag out isolation points necessary to perform the task stated on the request. The device identification, device location, device position, and locking mechanism shall be entered into the appropriate blocks on the Lockout / Tag out Request Permit.

- The Engineer in Charge indicates approval of the Lockout / Tagout Request Permit by signing in the appropriate space on the request. If the Lockout / Tag out Request Permit is rejected, the Engineer in Charge shall return it to the requestor, via the Lockout / Tagout Coordinator with a written explanation of the rejection.
- Once approved, the Lockout / Tag out Request Permit shall be forwarded to the Lockout / Tag out Coordinator to assign tags and locks.
- The log shall show current status of all Lockout / Tag out Request Permits from submittal to approval, through lifting of locks and tags to final closeout. The log shall be maintained by the Lockout / Tag out Coordinator in their office.

2. PLACEMENT OF LOCKS AND TAGS

- The tags shall be filled out to match the information on the LOTO Request Permit. Appropriate locks for the types of isolation devices specified shall be collected and placed with the tags and the Lockout / Tag out Request Permit.
- The isolator(s) shall take the device locks, tags, and the Lockout / Tagout Request Permit to position the specified isolation devices, sign and hang the tags, and place the locks. If the isolator does not agree with or understand the Lockout / Tagout Request Permit, or has a problem performing the isolation, the problem should be brought to the attention of the Safety Representative or Area Supervisor immediately and the lockout / tag out should be postponed until the situation is resolved.
- Once the Isolator has placed all "locks" on isolation points, they will "test" and "try" the machinery, equipment, or system to ensure all hazardous energy has been completely removed and the isolation is one totally accomplished, and has initialed and signed the Lockout / Tag out Request Permit indicating all isolation points have been confirmed.
 - Examples of "lock", "test" and "try"; by checking that all locks on the LOTO Request Permit have been applied and are in the specified position open/closed, on/off, etc.; metering test of electrical circuits, opening of drain valves, checking pressure gauges or indicators; and try by pushing start buttons and on/off switches, etc.



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- Testing shall be performed by person(s) knowledgeable of the energy source(s) being isolated (e.g., an electrician should meter electrical circuits).
- A copy of the completed Lockout / Tag out Request Permit shall remain with the Work Package and used as part of the daily Pre-Job Briefings

3. WORKING UNDER A LOCKOUT / TAGOUT REQUEST

- Prior to starting the work activity, the person(s) performing the work shall review the Lockout / Tag out Request Permit and place the necessary tags and personal locks on the identified isolation devices. Personal locks may be placed only on devices that have already been locked and tagged in accordance with the Lockout / Tag out Request Permit.
 - All personal locks shall be accompanied by a tag that is signed and dated by the worker(s) and specifies the work activity being performed.
 - Personal locks should be of a different color than device locks for ready identification.
- Verification of the effectiveness of the isolation by the Isolator shall be performed for Worker's working under the lockout / tag out, by demonstrating the checks on "lock", "test" and "try",
- When the work activity is finished, personal locks and tags shall be removed and the Safety Representative shall be notified that the Lockout / Tagout is no longer required. If work under a lockout / tag out is to be delayed or interrupted for a period in excess of 24 hours, personal locks shall be removed until the work restarts. Personal locks shall be removed prior to the worker(s) leaving the project at the end of shift unless the key(s) are maintained at the project.

4. REMOVAL OF LOCKS AND TAGS

- When the lockout / tag out is no longer required, the Safety Representative or Area Supervisor shall obtain the Lockout / Tagout Request Permit from the work package for LOTO removal. Prior to removing locks or tags that may allow equipment to be energized, a check shall be made to verify that the equipment is free to safely operate (i.e., will not cause damage or injury). The locks and tags shall be removed and returned to the Lockout / Tagout Coordinator. Isolation devices may be repositioned at the discretion of the Engineer in Charge according to operational requirements. The Isolator shall complete the Lockout / Tagout Request Permit indicating each lock and tag has been removed and the Safety Representative or Area Supervisor forward to the Lockout / Tagout Coordinator.
- The Lockout / Tagout Coordinator shall discard the tags and maintain the completed Lockout / Tagout Request Permit for future reference.
- In the event that an employee leaves the job site without removing the personal lock I tag, the following measures shall be taken and documented. The measures listed below are a minimum set of guidelines and under all circumstances, refer to the site-specific safe work plan for detailed procedures:
 - Attempt calling / contacting the employee to return to the site for removal.
 - In the event an employee cannot be contacted, the Site Manager and Safety Manager shall sign an Emergency Lockout/Tagout Removal Form, (**see Attachment 5**), which has been completed by the Area Supervisor.
 - Employee shall be notified upon returning to the site, prior to beginning any work.



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5. INTERRUPTION OF A LOCKOUT / TAGOUT

Operational Emergency

The Engineer in Charge / Safety Manager / Area Supervisor may deem it necessary to temporarily remove the locks and tags from isolation devices, prior to the end of the work activity. The standard procedure for removal of locks and tags shall be followed. Extreme caution shall be taken by the Isolator removing the locks and tags to prevent personnel injury.

Testing

When the performance of a work activity requires the functional testing of a machine, component, or system, the locks and tags may be temporarily removed in accordance with the tag removal, to perform the test. As a result of the testing, if it is determined that the equipment needs further work, the locks and tags shall be positioned back on to the device. If it is not necessary to replace all the locks and tags, then the unnecessary locks and tags may be returned to the Lockout / Tagout Coordinator. The Engineer in Charge shall initial the Lockout / Tag out Request Permit in the removal block to indicate that these locks and tags have been

removed. When testing has been satisfactorily completed, the locks and tags shall be removed.

ISOLATION DEVICES

- In most industrial applications, there are isolation devices that were not designed to accommodate a locking device. In these instances, an acceptable alternative that physically obstructs or prevents the use of the isolation device shall be found. Chains shall be placed on valves or electrical panels. Wires shall be determinate, pulled back, taped, and secured.
- If an isolation device does not accept a lock, a tag only is acceptable; however, all possible precautions shall be undertaken to provide a level of safety for the workers. The tag shall be readily visible to anyone attempting to operate the device.
 - If more than one Lockout / Tagout Request Permit requires that a single isolation device be locked and tagged, a lock and tag for each request shall be placed. Each lock in itself prevents the inadvertent operation of the device.

GROUP / COMPLEX LOCKOUT

In a multiple lockout / tag out procedure, each person working on the machinery or equipment must place a lock or tag on the energy isolating device. If the energy isolating device will not accept multiple locks or tags, a hasp (a multiple lockout device, may be used. The locks or tags must be placed in such a way that energy cannot be restored to the machinery or equipment until every lock or tag is removed. As each employee involved no longer needs to maintain lockout / tag out protection that employee removes his - her lock and/or tag. The employee attaching the lock or tag is the only person authorized to remove the lock or tag.

6. TRAINING

The training must include recognition of hazardous energy source, type and magnitude of energy available, methods and means necessary for energy isolation and control. Each authorized employee shall receive adequate training. The training should address that all affected employees are instructed in the purpose and



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use of the energy control procedure. There should be training provisions included for any other employee whose work operations are or may be in an area where energy control procedures may be utilized. The employee training should also address when tag out systems are used including the limitations of a tag (tags are warning devices and do not provide physical restraint). The training should also include that a tag is not to be removed without authorization. The tag is never to be ignored or defeated in any way. Retraining is required when there is a change in job assignments, in machines, a change in the energy control procedures, or a new hazard is introduced. All training and I or retraining must be documented with employee's name and dates of training.

7. PROGRAM REVIEW

The lockout / tag out program must be reviewed at least annually. The review must ensure that procedures are being followed and that they are effective. A documented review of the inspection must include the date, the equipment, employees involved & the inspector. The inspector must be someone other than those actually using the lockout / tag out in progress.

ATTACHMENTS

- #1. Danger (DO NOT OPERATE) Tags
- #2. Device & Personal Locks and Multi Lock Hasp:
- #3. Lockout / Tagout Request Permit
- #4. Lockout / Tag out Request Log



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Attachment 1, Danger (DO NOT OPERATE) Tags:

 DANGER DO NOT OPERATE THIS LOCK/TAG MAY ONLY BE REMOVED BY: NAME: _____ DEPT: _____ EXPECTED COMPLETION: _____ LOTAG36-25	 DANGER THIS ENERGY SOURCE HAS BEEN LOCKED OUT! UNAUTHORIZED REMOVAL OF THIS LOCK/TAG MAY RESULT IN POSSIBLE DISCHARGE. REMARKS _____ _____ _____ _____ _____ _____ www.nationalmarker.com



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Attachment 2, Device & Personal Locks and Multi Lock Hasp:





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Attachment 3, Lockout / Tag out Request Permit:

		LOCKOUT/TAGOUT REQUEST PERMIT			LOTO Request Permit No.: Work Permit No.:		
Equip. Out of Service:	LOTO Date Required by: ____/____/____	Estimated Duration:			LOTO Requested Signed by: Date:		
Scope of Work:					LOTO Authorization Signed by: Date:		
					LOTO Removal Authorization Signed by: Date: Time:		
Tag No.	Device to be Tagged / Locked I.D. No.	Device Location	Device Position OPEN / CLOSED -ON/OFF	Lock No.	Tag/Lock Placed by Print/Sign - Date/Time		Tag /Lock Removed by Print/Sign - Date/Time
Comments Instructions:							



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13.2.15 RISK ASSESSMENT

Risk and Hazard Analysis

In order to produce an overall Project EHS Plan, a project must be assessed for its risks. There are two components to the risk and hazard analysis. The procedure used to examine and plan for the identified risks and hazards is called a General Hazard and Risk Assessment.

JSA/HIRA review

Prior to commence the following activities Method statement and JSA/HIRA to be prepared by the concern engineer in coordination with EHS officer and submit to the client for review and approval. After getting approval the work will be started under PTW after clearance. For HIRA and criteria for the defining the high, medium & low risk the relevant annexure be referred. In case any deviations required in the approved method statement the concerned engineer/supervisor has to prepare additional HIRA/JSA to cover the new activities and associated risk. Following activities to be covered,

- Deep excavation (more than 5 feet)
- Significant concrete pouring (like heavy foundation, TG deck, Slab casting etc.)
- Confined entry
- Blasting
- Working on electrical/ energized equipment's
- Steel erection more than 5-Ton weight
- Working at height prior to completion of stairs/ladders/hand railing etc.

Definition:

HAZARD - Any potential or present danger to persons or property within the project site, e.g., oil on the floor is a hazard.

INCIDENT - An unintended happening that may result in injury, loss or damage, e.g., Slipping on the oil is an Incident.

INJURY – Physical harm, the result of an Incident, e.g., a sprained wrist from the fall would be an injury.

Hazard Analysis Document

- For high risk and dangerous work identified, the Applicant shall complete and submit a Hazard Analysis Document together with the PTW request. It will be a JSA (Job Safety Analysis) or Preliminary Hazard Analysis Checklist. And it shall be reviewed and approved by respective Construction and HSE Representatives.
- Issues such as work interface, coordination, drawings, toolbox meetings and work type/duration shall be detailed and included with supporting documentation for the Applicant's request for PTW.
- If applicable, Hazard Analysis Document shall be used as the foundation for development of Safe Work Method Statement. Each hazard identified shall be addressed in the Safe Work Method Statement and be submitted as part of the Applicant's submittal package.

Evaluation of Sub-contractor Risk Assessments includes

- Experience and expertise in performing similar type work.
- Duration of work performed
- Location of the work to be performed.

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- Nature of the work to be performed.
- Potential for a subcontractor performing the work to expose themselves, other persons or employees, to hazards.
- Potential for exposure to work site hazards.

Review of Subcontractor specific issues

Preventive and protective measures must be introduced according to the following order of priority

- Eliminating the hazard by removing the activity from the work process. Examples include substitution with less hazardous chemicals, using different manufacturing processes, etc.
- Controlling the hazard at its source through use of engineering controls. Examples include local exhaust ventilation, isolation rooms, machine guarding, acoustic insulating, etc.
- Minimizing the hazard through design of safe work systems and administrative or institutional control measures. Examples include job rotation, training safe work procedures, lock-out and tag-out, workplace monitoring, limiting exposure or work duration, etc.
- Providing appropriate personal protective equipment (PPE) in conjunction with training, use, and maintenance of the PPE.

13.2.16 HSE PREPAREDNESS FOR ADVERSE CLIMATES AND WEATHER

All Preventive and Precautionary measures to ensure Health & Safety of workers in all possible adverse weather conditions based on the analysis of the local area conditions to be taken by the subcontractor

13.2.16.1 SUMMER

1. The Working Time and Lunch Hour will be as per instruction of Statutory Authorities (no work between 11am to 3:30pm). However, in case temp comes down due to rain/cloudy weather work will continue as per normal routine.
2. During long lunch break, worker will be allowed to go back home for rest. Those who will like to stay back will avail at the facility of rest shed or other designed area.
3. They will be allowed to take small break during work as per their need.
4. Water sprinkling will be done on roads to reduce dust concentration.
5. Workers will be provided with adequate cool drinking water and Butter milk/Lemon water etc.
6. Adequate ORS stock will be made available at the work location in the First-Aid Box for use as needed and at First-aid Centre for emergency need.
7. Fire prevention shall be on high alert, with removal of dry grass and bushes, etc, inside and outside the surrounding work areas. No smoking, and control of open flame/sparks shall be maintained and monitored.
8. Worker will be informed about the Do's and Don'ts to be followed during summer in the Pre Job Brief.

Dos & Don'ts

1. Drink plenty of cool water and other non-alcoholic fluid and keep body well hydrated.
2. Eat salt in food to replenish loss of salt through sweating.
3. Avoid over physical exercise.
4. Have adequate sleep at night.
5. Eat light and less spicy food



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6. Avoid eating food which was cooked long time ago.
7. Nobody should use small water bodies such as pits, running rain water through crevices etc. for drinking and cleaning purpose as it may be unhygienic.

Emergency Handling

In case of emergency due to heat disorder:

1. Rescue the victim from workplace and place under shed.
2. If to be rescued from height, use stoke basket or rescue kit.
3. Inform Ambulance immediately.
4. If nearby any air conditioned room/shed is available, place him inside the room/shed.
5. Administer First aid by trained First aider for Heat Disorder
6. If conscious, give him ORS solution to drink.
7. If required send the victim hospital immediately.

13.2.16.2 MONSOON

A. Height Work & Structural Safety:

1. Ensure that all height work platforms are barricaded and avoid any highly hazardous
2. Height work.
3. Ensure that all personnel have good quality and intact safety shoes
4. Stop all dangerous height work during rain
5. Explain Do's and Don'ts to workers during Tool Box Meetings
6. Ensure that there are no weak structures, boards etc. that can fall during high winds
7. Do not allow any loose material (e.g. GI sheet, Ply board, empty cement bag, aluminium foil, foam sheets etc.) on roof sheds or top of structures.
8. Do not permit any one to ride up or come down scaffolds frame work during heavy wind or rain.
9. Provide "anchor" of adequate strength to scaffolds and other high-rise structures.
10. All rest sheds and GI sheds will be anchored into the round and wall and roof panels will be secured with J hook to prevent shed from blowing over or parts/pieces becoming airborne. Proper earthing per IS standard is also to be installed.
11. Do not go alone nor permit anyone to stay at tower-tops, roof-tops, high structures or on electrical poles during the course of stormy weather or heavy rain.

B. Electrical:

1. All electrical connections / loads have to be routed through ELCB / RCCB (residual current circuit breaker) whose rating should be 30mA.
2. RCCB operational checks need to be done DAILY / WEEKLY during monsoon season.
3. Avoid joints on power cables which need to be laid over-head or under-ground, better not to have any joint at all. In case joints become essential, such cables must be housed rigidly and insulation must be provided as per approved standard. The joint shall be suitable for outdoor use.
4. All electrical distribution board shall be properly covered at top and sides to protect from rain water. Extension boards shall be protected from rain water.
5. Ensure proper "earthing" for each and every electrical appliance.
6. Double earthing need to be provided for 3-phase power supply and for voltage more than 220V.



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7. Provide lightening arrestors at the top of Boiler 3 and boiler 4 and rest sheds which are not covered by existing lightening arrestor of other installation.

C. Others:

1. Maintain smooth flow on open drains. i.e. no obstruction or blockade shall be made on storm water drains. If required, make temporary drains.
2. Arrange back-filling of excavated pits on war-footing basis.
3. Arrange bringing down booms of all cranes, hydra machines during stormy weather (wind speed 40-50 km/hr)
4. Confirm that all gantry cranes are effectively choked to prevent rolling and toppling.
5. Do not forget to deep ready a dew battery operated lights at site-offices during rainy season.
6. Avoid using wet damp clothes.
7. Hard Barricade excavated zone filled with water with scaffolding pipe & clamp with reflective net
8. Engage diesel operated water pump to dewater work area. For electrically operated water pump, the starter shall be protected from rain water. All rotating parts shall be guarded. Ensure availability of sufficient water pumps.

D. Health and hygiene:

1. Monsoon reduces the immunity of our body and makes us vulnerable to many diseases which are commonly associated with this season. It is time for us to keep our body challenging against disease by boosting our immunity and taking safety measures against these diseases.
2. The diseases associated with monsoon are Malaria, Jaundice, Gastro-intestinal infections, like typhoid, cholera etc. apart from these viral infections like cold and cough also make their presence felt. Majority of above said diseases are on account of:
3. Puddle of water formed due to rain become breeding grounds for mosquitoes which spread disease like, malaria and dengue fever. As a precautionary measure against mosquito-bite disease one can use mosquito net around the end which is better choice to mosquito repellents like mats and coils.
4. Pollution of drinking water during monsoon is very common. It is very necessary to drink clean and pure water when water-borne monsoon diseases like diarrhoea and gastro-intestinal infections threaten us.
5. Walking in dirty water during rainy season leads of numerous fungal infection which affect toes and nails. Diabetic patients have to take a special care about their feet. Keeping feet always dry and clean is very necessary. Avoid walking in dirty water. Keep shoes socks and raincoats dry and clean.

E. Workmen will be made aware of following Do's and Don'ts:

1. Do not sleep in daytime.
2. Avoid over physical exertion.
3. During lightning and thunder storm, do not take shelter under tree. Take shelter inside rest shed or store room.
4. Wash vegetables with clean water and steam them well to kill germs.
5. Avoid eating un-cooked foods and salads should be washed properly before consumption.
6. Drink plenty of water and keep body well-hydrated.
7. Always keep the surrounding area dry and clean. Don't allow to get water accumulated around.



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8. Keep body warm as viruses attack immediately when body temperature goes down.
9. Do not enter air conditioned room with wet hair and damp cloths.
10. Dry your feet and webs with soft dry cloth whenever they are wet.
11. Eat light and less spicy food.
12. Avoid eating food which was cooked long time ago.
13. Eat salt in food to replenish loss of salt through sweating.

13.2.16.3 EMERGENCY WEATHER CONDITIONS

Cyclone/Severe thunder storm

In the event of Cyclone/Severe thunder storm, alert will be issued by subcontractor on notification received by Govt. authorities/Metrological departments Customer or BHEL.

The actions required during cyclone/rough weather:

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

Personnel Evacuation:

1. Personnel Evacuation will be required if predicted wind speed and storm surge heights are beyond acceptable limits as per the instructions from Govt. Authorities/ Metrological departments or Customer.
2. Once the warning is received for personnel evacuation, an emergency response team shall be formed. The team will work with local authorities and other agencies formed/deployed to evacuate and transport all personnel involved in the project to the cyclone shelter.
3. Cyclone may be 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".



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4. 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.
5. Checking of gas leaks and well-being of electrical appliances is essential before leaving the site.
6. Follow local communications for official warning and advice. The construction Manager shall also obtain updates from customer/metrological departments and communicate to the personnel on project site.

13.2.17 PREVENTION OF COVID-19 AT PROJECT SITE & LABOUR COLONY:

BHEL OCP 61: Resumption of Construction Activities after Lock Down and Prevention of Coronavirus Infection during Site Operations and OCP 61A: Prevention of COVID-19 Infection in Labor Colony will be strictly followed.

A. Preventive measures at project site:

- BHEL and Agencies shall nominate COVID Marshalls, who will be responsible for monitoring the COVID prevention measures and apprising management on the same.
- Mandatory health check-up for every worker/ official joining the site
- All activities to be carried out using least amount of paperwork and physical proximity as far as possible.
- **HSE Observer App** to be used to monitor HSE Activities and follow up with agencies for closure of non-conformities.

a. Strict Control at the Gate/ Banning Entry to Anyone Not Wearing Masks

- i. Security personnel at the gate may erect a barricade preferably approx. 10 meters from the gate and only allow personnel who are wearing proper masks inside.
- ii. Public address system may be used to warn any non-compliant visitors
- iii. Near entry gate, round markers at minimum 1-meter distance to be ensured so that distancing is ensured
- iv. A hand-wash or hand sanitiser facility is preferable at the gate to allow entry after hand wash or hand sanitisation. These are also to be provided at key locations to enable hand wash / hand sanitisation before starting work, before eating, etc.
- v. Gutkha, Paan, tobacco etc. to be banned from the site. Spitting to be strictly prohibited.

b. Screening at Gate with Contactless Thermometer & Action on Suspected Cases

- i. Security Personnel at the Gate to screen each person entering the premises using a non-contact infrared thermometer, which is duly serial numbered and calibrated.
- ii. In case any site worker/ official is found to have fever more than 99 Degrees Fahrenheit or found coughing/ sneezing, he/she may be advised rest till recovery and entry to be permitted after obtaining clearance from medical officer/assistance/attendants.
 - Parcel to be collected from gate by concerned person preferably with provision of Special Box
 - Any construction material received at site, unless properly sanitized, to be kept undisturbed for at least 3 days and to be used only after that period.
 - During Toolbox Talks, minimum 1-meter distance between any two workers to be ensured

c. During site execution activities:

For all site execution activities, social distancing is to be maintained. In case this is not possible due to nature of work, speciality of work, etc, ensure sensitisation of the labour/staff involved and use of

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appropriate PPEs, especially mandatory face mask. In any case, close working to be allowed only in special circumstances and ensuring these activities are preferably time staggered to the extent possible

d. In office premises:

- i. Sharing of items like pens, water bottles etc. in office premises to be avoided
- ii. Doors preferably to be in open condition to avoid contact
- iii. All common touch points to be frequently disinfected in a day.

e. Regular disinfection of all Areas, Equipment and facilities

- i. A dedicated disinfectant gang to be identified for the task by each agency. The disinfectant gang to be provided full body suits for the task.
- ii. All areas (including office premises, site areas, chairs, tables, furniture etc.), tools & equipment to preferably be disinfected by dedicated gang every day before resumption of work.
- iv. Common touch points like handrails, lift buttons, door/window knobs or handles, vehicle door handles, taps, conference room & dining hall tables/chairs, common sofas/chairs, visitor sofa/chairs, files & folders, etc to preferably be disinfected regularly at frequent intervals every day.
- v. Pool vehicles, to be disinfected after every use. Social distancing to be maintained inside the common pool vehicles as per Govt./ statutory body guidelines.

f. Disinfecting the operator/driver touch points of Vehicles/cranes, T&Ps etc.

Disinfection to also be carried out for all Cranes, Vehicles, Equipment, consoles, T&Ps etc. which come into contact with operating personnel.

g. Posters on COVID-19

Sufficient Posters on COVID-19 to be ensured across the site in languages understood by most workers.

h. Brief guidelines for hand washing are as below:

- i. Soap to be provided at each wash basin and replenished regularly.
- ii. Washing with soap for at least 20 seconds is recommended.
- iii. As a general guideline, for every 100 workers, 1 wash-basin may be provided at site areas.
- iv. Close queue to be avoided near wash-basins and 1-meter distance to be maintained. Round markers at 1-meter distance can be ensured as guidance

Composition of Disinfectant:

- i. Readily available 1% hypochlorite solution or 4%
- ii. Liquid chlorine-1% solution
- iii. Surgical spirit-95% alcohol content

Hand sanitizer should have: Isopropyl alcohol-75%, Glycerol-1.45%, Hydrogen Peroxide-0.125%

B. Prevention of COVID-19 Infection in Labor Colony:

- Spacing of minimum 2 meters between living areas of workers inside a room may be maintained. Preferably, the living area of each worker may be partitioned using sheet of cloth, plastic etc.
- Rooms to be properly ventilated as far as possible
- Sanitation to be given prime importance and personal hygiene to be promoted
- Face masks shall be worn by everyone inside the colony premises

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- Spitting of Pan. Gutkha etc. inside the colony and urinating etc. outside the toilets to be strictly avoided
- Regular visits by Doctors to the labor colony can be arranged on non-working day for check-up of all workers
- Identification of “COVID Wardens” (CWs) by each agency for maintaining the following:
 - i. Keeping an eye on the health of workers and report any suspected cases of fever, coughing etc. to the management
 - ii. Keeping an eye on the social distancing measures in the labor colony and report any non-conformances to the management.
 - iii. Educate the workers about social distancing and COVID prevention measures.
- Training/ Awareness regarding COVID-19 to be provided to workers regularly.
- Workers to be instructed to maintain social distancing of minimum 1 m at all time
- Posters on COVID-19: Sufficient Posters on COVID-19 to be ensured across the labor colony in languages understood by most workers.
- All workers to be instructed to inform any suspected cases of illness (individual or others) to an emergency contact number of CW, the emergency contact numbers and CW contact numbers to be displayed at prominent locations
- Inspection & Review
 - i. Daily Inspection by concerned COVID Wardens and reporting to Agency
 - ii. Regular inspection by Agency & BHEL

13.2.18 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.
- 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.

Noise Level Chart

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

13.3 ENVIRONMENTAL CONTROL

1. Environment protection has always been given prime importance by BHEL. Environmental damage is a major concern of the principal subcontractor and every effort shall be made, to have effective control measures in place to avoid pollution of Air, Water and Land and associated life.
2. Subcontractor shall list out all applicable environmental aspects and impacts, and ensure control measures to manage the same.
3. Chlorofluorocarbons such as carbon tetrachloride and trichloroethylene shall not be used.
4. Waste disposal shall be done in accordance with the guidelines laid down in the project specification.

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5. Any chemical including solvents and paints, required for construction shall be stored in designated bonded areas around the site as per MSDS.
6. 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. Subcontractor shall use appropriate MSDS for clean-up technique. Subcontractor shall be responsible for the cleanliness of their own areas.
7. Subcontractor shall ensure that noise levels generated by plant or machinery are as low as reasonably practicable. Where the subcontractor anticipates the generation of excessive noise levels from his operations the subcontractor shall inform BHEL accordingly so that reasonable & practicable precautions can be taken to protect other persons who may be affected.
8. It is imperative on the part of the subcontractor to join and effectively contribute to environmental protection measures such as tree plantation and towards social causes and maintaining good relations with local populace.
9. The subcontractor shall carry out periodic air and water quality check and illumination level checking in respective area of work place and take suitable control measure to maintain the same as per applicable laws / standards

13.3.1 WASTE MANAGEMENT

1. Subcontractor shall take suitable measures for waste management and fulfilling requirements of environment related laws/legislation as a part of normal construction activities.
2. 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.
3. Details of E-Waste, Hazardous Waste, shall be submitted to BHEL as per Format No. HSEP: 13-F19 and HSEP: 13-F20 respectively

13.3.1.1 BINS AT WORK PLACE

1. Sufficient rubbish bins shall be provided close to workplaces.
2. Bins should be painted yellow and numbered.
3. Sufficient nos. of drip trays shall be provided to collect oil and grease.
4. Sufficient qty. of broomsticks with handle shall be provided.
5. Adequate strength of employees should be deployed to ensure daily monitoring and service for waste management.

13.3.1.2 STORAGE AND COLLECTION

1. Different types of rubbish/waste should be collected and stored separately.
2. Paper, oily rags, smoking material, flammable, metal pieces should be collected in separate bins with close fitting lids.
3. Rubbish should not be left or allowed to accumulate on construction and other work places.
4. Do not burn construction rubbish near working site.

13.3.1.3 SEGREGATION

1. Earmark the scrap area for different types of waste.

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2. Store wastes away from building.
3. Oil spill absorbed by non-combustible absorbent should be kept in separate bin.
4. Clinical and first aid waste stored and incinerated separately.

13.3.1.4 DISPOSAL

1. Sufficient containers and scrap disposal area should be allocated.
2. All scrap bin and containers should be conveniently located.
3. Provide self-closing containers for flammable/spontaneously combustible material.
4. Keep drainage channels free from choking.
5. Make schedule for collection and disposal of waste.

13.3.1.5 WARNING AND SIGNS

1. Appropriate signage to be displayed at scrap storage area
2. No toxic, corrosive or flammable substance to be discarded into public sewage system.
3. Waste disposal shall be in accordance with best practice.
4. Comply with all the requirements of Pollution Control Board (PCB) for storage and disposal of hazardous waste.

13.4 HOUSEKEEPING

1. Keeping the work area clean/ free from debris, removing unused scaffoldings, scraps, insulation/ sheeting wastage /cut-pieces temporary structures, packing woods etc. will be in the scope of the subcontractor.
2. Such cleaning has to be done by subcontractor within quoted rate, on daily basis by dedicated identified groups equipped with all require PPEs and training. The details of housekeeping group shall be provided to BHEL.
3. 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 subcontractor's bill. Such decisions of BHEL shall be binding on the subcontractor.
4. Pests, such as beehives etc. shall be periodically removed in a humane fashion
5. Materials stacking and storage will be done in proper way and its height should not be more than 2 Mtr. from approach level.
6. **Following are to be taken care of on daily basis.**
 - i. All surplus earth and debris are removed/disposed of from the working areas to identified locations.
 - ii. Unused/Surplus cables, steel items and steel scrap lying scattered at different places /elevation within the working areas are removed to identify locations.
 - iii. 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 locations
 - iv. Access and egress (stair case, gangways, ladders etc.) path should be free from all scrap and other hindrances.
 - v. Workmen shall be educated through tool box talk about the importance of housekeeping and encourage not to litter.
 - vi. Labor camp area shall be kept clear and materials like pipes, steel, sand, concrete, chips and bricks, etc.

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shall not be allowed in the camp to obstruct free movement of men and machineries.

- vii. Fabricated steel structures, pipes & piping materials shall be stacked properly.
- viii. 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.
- ix. Utmost care shall be taken to ensure over all cleanliness and proper upkeep of the working areas

13.5 TRAFFIC MANAGEMENT

13.5.1 SAFE WORKPLACE TRANSPORT SYSTEM

1. Traffic routes in a work place shall be suitable for the persons or vehicles using them.
2. Traffic routes for pedestrians and vehicles shall be clearly demarcated and indicated
3. Traffic routes shall never intersect the area of work and shall not endanger the site personnel
4. For internal traffic, lines marked on roads / access routes and between buildings shall clearly indicate where vehicles are to pass.
5. Temporary obstacles shall be brought to the attention of drivers by warning signs / hazard cones.
6. Power cables shall be maintained at a minimum height above ground as specified in Indian Electricity Act & Rules.
7. Sensible speed limits shall set and clearly displayed. Painted Speed ramps preceded by a warning signs or marker are necessary for stretches of roads exceeding 50 meters.
8. The traffic route should be wide enough to allow vehicles to pass and re-pass oncoming or parked traffic and it may be advisable to introduce on-way system or parking restrictions.
9. Safest route shall be provided between places where vehicles have to call or deliver.
10. Avoid vulnerable areas/items such as fuel or chemicals tanks or pipes, open or unprotected edges and structures likely to collapse
11. Safe areas shall be provided for loading and unloading of material. Loading / Unloading Permit shall be taken from BHEL prior to any significant loading / unloading activity
12. Avoid sharp or blind bends. If this is not possible hazards should be indicated e.g. blind corner.
13. Ensure road crossings are minimum and clearly signed.
14. Entrance and gateways shall be wide enough to accommodate a second vehicle without causing obstruction.
15. Forklift trucks shall not pass over road hump unless of a type capable of doing so.
16. Overhead electric cable, pipes containing flammable hazardous chemical shall be shielded by using goal posts height gauge posts or barriers.
17. The height of Power cables above areas of movement shall conform to Indian Electricity Rules
18. Road traffic signs shall be provided on prominent locations for prevention of accidents and hazards and for quick guidance and warning to employees and public.
19. Safety signs shall be displayed as per the project working requirement and guideline of the state in which project is done.
20. Vehicles hired or used shall not be parked within the 15m radius of any working area. Any vehicle, that is required to be at the immediate/near the vicinity, shall be approved by the person in-charge of the site.

13.5.2 TRAFFIC ROUTE FOR PEDESTRIANS

1. Where traffic routes are used by both pedestrians and vehicles road shall be wide enough to allow vehicles and pedestrians safely.



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2. Separate routes shall be provided for pedestrians to keep them away from vehicles. Provide suitable barriers/guard at entrances/exit and the corners of buildings.
3. Where pedestrian and vehicle routes cross, appropriate crossing shall be provided.
4. Where crowd is likely to use roadway e.g. at the end of shift, stop vehicles from using them at such times.
5. Provide high visibility clothing for people permitted in delivery area.

13.5.3 WORK VEHICLES

Work vehicles shall be as safe, stable, efficient and roadworthy as private vehicles on public roads. Subcontractors shall ensure that drivers are suitably trained and have valid license and experience for the designated class of vehicle. All vehicle e.g. heavy motor vehicle forklift trucks dump trucks mobile cranes shall ensure that the work equipment conforms to the following:

1. A high level of stability.
2. A safe means of access/egress.
3. Suitable and effective service and parking brakes.
4. Windscreens with wipers and external mirrors giving optimum all round visibility.
5. Provision of horn, vehicle lights, reflectors, reversing lights, automatic reverse camera & reverse horn connected to reverse gear.
6. Provision of seat belts.
7. Guards on dangerous parts.
8. Driver protection - to prevent injury from overturning and from falling objects/materials.
9. Driver protection from adverse weather.
10. No vehicle shall be parked below HT/LT power lines in conformance to Indian Electricity Act & Rules.
11. Valid Pollution Under Control certification for all vehicles

13.5.4 DAILY CHECKS BY DRIVER

There should also be daily safety checks containing below mentioned points by the driver before the vehicle is used. Subcontractors should ensure that drivers carry out these checks as a minimum.

Brakes	Mirrors	Warning signals
Tires	Windscreen waters	Specific safety system i.e. control interlocks
Steering	Wipers	Back Camera

13.5.5 TRANSPORTATION OF PERSONNEL AND MATERIALS BY VEHICLES

1. 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.
2. 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.
3. All overhangs shall be made clearly visible and restricted to acceptable limits
4. Load shall be checked before moving off and after traveling a suitable distance.
5. 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.
6. Warning signs shall be displayed during transportation of material.

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7. All vehicles used by Subcontractor shall be in worthy condition and in conformance to the Land Transport requirement
8. All vehicles shall have automatic reverse camera and reverse horn connected with reverse gear.
9. Speed limit for passenger vehicles is 20 Km/ Hr. within plant premises.

13.5.6 MAINTENANCE

All Vehicles used for transportation of man and material shall undergo scheduled inspections on frequent intervals to secure safe operation. Such inspections shall be conducted in particular for steering, brakes, lights, horn, doors etc. Site management shall ensure that work equipment is maintained in an efficient, working order and in good repair. Inspections and services carried out at regular intervals of time and or mileage. No maintenance shall be carried below HT/LT power lines.

13.6 EMERGENCY PREPAREDNESS AND RESPONSE

1. Subcontractor shall develop Emergency preparedness and response capability and Emergency Response Team as per HSEP06: HSE Procedure for Emergency Preparedness and Response
2. Availability of adequate number of first aiders and fire warden shall be ensured
3. All the subcontractor's supervisory personnel and sufficient number of workers shall be trained for fire protection systems. Enough number of such trained personnel must be available during the tenure of contract. Subcontractor should nominate his supervisor to coordinate and implement the safety measures and communicate the same to BHEL.
4. Assembly point shall be earmarked and access to the same from different location shall be shown
5. Fire exit shall be identified and pathway shall be clear for emergency escape.
6. Appropriate type and number of fire extinguisher shall be deployed as per Clause No. 13.2.7 and validity shall be ensured periodically through inspection
7. Adequate number of first aid boxes shall be strategically placed at different work places to cater to all emergency needs. Holder of the first aid box shall be identified on the box itself who will have the responsibility to maintain the same.
8. First aid center shall be developed at site with trained medical personnel and ambulance
9. Emergency contact numbers of the site shall be displayed at prominent locations.
10. Tie up with fire brigade shall be done in case customer is not having fire station.
11. Tie up with hospital shall be ensured in order to ensure the availability of following services to victims quickly without wasting precious time:
 - a. Intensive Care Unit with Ventilator and other necessary life support systems
 - b. Facility of specialized Orthopedic Surgery – in case of fracture / amputation
 - c. Facility of specialized brain / neuro surgery – in case of head trauma
 - d. Facility of specialized burn unit / ward – in case of Fire / burn injury
 - e. and other facilities as per requirement at site location

In case tie up with multiple hospitals is required to cover all possible accidents, same shall be done. The list of facilities to be regularly checked and updated.
12. A detailed emergency services (Fire / Medical etc.) tie up plan shall be submitted to BHEL in monthly HSE planning & review Format No. HSEP:13-F30
13. Mock drill shall be conducted on different emergencies periodically to find out gaps in emergency preparedness and taking necessary corrective action

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13.6.1 RESCUE PLAN:

PURPOSE

The purpose of this rescue template is to establish guidelines for responding to falls from height. This rescue plan is intended to reduce risks to an employee's health after a fall arrest event. The rescue plan should also minimize the amount of at-risk behavior of the rescuer during the rescue attempt, and help to ensure that the rescue is conducted promptly in a safe and professional manner.

APPLICATION

1. This rescue plan applies to all locations where personnel are employed to work at height. The requirements of this rescue plan must be observed by all personnel involved in working at heights.
2. This rescue plan must be considered in any job safety analysis or pre- task planning for activities that require working at heights.

RESPONSIBILITIES

EMPLOYEES:

- Must be familiar with the Fall Protection Program.
- Must understand and be able to evaluate the risks associated with working at heights. Must be trained and competent in the use of fall protection equipment prior to conducting work at heights.
- Must report unsafe conditions or behaviors to the Person-In-Charge.
- Must be familiar with and understand the company's rescue plan to provide assistance in prompt rescue in the event of an arrested fall event.

AUTHORIZED RESCUER:

- Must be trained by a competent rescuer trainer before being exposed to a fall hazard or potential rescue application.
- Must be re-trained when the nature of the work, workplace, or methods of control or rescue change to an extent that prior training is no longer adequate.
- Must be trained on how to inspect, anchor, assemble and use the fall protection and rescue equipment used in locations where employees work. Training must include physical demonstrations by trainees.
- Training must include at least the following:
 - Fall hazard recognition;
 - Fall hazard elimination and control methods;
 - How to use written fall protection and rescue procedures;
 - Inspection of equipment components and systems before use.
- Refresher training must occur at least every two years for the authorized rescuer to stay current with fall protection and rescue educational requirements.
- Must be evaluated by a competent rescuer or competent rescuer trainer at least annually to ensure competency of the duties assigned. This evaluation must include both an examination and a physical demonstration of usage of all equipment the person is authorized to operate.
- Mock rescue drills of work at height scenarios shall be conducted periodically (3 times per year to ensure skills and response quality is maintained).



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14 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 necessary safety equipment as applicable, to enable inspection personnel/agency perform 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.

The requirements of respective work permits are to be ensured by respective supervisors, safety personnel and area in-charges. In addition, the formats & checklists as per Clause 21 of this document provided by BHEL shall be used for inspection by Safety personnel (as a minimum), and records of inspection to be maintained. BHEL shall reserve the right to modify any Format in this document or introduce additional checklists / formats to ensure regular inspection of all equipment as per requirement.

14.1 DAILY HSE CHECKS

Both the Site Supervisors and HSE Supervisors 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:

1. Height Work:

- Safe, barricaded platform
 - PPEs
 - Proper method
 - Awareness
- 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 shall 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.

14.2 INSPECTION OF HEIGHT WORKING

- Any kind of height work (above 2 meters) shall not be carried out without active physical supervision by concerned supervisor or safety personnel. All non-conformances related to height work shall be handled on priority and closed immediately after halting the work.
- A roster of personnel deployed for inspection of height work and other critical activities shall be prepared and submitted to BHEL in monthly report Format No. HSEP:13-F05, in order to ensure effective supervision at all times
- 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 valid Tags, access and egress.
- Illumination



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4. Inspection on height working shall be conducted once in a week by HSE officer as per Format no. HSEP: 13-F10.
5. Medical fitness, including vertigo test of height worker shall be ensured.
6. Height working shall not be allowed during adverse weather.

14.3 INSPECTION OF PPE

PPEs shall be inspected by HSE officer at random once in a week as per Format no. HSEP: 13-F06 for compliance to standard and provisions and any adverse observation shall be recorded in the PPE register.

14.4 INSPECTION OF T&Ps

1. All T& Ps being used at site shall be inspected by HSE officer once in a month as per specific Formats in this document, or (if not available) general Format no. HSEP: 13-F07 for its healthiness and maintenance.
2. A master list of T&Ps and validity of their inspection certificates shall be maintained by each agency and details shall be submitted to BHEL in monthly format no. HSEP:13-F05.
3. 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. BHEL shall be given advance intimation of Third-Party Inspection. BHEL shall associate with Inspection as per discretion.

14.5 INSPECTION OF CRANES AND WINCHES

1. 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.
2. Cranes and Winches shall be inspected by HSE officer once in a month as per Format no. HSEP: 13-F09A & F09B for healthiness, maintenance and validity of third-party inspection.
3. The date of third-party inspection and next due date shall be painted on cranes and winches.
4. The operators/drivers shall be authorized by sub-contractor based on their competency and experience and shall carry the I-card.
5. The operator should be above 18 years of age and should be in possession of driving license of HMV (man & goods), vision test certificate and should have minimum qualification so that he can read the instructions and check list.

14.6 INSPECTION ON WELDING AND GAS CUTTING OPERATION

1. Supervisor shall ensure that no flammable items are available in near vicinity during welding and gas cutting activity.
2. Gas cylinders shall be kept upright.
3. Use of Flash back arrestor shall be ensured at both ends.
4. Inspection during welding and gas cutting operations shall be carried out by HSE officer once a month as per Format no. HSEP: 13-F11.
5. Use of fire blanket to be ensured to avoid falling of splatters during welding or gas cutting operation at height.
6. Availability of fire extinguisher in vicinity shall be ensured.



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14.7 INSPECTION ON ELECTRICAL INSTALLATION / APPLIANCES

1. Ensure proper earthing in electrical installation
2. Use of ELCB at electrical booth
3. Electrical installation shall be properly covered at top where required
4. Use appropriate PPEs while working
5. Use portable electrical light < 24 V in confined space and potentially wet area.
6. Monthly inspection shall be carried out as per Format no. HSEP: 13-F12.

14.8 INSPECTION OF ELEVATOR

1. Elevators shall be inspected by concerned supervisors once in a week as per Format no. HSEP: 13-F13.
2. All elevators shall be inspected by competent person and validity shall be ensured.
3. The date of third-party inspection and next due date shall be painted on elevator.

14.9 MONTHLY SITE INSPECTION

Subcontractor shall carry out monthly HSE inspection of all work areas as per Format No. HSEP: 13-F21 and submit to BHEL

14.10 NON-CONFORMITY HANDLING

Any serious non-conformances identified during inspection observed shall be addressed immediately. In case immediate closure of non-conformities is not possible:

- a. work to be halted in the area
- b. Non-conformance to be generated and submitted to responsible person and BHEL
- c. non-conformance to be resolved through responsible agency / person

Only after closure of serious non-conformances, work to be allowed to resume.

All non-conformances & safety violations to be recorded and closed in a time bound manner.

15 HSE PERFORMANCE

HSE performance of subcontractor shall be monitored as per BHEL criteria, based on which, marks will be awarded. Marks can be used to evaluate and rate the contractor as per BHEL internal systems. Format for vendor HSE performance evaluation is attached in annexure (**Format No. HSEP: 13-F33**)

Subcontractor shall make available all data required for evaluation to BHEL as and when demanded.

1. 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.
 2. 1.5% of running bill shall be cleared subject to certification of desired safety performance by BHEL
- Periodicity of HSE Performance Review: Monthly

 PS-ER	HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION BY SUB-CONTRACTORS FOR SAGARDIGHI	Doc. No.: HSEP:14-SGD Rev.: 02 Date: 01.09.20 Page 102 of 195

16 HSE PENALTIES FOR NON-COMPLIANCE

1. Nonconformity of safety rules and safety appliances will be viewed seriously and BHEL has right to impose fines on the subcontractor for every instance of violation noticed.
2. The applicable penalties for HSE violations are given in Format No. HSEP13-F14 of this document
3. The list of non-compliances given in above format is not exhaustive. The BHEL site in-charge has liberty to impose a penalty for any other non-compliance and incidents of any nature.
4. 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
5. The penalty amount shall be recovered from subcontractors from the RA Bill, otherwise Final bill.

17 COMPENSATION TO ACCIDENT VICTIMS

1. BHEL shall recover the amount of compensation paid to victim(s) by BHEL towards loss of life / permanent disability due to an accident which is attributable to the negligence of contractor, agency or firm or any of its employees as detailed below.
 - a. **Victim:** Any person who suffers permanent disablement or dies in an accident as defined below.
 - b. **Accident:** Any death or permanent disability resulting solely and directly from any unintended and unforeseen injurious occurrence caused during the manufacturing/ operation and works incidental thereto at BHEL factories/ offices and precincts thereof, project execution, erection and commissioning, services, repairs and maintenance, trouble shooting, serving, overhaul, renovation and retrofitting, trial operation, performance guarantee testing undertaken by the company or during any works / during working at BHEL Units/ Offices/ townships and premises! Project Sites.
 - c. **Compensation in respect of each of the victims:**
 - i. In the event of death or permanent disability resulting from Loss of both limbs: Rs. 10,00,000/- (Rs. Ten Lakh)
 - ii. In the event of other permanent disability: Rs. 7,00,000/- (Rs. Seven Lakh)
 - d. **Permanent Disability:** A disablement that is classified as a permanent total disablement under the proviso to Section 2 (I) of the Employee's Compensation Act, 1923. "
2. In addition to above, contractor shall provide appropriate compensation to victims of major and fatal incidents as per Employee Compensation Act, 1923, ESIC Act, 1948 or as per any existing Acts and guidelines.
3. Penalty, as per BHEL rate, will be imposed in addition to the above.

18 INTERNAL & EXTERNAL HSE AUDITS

1. Subcontractor shall extend full co-operation and maintain necessary documents & records as required by Internal & External HSE Audit carried out by BHEL. / Third Party
2. All non-conformities and observations on HSE shall be disposed of by subcontractor in a time bound manner as detailed in Audit Report.
3. All required corrective actions shall be taken by the subcontractor in order to avoid recurrence

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19 OTHER REQUIREMENTS

1. 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 holding an appropriate enquiry and notifying the subcontractor suitably.
 2. **RISK & COST:**
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 as per contractual requirements, 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.
 3. 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, favourably consider to reward the subcontractor suitably for the performance.
 4. The subcontractor shall take all measures at all the sites of work to protect all persons from incidents and shall be bound to bear the expenses of every suit, action or other proceeding of law that may be brought by any persons for injury sustained, death or damage to environment owing to neglect of the HSE precautions by the subcontractor; and shall be liable to pay any such persons such compensation, should such claim proceeding be filed against BHEL.
- The subcontractor hereby agrees to indemnify BHEL against the same.

20 HSE REVIEW

BHEL shall hold HSE review meeting every month or as per requirement in order 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. The indicative agenda is given below:

1. Implementation of earlier MOM
2. HSE performance review
3. HSE inspection review w.r.t non-conformances observed and their status
4. HSE audit and CAPA
5. HSE training conducted and requirement
6. Health check-up camp
7. HSE planning for the erection and commissioning and installation activities in the coming month
8. HSE reward and promotional activities
9. HSE data analysis and improvement – Data analyzed will include non-conformances closed and pending, incident data, training data etc.

Subcontractor shall ensure presence of site in-charge, all package in-charges and safety officers, as communicated by BHEL in the meeting.

Subcontractor shall take requisite actions as per record notes and as decided in the meeting, in a time bound manner and submit compliance report to BHEL.



**HEALTH, SAFETY AND ENVIRONMENT
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21 FORMATS USED

This is minimum list of Formats to be used for reporting by the subcontractor. Other Formats are indicated in respective HSE Procedures, Work Permits and OCPs or as specified by BHEL. The medium of reporting can be hard / soft as indicated by BHEL.

BHEL can modify these Formats or introduce new Formats to the extent necessary to get the desired performance data of all HSE activities.

SN	Format Name	Format No.	Frequency of check	Rev
1	General Work Permit	HSEP:12-FP01	Before start of work and regularly thereafter as per Permit conditions	00
2	Work at Height Permit	HSEP:12-FP02		00
3	Hot Work Permit	HSEP:12-FP03		00
4	Confined Space Work Permit	HSEP:12-FP04		00
5	Excavation Work Permit	HSEP:12-FP05		00
6	Radiation Work Permit	HSEP:12-FP06		00
7	Critical Lifting Activity Work Permit	HSEP:12-FP07		00
8	Night Work Permit	HSEP:12-FP08		00
9	Loading/ Unloading Work Permit	HSEP:12-FP09		00
10	Grating/ Safety net removal Work Permit	HSEP:12-FP10		00
11	Lock out-Tag out Work Permit	HSEP:12-FP11		00
12	Beam/ Truss/ Duct/ Structure Alignment Work Permit	HSEP:12-FP12		00
13	Inspection of First Aid Box	HSEP:13-FP01	Weekly	00
14	Health Check Up	HSEP:13-F02	With new Induction & as per requirement thereafter	00
15	HSE Induction / Regular / On-the-Job Training	HSEP:13-F03		00
16	Tool Box Talk	HSEP:13-F04	Daily before job start	00
17	Site HSE Report	HSEP:13-F05	Monthly	00
18	PPE Inspection	HSEP:13-F06	Weekly	00
19	Inspection of T&Ps	HSEP:13-F07	Monthly / As per requirement	00
20	Status of T&Ps	HSEP:13-F08	Monthly / As per requirement	00
21	Inspection of Cranes	HSEP:13-F09A	Monthly / As per requirement	
22	Inspection of Winches	HSEP:13-F09B	Monthly / As per requirement	00
23	Inspection of Height Working	HSEP:13-F10	Daily / As per requirement	00
24	Inspection on Welding & Gas Cutting	HSEP:13-F11	Weekly / As per requirement	00
25	Inspection on Electrical Installation	HSEP:13-F12	Weekly / As per requirement	00
26	Inspection on Elevator	HSEP:13-F13	Weekly / As per requirement	00
27	HSE Penalty	HSEP:14-F14	-	00
28	Initial Verification of PPE's & Lifting Tools & Tackles	HSEP:13-F15	As and when new PPEs and T&Ps are received	00
29	Inspection of Labor Colony	HSEP:13-F16	Monthly / as per requirement	00
30	Recording of First Aid Injuries	HSEP:13-F17	As and when such injuries occur	00
31	Register of Issue and Receipt of PPEs	HSEP:13-F18	With new Induction	00
32	E Waste Records at the facility	HSEP:13-F19	Half Yearly	



PS-ER

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SN	Format Name	Format No.	Frequency of check	Rev
33	Hazardous Waste at the facility	HSEP:13-F20	Half Yearly	00
34	HSE Checklist-cum-Compliance Report	HSEP:13-F21	As per Audit Calendar	00
35	Monthly HSE Planning & Review	HSEP:13-F30	Monthly	00
36	Daily HSE Report (Agency)	HSEP:13-F31A	Daily	00
37	Method Statement Format	HSEP:13-F32A	Before starting critical activity	00
38	Job Safety Analysis	HSEP:13-F32B	Before starting new job	00
39	Evaluation of HSE Performance	HSEP:13-F33	Monthly	00
40	Initial Incident Report (Near Miss/ Minor incident)	HSEP: 08-F01	Within 24 hours of incident occurrence	00
41	Preliminary Incident Report to HQ (Fatal/ Major/ Fire)	HSEP: 08-F02		00



HSEP:12-F01

GENERAL WORK PERMIT		Permit No. & Date
Project & Unit:		Emergency Contact Nos:
BHEL Sub-contractor:		

Exact Location of Work: _____

Nature / Description of Work: _____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Sub-Contractor Performing the Work: _____

Name of Sub-Contractor's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Sub-Contractor's Package In-charge: _____ Sign: _____ Date: _____

The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit.

No.	Item	Yes	Not required / Remarks
	Job Specific Permit Required :		
1.	Height Work Permit Required		
2.	Hot Work Permit Required		
3.	Confined Space Work Permit Required		
4.	Excavation Work Permit Required		
5.	Radiation Work Permit Required		
6.	Heavy / Complex / Critical Lifting Activity Permit Required		
7.	Night Work / Holiday Work Permit Required		
8.	Loading / Unloading Permit Required		
9.	Grating / Safety Net / Safety Facility Removal Permit Required		
10.	Lockout / Tag out Request Permit Required		
11.	Other Permit required. PI specify :		
	Specific PPEs for the Activity:		
1.	Dust Mask/ other respiratory equipment required. List details:		
2.	Welding and/or Grinding Shield required.		
3.	Gloves: Leather () / PVC () / Welding ()		
4.	Other PPE, List:		
	Procedure Required :		
1.	OCP No. Ref :		

Declaration:

All the points mentioned in the above checklist have been checked and found OK.

Permit Receiver:

Site Engineer (Sub- Contractor):	
Signature:	
Name:	Designation:

Site Safety Officer (Sub-Contractor):	
Signature:	
Name:	Designation:

Permit Issuer:

Engineer of Concerned Execution Department (BHEL):	
Signature:	
Name:	Designation:

Site Safety Officer (BHEL):	
Signature:	
Name:	Designation:

Package-in-charge (BHEL):	
Signature:	
Name:	Designation:

(This permit is valid only for max. 15 days)

Original: Permittee	☐	2 nd Copy: Sub-Contractor Deptt. HOS	☐	3 rd Copy: BHEL Site HSE	☐



HSEP:12-F02

WORK AT HEIGHT PERMIT		Permit No. & Date
Project & Unit:		Emergency Contact Nos
Agency:		

Exact Location of Work: _____

Nature / Description of Work: _____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Agency's Package In-charge: _____ Sign: _____ Date: _____

The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit.

No.	Item	Yes	Not required / Remarks
1.	All workers on job are competent and medically fit (No Height Phobia) for working at height		
2.	Horizontal life lines are provided to cater to design specification of 2300 kg per person and are installed on a rigid & independent structure		
3.	Safety harness with life line support/ fall arrester are checked and available in working condition		
4.	Scaffolding soundness inspected is available for use with valid tag		
5.	Work platform is not made of bamboo or weak material. Barricading is available with Top, Mid Rails and Toe Guard.		
6.	Working platform is clean without any unwanted material. Floor openings are covered.		
7.	Access and exit to workplace are safe, marked and without obstruction.		
8.	Adequate lighting provided (for dark hours) as per applicable lux standards (Refer HSEP:13)		
9.	Safety nets are provided below working area as secondary line of fall protection		
10.	Area below the working platform has been cleared of all activity		
11.	Ladders have been secured, inspected and provided as per BHEL standard/contract.		
12.	Safety shoes (non-slip), Helmet with chin strip available with employees		
13.	Visible Signboards provided on working platforms in workers' understandable language		
14.	All lifting / tightening tools, hand tools/equipment checked and in good condition		
15.	ELCB provided for Electrical connections individually. Electrical cable, welding Hose/Compressed air hose properly secured and laid down without obstruction. Earth resistance is OK.		
16.	Crane / Winch / Hydra operator is qualified and experienced		
17.	Emergency response team & Medical Facilities available.		
18.	Work hazards are identified, controlled and communicated to the worker.		
19.	Method Statements/ Job Safety Analyses attached:		
20.	Other:		
21.	List of Other Permits Required for the Activity (Attached):		

Declaration:

All the points mentioned in the above checklist have been checked and found OK.

Permit Receiver:

Site Engineer (Agency):
Signature:
Name: _____ Designation: _____

Site HSE Officer (Agency):
Signature:
Name: _____ Designation: _____

Permit Issuer:

Site Engineer (BHEL):
Signature:
Name: _____ Designation: _____

Site HSE Officer (BHEL):
Signature:
Name: _____ Designation: _____

Package-in-charge (BHEL):
Signature:
Name: _____ Designation: _____

(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)

Original: Permittee		2 nd Copy: Agency Deptt. HOS		3 rd Copy: BHEL Site HSE	

P.T.O.

To be printed on both sides of an A4 Sheet

Page 1 of 2

Daily Work Area Condition Endorsement

Sl. No.	Date	Signature with Date & Time			Remarks
		Agency Site Engineer	Agency HSE Officer	BHEL HSE Officer	
Day 2					
Day 3					
Day 4					
Day 5					
Day 6					
Day 7					

Permit Extension Beyond Initially Requested Hours

Sl. No.	Extension Period		Remarks	Signature with Date & Time			
	From..... (Date, Time)	To..... (Date, Time)		Agency Site Engineer	Agency HSE Officer	BHEL Site Engineer (PIA)	BHEL HSE Officer
1.							
2.							
3.							
4.							
5.							
6							

Permit Closure After Work Completion

Permit is here by returned after completing the job & ensuring safe removal of men and material.	
Site Engineer, Agency	Site HSE Officer, Agency
Signature:	Signature:
Name:	Name:
Verified the area is safe and Permit is Closed	
Site HSE Officer, BHEL	Site Engineer, BHEL
Signature:	Signature:
Name:	Name:

General Instructions:

- Each Permit shall be given a unique number and recorded.
- Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
- Any other Work Permits required for the task to be taken and attached along with this Permit
- Ensure that workers and supervisors involved are trained & medical checkup done
- This permit must be available at the work site all the times of the work.
- Location and description of the work must be clearly indicated by the permittee.
- Terms applicable must be clearly indicated by the permittee.
- This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
- Compliance to Permit conditions to be checked regularly by concerned execution department
- Permit shall be issued for not more than **7 days** including the issue date.
- Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
- All additional safety precautions to be taken as per HSE Management System.

(For system details, please refer HSEP12: HSE Procedure for Permit to Work)

Distribution

Original- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.



HSEP:12-F03

BURNING/ WELDING/ HOT WORK PERMIT	Permit No. & Date
Project & Unit:	Emergency Contact Nos
Agency:	

Exact Location of Work: _____

Nature / Description of Work: _____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Agency's Package In-charge: _____ Sign: _____ Date: _____

The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit.

No.	Item	Yes	Not required / Remarks
1.	Welding area ensured safe and free from all hazards (explosives etc.) with barricading and safe inlet / exit		
2.	Proper ventilation and /or lighting provided (in case of dark hours).		
3.	Welding platform ensured safe and strong. Not built of bamboo or similar material		
4.	For enclosed / confined spaces, the integrity of the structure and supports are ensured, Gas Testing done		
5.	Gas hoses, Welding machine input/output cables, welding holder and weld return clamp (Holder) are in good condition, routed and insulated as required		
6.	Emergency STOP buttons are in working condition. Welder /Helper knows how to operate it.		
7.	Welder & Fitter trained to connect ground/work return clamps (Holder) to work place prior to energization of welding machine.		
8.	Gas cylinders are stacked vertically and not below the welding / cutting area. Regulator key is available with cylinder. Gas cylinders covered with shields to prevent falling splinters.		
9.	Pressure gauges/Flash back arrestor (at both ends) provided and in working condition.		
10.	Personal Protective equipment Minimum applicable: safety helmet, safety goggles, welding helmet, safety shoes, leather gloves, long sleeve and nose mask -provided		
11.	In case of pits, water removed from the pit and wood/rubber insulation provided.		
12.	Safety signboards / cautions are in place.		
13.	Adequate and Suitable nos. of firefighting extinguisher provided. Sufficient water for firefighting available.		
14.	Nearby combustible material removed. Housekeeping done.		
15.	Emergency response team & Medical Facilities available.		
16.	Work hazards are identified, controlled and communicated to the worker.		
17.	Method Statements/ Job Safety Analyses attached:		
18.	Other:		
19.	List of Other Permits Required for the Activity (Attached):		

Declaration:

All the points mentioned in the above checklist have been checked and found OK.

Permit Receiver:

Site Engineer (Agency):	Site HSE Officer (Agency):
Signature:	Signature:
Name: _____ Designation: _____	Name: _____ Designation: _____

Permit Issuer:

Site Engineer (BHEL):	Site HSE Officer (BHEL):
Signature:	Signature:
Name: _____ Designation: _____	Name: _____ Designation: _____

Package-in-charge (BHEL):

Signature:
Name: _____ Designation: _____

(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)

Original: Permittee ☐	2 nd Copy: Agency Deptt. HOS ☐	3 rd Copy: BHEL Site HSE ☐

P.T.O.

To be printed on both sides of an A4 Sheet

Daily Work Area Condition Endorsement

Sl. No.	Date	Signature with Date & Time			Remarks
		Agency Site Engineer	Agency HSE Officer	BHEL HSE Officer	
Day 2					
Day 3					
Day 4					
Day 5					
Day 6					
Day 7					

Permit Extension Beyond Initially Requested Hours

Sl. No.	Extension Period		Remarks	Signature with Date & Time			
	From..... (Date, Time)	To..... (Date, Time)		Agency Site Engineer	Agency HSE Officer	BHEL Site Engineer (PIA)	BHEL HSE Officer
1.							
2.							
3.							
4.							
5.							
6							

Permit Closure After Work Completion

Permit is here by returned after completing the job & ensuring safe removal of men and material.	
Site Engineer, Agency	Site HSE Officer, Agency
Signature:	Signature:
Name:	Name:
Verified the area is safe and Permit is Closed	
Site HSE Officer, BHEL	Site Engineer, BHEL
Signature:	Signature:
Name:	Name:

General Instructions:

- Each Permit shall be given a unique number and recorded.
- Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
- Any other Work Permits required for the task to be taken and attached along with this Permit
- Ensure that workers and supervisors involved are trained & medical checkup done
- This permit must be available at the work site all the times of the work.
- Location and description of the work must be clearly indicated by the permittee.
- Terms applicable must be clearly indicated by the permittee.
- This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
- Compliance to Permit conditions to be checked regularly by concerned execution department
- Permit shall be issued for not more than **7 days** including the issue date.
- Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
- All additional safety precautions to be taken as per HSE Management System.

(For system details, please refer HSEP12: HSE Procedure for Permit to Work)

Distribution

Original- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.,



HSEP:12-F04

SAFETY WORK CLEARANCE

Permit no. _____

Project: _____

Emergency Contact Nos: _____

BHEL Sub-contractor: _____

CONFINED SPACE ENTRY PERMIT

Area of work: _____ Date: _____ Time: _____

Name of Sub-Contractor Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Work Performing Contractor: _____

Name of Package In charge: _____ Sign: _____ Date: _____

Description of Work: _____

Duration of Work Execution*: From Time: _____ Date: _____ to Time: _____ Date: _____

The above signing person(s) will be responsible to ensure that the above described work will be done under all the safety precautions mentioned on the permit to work.

The following precautions are to be taken:

No.	Item	Yes	Not required / Remarks
1.	Has the equipment been Isolated from Power/Steam/Air?		
2.	Has the equipment been Isolated from liquid or gasses?		
3.	Has the equipment been de-pressurized &/or drained?		
4.	Has the equipment been Blanked/blinded or disconnected?		
5.	Has the equipment been water flushed &/or steamed?		
6.	Whether man ways open and ventilated?		
7.	Whether constant Inert gas flow arranged?		
8.	Whether mechanically ventilated and adequately cooled?		
9.	Whether 24 V lighting provided inside the confined space?		
10.	Whether Radiation sources removed?		
11.	Whether training on confined space provided to the group?		
12.	Whether required PPEs (hand gloves, goggles, face shield, ear plug/muff, protective clothing etc.) used?		
13.	Whether Safety harness and Lifeline used?		
14.	Whether Dust/Gas/Air Line mask used?		
15.	Whether attendant with SCBA/Air mask available?		
16.	Whether grounded air Exhaust/Blower/ AC provided?		
17.	Whether Personal Gas alarm provided?		
18.	Whether communication Equipment Provided?		
19.	Whether rescue equipment/team available?		
20.	Whether firefighting arrangement done		
21.	Others:		

Name of Sub-Contractor Safety Officer: _____ Sign: _____ Date: _____ Time: _____

Reviewed and approved by BHEL Site Engineer (Permit Issuing Authority):

Name: _____ Sign: _____ Date: _____ Time: _____

Name of BHEL Safety Representative: _____ Sign: _____

I understand the precaution to be taken as described above and as per project requirement and hereby confirm that work will be executed under my supervision by following all precaution and Safety Rules.

Name of Work Performing Authority: _____ Sign: _____ Date: _____ Time: _____

Permit Cancellation / Closure:*I hereby declare that the work is cancelled/complete, all workers under my control have been withdrawn and the site restored to safe tidy condition.*

Name of Work performing Authority: _____ Sign: _____ Date: _____ Time: _____

Name of SC Site Engr. (Permit Requesting Authority): _____ Sign: _____ Date: _____ Time: _____

Name of BHEL Site Engr. (Permit Issuing Authority): _____ Sign: _____ Date: _____ Time: _____

(* Permit valid subject to daily renewal as per overleaf instructions)

Original at BHEL site

Second Copy – BHEL SAFETY

Third Copy: BHEL Sub-Contractor

PERMIT RENEWAL

Sl. No.	Extension Period		Signature of Contractor Site Engineer	Signature of Contractor /BHEL Safety Officer
	(Date) From.....	(Time- Hrs) From.....		
	To.....	To.....		
1.				
2.				
3.				
4.				
5.				
6				

TO BE SIGNED JOINTLY BY THE CONTRACTOR HSE & EXECUTION AFTER THE WORK IS OVER

Permit is here by returned / closed after completing the job.

Site Engineer, Contractor	Site HSE Engineer, EPC Contractor
Certified that the subject work has been completed /stopped and the area cleaned.	Certified that the subject work has been completed/stopped and the area cleaned.
Signature (With Dt. & Time):	Signature (With Dt. & Time):
Name:	Name:

General Instructions:

1. Permittee to observe precautions as mentioned on pre-page, mentioned by concerned discipline coordinator.
2. Permit must be available at the site all the time during work with permit receiver.
3. This Permit is valid for maximum 7 days or as indicated. Every day permit shall be renewed before start of the shift by EPC contractor both HSE and Site Engineer.
4. Work location to be constantly supervised by Contractor and BHEL HSE and Execution, to ensure precautions as per this Permit and other HSE requirements



HSEP:12-F05

EXCAVATION WORK PERMIT		Permit No. & Date
Project & Unit:		Emergency Contact Nos
Agency:		

Exact Location of Work: _____

Nature / Description of Work: _____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Agency's Package In-charge: _____ Sign: _____ Date: _____

The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit.

No.	Item	Yes	Not required / Remarks
1.	Precautions taken for Underground Electrical Cable		
2.	Precautions taken for Under / Above ground sewer/Drinking Water Line		
3.	Precautions taken for Underground Telecommunication Line		
4.	Precautions taken for Underground Product/Utility Line		
5.	Precautions taken for Underground Fire Water Line		
6.	Shoring / Shuttering / Sheet piling done to prevent collapse of excavation walls. Strength of Excavation wall ensured at all times		
7.	Hard Barricading & Edge Protection provided		
8.	Separate Safe Access for Man and Vehicle		
9.	Lighting arrangement		
10.	Banks Man Provided		
11.	Required basic PPEs provided		
12.	Slope Cutting/Benching Maintained		
13.	Excavated soil / Construction Material / equipment kept away from the edge.		
14.	Emergency response team & Medical Facilities available.		
15.	Work hazards are identified, controlled and communicated to the worker.		
16.	Method Statements/ Job Safety Analyses attached:		
17.	Other:		
18.	List of Other Permits Required for the Activity (Attached):		

Declaration:

All the points mentioned in the above checklist have been checked and found OK.

Permit Receiver:

Site Engineer (Agency):	Site HSE Officer (Agency):
Signature:	Signature:
Name: _____ Designation: _____	Name: _____ Designation: _____

Permit Issuer:

Site Engineer (BHEL):	Site HSE Officer (BHEL):
Signature:	Signature:
Name: _____ Designation: _____	Name: _____ Designation: _____
Package-in-charge (BHEL):	
Signature:	
Name: _____ Designation: _____	

(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)

Original: Permittee	2 nd Copy: Agency Deptt. HOS	3 rd Copy: BHEL Site HSE

P.T.O.

To be printed on both sides of an A4 Sheet

Page 1 of 2

Daily Work Area Condition Endorsement

Sl. No.	Date	Signature with Date & Time			Remarks
		Agency Site Engineer	Agency HSE Officer	BHEL HSE Officer	
Day 2					
Day 3					
Day 4					
Day 5					
Day 6					
Day 7					

Permit Extension Beyond Initially Requested Hours

Sl. No.	Extension Period		Remarks	Signature with Date & Time			
	From..... (Date, Time)	To..... (Date, Time)		Agency Site Engineer	Agency HSE Officer	BHEL Site Engineer (PIA)	BHEL HSE Officer
1.							
2.							
3.							
4.							
5.							
6							

Permit Closure After Work Completion

Permit is here by returned after completing the job & ensuring safe removal of men and material.	
Site Engineer, Agency	Site HSE Officer, Agency
Signature:	Signature:
Name:	Name:
Verified the area is safe and Permit is Closed	
Site HSE Officer, BHEL	Site Engineer, BHEL
Signature:	Signature:
Name:	Name:

General Instructions:

- Each Permit shall be given a unique number and recorded.
- Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
- Any other Work Permits required for the task to be taken and attached along with this Permit
- Ensure that workers and supervisors involved are trained & medical checkup done
- This permit must be available at the work site all the times of the work.
- Location and description of the work must be clearly indicated by the permittee.
- Terms applicable must be clearly indicated by the permittee.
- This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
- Compliance to Permit conditions to be checked regularly by concerned execution department
- Permit shall be issued for not more than **7 days** including the issue date.
- Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
- All additional safety precautions to be taken as per HSE Management System.

(For system details, please refer HSEP12: HSE Procedure for Permit to Work)

Distribution

Original- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.,



HSEP:12-F06

RADIATION WORK PERMIT		Permit No. & Date
Project & Unit:		Emergency Contact Nos
Agency:		

Exact Location of Work: _____

Nature / Description of Work: _____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Agency's Package In-charge: _____ Sign: _____ Date: _____

The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit.

No.	Item	Yes	Not required / Remarks
1.	All the persons at the site informed/removed from the area.		
2.	Area around the source of radiation cordoned off with the rope/chord.		
3.	Radiation warning symbol/boards displayed around radiography work on rope/chord.		
4.	Radiographer worn radiation badges during testing and is within safe limits.		
5.	Radiography camera and carrying case box having radiation symbol.		
6.	Radiation Survey Meter is in working condition, calibrated & within validity period.		
7.	Radiographer has valid certificate from BARC.		
8.	Blinking light provided on road during radiography (in dark hours).		
9.	Proper required Illumination provided		
10.	Safe access and working platform provided to conduct RT work		
11.	All the persons involved in Radiography work are aware of the hazard of radiation		
12.	Emergency response team & Medical Facilities available.		
13.	Work hazards are identified, controlled and communicated to the worker.		
14.	Method Statements/ Job Safety Analyses attached:		
15.	Other:		
16.	List of Other Permits Required for the Activity (Attached):		

Declaration:

All the points mentioned in the above checklist have been checked and found OK.

Permit Receiver:

Site Engineer (Agency):	Site HSE Officer (Agency):
Signature:	Signature:
Name: _____ Designation: _____	Name: _____ Designation: _____

Permit Issuer:

Site Engineer (BHEL):	Site HSE Officer (BHEL):
Signature:	Signature:
Name: _____ Designation: _____	Name: _____ Designation: _____
Package-in-charge (BHEL):	
Signature:	
Name: _____ Designation: _____	

(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)

Original: Permittee ☐ 2nd Copy: Agency Deptt. HOS ☐ 3rd Copy: BHEL Site HSE ☐

P.T.O.

To be printed on both sides of an A4 Sheet

Page 1 of 2

Daily Work Area Condition Endorsement

Sl. No.	Date	Signature with Date & Time			Remarks
		Agency Site Engineer	Agency HSE Officer	BHEL HSE Officer	
Day 2					
Day 3					
Day 4					
Day 5					
Day 6					
Day 7					

Permit Extension Beyond Initially Requested Hours

Sl. No.	Extension Period		Remarks	Signature with Date & Time			
	From..... (Date, Time)	To..... (Date, Time)		Agency Site Engineer	Agency HSE Officer	BHEL Site Engineer (PIA)	BHEL HSE Officer
1.							
2.							
3.							
4.							
5.							
6							

Permit Closure After Work Completion

Permit is here by returned after completing the job & ensuring safe removal of men and material.	
Site Engineer, Agency	Site HSE Officer, Agency
Signature:	Signature:
Name:	Name:
Verified the area is safe and Permit is Closed	
Site HSE Officer, BHEL	Site Engineer, BHEL
Signature:	Signature:
Name:	Name:

General Instructions:

- Each Permit shall be given a unique number and recorded.
- Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
- Any other Work Permits required for the task to be taken and attached along with this Permit
- Ensure that workers and supervisors involved are trained & medical checkup done
- This permit must be available at the work site all the times of the work.
- Location and description of the work must be clearly indicated by the permittee.
- Terms applicable must be clearly indicated by the permittee.
- This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
- Compliance to Permit conditions to be checked regularly by concerned execution department
- Permit shall be issued for not more than **7 days** including the issue date.
- Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
- All additional safety precautions to be taken as per HSE Management System.

(For system details, please refer HSEP12: HSE Procedure for Permit to Work)

Distribution

Original- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.,



HSEP:12-F07

HEAVY/ COMPLEX/ CRITICAL LIFTING ACTIVITY WORK PERMIT		Permit No. & Date
Project & Unit:		Emergency Contact Nos
Agency:		

Exact Location of Work: _____

Nature / Description of Work: _____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Agency's Package In-charge: _____ Sign: _____ Date: _____

The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit.

No.	Item	Yes	Not required / Remarks
1.	Crane used for lifting activity TPI tested, certified and approved for rated lifting		
2.	All lifting tackles, gears/appliances (chain pulley blocks, wire rope slings etc.) are tested and certified for lifting works with valid Serial numbers traceable to certificates.		
3.	Chain Pulley Blocks are exclusively used for alignment, not loading		
4.	Crane operator is trained and competent for lifting operation.		
5.	Lifting sling/ belt is protected against sharp edge of the jobs to be lifted.		
6.	Lifting hook is properly latched to prevent material falling over		
7.	Access and exit marked and without obstruction.		
8.	In case of lifting multiple materials at once, same are tied up with strong rope / material		
9.	Area below lifting activity barricaded to prevent movement		
10.	Minimum 2 guidelines have been provided for balancing and guiding jobs to be lifted.		
11.	Periphery area of crane booms as well as lifting job is barricaded and unauthorized/no-entry sign board posted.		
12.	Rigger and signal man is trained and competent for lifting work.		
13.	No lifting activity to be carried out during lightening, heavy wind/rain.		
14.	If scaffolding to be used during lift, scaffolding with valid tag available for use.		
15.	Emergency response team & Medical Facilities available.		
16.	Work hazards are identified, controlled and communicated to the worker.		
17.	Method Statements/ Job Safety Analyses/ Lifting Plan attached:		
18.	Other:		
19.	List of Other Permits Required for the Activity (Attached):		

Declaration:

All the points mentioned in the above checklist have been checked and found OK.

Permit Receiver:

Site Engineer (Agency):	
Signature:	
Name:	Designation:

Site HSE Officer (Agency):	
Signature:	
Name:	Designation:

Permit Issuer:

Site Engineer (BHEL):	
Signature:	
Name:	Designation:

Site HSE Officer (BHEL):	
Signature:	
Name:	Designation:

Package-in-charge (BHEL):	
Signature:	
Name:	Designation:

(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)

Original: Permittee	☐	2 nd Copy: Agency Deptt. HOS	☐	3 rd Copy: BHEL Site HSE	☐

P.T.O.

To be printed on both sides of an A4 Sheet

Page 1 of 2

Daily Work Area Condition Endorsement

Sl. No.	Date	Signature with Date & Time			Remarks
		Agency Site Engineer	Agency HSE Officer	BHEL HSE Officer	
Day 2					
Day 3					
Day 4					
Day 5					
Day 6					
Day 7					

Permit Extension Beyond Initially Requested Hours

Sl. No.	Extension Period		Remarks	Signature with Date & Time			
	From..... (Date, Time)	To..... (Date, Time)		Agency Site Engineer	Agency HSE Officer	BHEL Site Engineer (PIA)	BHEL HSE Officer
1.							
2.							
3.							
4.							
5.							
6							

Permit Closure After Work Completion

Permit is here by returned after completing the job & ensuring safe removal of men and material.	
Site Engineer, Agency	Site HSE Officer, Agency
Signature:	Signature:
Name:	Name:
Verified the area is safe and Permit is Closed	
Site HSE Officer, BHEL	Site Engineer, BHEL
Signature:	Signature:
Name:	Name:

General Instructions:

- Each Permit shall be given a unique number and recorded.
- Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
- Any other Work Permits required for the task to be taken and attached along with this Permit
- Ensure that workers and supervisors involved are trained & medical checkup done
- This permit must be available at the work site all the times of the work.
- Location and description of the work must be clearly indicated by the permittee.
- Terms applicable must be clearly indicated by the permittee.
- This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
- Compliance to Permit conditions to be checked regularly by concerned execution department
- Permit shall be issued for not more than **7 days** including the issue date.
- Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
- All additional safety precautions to be taken as per HSE Management System.

(Please refer HSEP12: HSE Procedure for Permit to Work for details of critical lift and permit workflow)

Distribution

Original- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.,



HSEP:12-F08

NIGHT WORK PERMIT		Permit No. & Date
Project & Unit:		Emergency Contact Nos
Agency:		

Exact Location of Work: _____

Nature / Description of Work: _____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Agency's Package In-charge: _____ Sign: _____ Date: _____

The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit.

No.	Item	Yes	Not required / Remarks
1.	No heavy complex work is being carried out involving heavy, moving machinery etc. during night work		
2.	Proper illumination (lux value) as per prescribed standards has been provided		
3.	All required safety precautions / Permits / PPEs have been taken		
4.	Work area certified safe (with barricading, w/o hazards, proper access / ingress)		
5.	Workers are trained for the task		
6.	Adequate supervision is in order during the course of work		
7.	Emergency response team & Medical Facilities available.		
8.	Work hazards are identified, controlled and communicated to the worker.		
9.	Method Statements/ Job Safety Analyses attached:		
10.	Other:		
11.	List of Other Permits Required for the Activity (Attached):		

Declaration:

All the points mentioned in the above checklist have been checked and found OK.

Permit Receiver:

Site Engineer (Agency):	
Signature: _____	
Name: _____	Designation: _____

Site HSE Officer (Agency):	
Signature: _____	
Name: _____	Designation: _____

Permit Issuer:

Site Engineer (BHEL):	
Signature: _____	
Name: _____	Designation: _____

Site HSE Officer (BHEL):	
Signature: _____	
Name: _____	Designation: _____

Package-in-charge (BHEL):	
Signature: _____	
Name: _____	Designation: _____

(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)

Original: Permittee ☐	2 nd Copy: Agency Deptt. HOS ☐	3 rd Copy: BHEL Site HSE ☐

P.T.O.

To be printed on both sides of an A4 Sheet

Page 1 of 2

Daily Work Area Condition Endorsement

Sl. No.	Date	Signature with Date & Time			Remarks
		Agency Site Engineer	Agency HSE Officer	BHEL HSE Officer	
Day 2					
Day 3					
Day 4					
Day 5					
Day 6					
Day 7					

Permit Extension Beyond Initially Requested Hours

Sl. No.	Extension Period		Remarks	Signature with Date & Time			
	From..... (Date, Time)	To..... (Date, Time)		Agency Site Engineer	Agency HSE Officer	BHEL Site Engineer (PIA)	BHEL HSE Officer
1.							
2.							
3.							
4.							
5.							
6							

Permit Closure After Work Completion

Permit is here by returned after completing the job & ensuring safe removal of men and material.	
Site Engineer, Agency	Site HSE Officer, Agency
Signature:	Signature:
Name:	Name:
Verified the area is safe and Permit is Closed	
Site HSE Officer, BHEL	Site Engineer, BHEL
Signature:	Signature:
Name:	Name:

General Instructions:

- Each Permit shall be given a unique number and recorded.
- Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
- Any other Work Permits required for the task to be taken and attached along with this Permit
- Ensure that workers and supervisors involved are trained & medical checkup done
- This permit must be available at the work site all the times of the work.
- Location and description of the work must be clearly indicated by the permittee.
- Terms applicable must be clearly indicated by the permittee.
- This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
- Compliance to Permit conditions to be checked regularly by concerned execution department
- Permit shall be issued for not more than **7 days** including the issue date.
- Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
- All additional safety precautions to be taken as per HSE Management System.

(For system details, please refer HSEP12: HSE Procedure for Permit to Work)

Distribution

Original- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.,



HSEP:12-F09

**LOADING/ UNLOADING
PERMIT**

Permit No. & Date

Project & Unit:

Agency:

Emergency Contact Nos

Exact Location of Work: _____

Nature / Description of Work: _____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Agency's Package In-charge: _____ Sign: _____ Date: _____

The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit.

No.	Item	Yes	Not required / Remarks
1.	Sufficient Area has been provided for material unloading		
2.	Material loaded properly / Safety precautions taken – Unlashing can be undertaken. (In case loosening the material lashes could lead to material falling in uncontrolled manner)		
3.	Loading / Unloading Cranes, T&Ps are in order with valid TPI certificate.		
4.	Workers involved are properly trained and sensitized to the dangers		
5.	Crane operator is authorized.		
6.	Communication methodology between different gangs is in place. Communication gear (walkie-talkie sets etc.) provided where required		
7.	Adequate supervision is in order		
8.	Area barricaded including backside movement of crane.		
9.	Emergency response team & Medical Facilities available.		
10.	Work hazards are identified, controlled and communicated to the worker.		
11.	Method Statements/ Job Safety Analyses attached:		
12.	Other:		
13.	List of Other Permits Required for the Activity (Attached):		

Declaration:

All the points mentioned in the above checklist have been checked and found OK.

Permit Receiver:

Site Engineer (Agency):

Signature:

Name: _____ Designation: _____

Site HSE Officer (Agency):

Signature:

Name: _____ Designation: _____

Permit Issuer:

Site Engineer (BHEL):

Signature:

Name: _____ Designation: _____

Site HSE Officer (BHEL):

Signature:

Name: _____ Designation: _____

Package-in-charge (BHEL):

Signature:

Name: _____ Designation: _____

(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)

Original: Permittee	2 nd Copy: Agency Deptt. HOS	3 rd Copy: BHEL Site HSE

Daily Work Area Condition Endorsement

Sl. No.	Date	Signature with Date & Time			Remarks
		Agency Site Engineer	Agency HSE Officer	BHEL HSE Officer	
Day 2					
Day 3					
Day 4					
Day 5					
Day 6					
Day 7					

Permit Extension Beyond Initially Requested Hours

Sl. No.	Extension Period		Remarks	Signature with Date & Time			
	From..... (Date, Time)	To..... (Date, Time)		Agency Site Engineer	Agency HSE Officer	BHEL Site Engineer (PIA)	BHEL HSE Officer
1.							
2.							
3.							
4.							
5.							
6							

Permit Closure After Work Completion

Permit is here by returned after completing the job & ensuring safe removal of men and material.	
Site Engineer, Agency	Site HSE Officer, Agency
Signature:	Signature:
Name:	Name:
Verified the area is safe and Permit is Closed	
Site HSE Officer, BHEL	Site Engineer, BHEL
Signature:	Signature:
Name:	Name:

General Instructions:

- Each Permit shall be given a unique number and recorded.
- Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
- Any other Work Permits required for the task to be taken and attached along with this Permit
- Ensure that workers and supervisors involved are trained & medical checkup done
- This permit must be available at the work site all the times of the work.
- Location and description of the work must be clearly indicated by the permittee.
- Terms applicable must be clearly indicated by the permittee.
- This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
- Compliance to Permit conditions to be checked regularly by concerned execution department
- Permit shall be issued for not more than **7 days** including the issue date.
- Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
- All additional safety precautions to be taken as per HSE Management System.

(For system details, please refer HSEP12: HSE Procedure for Permit to Work)

Distribution

Original- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.,



HSEP:12-F10

SAFETY FACILITY REMOVAL PERMIT		Permit No. & Date
Project & Unit:		Emergency Contact Nos
Agency:		

Exact Location of Work: _____

Nature / Description of Work: _____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Agency's Package In-charge: _____ Sign: _____ Date: _____

The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit.

No.	Item	Yes	Not required / Remarks
1.	Has the area been hard barricaded (tape/rope not to be used), to cordoned off area		
2.	Has signage been displayed to caution others of the hazard		
3.	Has proper illumination been arranged to ensure area is well lit as required		
4.	Are personal fall arrest systems being used around hole-opening as required?		
5.	Is a structurally solid hole-cover, marked with do not remove notice being used		
6.	Has the grating been properly installed with clamp/ nut & bolt/ welded		
7.	Emergency response team & Medical Facilities available.		
8.	Work hazards are identified, controlled and communicated to the worker.		
9.	Method Statements/ Job Safety Analyses attached:		
10.	Other:		
11.	List of Other Permits Required for the Activity (Attached):		

Declaration:

All the points mentioned in the above checklist have been checked and found OK.

Permit Receiver:

Site Engineer (Agency):	
Signature: _____	
Name: _____	Designation: _____

Site HSE Officer (Agency):	
Signature: _____	
Name: _____	Designation: _____

Permit Issuer:

Site Engineer (BHEL):	
Signature: _____	
Name: _____	Designation: _____

Site HSE Officer (BHEL):	
Signature: _____	
Name: _____	Designation: _____

Package-in-charge (BHEL):	
Signature: _____	
Name: _____	Designation: _____

(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)

Original: Permittee ☐	2 nd Copy: Agency Deptt. HOS ☐	3 rd Copy: BHEL Site HSE ☐

P.T.O.

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Page 1 of 2

Daily Work Area Condition Endorsement

Sl. No.	Date	Signature with Date & Time			Remarks
		Agency Site Engineer	Agency HSE Officer	BHEL HSE Officer	
Day 2					
Day 3					
Day 4					
Day 5					
Day 6					
Day 7					

Permit Extension Beyond Initially Requested Hours

Sl. No.	Extension Period		Remarks	Signature with Date & Time			
	From..... (Date, Time)	To..... (Date, Time)		Agency Site Engineer	Agency HSE Officer	BHEL Site Engineer (PIA)	BHEL HSE Officer
1.							
2.							
3.							
4.							
5.							
6							

Permit Closure After Work Completion

Permit is here by returned after completing the job & ensuring safe removal of men and material.	
Site Engineer, Agency	Site HSE Officer, Agency
Signature:	Signature:
Name:	Name:
Verified the area is safe and Permit is Closed	
Site HSE Officer, BHEL	Site Engineer, BHEL
Signature:	Signature:
Name:	Name:

General Instructions:

- Each Permit shall be given a unique number and recorded.
- Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
- Any other Work Permits required for the task to be taken and attached along with this Permit
- Ensure that workers and supervisors involved are trained & medical checkup done
- This permit must be available at the work site all the times of the work.
- Location and description of the work must be clearly indicated by the permittee.
- Terms applicable must be clearly indicated by the permittee.
- This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
- Compliance to Permit conditions to be checked regularly by concerned execution department
- Permit shall be issued for not more than **7 days** including the issue date.
- Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
- All additional safety precautions to be taken as per HSE Management System.

(For system details, please refer HSEP12: HSE Procedure for Permit to Work)

Distribution

Original- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.



HSEP:12-F11

LOCKOUT TAGOUT WORK PERMIT		Permit No. & Date
Project & Unit:		Emergency Contact Nos
Agency:		

Exact Location of Work: _____

Nature / Description of Work: _____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Agency's Package In-charge: _____ Sign: _____ Date: _____

The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit.

The following precautions are to be taken:

Tag No.	Device to be Tagged / Locked I.D. No.	Device Location	Device Position OPEN / CLOSED - ON/OFF	Lock No.	Tag Lock Placed by Name/Sign - Date/Time	Tag/ Lock Removed by Name/Sign - Date/Time

Item	Yes	Not Required/ Remarks
Emergency response team & Medical Facilities available.		
Work hazards are identified, controlled and communicated to the worker.		
Method Statements/ Job Safety Analyses attached:		
Other:		
List of Other Permits Required for the Activity (Attached):		

Declaration:

All the points mentioned in the above checklist have been checked and found OK.

Permit Receiver:

Site Engineer (Agency):	Site HSE Officer (Agency):
Signature:	Signature:
Name: _____ Designation: _____	Name: _____ Designation: _____

Permit Issuer:

Site Engineer (BHEL):	Site HSE Officer (BHEL):
Signature:	Signature:
Name: _____ Designation: _____	Name: _____ Designation: _____
Package-in-charge (BHEL):	
Signature:	
Name: _____ Designation: _____	

(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)

Original: Permittee	☐	2 nd Copy: Agency Deptt. HOS	☐	3 rd Copy: BHEL Site HSE	☐

P.T.O.

To be printed on both sides of an A4 Sheet

Daily Work Area Condition Endorsement

Sl. No.	Date	Signature with Date & Time			Remarks
		Agency Site Engineer	Agency HSE Officer	BHEL HSE Officer	
Day 2					
Day 3					
Day 4					
Day 5					
Day 6					
Day 7					

Permit Extension Beyond Initially Requested Hours

Sl. No.	Extension Period		Remarks	Signature with Date & Time			
	From..... (Date, Time)	To..... (Date, Time)		Agency Site Engineer	Agency HSE Officer	BHEL Site Engineer (PIA)	BHEL HSE Officer
1.							
2.							
3.							
4.							
5.							
6							

Permit Closure After Work Completion

Permit is here by returned after completing the job & ensuring safe removal of men and material.	
Site Engineer, Agency	Site HSE Officer, Agency
Signature:	Signature:
Name:	Name:
Verified the area is safe and Permit is Closed	
Site HSE Officer, BHEL	Site Engineer, BHEL
Signature:	Signature:
Name:	Name:

General Instructions:

- Each Permit shall be given a unique number and recorded.
- Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
- Any other Work Permits required for the task to be taken and attached along with this Permit
- Ensure that workers and supervisors involved are trained & medical checkup done
- This permit must be available at the work site all the times of the work.
- Location and description of the work must be clearly indicated by the permittee.
- Terms applicable must be clearly indicated by the permittee.
- This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
- Compliance to Permit conditions to be checked regularly by concerned execution department
- Permit shall be issued for not more than **7 days** including the issue date.
- Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
- All additional safety precautions to be taken as per HSE Management System.

(For system details, please refer HSEP12: HSE Procedure for Permit to Work)

Distribution

Original- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.,



HSEP:12-F12

BEAM / TRUSS/ DUCT/ STRUCTURE ALIGNMENT PERMIT	Permit No. & Date
Project & Unit:	Emergency Contact Nos:
Agency:	

Exact Location of Work: _____

Nature / Description of Work: _____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Agency's Package In-charge: _____ Sign: _____ Date: _____

The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit.

No.	Item	Yes	Not required / Remarks
1.	Is the alignment procedure & Plan submitted, checked and verified safe (Please attach plan along with drawing, location & capacities of lifting tools & tackles)		
2.	Are all lifting tools & tackles, equipment tested and with valid serial numbers traceable to valid certificates		
3.	Ensured that (for load above 5 Ton) chain pulley blocks will not be used to bear full load of the hanging structure and will only be used for lateral movement. Either Winches, Leashing, Structural supports or similar arrangement will be used for hanging the load		
4.	Ensure that area below is cordoned off and barricaded		
5.	Ensured that all the workers working on the load (if any): (check whichever is applicable) a. have double lanyard safety harnesses which are hooked to a lifeline anchored with rigid structure independent of the hanging load b. have retractable fall arrestors, which are hooked to a lifeline anchored with rigid structure independent of the hanging load		
6.	Other Permits (Height Work, Hot Work etc. are ensured)		
7.	All necessary PPEs to be ensured		
8.	List of associated workers attached		
9.	Emergency response team & Medical Facilities available.		
10.	Work hazards are identified, controlled and communicated to the worker.		
11.	Method Statements/ Job Safety Analyses attached:		
12.	Other:		
13.	List of Other Permits Required for the Activity (Attached):		

Declaration:

All the points mentioned in the above checklist have been checked and found OK.

Permit Receiver:

Site Engineer (Agency):	Site HSE Officer (Agency):
Signature:	Signature:
Name: _____ Designation: _____	Name: _____ Designation: _____

Permit Issuer:

Site Engineer (BHEL):	Site HSE Officer (BHEL):
Signature:	Signature:
Name: _____ Designation: _____	Name: _____ Designation: _____
Package-in-charge (BHEL):	
Signature:	
Name: _____ Designation: _____	

(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)

Original: Permittee	2 nd Copy: Agency Deptt. HOS	3 rd Copy: BHEL Site HSE

P.T.O.

To be printed on both sides of an A4 Sheet

Page 1 of 2

Daily Work Area Condition Endorsement

Sl. No.	Date	Signature with Date & Time			Remarks
		Agency Site Engineer	Agency HSE Officer	BHEL HSE Officer	
Day 2					
Day 3					
Day 4					
Day 5					
Day 6					
Day 7					

Permit Extension Beyond Initially Requested Hours

Sl. No.	Extension Period		Remarks	Signature with Date & Time			
	From..... (Date, Time)	To..... (Date, Time)		Agency Site Engineer	Agency HSE Officer	BHEL Site Engineer (PIA)	BHEL HSE Officer
1.							
2.							
3.							
4.							
5.							
6							

Permit Closure After Work Completion

Permit is here by returned after completing the job & ensuring safe removal of men and material.	
Site Engineer, Agency	Site HSE Officer, Agency
Signature:	Signature:
Name:	Name:
Verified the area is safe and Permit is Closed	
Site HSE Officer, BHEL	Site Engineer, BHEL
Signature:	Signature:
Name:	Name:

General Instructions:

- Each Permit shall be given a unique number and recorded.
- Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
- Any other Work Permits required for the task to be taken and attached along with this Permit
- Ensure that workers and supervisors involved are trained & medical checkup done
- This permit must be available at the work site all the times of the work.
- Location and description of the work must be clearly indicated by the permittee.
- Terms applicable must be clearly indicated by the permittee.
- This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
- Compliance to Permit conditions to be checked regularly by concerned execution department
- Permit shall be issued for not more than **7 days** including the issue date.
- Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
- All additional safety precautions to be taken as per HSE Management System.

(For system details, please refer HSEP12: HSE Procedure for Permit to Work)

Distribution

Original- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.

**POWER SECTOR****Inspection of First Aid Box**FORMAT NO: **HSEP:13-F01**

REV NO.: 01

PAGE NO. 01 OF 02

Name of Site :	
Name of Sub-Contractor:	
Inspected by :	
Date of Inspection:	

Number of employees in the site: - _____

Sl.No.	Item	No. Available	Remarks
1	No. of small sterilized dressings		
2	No of medium sized sterilized dressings		
3	No of large sized sterilized dressings.		
4	No of large sized sterilized burn dressings		
5	No of (15 grams) packets sterilized cotton wool		
6	No of pieces of sterilized eye pads in separate sealed packets.		
7	No of roller bandages 10 cm wide.		
8	No of roller bandages 5 cm wide.		
9	Whether tourniquet available		
10	Whether supply of suitable splints available.		
11	No of packets of safety pins.		
12	Whether kidney tray available		
13	Whether sufficient number of eye wash bottles, filled with distilled water or suitable liquid, clearly indicated by a distinctive sign which shall be visible at all times, available.		
14	Whether 4%-xylocaine eye drops, and boric acid eye drops and soda by carbonate eye drops available.		
15	Whether (60ml) bottle containing a two percent alcoholic solution of iodine available		
16	Whether (two hundred ml) bottle of mercurochrome (2 per cent) solution in water available.		
17	Whether 120ml bottle containing Sal volatile having the dose and mode of administration indicated on the label,		
18	Whether roll of adhesive plaster (6 cm X 1 meter) available		

**POWER SECTOR****Inspection of First Aid Box**FORMAT NO: **HSEP:13-F01**

REV NO.: 01

PAGE NO. 01 OF 02

Sl. No.	Item	No. Available	Remarks
19	No of rolls of adhesive plaster (2 cmX1 meter)		
20	Whether snake bite lancet available.		
21	Whether (30 grams) bottle of potassium permanganate crystals available.		
22	Whether a pair scissors available		
23	Whether copy of the First-Aid leaflet issued by the Director-General, Factory Advice service and labor Institutes, Government of India available.		
24	Whether bottle containing 100 tablets (each of 5 grains) of aspirin available		
25	Whether Ointment for burns available		
26	Whether bottle of a suitable surgical anti-septic solution available		
27	Whether List of Contents pasted on First Aid Box along with respective expiry dates		

Signature of Subcontractor's Site I/C Date:

**POWER SECTOR****Health Check-Up**

FORMAT NO: HSEP:13-F02

REV NO.: 01

PAGE NO. 01 OF 02

Name of Site :	
Name of Sub-Contractor:	
Name of Employee :	
Age:	

History Of Past Illness	H/O Epilepsy
	H/O Drug Allergy
	H/O Diabetics/ Hypertension
	H/O Unconsciousness
Personal History	

EXAMINATION**OBSERVATION****General Physical Examination**

Height		
Weight		
BMI		
Built And nourishment		
Pallor		
Temperature		
Chest Expansion	Inspiration	Expansion
Lymph Node Enlargement		
Upper Limbs Strength & Function		
Lower Limbs Strength & function		
Spine Adequately flexible for the job concerned (Yes/No)		
Mental alertness and stability with good eye, hand and foot co-ordination.		

Ear, Nose, Throat

Ear / Hearing	
Nose	
Throat	
<u>Vision</u>	
Left Eye	Right Eye

**POWER SECTOR****Health Check-Up**FORMAT NO: **HSEP:13-F02**

REV NO.: 01

PAGE NO. 02 OF 02

EXAMINATION		OBSERVATION	
<u>Cardiovascular System Examination</u>			
Inspection			
Palpation	Pulse	BP	
Auscultation (Heart Sounds)			
<u>Respiratory System</u>			
Inspection	Respiratory Rate		
Palpation:			
Percussion			
Auscultation (Breath Sounds)			
<u>Examination of Abdomen</u>			
Inspection			
Palpation			
Auscultation (Bowel Sounds)			
Any Other			
Clinical Impression			

Signature of the examining doctor Date:

**POWER SECTOR****HSE Induction Training**

FORMAT NO: HSEP:13-F03

REV NO.: 01

PAGE NO. 01 OF 01

Name of Site :**Name of Sub-Contractor :****Date :****Name of Training
Co-ordinator:**

Sl. No.	Name	Designation	Organisation	Signature

(Training carried out as per HSEP04: HSE Procedure for Training & Awareness)

Signature of Training Coordinator Date:

**POWER SECTOR****Toolbox Talk**

FORMAT NO: HSEP:13-F04

REV NO.: 00

PAGE NO. 01 OF 01

Name of Site :**Sub-Contractors Name :****Date :**

Topic	Name of person delivered Tool Box Talk	No. of Participants attended	Remarks

Signature of Site I/C of Subcontractor Date:

	POWER SECTOR	FORMAT NO: HSEP:13-F05
	Monthly Site HSE Report	REV NO.: 01 Page 01 of 7

Name of Site:	Report Month:

A) Accidents/Incidents Details: -

a	Lost time in Accidents	No. of incidents	Man Hours Lost	No. of People Involved	No. of contractors involved	BHEL persons if any	No. of persons reported to Govt.
	For the Month						
	Cumulative						
b	Minor Injuries						
	For the Month						
	Cumulative						
c	Fires	No. of Near-Misses	No. of First- Aid cases	No. of persons injured	No. of equipment damaged	No. of Fire reported Outside	
	For the Month						
	Cumulative						
d	Other mishaps not covered in a, b, c.	No. of Near-Misses	No. of First- Aid cases	No. of persons injured	No. of equipment damaged	Total near misses and First-Aid	
	For the Month						
	Cumulative						

B) Data for Man-hours worked:

Details	BHEL(A)	Contractors(B)	Remarks if any
No. of people			
Man Hours worked			
O.T. Hours			
Total Man Hours			
Grand Total of man hours worked during the month(A+B)			
Cumulative man-hours(from _____ to _____): (Since the opening of the site)			

Signature of Head(SOX)

Signature of Site HSE Coordinator

**POWER SECTOR****Monthly Site HSE Report**

FORMAT NO: HSEP:13-F05

REV NO.: 01

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C) Status of Deployment of Work force, Safety Officers/Supervisors & Construction Medical Officer(s) & Electricians by Agencies:

Description	Name	Qualification & Experience
Safety Officers		
Safety Supervisors		
Construction Medical Officer		
Nursing Staff.		
Electricians		

D) Lifting Tools, Tackles, Equipment and Pressure Vessels:

Item	Nos. Deployed	Identification Nos. (Comma separated) (A)	Nos. Tested by competent person	Validities of Test Certificates (Comma separated – corresponding to column A)
Winches				
Chain Blocks				
Wire Rope Slings				
Man Cages				
D-Shackles				
Air Compressors				
Crawler Cranes				
Mobile Cranes				
Hydra Cranes				
Others				

Signature of Head(SOX)

Signature of Site HSE Coordinator

**POWER SECTOR****Monthly Site HSE Report**

FORMAT NO: HSEP:13-F05

REV NO.: 01

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E) Reverse Horns in Construction Vehicles:

Item	Nos. Deployed with serial numbers (Comma separated) (A)	Nos. Having Functional reverse horns	Inspection Dates (Comma separated corresponding to column A)
Transit Mixers			
Hydra Cranes			
Dumpers/Trippers			
Backhoes			
Other Vehicles			

F) ELCBs:

No. Of ELCBs provided with Serial Nos. (Comma separated) (A)	Nos. Functional	When They were last Tested (Comma separated corresponding to column A)

G) Electrical Earthing:

No. Of Earth resources with serial numbers and locations (Comma separated) (A)	Whether Double Earthing provided to all equipment	When they were last tested (Comma separated corresponding to column A)

H) Fire Extinguishers:

Name & designation of person responsible for maintenance of Extinguishers at different locations: (Individual Contractor's Safety Officers).

FIRE EXTINGUISHERS AT ERECTION SITE:

Type	Size (Add more rows if required)	Qty + Serial numbers (Comma separated) (A)	Healthiness – Last checked dates (Comma separated corresponding to column A)	Locations (Comma separated corresponding to column A)
FOAM TYPE				
SODA TYPE				
DRY TYPE (DCP)				
CO2 TYPE				

Signature of Head(SOX)

Signature of Site HSE Coordinator

	POWER SECTOR	FORMAT NO: HSEP:13-F05
	Monthly Site HSE Report	REV NO.: 01 Page 04 of 7

FIRE EXTINGUISHERS AT BHEL SITE OFFICE & STORES:

Type	Size (Add more rows if required)	Qty + Serial numbers (Comma separated) (A)	Healthiness – Last checked dates (Comma separated corresponding to column A)	Locations (Comma separated corresponding to column A)
FOAM TYPE				
SODA TYPE				
DRY TYPE (DCP)				
CO2 TYPE				

I) Implementation of checklist, Work permits:

Item	Numbers During the Month	Major Deviations

Note:- Please attach photocopies of all filled Checklists & Work permits for that month.

J) Personal Protective Equipment Issued (*Extend table for each contractor*):

Item	Issued this Month	Nos. Issued up to the Month	Percentage of usage at Site (as per physical verification)
Name of Contractor:			
Safety Helmet			
Safety Shoes			
Full Body Harness			
Fall Arrestor			
Safety Nets			
Other PPEs.			

Signature of Head(SOX)

Signature of Site HSE Coordinator

	POWER SECTOR	FORMAT NO: HSEP:13-F05 REV NO.: 01 Page 05 of 7
	Monthly Site HSE Report	

K) Safety Observations by BHEL Executives- Observations package wise:

No. of Observations received in the month	No of points complied	Cumulative no. of non-complied points

L) Training programs on safety during the month:

• Refresher Trainings Conducted: -

Topic	Date Of Programme	No. Of Participants	Level Of Participants

• Tool-Box talks/ Pep-talks on Safety:

Date	Tool Box Talk - No of Participants	Topic	Remarks
Date	Safety Induction No. of Participants	Topic	Remarks

Signature of Head(SOX)

Signature of Site HSE Coordinator

**POWER SECTOR****Monthly Site HSE Report**

FORMAT NO: HSEP:13-F05

REV NO.: 01

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M) Progress of Management Programmes at Site

SL	Description Of MPs	Annual Plan	Achievement In This Month	Cumulative Achievement
A. Environment Improvement Programme				
1	Plantation of Trees			
2	Installation of Scrap Bins			
3	Chemical Storage & Handling system			
B. Improvement of Working Environment				
4	Increasing LTI free days			
5	Air Quality Monitoring			
6	Water Quality Monitoring			
7	Illumination level Monitoring			

N) HR Information:

Designation	Total No. Inducted	Total no. of Induction Balance	Total no. of Gate Pass Issued	Total no. of Gate Pass Balance	Total no. of Gate Pass Cancelled	Medical Checkup Completed	Medical Checkup Balance

Signature of Head(SOX)

Signature of Site HSE Coordinator

	POWER SECTOR	FORMAT NO: HSEP:13-F05 REV NO.: 01 Page 07 of 7
	Monthly Site HSE Report	

O) Penalty Imposed On Account of Safety Violation

By Customer	On Subcontractor By BHEL	Amount (Rs)	Deducted (Yes/No, Remarks)	Brief Reason

P) Rewards on Account of Good Safety Performance

Reward issuing Agency (BHEL / Customer/ Subcontractor)	Reward Issued to	Details of Reward Issued (Amount etc.)	Brief Reason

Note: Photos of Reward Functions to be attached

Q) Other Safety initiatives / Safety Activities conducted at sites (with photos, if any):

Signature of Head(SOX)

Signature of Site HSE Coordinator

**POWER SECTOR****Personal Protective Equipment**

FORMAT NO: HSEP:13-F06

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Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection:	

Item	Issued this Month	Nos. Issued up to the Month	Percentage of usage at site
Safety Helmet			
Safety Shoes			
Full Body Harness			
Fall Arrestor			
Safety Nets			
Other PPEs.			

Signature of Site I/C of Subcontractor:

Date:

**POWER SECTOR****Inspection Of T&Ps**FORMAT NO: **HSEP:13-F07**

REV NO.: 00

PAGE NO. 01 OF 01

Name of Site :	
Name of Sub-Contractor :	
Date of Inspection :	

Sl.No.	Description	Remarks
1.0	Name of equipment	
2.0	Basic Information of equipment	
2.1	Specification	
2.2	Sr. No. of equipment	
2.3	Make	
2.4	Year of manufacture	
3.0	Major repairs / overhauls(Furnish details of work carried out)	Date(s) of major repair/overhaul
3.1		
3.2		
3.3	Repairs carried out at site	
4.0	Any performance test conducted	Yes/No
5.0	Document Submitted	Yes/No
6.0	Manufacturer's test / guarantee certificate	Available/ Not available
7.0	Performance test	Done/ Not Done
8.0	Acceptance Norms	
9.0	Committee Observations	
10.0	Date of next review (if accepted)	
Signature-Subcontractor/ Subcontractor's Safety Officer		Signature-Site Safety Officer (BHEL)

**POWER SECTOR****Status Of T&Ps**FORMAT NO: **HSEP:13-F08**

REV NO.: 01

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Name of Site :	
Name of Sub-Contractor :	
Date of Inspection :	

Item	Nos. Deployed	Identification Numbers (1 on each line)	Whether Tested by competent person	Validity of Test Certificates	Whether internal testing using Color Coding or similar system done
Winches					
Chain Blocks					
Wire Rope Slings					
Man Cages					
D-Shackles					
Air Compressors					
Crawler Cranes					
Mobile Cranes					
Hydra Cranes					
Others					

Signature of Site I/C of Subcontractor:

Date:

**POWER SECTOR****Inspection Of Cranes**

FORMAT NO: HSEP:13-F09A

REV NO.: 00

PAGE NO. 01 OF 01

Name of Site :**Name of Sub-Contractor :****Inspected by :****Date of Inspection:****Crane Reg. No(Make/Model)****Name of Driver/Operator**

Sl.no.	Description	Observation	Measures
1	Valid Driving license		
2	Hook & Hook Latch		
3	Over Hoist limit switch		
4	Boom limit switch		
5	Boom Angle Indicator		
6	Boom limit cutoff switch		
7	Condition of Boom		
8	Condition of ropes		
9	Number of load lines		
10	Size and condition of the slings		
11	Stability of the cranes		
12	Soil Condition		
13	Swing Break And Lock		
14	Proper Break And Lock		
15	Hoist Break And Lock		
16	Boom Break And Lock		
17	Main Clutch		
18	Leakage in Hydraulic Cylinders		
19	Out riggers fully extendable		
20	Tyre pressure		
21	Condition of Battery And Lamps		
22	Guards of moving and rotating parts		
23	Load chart provided		
24	Number and position of pedant ropes		
25	Reverse Horn		
26	Load Test Details		
27	Operator's fitness		
28	Pollution under control certificate		
29	Fire extinguisher of appropriate type.		
30	Training of the operator		

Signature of Site I/C of Subcontractor:**Date:**

**POWER SECTOR****Inspection Of Winches**

FORMAT NO: HSEP:13-F09B

REV NO.: 00

PAGE NO. 01 OF 01

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection:	

Winch Reg. No(Make/Model) _____

Name of Operator _____

Sl. No.	Description	YES	NO	NA	Remarks
1	Has the copy of Third Party Inspection certificate been provided in winch machine shed?				
2	Is winch machine operator experienced enough to operate the winch machine?				
3	Is the winch machine operated by someone other than the winch machine operator?				
4	Is there guard provided in all moving parts like wheel and motor's shaft?				
5	Will it protect against unforeseen operational contingencies?				
6	Are brakes, clutch and locking arrangement working properly?				
7	Has it been ensured that the guard does not constitute a hazard by itself?				
8	Are the cranks and the connecting rods protected by guardrails?				
9	Is there provision for fully covered shed with wooden plank roof?				
10	Is wire rope free from any kind of damage or wear and tear?				
11	Is split pin provided for the protection of clutch and brake locking arrangement?				
12	Is pulley inspected by competent person and certified before use?				
13	Is pulley free from any wear and tear visually?				
14	Is winch rope barricaded with clipsheet for the protection of rope and person?				
15	Is the wire rope lubricated by cardium oil?				
16	Is there any friction in wire rope which may damage the wire rope rather than the rolling parts?				
17	Is there any oil leakage in the hydraulic system of the winch machine?				
18	Has it been ensured that the guard will not cause discomfort or inconvenience to operator?				
Total NO		Total NA		% Compliance	

Signature of Site I/C of Subcontractor:

Date:

**POWER SECTOR****Inspection of Height Working**

FORMAT NO: HSEP:13-F10

REV NO.: 01

PAGE NO. 01 OF 2

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection:	

Sl. No.	Descriptions	Observation (Yes/No)	Remarks
1	All the workers have been explained safe work method?		
2	An established communication system has been established and explained to the workers.		
3	Adequate illumination has been ensured.		
4	Work area inspected prior to the start of the work.		
5	Is the work area barricaded to prevent fall and platforms are of adequate strength (bamboo, jute / plastic ropes not to be used).		
6	The temporary work platforms& structures for height work including those used in Boiler structures, water walls, ESP, Powerhouse are fully barricaded with railings (as per IS 3696)		
7	Fabricated makeshift arrangements are checked for quality and type of material welding, anchoring etc.		
8	Are floor gaps, permanently covered and barricaded		
9	Area below the work place barricaded, particularly below hot work.		
10	Workers provided with bags /box to carry bolts, nuts and hand tools		
11	Arrangement for fastening hand tools made.		
12	All work platforms ensured to be of adequate strength and ergonomically suitable.		
13	Work at more than one elevation at the same segment is restricted.		
Access/Egress			
1	Walkways provided with handrail, mid-rail and toe guard?		
2	All checkered plates, gratings properly welded/ bolted?		
3	Are ladders inspected and they are in good condition?		
4	Are ladders spliced?		
5	Are ladders properly secured to prevent slipping, sliding or falling?		
6	Do side rails extend 36" above top landing?		

**POWER SECTOR****Inspection of Height Working**

FORMAT NO: HSEP:13-F10

REV NO.: 01

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Sl. No.	Descriptions	Observation (Yes/No)	Remarks
7	Are built up ladders constructed of sound materials?		
8	Are rugs and cleats not over 12" on center?		
9	Metal ladders not used around electrical hazards.		
10	Proper maintenance and storage.		
11	Ladders placed at right slope.		
12	Ladders / staircases welded/ bolted properly.		
13	Any obstruction in the stairs.		
14	Are landing provided with handrails, knee rails, toe boards etc.?		
15	Whether ramp is provided with proper slope.		
16	Proper hand rails / guards provided in ramps.		
Housekeeping			
1	Walkways, aisles & all overhead workplaces cleared of loose material.		
2	Flammable materials, if any, are cleared.		
3	All the de shuttering materials are removed after de shuttering is done.		
4	Platforms and walkways free from oil/grease or other slippery material.		
5	Collected scrap are brought down or lowered down and not dropped from height.		
PPE And Safety Devices			
1	Use of safety helmet, safety belts ensured for all workers		
2	Anchoring points provided at all places of work.		
3	Common lifeline provided wherever linear movement at height is required.		
4	Safety nets are use wherever required.		
5	Proper fall arrest system is deployed at critical workplaces.		
6	Crawler boards/Safety system or works on fragile roof are used.		

Signature of Site I/C of Subcontractor:

Date:

**POWER SECTOR**

FORMAT NO: HSEP:13-F11

REV NO.: 01

PAGE NO. 01 OF 02

Inspection of Welding and Gas Cutting

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

Welding				
Sl.no.	Description	Y e s	N o	Remarks
1	Is electric connection given through 30 mA ELCB/RCCB to welding m/c?			
2	Is electric cable fitted properly in junction box on m/c?			
3	Is electrical cable free from joints?			
4	Are the joints attached firmly & insulated with tape?			
5	Is double earthing given to body of m/c?			
6	Is the physical condition of the m/c good?			
7	Is ON/OFF switch connected to the m/c is working and in good condition?			
8	Are indication lamps on m/c working?			
9	Is the electrode holder in good condition?			
10	Are the cables of the welding m/c plugged & tight properly?			
11	Are return lead connected properly (Rod, Angle, Channels shall not be used)			
	Total No of NO			
	Total No of YES			

**POWER SECTOR****Inspection of Welding and Gas Cutting**FORMAT NO: **HSEP:13-F11**

REV NO.: 00

PAGE NO. 02 OF 02

Gas Cutting				
Sl.no	Description	Yes	No	Remarks
1	Are Cylinders kept on trolleys?			
2	Physical condition of Gas cylinders Good?			
3	Is there Oil/Grease on valve of the cylinder?			
4	Are pressure regulators in good condition?			
5	Condition of hose pipe OK?			
6	Are hose pipe clamped with hose clip?			
7	Is flash back arrestor & NRV fitted on torch both for O2 and LPG cylinder?			
8	Is nozzle of the torch cleaned?			
	Total Number of NO			
	Total No of YES			
	% Compliance			

Signature of Site I/C of Subcontractor:

Date:

**POWER SECTOR****Inspection Of Electrical Installations**

FORMAT NO: HSEP:13-F12

REV NO.: 00

PAGE NO. 01 OF 02

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

Sr. No.	Contents	Yes/No	Remarks
A	Cable		
1.	Whether the condition of cable is checked?		
2.	Are cables received from other sites checked for insulation resistance before putting them into use?		
3.	Are all main cables taken either underground /overhead?		
4.	Are welding cables routed properly above the ground?		
5.	Are welding and electrical cables overlapping?		
6.	Is any improper joining of cables/wires prevailing at site?		
B	DBs/SDBs		
1.	Is earth conductor continued up to DB / SDB?		
2.	Whether DBs and extension boards are protected from rain / water?		
3.	Is there any overloading of DBs / SDBs?		
4.	Are correct / proper fuses & CBs provided at main boards and sub-boards?		
5.	Is energized wiring in junction boxes, CB panels & similar places covered all times?		
C	ELCB		
1.	Whether the connections are routed through ELCB?		
2.	Is ELCB sensitivity maintained at 30 mA?		

**POWER SECTOR****INSPECTION OF ELECTRICAL INSTALLATION**

FORMAT NO: HSEP:13-F12

REV NO.: 00

PAGE NO. 02 OF 02

Sr. No.	Contents	Yes/No	Remarks
3.	Are the ELCB numbered and tested periodically & test results recorded in a logbook countersigned by a competent person?		
D	Grounding		
1.	Is natural earthing ensured at the source of power (main DB at Generator or Transformer)?		
2.	Whether the continuity and tightness of the earth conductor are checked?		
3.	Mention the gauge of the earth conductor used at the site.		
4.	Mention the value of Earth Resistance.		
E	Electrically operated Machines or Accessories.		
1.	Whether the plug top is provided everywhere.		
2.	Are all metal parts of electrical equipment and light fittings / accessories grounded?		
3.	Is there any shed or cover for welding machines?		
4.	Are halogen lamps fixed at proper places?		
5.	Are portable power tools maintained as per norms?		
6.	Any other information:		

Signature of Site I/C of Subcontractor:

Date:

**POWER SECTOR****Inspection of Elevator**

FORMAT NO: HSEP:13-F13

REV NO.: 00

PAGE NO. 01 OF 01

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

Sr. No.	Description	Remarks
1.0	Name of equipment	
2.0	Basic Information of equipment	
2.1	Specification	
2.2	Sr. No. of equipment	
2.3	Make	
2.4	Year of manufacture	
3.0	Major repairs/overhauls(Furnish details of work carried out)	Date(s) of major repair/overhaul
3.1		
3.2		
3.3	Repairs carried out at site	
4.0	Any performance test conducted	Yes/No
5.0	Document Submitted	Yes/No
6.0	Manufacturer's test / guarantee certificate	Available/ Not available
7.0	Performance test	Done/ Not Done
8.0	Acceptance Norms	
9.0	Committee Observations	
10.0	Date of next review (if accepted)	
Signature-Subcontractor/ Subcontractor's Safety Officer		Signature-Site Safety Officer (BHEL)

**POWER SECTOR****HSE Penalty Format**

FORMAT NO: HSEP:14-F14

REV NO.: 00

PAGE NO. 01 OF 2

Sub: MEMO for Penalty for non-compliances in Safety and Fabrication Quality requirement

Following lapse (tick marked) was observed and penalty is imposed as stated at the bottom of this memo. It is requested that such occurrences may please be avoided in future.

S. No	Nature of Non - Compliance	Penalty (in Rs.)	Remarks
A. PPEs			
1.	Not wearing safety helmet / wearing without chin straps	500	Per Person/ day
2.	Not Wearing safety shoes	500	Per Person/ day
3.	Not wearing gloves, nose masks where required	350	Per Person/ day
4.	Not using grinding goggles while doing grinding operations	500	Per Person/ day
5.	Not wearing Reflective Vest with company LOGO	350	Per Person/ day
6.	Not wearing safety goggles	350	Per Person/ day
7.	HV arc flash suit with protective hood	2500	Per Person/ day
8.	LV arc flash jacket	1000	Per Person/ day
9.	Electrical Hand gloves for voltage work >260 V and <=690(LV)	500	Per Person/ day
10.	Electrical safety over shoe (for Electrical work)	500	Per Person/ day
B. Height Work			
1.	Not providing Lifelines for height work	1000	Per location per day
2.	Not ensuring barricading of working platforms	1000	Per location per day
3.	Not using temporary platform during work at height	1000	Per case per day
4.	Not wearing safety belt while working at height (> 2 meters) or not anchoring to lifeline	2000	Per Person/ day
5.	Not providing proper barricades (caution tape at 2 elevations)	500	Per location per day
6.	Use of mobile phones by Height worker / Crane / Hydra Operator	1000	Per case per day
C. Electrical			
1.	Not using 24 V supply for lighting in confined spaces	500	Per case per day
2.	Lack of Electrical Earthing	2000	Per case per day
3.	Improper earthing of welding & Other electrical Machines. Earth resistance not OK	500	Per Machine per incidence
4.	Electrical plug not used for connection/ hand machines	500	Per connection per incidence
5.	Unsafe electrical practice like not installing ELCB/ RCCB	500	Per case per day
6.	Using frayed/ broken welding cables	500	Per machine per week
7.	Non deployment of valid licensed electrician for LV & HV work as per IER	5000	Per Person/ day
D. Lifting			
1.	Use of lifting equipment without having valid Third Party Test certificate	5000	Per equipment per seven days
2.	Lifting hooks without latches	500	Per hook per day
3.	Using damaged slings or not slinging properly	2000	Per event Per T&P
4.	Lifting cylinders without cage or rolling of cylinders	500	Per Event per incidence
5.	Non removal of scrap from platforms	1000	Per Event Per location per 7 days
E. Hot Work / Cylinder Handling			
1.	Gas cutting without flash back arrestor	2000	Per machine per incidence
2.	Gas cutting at height without sheet below	500	Per event
3.	Not keeping gas cylinders vertically / in trolley on ground	500	Per event
4.	Gas cutting with damaged hose pipes	500	Per event
5.	Not covering welding cylinder with top cover	500	Per event

**POWER SECTOR****HSE Penalty Format**

FORMAT NO: HSEP:14-F14

REV NO.: 00

PAGE NO. 02 OF 2

	Nature of Non - Compliance	Penalty in Rs.)	Remarks
F. Construction Vehicles			
24.	Not having valid driving license for the type of vehicle/ T&P	2000	Per driver per event
25.	Two wheeler entry in construction area	500	Per vehicle
26.	Using Hydra for material movement at site in unsafe manner	1000	Per case
27.	Using Two Hydra in Tandem for material movement	2000	Per case
28.	Vehicles, Hydras, Cranes, Dumpers and Earth Movers not having automatic back horns linked to gear	1000	Per Equipment per day
29.	Not using guide rope while moving material using Hydra or Cranes	1000	Per event
30.	Violating speed limit during vehicle movement	1000	Per event
Engineering / Administrative Controls / General			
31.	Major Accident – Victim not reporting for work within 48 hours – resulting in partial loss in earning capacity & termination / demotion in employment	200000	Per victim
32.	Fatal Accident/Accidents Resulting in total Loss in Earning Capacity #	500000	Per victim#
33.	Unsafe Act in violation of standards / clauses of this document	500-5000	Per case
34.	Activity carried out without safety work permit where applicable	2000	Per person per event
35.	Using untrained / unqualified personnel for hazardous work	2000	Per event
36.	Not maintaining proper hygiene in canteen as per BOCW	1000	Per event

or as deducted by customer, whichever is higher.

For repeated **major and** fatal incidents under the same subcontractor for the same package in the same Unit, the subcontractor will pay 2 times the penalty compared to previously paid

Details (if any) related to non- compliance (Name of persons, Nature of deficiency, etc.)

Penalty imposed: _____

1, Rate as per above chart _____

2. No. of Persons/ machine/ event/ labor _____

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

BHEL Personnel:

Signatures:

Name _____

Attachments: Photographs & Documentary proof (if available) for violation

Distribution: 1 Copy: to Sub- Contractor Site In-charge,
1 Copy to Site Construction Manager (BHEL)

REV NO.: 00
PAGE NO. 01 OF 1

**POWER SECTOR****Format for Inspection of Labor Colony**

FORMAT NO: HSEP:13-F16

REV NO.: 00

PAGE NO. 01 OF 1

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

S. No	Particulars	No	Yes	Comments
1	Sufficient living space ensured for each occupant with Kitchen area			
2	Area cleanliness ensured through regular cleaning			
3	Toilet facility sufficient for all occupants available, in order with adequate lighting, cleaned regularly and in hygienic condition			
4	Washing facilities available with adequate water supply			
5	Availability of sufficient drinking water in protected tanks with weekly tank cleaning and source tested annually as per IS10500 ensured			
6	Adequate drainage to remove waste and rain water, no flooding			
7	"Unsafe for Drinking" posted near accessible non-potable water and sources; posted in language of occupants or universal symbol			
8	Prevention of mosquitoes, flies, and rodents in immediate housing area through insecticide sprays if required			
9	Electricity provided& electrical connections safety ensured			
10	Fans, Coolers / Quilts, Heaters provided as required to cater to weather conditions along with adequate electricity supply			
11	Houses Walls and roof tight and solid; floors rigid and durable, with smooth, cleanable finish in good repair			
12	Availability of nominal rate ration / common use items shop within / nearby the colony			
13	Emergency medical plan developed: (A) Potential injuries determined (B) Local EMS response determined (C) Qualified first-aid person on site, if required			
14	Emergency plans posted where employees gather			
15	Transportation to nearest suitable facility			

Any other checks:

Remarks:

Name & Sign. Of HSE Officer



POWER SECTOR

FORMAT NO: HSEP:13-F17

REV NO.: 00

PAGE NO. 01 OF 1

Format for Recording of First Aid Injuries

Name of Site:

[illegible]



POWER SECTOR

FORMAT NO: HSEP:13-F18

REV NO.: 00

PAGE NO. 01 OF 1

Format for Register of Issue and Receipt of PPEs

Site:

Subcontractor:

[illegible]

**POWER SECTOR****Format for Maintaining Records of E-waste
Handled / Generated**

FORMAT NO: HSEP:13-F19

REV NO.: 00

PAGE NO. 01 OF 1

(Generated Quantity in Metric Tonnes (MT) per year)

Site		
Subcontractor		
Date		
Types & Quantity of e-waste handled/generated**	Category	Quantity
	Item Description	
Types & Quantity of e-waste stored	Category	Quantity
	Item Description	
Types & Quantity of e-waste sent to collection center authorized by producer/dismantler/recycler/refurbisher or authorized dismantler/ recycler or refurbisher **	Category	Quantity
	Item Description	
Types & Quantity of e-waste transported*	Category	Quantity
	Item Description	
Name, address and contact details of the destination		
Types & Quantity of e-waste refurbished*	Category	Quantity
	Item Description	
Name, address and contact details of the destination of refurbished materials		
Types & Quantity of e-waste dismantled*	Category	Quantity
Name, address and contact details of the destination		
Types & Quantity of e-waste recycled*	Category	Quantity
Types & Quantity of materials recovered	Item Description	
	Quantity	
Name, address and contact details of the destination		
Types & Quantity of e-waste sent to recyclers by dismantlers	Category	Quantity
	Item Description	
Name, address and contact details of the destination		
Types and Quantity of other waste sent to respective recyclers by dismantlers / recyclers of e-waste	Category	Quantity
	Item Description	
Types and Quantity of e-waste treated & disposed	Category	Quantity
	Item Description	
Name, address and contact details of the destination		

Signature of Subcontractor:

Date

**POWER SECTOR****Format for Maintaining Records of Hazardous Waste at the Facility**

FORMAT NO: HSEP:13-F20

REV NO.: 00

PAGE NO. 01 OF 1

1. Name of Site:
2. Name of the Subcontractor:
3. Date:
4. Description of hazardous waste:

Physical form with description	Chemical form	Total volume and weight (in kg.)

5. Description of storage and treatment of hazardous waste:

Date	Method of storage of hazardous wastes	Date	Method of treatment of hazardous wastes

6. Details of transportation of hazardous waste:

Name & address of consignee of package	Mode of packing/of the waste for transportation	Mode of transportation to site of disposal	Date of transportation

7. Details of disposal of hazardous waste:

Date of disposal	Concentration of hazardous material in the final waste form	Site of disposal (identify the location on the relevant layout drawing for reference)	Method of disposal	Persons involved in disposal

8. Data of environmental surveillance:

Date of measurement	Analysis of ground water			Analysis of soil samples			Analysis of air sampling			Analysis of any other samples (give details)
	Location of sampling	Depth of sampling	Data	Location of sampling	Depth of sampling	Data	Location of sampling	Data		

9. Details of the hazardous wastes reused and recycled:

Date	Total quantity of hazardous waste generated	Details of hazardous waste minimization activity	Material received	Final quantity of waste generated	Net reduction in waste generation quantity and percentage

Signature of Subcontractor:

Date:

**POWER SECTOR****HSE Checklist-cum-Compliance Report**

FORMAT NO: HSEP:13-F21

REV NO.: 00

PAGE NO. 01 OF 3

PROJECT: _____

CONTRACTOR: _____

_____ 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 EQUIPMENT				
Goggles; shields				
Face protection				
Hearing protection				
Respiratory masks etc.				
Safety belts				
Other				
EXCAVATIONS / OPENINGS				
Openings properly covered or barricaded				
Excavations shored				
Excavations barricaded				
Overnight lighting provided				
Other				
WELDING, CUTTING				
Gas cylinders chained upright				
Cable and hoses not obstructing				
Fire extinguisher (s) accessible				
Others				
SCAFFOLDING				
Fully decked platforms				
Guard and intermediate rails in place				
Toe boards in place				
Adequate shoring				
Adequate access				
Others				
LADDER				
Extension side rails 1 m above				
Top of landing				
Properly secured				
Angle + 70° from horizontal				
Other				



POWER SECTOR

HSE Checklist-cum-Compliance Report

FORMAT NO: HSEP:13-F21

REV NO.: 00

PAGE NO. 02 OF 3

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				

**POWER SECTOR****HSE Checklist-cum-Compliance Report**

FORMAT NO: HSEP:13-F21

REV NO.: 00

PAGE NO. 03 OF 3

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 rag sand combustible materials done properly.				
HEALTH CHECKS				
Hygienic conditions at labor camps O.K.				
Availability of first-aid facilities				
Proper sanitation at site, office & labor camps.				
Arrangement of medical facilities.				
Measures for dealing with illness.				
Availability of potable drinking water for workmen & staff.				
Provision of crèches for children.				

Signature of Subcontractor:

Date:



POWER SECTOR - HQ

**Initial Incident Report
Near Miss / Minor Incident**FORMAT NO.: HSEP:08-F01
REV NO.: 00**1. Incident Details:**

Sl. No	Item	Information	Sl. No	Item	Information
1	Place of Incident		8	IP's Name	
2	Exact location		9	IP Date of Birth	
3	Date & Time		10	Injury Details	
4	Main EPC		11	Body Part Injured	
5	Sub-Contractor if any		12	IP's Gate Pass No.	
6	Job Sup. Name	MR. XXXXXXXXXXXX	13	Name of	
7	Date of Joining Duty		14	Witness	

2. Classification of Incident:**3. Activity Type:**

Height Work		Hot work		Machine Guarding	
Excavation		Confined Space		Vehicle Movement	
Scaffolding		Electrical		Construction Equipment	
Hoist & Rigging		Portable & Power Hand Tools		Housekeeping	
Material Handling		Environmental Spill		Painting	
Insulation		Hydro test		Commissioning	

Incident Description:**Immediate Action Taken:** Immediately higher elevation work stopped (Example).**Immediate causes:** Loose material or poor material handling suspected (Example).**Action Taken to Correct:**

Name of the reporting Person:

Date:

	POWER SECTOR - HQ	FORMAT NO.: HSEP:08-F02
	Preliminary Incident Report to HQ (Fatal / Major / Fire)	REV NO.: 00 Page 1 of 2

Type of incident: Fatal/Major//Fire/Property damage (Tick what is applicable)

1	NAME OF SITE			3	ACTIVITY AREA	
2	SCOPE OF WORK			4	NAME OF CONTRACTOR	
				5	NAME & DESIGNATION OF BHEL ACTIVITY I/C	
6	DATE & TIME OF ACCIDENT			7	DATE RESUMED	
8	NO. OF WORK-DAYS LOST BY VICTIM (If duty not resumed, give estimated figure)					
9	NO. OF MANHOURS LOST BY OTHERS					
10	PERSONAL DETAILS OF INJURED AND/OR DETAILS OF MATERIALS/EQUIPMENT/ PROPERTY DAMAGED					
NAME					NAME OF MATERIAL / EQUIPMENT / PROPERTY	
PERIOD OF EMPLOYMENT						
AGE	YRS	SEX	MALE/FEMALE	ESTIMATED COST	ACTUAL COST	
MARITAL STATUS		SINGLE/ MARRIED				
OCCUPATION					NATURE OF DAMAGE	
PART OF BODY INJURED						
NATURE OF INJURY						
AGENCY (OBJECT / EQUIPMENT / SUBSTANCE) MOST RESPONSIBLE FOR CAUSING ACCIDENT / INJURY / DAMAGE						
12	PERSON (NAME & DESIGNATION) WITH MOST CONTROL OVER AGENCY (OBJECT / EQUIPMENT / SUBSTANCE) CAUSING ACCIDENT INJURY / DAMAGE					
13	DESCRIBE CLEARLY HOW THE ACCIDENT OCCURRED (USE ADDITIONAL SHEET, IF REQUIRED)					



POWER SECTOR - HQ

**Preliminary Incident Report to HQ
(Fatal / Major / Fire)**

FORMAT NO.: HSEP:08-F02

REV NO.: 00

Page 2 of 2

ANALYSIS

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



Monthly HSE Planning & Review Format

(Based on Contractual Requirements & BHEL Systems)

Health, Safety & Environment

Power Sector Headquarters

Format No. HSEP13: F30

Rev. 00

Name of Project		Name of Agency		Approx. No. of Workers	
Scope of Work			Date		
PART- A: PLAN OF HSE ACTIVITIES FOR THE MONTH OF February, 2020				PART-B: REVIEW ON	
(Note: Form to be filled in soft copy. Add additional sheets as per requirement; All Formats as per HSEP14 except Excavation Format, which is supplied separately/ available on BHEL intranet portal. Filled Formats/ Records to be submitted by Agency at the end of each month along with Review as mentioned below)					
SN.	Description of HSE Activity& Formats	Plan & Targets for the month		Review	
1	Availability of First Aid Box at Required Places and Inspection thereof as per Format: Fo1 (Submit separate Format for each First Aid Box)	Areas			
2	Health check-up as per Format: Fo2	Health check-up for 1. New inductees 2. Drivers & Operators Workers in following high risk areas: Nos			
3	Induction training of newly joined workers as per Format: Fo3	Minimum No. of workers:			
4	Daily Toolbox talks (TBT) conducted before start of work as per Format: Fo4	Locations of TBTs & Approx. No. of workers			
5	PPE usage and issue as per Format: Fo6				
6	Inspection of T&Ps as per Format: Fo7 (Ensure Master T&P List is available)	List of T&Ps to be inspected			
7	Identification & Inspection Status of T&Ps as per Format: Fo8 (Ensure Master T&P List is available)				
8	Inspection of Cranes & Winches as per Format: Fog (Ensure Master T&P List is available)	Serial Numbers of Cranes & Winches to be tested			



Monthly HSE Planning & Review Format

(Based on Contractual Requirements & BHEL Systems)

Health, Safety & Environment

Power Sector Headquarters

Format No. HSEP13: F30

Rev. 00

9	Inspection of Height Working as per Format: F10 (Submit separate format for each location)	Areas:	
10	Inspection of Welding & Gas Cutting operations as per Format: F11 (Submit separate format for each location)	Areas:	
11	Inspection of Electrical Installations as per Format: F12 (Submit separate format for each location)	Locations:	
12	Inspection of Elevators (as applicable) as per Format: F13 (Submit separate format for each location)	Locations:	
13	Inspection of Excavation as per Format: F13E (Submit separate format for each location)	Locations:	
14	Job Safety Analysis (JSA) as per Format (HSEP13:F32B) Development of Operational Control Procedures (OCP)	JSA Activities: OCP Activities	
15	Regular Job Specific Training (Re-training) for workers involved in hazardous activities (Training calendar to be prepared by Agency and Audio-visual training to be ensured)	Topics/ Hazards, Dates & No. of workers	
16	Mass housekeeping (HK) drive in work areas	Areas with Dates	
17	Vertigo Test of Height workers	Minimum No. of workers:	
18	Deployment of qualified HSE Officers as per contract (Ensure Roster for HSE Staff is available)	Location(s) & Nos.	
19	Deployment of qualified HSE Stewards as per contract (Ensure Roster for HSE Staff is available)	Location(s) & Nos.	

20	Deployment of Safety tools & Equipment (Safety Nets, Lifelines, Fall arrestors, Man-cages, flashback arrestors, scaffolding etc.) (Ensure Test Certificates are available and equipment conform to relevant Indian Standards)	Tool/ Equipment, Numbers & Location	
21	Safety Walks by site in charge of agency (4 - Weekly once) (Submit Photos/ Records)	Dates:	
22	Safety walks by departmental head (8-Weekly twice) (Submit Photos/ Records)	Dates:	
23	Availability/ deployment of Safety posters/ placards/ signage at strategic locations	Locations: Content & Nos.	
24	Provision of clean drinking water sources for workers (Ensure testing as per IS10500)	Locations: Nos.	
25	Provision of toilets for workers (separate for male & female workers)	Locations: Nos.	
26	Rest sheds for workers during lunchtime, rain, dust storm etc.	Locations: Capacity & Nos.	
27	Availability of following in Labor colony (check whichever is applicable)	1. Clean drinking water 2. Toilets 3. Cleanliness & Hygiene 4. Grass cutting, 5. Fogging 6. Electrical Inspection	



Monthly HSE Planning & Review Format

(Based on Contractual Requirements & BHEL Systems)

Health, Safety & Environment

Power Sector Headquarters

Format No. HSEP13: F30

Rev. 00

28	Availability of dust/ waste bins at various locations	Locations:	
29	Availability of Ambulance (individual/ joint) in each shift	Ambulance Nos. & locations	
30	Availability of emergency vehicle in each shift	Emergency vehicle nos. & locations	
31	Deployment/ Availability of tested Fire Extinguishers	Locations, Types & Nos.	
32	Tree plantation	Locations & Nos.	
33	Waste disposal & Scrap Bins	Locations & Details/ Nos.	
34	Illumination checks using Lux Meter (Submit Report with Serial No. of Lux Meter)	Locations:	
35	Safety award function: 1. Display of good practices 2. Award presentation	Dates:	
36	Submission of Daily Reports as per Format No. HSEP13:F31A	Nos planned:	

PLAN		REVIEW	
Agency HSE	BHEL HSE	Agency HSE	BHEL HSE
Name:	Name:	Name:	Name:
Sign:	Sign:	Sign:	Sign:
Date:	Date:	Date:	Date:



Daily HSE Report (Agency)

Health, Safety & Environment

Power Sector Headquarters

Format No. HSEP13:F31A

Rev. 00

DAY		MONTH		YEAR	

PROJECT		AGENCY	

Important:

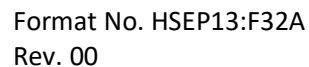
1. N-Night Shift

2. Photographs of inspection of height work, hazardous activities, T&Ps, Toolbox Talks, Training, Reward Function, Housekeeping/ Plantation drives etc. to be attached

4. Report to be compiled daily at day end and submitted to BHEL

5. Format to be preferably used in soft copy only and submitted by e-mail

General Info		Manpower Details		Safety Statistics										Incident Statistics				NCs									
SHIFT	Submitted By	Work Area(s)	Staff	Man-Power	Safety Officers	Safety Stewards	Tool Box (Topics and No. of Participants)	Induction Training (No. of Participants)	Vertigo Test (Numbers Tested)	On-the-Job Training (Topic & participants)	Work Permits	Job Safety Analyses conducted	Height Work Inspection	Other Hazardous Activities Inspection	T&P Inspection (Names & Nos. Inspected)	Safety Walk (Designation, Areas)	HSE Meeting	Safety Reward (Details)	Housekeeping/ Dust Suppression/ Tree Plantation Activities (Locations/ Details)	Lost time Accident	Restricted Work Case	Medical Treatment Case	First Aid Case	Near miss	Property Damage/ Fire	Non-Compliances Submitted by BHEL	Complied by Agency
DAY																											
NIGHT							NA	NA	NA						NA		NA	NA	NA								

1 of 1



Job Safety Analysis Format

Health, Safety & Environment

Power Sector Headquarters

Format No. HSEP13:F32B

Rev. 00

Hazard Identification & Risk Assessment and Control Measure Worksheet (HIRA) for the Job

JOB TITLE :				FORMAT NO:		
TEAM MEMBER:				REV:		
NAME OF THE SUB-CONTRACTOR		AREA :				

HAZARDS

PRECAUTIONS

(Name)	Submitted By (Agency HSE)		Reviewed By (BHEL Execution)		Approved By (BHEL HSE)	
(Sign)						
(Date)						



Vendor HSE Performance Evaluation Checklist

Health, Safety & Environment

Power Sector Headquarters

Format No. HSEP13:F33
Rev. 00

Project	Enter Project Name Here		Enter Name of		Enter Package/Unit Name Here	
SL	Parameter for Measurement	Mandatory/ Optional	o	5	Max Score	Supporting Documents
1a	Induction training for new workers conducted through audio-visual medium & documented ?	Mandatory	No	Yes	1	Induction Training Records
1b	Tool box talk conducted regularly as per plan, and documented?	Mandatory	No	Yes	1	Toolbox Talk Records
1c	Contractor in charge and safety in charge attended safety meetings?	Mandatory	No	Yes	2	Minutes of Meeting
1d	Whether observations in safety meetings are complied before next meeting?	Mandatory	No	Yes	2	-do-
1e	Preparation and submission of Monthly HSE report within stipulated time	Mandatory	No	Yes	1	Report submission date
1f	Preparation and submission of Incident/near-miss report and RCA Report (as applicable) within stipulated time	Mandatory	No	Yes	1	Incident/ Near Miss Records
1g	Carrying out Inspections and submission of Inspection reports within stipulated time	Mandatory	No	Yes	1	Inspection Records
1h	Regular Job Specific Training ensured for High Risk Workers (through audio-visual medium) as per plan	Mandatory	No	Yes	1	Training & Attendance Records
2a	Whether the contractor is registered under BOCW	Mandatory	No	Yes	2	BOCW Registration Certificate
2b	Availability of Qualified safety officer (1 for every 500 labour)	Mandatory	No	Yes	2	Safety Officer qualification & experience records
2c	Availability of Qualified safety supervisor (1 for every 100 labour)	Mandatory	No	Yes	2	Safety Officer qualification & experience records
2d	All the workers are provided and using safety helmets and safety shoes/gum boots	Mandatory	No	Yes	2	PPE Issue Records, Inspection/ non-conformity records
2e	House keeping done on regular basis and scrap removal at site	Mandatory	No	Yes	1	Housekeeping records, Inspection/ non-conformity records
2f	Usage of Goggles/Face shields and Hand gloves for gas cutter and grinders		No	Yes	1	PPE Issue Records, Inspection/ non-conformity records
2g	Wall openings & floor openings are guarded?		No	Yes	1	Inspection/ non-conformity records
2h	Adequate illumination provided in all working area?		No	Yes	1	Inspection/ non-conformity records
2i	Safety posters, sign boards and emergency contact numbers in all prominent location are displayed?		No	Yes	1	Inspection/ non-conformity records
2j	Availability of automatic reverse horns,Main horn, hook latches for Vehicles,mobile cranes,Hydras		No	Yes	1	Inspection/ non-conformity records
2k	Ban of carrying mobile phones to work place is implemented for workers		No	Yes	1	Inspection/ non-conformity records
2l	Availability of Tags & Inspection Certificates for Cranes of all capacities		No	Yes	1	Master T&P List with internal & external test details
2l.2	Availability of Tags & Inspection Certificates for Winches of all capacities		No	Yes	1	Master T&P List with internal & external test details
2l.3	Availability of Tags & Inspection Certificates, color coding for Chain pulley blocks		No	Yes	1	Master T&P List with internal & external test details
2l.4	Availability of Tags & Inspection Certificates for Vehicles - Trailors, Dozers,Dumpers,Excavators.Mixers etc		No	Yes	1	Master T&P List with internal & external test details
2l.5	Availability of Tags & Inspection Certificates for Welding machines,grinders, Drilling machines, etc		No	Yes	1	Master T&P List with internal & external test details
2l.6	Availability of Tags & Inspection Certificates, color coding for Wire rope slings etc		No	Yes	1	Master T&P List with internal & external test details
2l.7	Availability of Tags & Inspection Certificates for Batching plants		No	Yes	1	Master T&P List with internal & external test details
2m.1	Use of Lifting Permit as per requirement		No	Yes	1	Permit Records
2m.2	Use of Height Permit as per requirement		No	Yes	1	Permit Records
2m.3	Use of Hot Work Permit as per requirement		No	Yes	1	Permit Records
2m.4	Use of Excavation permit as per requirement		No	Yes	1	Permit Records
2m.5	Use of Confined space work permit as per requirement		No	Yes	1	Permit Records
2m.6	Use of Grating removal and safety net removal permit as per requirement		No	Yes	1	Permit Records
2m.7	Use of Lockout-Tagout permit as per requirement		No	Yes	1	Permit Records
2m.8	Use of Radiography permit as per requirement		No	Yes	1	Permit Records
2m.9	Use of Night/ Holiday Work Permit as per requirement		No	Yes	1	Permit Records
2m.10	Use of Any other Applicable Permit as per requirement		No	Yes	1	Permit Records
3a	Material safety data sheet(MSDS) available for all chemicals and displayed in usage and storage area?		No	Yes	1	Inspection/ non-conformity records
3b	Spillages of oil/concrete and other chemical is controlled and cleaned by proper method in case of spill?		No	Yes	1	Inspection/ non-conformity records
3c	Availability of adequate number of urinals in workplace and in elevations and maintained	Mandatory	No	Yes	1	



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3d	Availability of rest rooms for workers at site	Mandatory	No	Yes	1	
3e	Availability of Drinking water facility at work spot		No	Yes	1	
3f	Hygienic Labour colony is provided for workers.		No	Yes	1	
4a	Is heavy/complex critical lifting permit obtained for heavy, complex materials before handling/erection activity?		No	Yes	1	Work Permit records
4b	Whether area below lifting activities barricaded		No	Yes	1	Inspection/ non-conformity records
4c	Availability of experienced rigging foreman		No	Yes	1	Experience details of rigging foreman
4d	Is agency is following proper storage and handling procedure as per manufacturer standard for all hazardous material?		No	Yes	1	Procedure for storage & handling
4e	Are oxygen and acetylene cylinders are transported to work place from storage area in trolleys		No	Yes	1	
5a	Whether all deep excavation has been protected by barrier		No	Yes	1	Inspection/ non-conformity records
5b	Sloping/benching & shoring provided for excavation as per requirement?		No	Yes	1	-do-
5c	Proper access and egress provided for excavations?		No	Yes	1	-do-
5d	Blasting is done in controlled manner?		No	Yes	2	-do-
6a	Whether Electrical booth is equipped with CO ₂ fire extinguishes and fire buckets filled with sand?		No	Yes	2	Inspection/ non-conformity records
6b	Availability of Illumination lamp in electric booth?		No	Yes	1	-do-
6c	whether Caution Boards have been displayed?		No	Yes	1	-do-
6d	Usage of Metal Plug top for all hand power tools ?		No	Yes	1	-do-
6e	Usage of Insulated welding cables.		No	Yes	1	-do-
6f	Electrical Booth/Distribution Board to be covered by proper Canopy.		No	Yes	1	-do-
6g	Availability of functional & individual 30mA ELCB / RCCB and MCB for protection and conducting periodical checkup?		No	Yes	1	-do-
6h	Double earthing for panel boards and all machinery & proper earth pit with regular inspection available?		No	Yes	1	-do-
6i	Whether Electrician is qualified and experienced		No	Yes	1	Qualification & Experience records of electrician
6j	Availability and usage of Rubber hand gloves by electrician?		No	Yes	1	Inspection/ non-conformity records
7a	Whether Scaffolding pipes made with steel or aluminium, are being used and checked periodically by experienced/ certified scaffolder?		No	Yes	2	Inspection/ non-conformity records
7b	8mm Stainless Steel wire rope with plastic cladding is provided for life line (Vertical / Horizontal) during height work?		No	Yes	2	-do-
7c	Availability of emergency lighting in case of power failure		No	Yes	1	-do-
7d	Whether all the openings are covered with Safety Nets made of fire proof Nylon?		No	Yes	1	-do-
7e	Whether MS pipe rails around staircases & platforms in usage are provided with top, middle rails and toe guard ?		No	Yes	1	-do-
7f	Whether Ladder with vertical life line /Fall arrestor is available to climb?		No	Yes	1	-do-
7g	Whether all workers deployed for working at height have been issued height pass after undergoing vertigo test?		No	Yes	1	Height Pass records
7h	Whether all workers deployed for height work / climbing ladder are provided and using Double lanyard safety belt?		No	Yes	1	PPE Issue records, inspection/ non-conformity reports
7i	Is all hand tools/Small material used by height workers is tied firmly to prevent fall?		No	Yes	1	-do-
8a	Flash back arrestors for all gas cutting sets is available on Torch side and cylinder side		No	Yes	1	Inspection/ non-conformity records
8b	Oxygen/Acetylene/LPG cylinders not in use have caps in place and stored separately?		No	Yes	1	-do-
8c	Availability of Face screen, Hand gloves, and Apron, for welders		No	Yes	1	-do-
8d	Protection from falling hot molten metal during metal cutting / welding at height by providing GI sheet below the cutting area especially in fire prone areas		No	Yes	1	-do-
9a	Pre-employment medical check-up done for all workers and submitted?		No	Yes	1	Medical check records
9b	Availability of first aid centre, with MBBS doctor(Own or Sharing basis)	Mandatory	No	Yes	2	Attendance records
9c	Availability of Ambulance facility 24 hours (Own or sharing basis)	Mandatory	No	Yes	2	-do-
9d	Is First aid trained personnel's are available and their names are displayed at site?	Mandatory	No	Yes	1	-do-
9e	Availability of Emergency vehicle at site		No	Yes	1	
9f	Periodical medical check up is conducted for all the workers and submitted?		No	Yes	1	Medical check records
9g	Availability of sufficient number of first aid box as per standard list and maintaining record		No	Yes	1	Inspection records
10a	Availability of Fire extinguishers, buckets at all vulnerable points		No	Yes	2	Fire extinguisher records



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10b	Periodic fire mock drill conducted?		No	Yes	1	Fire, Mock drill records
10c	Are all flammable materials are stored separately?		No	Yes	1	
10d	Periodic grass cutting is done in material storage area?		No	Yes	1	
10e	Availability of 24V DC lighting in confined space work area		No	Yes	1	
10f	Availability of exhaust fan in confined space work area		No	Yes	1	

Note:

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Points other than mandatory can be excluded with appropriate justification (scope etc.)

Additionally: 3 Marks for Fatal Accident and 1 mark for major accident to be deducted

SECTION-B

Special Requirements

(Applicable to this Contract Only)



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1. Establishment of Common Facilities for whole Project – cost to be borne in full by subcontractor.

Table 1.1

Sl. No.	Item	Facility Details as per Clause No.	Applicable / Not Applicable with Remarks	Package
1	Construction of Medical Centre	a	Applicable	Civil
2	Construction of Worker Training Centre (A part of safety park)	b	Applicable	Civil
3	Construction of Vertigo Test Structure (A part of safety park)	c	Applicable	Civil
4	Deployment of Specialists	d	Applicable	By concerned agencies
5	HSE Equipment	e	Applicable	By concerned agencies
6	HSE measurement devices	f	Applicable	By concerned agencies
7	Urinals in under-construction structures	g	Applicable	By concerned agencies
8	Safety Park	h	Applicable	Civil

a. MEDICAL CENTRE

- A medical center shall be setup at site with basic facilities for handling medical emergencies
- Deployment of Medical Professional:
 - A qualified medical professional shall be deployed at site at all times.**
 - When total employee & worker strength at site crosses 500, medical professional with MBBS Degree from recognized institute shall necessarily be deployed**
- Ambulance shall be deployed along with a trained driver and accessories as per Schedule V of BOCW Central Rules, 1998. Ambulance shall be utilized exclusively for transporting the accident victim. Ambulance drivers shall be regularly trained in First Aid.
- Non deployment of Ambulance and First Aider as above shall invite a penalty of Rs. 30,000 pm and Rs10,000 PM respectively
- Medical waste shall be disposed as per prevailing legislation (Bio-Medical Waste – Management and Handling Rules, 1998).
- Above are bare minimum requirements. Any legal requirements over and above these specifications shall supersede the above requirements

b. WORKER TRAINING CENTRE

- Indoor Worker Training Center to be developed at site with seating capacity of at least 50 trainees
- Projector with following minimum specifications:

Native Resolution	XGA, 1024x768
Brightness (ANSI lumens)	3300
Contrast Ratio	13000:1
Display Color	30 Bits
Aspect Ratio	4:3



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iii. A Laptop or Desktop PC with following minimum specifications:

Processor	Intel Celeron Dual Core
Memory (RAM)	2 GB
Graphics Card	2GB Video Memory
Hard Disk Capacity	60 GB
Monitor Size	14 inches
Keyboard	
Mouse	

iv. Stereo speakers with minimum 50W RMS sound output

v. PA system for Addressing Workers

vi. Seating arrangement

c. Development of Vertigo Test Structure:

Vertigo test Structure to be developed as per **Annexure 03**

d. Specialists:

Following specialists shall be deployed by the subcontractor, who shall cater to whole project as per BHEL requirements / instructions

- I. **Qualified Rigging Inspector:** subcontractor shall engage one qualified Rigging inspector having undergone a certification course in the discipline of minimum supervisor level. He must have post certification experience of minimum one year. In case of non-deployment, penalty of Rs. 50,000/- per month will be imposed by BHEL.
- II. **Qualified Scaffolding Inspector:** Subcontractor shall deploy one qualified Scaffolding inspector having undergone a certification course in the discipline of minimum supervisor level. He must have post certification experience of minimum one year. In case of non-deployment, penalty of Rs. 50,000/- per month will be imposed by BHEL.
- III. All the scaffolding workmen being engaged at site should have at least one-year prior experience in erection/ dismantling of scaffolding.
- IV. BHEL HSE Dept. can opt for a qualified T&P inspector against a rigging inspector/ scaffolding inspector. T&P inspector must have a certification course in the discipline with minimum one-year post certification experience.



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- e. **Tools & Equipment:** Following equipment conforming to relevant IS Codes for the job shall be ensured by subcontractor:

S. No.	Item
1	Lifelines
2	Retractable Fall Arrestors
3	Safety Nets (10m X 5m)
4	Sky Climbers
5	Fire Blanket
6	Honey Bee Removal Suit & Kit
7	Flashback Arrestors
8	Barricading Tape & net
9	Binoculars
10	Walkie-Talkies
11	LOTO kit
12	24-Volt light
13	Sand Buckets
14	Hard barricading planks
15	Standby Fire kits

Sl. No.	Item	Type of Job / Purpose
1	Lifelines (Steel Rope) and posts	Height work
2	Retractable Fall Arrestors	Height Work
3	Safety Nets (for fall protection; railings also to be covered)	Height Work
4	Sky Climbers	Height Work
5	Fire Blanket, Spark/ slag collector	Hot Work
6	Honey Bee Removal Suit & Kit	General
7	Flashback Arrestors	Hot work
8	Barricading –Hard (Scaffolding Pipes & Clamps or fabricated using structural/round	Height Work, Excavation, General Barricading
9	Binoculars	HSE Inspection
10	Walkie-Talkies	Lifting
11	LOTO kit	Working on charged line
12	24-Volt light	Confined Space/ temp work
13	Sand and Water Buckets	Hot work/Electrical work
15	Standby Fire kits Fire extinguisher stands	Hot work/Electrical work
16	Inbuilt VRD equipped arc welding machine	Welding work



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Above equipment are bare minimum to be essentially maintained at all times. Additional numbers to be deployed as and when required in order to ensure fulfillment of all Safety requirements

f. HSE Measurement Equipment & Tools

Sl. No	Device
1	ELCB Tester
2	Multi meter (Light cables)
3	Earth Resistance Meter
4	Lux Meter
5	Decibel Meter
6	Anemometer
7	Breath Analyzer (Alcohol)
8	Multi-gas analyzer
9	Gas leakage detector / alarm
10	Gas monitor (confined space)
11	Radiation meter & Badges
12	Blood pressure monitor
13	Fire detectors
14	Dust Particle Detector
15	Underground cable detector

In case, sub-contractor fails to deploy tools & equipment as mentioned in clause no. e & f, BHEL will purchase/ arrange the same at the risk and cost of the sub-contractor.

g. Urinals in Under-construction structures:

Urinals in under-construction structures for easy access e.g. in case of Boiler elevations etc.

h. Safety Park

Following are the item wise requirements for the safety park.

Sl. No.	Description	Qty.	Sl. No.	Description	Qty.
1	Class room chair	25 Nos.	28	Hand Gloves (Cotton)	1 No.
2	Office Table	3 Nos.	29	Hand Gloves for Electrician (Rubber)	1 No.
3	Rolling chair	3 Nos.	30	Hand gloves Rubber	1 No.
4	Almirah	1 No.	31	Hand Gloves Lather	1 No.
5	Visitor chair	10 Nos.	32	Construction Safety Uniform (Boiler Suit)	1 No.
6	Drawer	2 Nos.	33	Welding Apron	1 No.



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7	Single bed	1 No.	34	Safety Shoes	1 No.
8	Mattress	1 No.	35	Leg Guard for Welder	1 No.
9	Projector	1 No.	36	Poster for Occupational Disease like Pneumoconiosis, silicosis etc.	1 No.
10	Projector screen	1 No.	37	Gum Boot	1 No.
11	Sound speakers	1 No.	38	Full Body Harness	1 No.
12	Desktop Computer	3 Nos.	39	12 MM Wire rope for life line. Length 20 Feet (FT).	1 No.
13	Printer	1 No.	40	Safety Net for man & materials. Size 15 FT X 15FT.	1 No.
14	White Board	1 No.	41	Monkey ladder 15 FT.	1 No.
15	Marker	5 Nos.	42	Fire Extinguisher All types (DCP, CO2 & Foam)	1 No.
16	Duster	1 No.	43	Bed Sheet	1 No.
17	Door Mat	9 Nos.	44	Pillow	1 No.
18	Dustbin (Small + Big)	7+1 Nos.	45	Curtain	12 Nos.
19	Mannequin	1 No.	46	curtain fittings	12 Nos.
20	Helmet	1 No.	47	AC (1.5 TON)	3 Nos.
21	Face Shield	1 No.	48	AC (2 TON)	2 Nos.
22	Safety Goggle	1 No.	49	Rope pulley.	1 No.
23	Welding shield	1 No.	50	PP Rope for pulley	20 Mtr.
24	Ear Muff	1 No.	51	Ladder Clamps	6 Nos.
25	Ear Plug	1 No.	52	Aluminum ladder 6 MTR.	1 No.
26	Nose Mask	1 No.	53	Carry Bag	As Req.
27	Breathing Apparatus	1 No.	54	Scaffolding all Materials for 5 Mtr. Height like. Scaffolding tubes, Sole plate, base plate, Right angle clamps, Swivel clamps, beam clamps, Joint box/joint pin, toe guard/board,	1 Lot

2. **Shared Facilities** – where part of operating cost is borne by subcontractor in proportion to contract value, the subcontractor shall bear running expenses of below mentioned facilities in 'proportion to contract value sharing basis' as finalized by BHEL.

S. No.	Facility
1.	Operation of Medical Centre, Ambulance, Doctor, Nurses, Paramedical staff, Medical Consumables
2.	Construction, Maintenance & Upkeep of Latrines and Urinals in Common spaces
3.	Drinking Water Provision in Common Spaces
4.	Dust Control / Water Sprinkling, Pest Control, Fumigation at Site



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Annexure-01

LIST OF REFERENCES (IS Codes)

Sl. No.	Code Name	Title
1	IS: 818-1888 (Reaffirmed 2003)	Code of Practice for Safety and Health requirements in Electric and Gas Welding and Cutting operations.
2	IS: 1179-1967 (Reaffirmed 2003)	Specification for Equipment for Eye & Face protection during welding.
3	IS: 1989 (Part 2):1986 (Reaffirmed 1997)	Specification for Leather Safety Boots & Shoes
4	IS:2925 – 1984 (Reaffirmed 2010)	Specification for Industrial Safety Helmets
5	IS:3521: 1999 (Reaffirmed 2002)	Industrial Safety Belts & Harnesses-Specification
6	IS:3646(Part II) – 1966(Reaffirmed 2003)	Code of Practice for Interior Illumination
7	IS:3696 (Part I) – 1987 (Reaffirmed 2002)	Safety Code for Scaffolds and Ladders
8	IS: 3696(Part 2): 1991 (Reaffirmed 2002)	Scaffolds and Ladders-Code of Safety
9	IS: 3764:1992	Excavation Work – Code of Safety
10	IS:3786 – 1983 (Reaffirmed 2002)	Method for Computation of Frequency and Severity Rates for Industrial Injuries and Classification of Industrial Accidents
11	IS.4014.2.1967	Steel tubular Scaffolding
12	IS:4770: 1991 (Reaffirmed 2006)	Rubber Gloves Specification (Electricals Purposes)
13	IS:4912: 1978 (Reaffirmed 2002)	Safety Requirements for Floor and Wall Openings, Railings and Toe Boards
14	IS: 5557 – 1969	Industrial and Safety rubber knee boots.
15	IS: 5983 – 1980 (Reaffirmed 2002)	Specification for Eye-Protectors
16	IS:6519 – 1971 (Reaffirmed 1997)	Code of Practice for Selection, Care and Repair of Safety Footwear
17	IS.6549.1972	Glossary of terms used for Lifting tackles
18	IS:6994(Part I)-1973 (Re affirmed 1996)	Specification for Industrial Safety Gloves Leather and Cotton Gloves
19	IS.7215.1974	Steel Structure Fabrication



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Sl. No.	Code Name	Title
20	IS.7969.1975	Handling and storage of building material
21	IS:8519 – 1977 (Reaffirmed 1983)	Guide for Selection of Industrial Safety Equipment for Body Protection.
22	IS:8520 – 1977 (Reaffirmed 2002)	Guide for Selection of Industrial Safety Equipment for Eye, Face and Ear Protection.
23	IS: 9167:1979	Specification for Ear-Protectors
24	IS: 9473:2002	Respiratory Protective Devices-Filtering Half Masks to protect against Particles-Specification.
25	IS: 9944:1992 (Reaffirmed 2003)	Natural and Man-made Fiber Rope Slings- Recommendations on Safe working loads.
26	IS 11006: 2011	Flash Back (Flame) Arrestor Specification
27	IS: 11226 – 1985	Leather Safety footwear having direct molding sole.
28	IS:11057 – 1884 (Reaffirmed 2001)	Specification for Industrial Safety Nets
29	IS: 12254:1993 (Reaffirmed 2002)	Polyvinyl Chloride (PVC) Industrial Boots Specification
30	IS:13367(Part 1):1992 (Reaffirmed 2003)	Safe Use of Cranes-Code of Practice
31	IS: 14166:1994 (Reaffirmed 2002)	Respiratory Protective Devices-Full Face Masks Specification
32	IS:14746: 1999 (Reaffirmed 2003)	Respiratory Protective Devices-Half Masks and Quarter Masks - Specification
33	IS: 15397 :2003 (Reaffirmed 2008)	Portable Extinguisher Mechanical Foam Type (Stored Pressure)-Specification
34	IS: 19011:2002	Guidelines for Quality and/or Environmental Management Systems Auditing

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Annexure-2: First Aid Box Items

As per Contract Labor (Regulation & Abolition Act), Central Rules, 1971,

- (1) The first-aid box shall be distinctively marked with a white cross on green background and shall contain the following items, namely:

(a) For establishments in which the number of contract laborers employed does not exceed fifty, each first aid box shall contain the following equipment:

(i)	6 small sterilized dressings
(ii)	3 medium size sterilized dressings
(iii)	3 large size sterilized dressings
(iv)	6 pieces of sterilized eye pads in separate sealed packets.
(v)	6 roller bandages 10 cm wide.
(vi)	6 roller bandages 5 cm wide.
(vii)	One tourniquet
(viii)	A supply of suitable splints
(ix)	Three packets of safety pins.
(x)	Kidney tray.
(xi)	3 large sterilized burn dressings.
(xii)	1 (30ml) bottle containing a two percent alcoholic solution of iodine
(xiii)	1 (30 ml) bottle containing Sal volatile having the dose and mode of administration indicated on the label
(xiv)	1 snake bite lancet
(xv)	1 (30gms) bottle of potassium permanganate crystals.
(xvi)	1 pair scissors
(xvii)	1 copy of the First-Aid leaflet issued by the Director General, Factory Advice Service and Labor Institutes, Government of India.
(xviii)	A bottle containing 100 tablets (each of 5 grains) of aspirin
(xix)	Ointment for burns
(xx)	A bottle of suitable surgical anti-septic solution



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(b) For establishment in which the number of contract laborers exceeds fifty each first-aid box shall contain the following equipment:

(i)	12 small sterilized dressings
(ii)	6 medium size sterilized dressings
(iii)	6 large size sterilized dressings.
(iv)	6 large size sterilized burn dressings
(v)	6 (15 grams) packets sterilized cotton wool
(vi)	12 pieces of sterilized eye pads in separate sealed packets.
(vii)	12 roller bandages 10 cm wide.
(viii)	12 roller bandages 5 cm wide.
(ix)	One tourniquet.
(x)	A supply of suitable splints.
(xi)	Three packets of safety pins.
(xii)	Kidney tray.
(xiii)	Sufficient number of eye washes bottles filled with distilled water or suitable liquid clearly indicated by a distinctive sign which shall be visible at all times.
(xiv)	4 per cent Xylocaine eye drops, and boric acid eye drops and soda by carbonate eye drops.
(xv)	1 (60ml) bottle containing a two percent alcoholic solution of iodine
(xvi)	One (two hundred ml) bottle of mercurochrome (2 per cent) solution in water.
(xvii)	1 (120ml) bottle containing Sal volatile having the dose and mode of administration indicated on the label.
(xviii)	1 roll of adhesive plaster (6 cmX1 meter)
(xix)	2 rolls of adhesive plaster (2 cmX1 meter)
(xx)	A snake bite lancet.
(xxi)	1 (30 grams) bottle of potassium permanganate crystals.
(xxii)	1 pair scissors
(xxiii)	1 copy of the First-Aid leaflet issued by the Director-General, Factory Advice service and labor Institutes, Government of India.
(xxiv)	a bottle containing 100 tablets (each of 5 grains) of aspirin
(xxv)	Ointment for burns
(xxvi)	A bottle of a suitable surgical anti septic solution.

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



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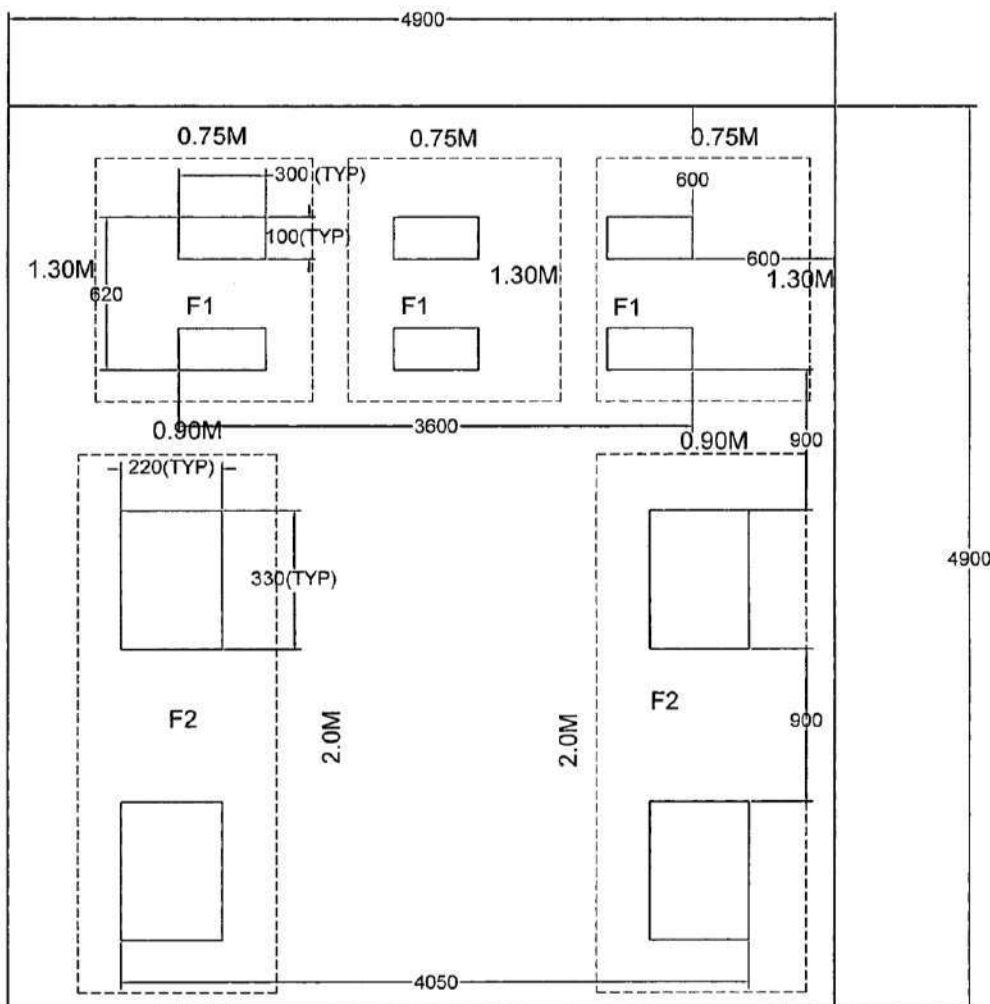
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Annexure-3: Vertigo test structure specifications

Table 1

S. No.	Topic
1	Vertigo / Height working Test Structure Layout
2, 3	Structure Layout Sketch
3	Actual Photo of a typical structure
4	Bill of Materials
5	Guidelines for Conducting the Test



Note:

- All dimensions are in mm
- Drawing is not to scale
- Inside boundary area to be filled with sand to level with road (external)
- Details of F1 and F2 are shown below

Figure 1: Vertigo / Height Work Test Structure Layout



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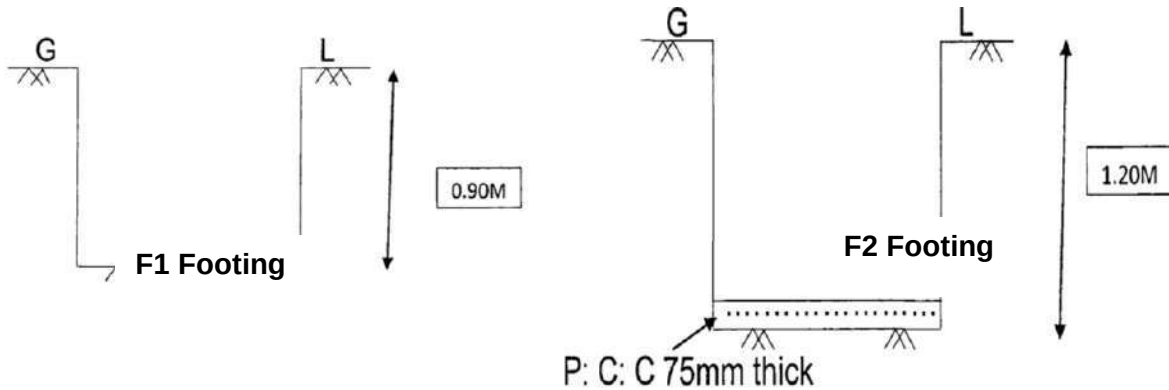
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Vertigo test structure specifications...



Note:

- Concrete Grade is M15
- Drawing is not to scale
- TOC is at Road Level
- G L refers to Ground Level

Figure 2



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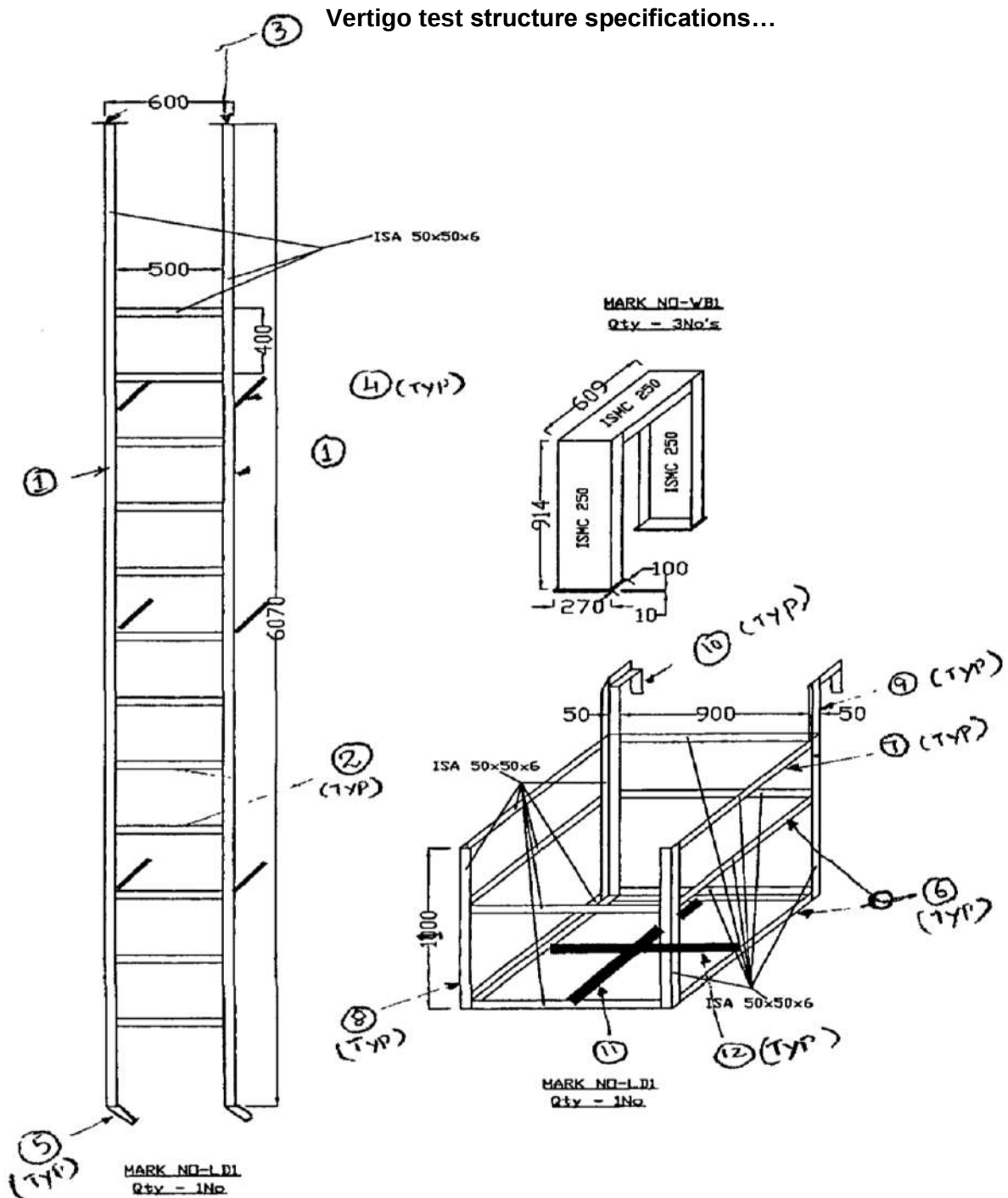


Figure 3



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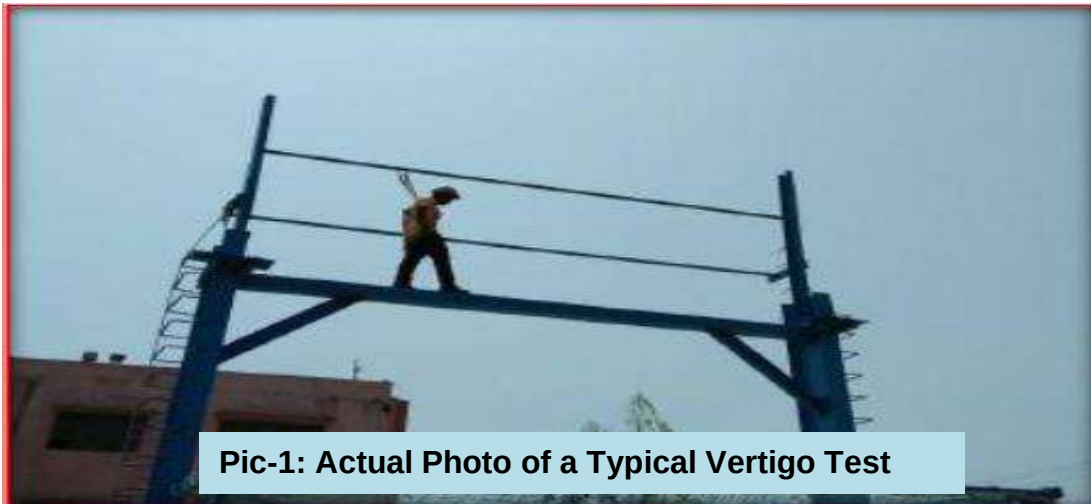
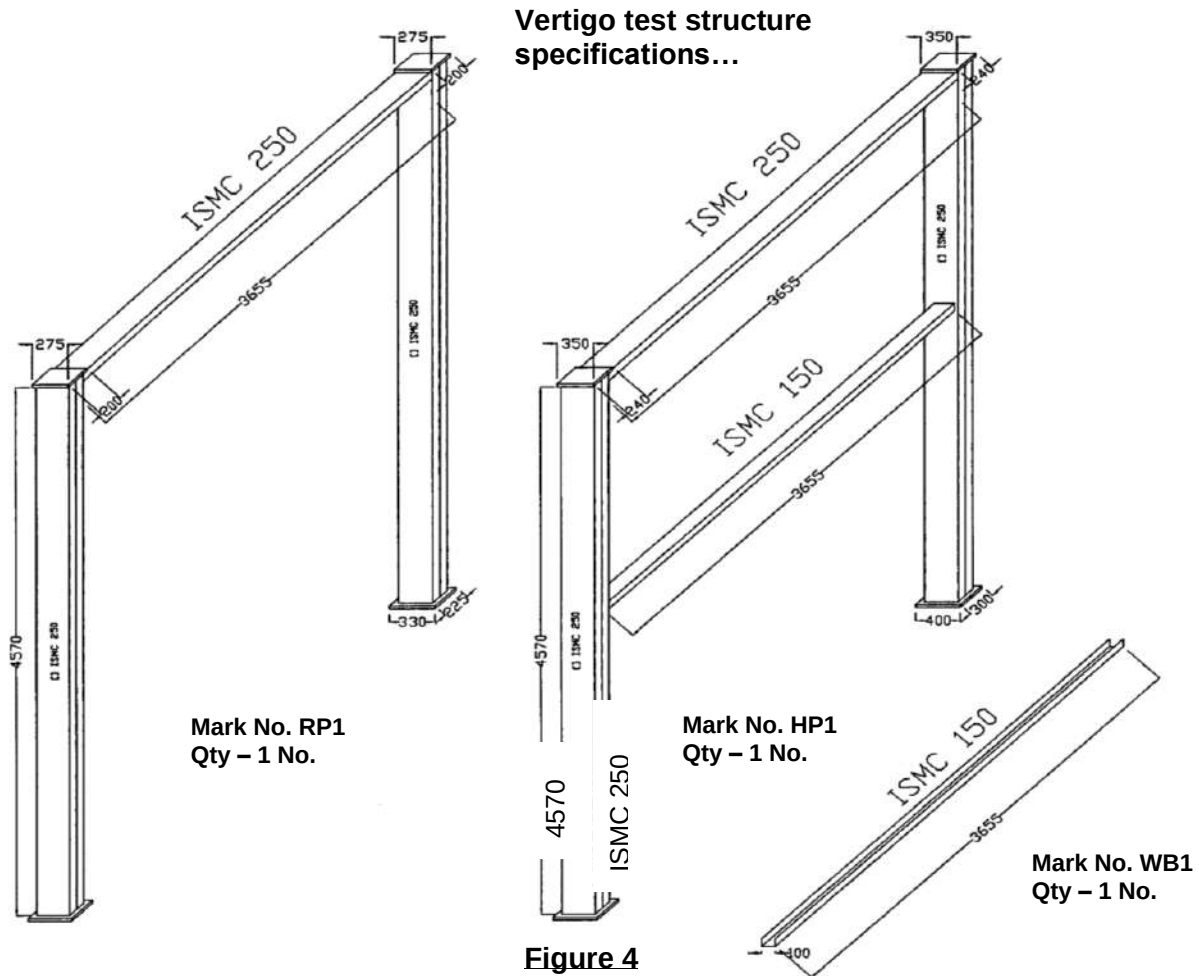
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Vertigo test structure specifications...

Table 2: BOM FOR HEIGHT WORK INDUCTION TRAINING MODULE

Sl. No.	Description	Width (mm)	Length (mm)	Qty (No's)	Unit Wt (Kgs)	Total Wt. (Kgs)
MKD NO. WB1						
1	ISMC250		609	3	34.20	62.483
2	ISMC250		914	6	34.20	187.553
3	ISMC100		3655	1	9.56	34.942
4	PL10	100	270	6	78.50	12.717
			Total Weight (Kgs)			297.695
MKD NO. RP1						
1	ISMC250		4570	4	34.20	625.176
2	ISMC250		3655	1	34.20	125.001
3	PL25	225	330	2	196.25	29.143
4	PL25	200	275	2	196.25	21.588
			Total Weight (Kgs)			800.908
MKD NO. HP1						
1	ISMC250		4570	4	34.20	625.176
2	ISMC250		3655	1	34.20	125.001
3	ISMC150		3655	1	16.80	61.404
4	PL25	300	400	2	196.25	47.100
5	PL25	240	350	2	196.25	32.970
			Total Weight (Kgs)			891.651
MKD NO. LD1						
1	ISA50X50X6		6070	2	4.50	54.630
2	ISA50X50X6		500	12	4.50	27.000
3	PL12	75	75	2	94.20	1.060
4	ISA50X50X6		300	6	4.50	8.100
5	ISA50X50X6		255	2	4.50	2.295
6	ISA50X50X6		1000	8	4.50	36.000
7	ISA50X50X6		910	3	4.50	12.285
8	ISA50X50X6		1100	4	4.50	19.800
9	ISA50X50X6		650	2	4.50	5.850
10	ISA50X50X6		350	2	4.50	3.150
11	PL8	75	900	1	62.80	4.239
12	PL8	75	410	2	62.80	3.862
			Weight (Kgs)			178.271
			Total Weight (Kgs)			2168.525

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Vertigo test structure specifications...

A. Test Procedure / Guidelines

Fear of height may be physiological or psychological. Therefore, to rule out any possibility of physiological factor, detailed medical check-up of workers is carried out before vertigo test. Medical check-up of workers includes the following:

History of past illnesses (like epilepsy, drug allergy, diabetics/ hypertension, unconsciousness etc.), general physical examination (like height, weight, BMI, build and nourishment etc.), measurement of pulse rate, Blood Pressure, respiratory rate.

After this check-up, those who are found suitable for height work by examining doctor, are allowed to undergo vertigo test.

During this health check-up, psychology of workers is also studied. If any worker finds it extremely difficult/ frightening to climb the monkey ladder & walk on the beam, during/after performing vertigo test or even before performing, then he is treated as disqualified.

As per standard, during vertigo test, worker is allowed to climb on a foundation through monkey ladder, walk on a beam, then steps down at the other end of beam, through monkey ladder. Height of the beam should be at least six feet from ground level. All necessary safety precautions are taken during this test. Worker has to wear full body harness with double lanyard. A horizontal lifeline is run parallel to the beam and worker has to put his lanyards into the lifeline. Additionally, a safety net is also put below the beam for rescue of the victim in case of a fall from beam.

Following activities are generally carried during testing:

1. Walking Bench Training:

- Person should walk over the channel. He should maintain balance & walk without much problem.
- If the person has problem to balances himself on repeated chances, he may be having flat foot or some other problem. So, he may not be fit for height work.

2. Rope Climb Training:

Person should be able to climb the rope up to the top channel for ensuring that in case of fall, a person hanging on the safety harness, will be able to safely climb back to the platform within minimum time period before the safety harness start breaking down under the load.

3. Height Work Training:

Person should walk freely on the middle channel while holding the top channel with the help of safety harness.

4. Ladder for Vertical fall arrestor Training:

Vertical fall arrestor rope is fixed from top to bottom of the ladder. It will ensure:

- Usage of vertical fall arrestor.
- Usage of two lanyards of a safety harness.
- Ensure 3-point contact on the ladder while climb.

5. Chair for work at height Training:

- Climb though vertical ladder with two lanyard ropes.
- Hooking of two lanyard ropes to life line. With this safe arrangement, he can walk to chair.
- Sits in the chair safely, comes out & walks back to the vertical ladder & come down from vertical ladder. After completion of vertigo test, blood pressure of worker is again measured. If it is not within acceptable limits for any worker, concerned worker is denied height pass.

Only those who pass the above training are fit for height work.



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RECORD OF REVISION

Clause No.	Rev. No.	Brief Description of Revision	Date
All	00	New Procedure Introduced	25.04.2019
All	01	OCPs-60, 61& 62 introduced, New formats introduced, lifeline diameter change (8 mm to 12 mm), introduction of modern PDB, VRD inbuilt arch welding machine, qualification & experience of scaffolding inspectors, rigging inspectors, penalty for non-deployment, mandatory PPEs for electrical work, penalty format, mandatory back camera and horn for all vehicles, only use of cup type scaffoldings	20.07.2020
All	02	-Document has been made in line with OPGC HSE Plan & Manual. -New systems added are: Painting job, LOTO Procedure, Noise Mitigation, Prevention of covid-19 at project site & Rescue plan (Against clause no. 13)	01.09.2020



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**Health, Safety & Environment Department,
Power Sector Eastern Region**

Bharat Heavy Electricals Limited



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Resumption of Construction Activities After Lock Down and Prevention of Coronavirus Infection during Site Operations

Purpose	➤ To resume work in a safe manner after Lock down due to COVID-19 Outbreak ➤ To ensure health & safety of personnel and prevention of infection during operations ➤ To ensure HSE Management & Control during operations	Scope	PS Regions
Background	➤ The purpose of this procedure is to resume construction works at BHEL project sites in the event of 'Construction activities' being permitted by the Government/District Administration/Statutory Authorities. ➤ By following this OCP the chain of corona spread will largely be contained and works can be done safely. ➤ All precautionary measures are to be ensured at site and labor colonies so that the labor force feels safe and secure at work place and act in a productive manner. ➤ This OCP also lays down guidelines to handle cases of infection		
Applicability	➤ This OCP applies to all BHEL employees and its subcontractors working at project sites. ➤ It also covers guidelines for medical personnel, security personnel, visitors and others		
Responsibility	Concerned Site In-charge / Site HSE Head/Package Head		
Performance Criteria	Number of cases of violations from these guidelines. All violations must be recorded and compliance for the same immediately/ within day		
References	➤ Corporate HSE Circular BHEL:CO: SOP: COVID-19 : 01 ➤ Corporate Guidelines regarding disinfection for Prevention of COVID-19 in BHEL Offices, Townships, Hospitals, Factories and other common places (No. AA:HR:MR 1 (C) dated 20-03-2020) ➤ OHSAS : 18001 , ISO : 14001:2015, ISO 45001:2018 ➤ ICMR & WHO Guidelines for COVID 19 ➤ Govt. of India Guidelines being issued from time to time ➤ Guidelines issued by National Centre for Disease Control and other agencies of Govt. of India ➤ WHO Guidelines being issued from time to time		

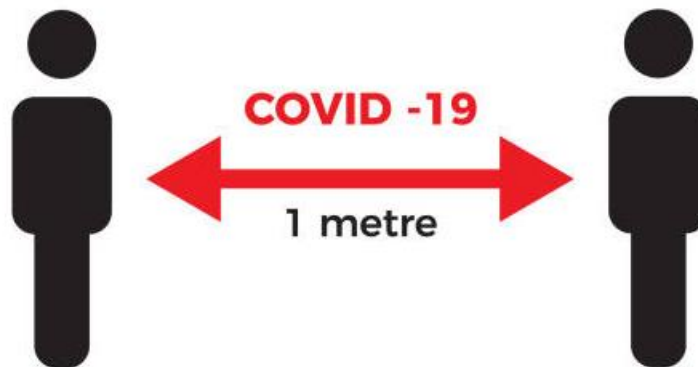
Prepared by	Reviewed by	Approved By
Task Force: Rohit Kumar, SM/ PSHQ-HSE Nitesh K. Meena, DM/ PSNR-HSE Saswajeet Raut, SE/PSER-HSE Navin Sadh, SE/ PSWR-HSE Sandeep Dalal, SE/ PSSR-HSE	HSE Heads/ PS-Regions: S. C. Meena, AGM/ PSNR B Tirkey, AGM/ PSER R. O. Jadhao, AGM/ PSWR Mukesh Shrivastava, AGM/ PSSR	Head/ HSE, PSHQ: Santosh Nair, GM

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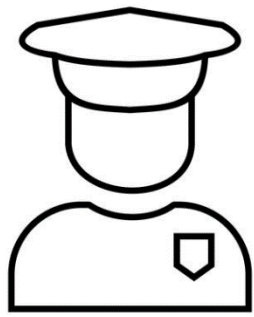
Resumption of Construction Activities After Lock Down and Prevention of Coronavirus Infection during Site Operations

General PPEs & Precautions

Maintain Social Distance of at least 1 meter **Minimum (more the better)**



Precautions at all times is necessary. Even a single lapse can lead to infection

	Face shield/ mask must be worn by all at all times and disposed/ cleaned properly		Protective clothing must be worn		Protective gloves as identified in Safety Data Sheet
	Appropriate footwear with substantial uppers must be worn		Mandatory requirements are specified and must be followed. Report any accidents.		
	Spray to disinfect personal items/ areas		Spray to disinfect public places/ infrastructures/ tools etc.	Strictly No Shaking Hands	
	Hazmat suits and special PPEs for medical personnel and other officials with more probability of coming into contact with infected		Strict security & control at Gate to avoid entry into site/office premises of infected persons and persons without necessary PPEs, unauthorized personnel, animals etc.		



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Resumption of Construction Activities After Lock Down and Prevention of Coronavirus Infection during Site Operations

General

1. This procedure is applicable for all personnel working at Project Site, including staff, workers, officials, medical and security personnel, cleaners, housekeeping staff etc. It also includes visitors including drivers, cleaners, doctors, nurses, etc. entering the site premises
2. These are broad guidelines that may be followed in order to ensure the purpose of this OCP is met.
3. The procedure refers specifically to COVID-19 disease caused by SARS-CoV-2 Virus, but is applicable to similar highly infectious respiratory illnesses as well
4. This procedure is branches out of Corporate HSE Circular **BHEL: CO: SOP: COVID-19: 01 – ‘Standard Operation Procedure for Work Resumption after Lockdown’**. In case of any ambiguity & duplicity, Corporate HSE Circular & Guidelines and Govt. guidelines to be followed
5. This procedure is necessary to ensure continuation of business operations in order to avoid mandatory lockdown due to an infection. All precautions to be taken seriously due to the contagiousness and mortality rate of this disease. Even a slight lapse can lead to infections and shut down of site operations for the mandatory notified period
6. The physical distancing guidelines of minimum 1 m indicated in this document to be reviewed in line with latest Govt. guidelines and ensured appropriately

Detailed Procedures & Controls are given below

Procedures and Controls		
S No	Activity	Responsibility
1	<u>Deployment/ Nomination of COVID Marshall</u> a. BHEL and Agencies shall nominate COVID Marshalls, who will be responsible for monitoring the COVID prevention measures and apprising management on the same. b. Every agency shall nominate COVID Marshall, who shall report to BHEL COVID Marshall c. BHEL COVID Marshall shall be nominated by Site In-charge in consultation with Site HSE Head. d. BHEL COVID Marshall shall be the Nodal COVID Marshall for the site, and having overall responsibility.	Agency, BHEL
2	<u>Directions for Newly Joining Workers/ Officials</u> a. Mandatory health check-up for every worker/ official joining the site b. An undertaking to be submitted by every worker/ official which shall specify if he/she had been in contact with a Covid-19 positive case, and other health-related details (as per Format HSEOCP61-F01) c. All newly joining workers/ officials, shall follow the applicable procedures/ guidelines as laid out by Govt./ statutory authorities pertaining to quarantine, prior to joining work	Agency, BHEL
3	<u>Routine HSE Management Activities During COVID-19</u> a. Due to the stress on existing medical facilities due to COVID-19 pandemic, it is imperative to take utmost precautions and avoid any incidents during operations. b. All activities to be carried out in safest manner possible with all necessary precautions. c. All activities to be carried out using least amount of paperwork and physical proximity as far as possible. The methodology to issue Permit etc. can be decided by Site Management. All necessary precautions before starting activity to be ensured and regularly monitored by concerned execution and HSE Team.	Agency, BHEL



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	d. As far as possible, meetings & classroom trainings to be avoided. Essential meetings can be carried out by following the relevant guidelines e. HSE Observer App to be used to monitor HSE Activities and follow up with agencies for closure of non-conformities. Follow up can also be carried out through Phone/ Video Call etc. f. Apart from monitoring of HSE requirements, monitoring of COVID-19 precautions by workers and BHEL and Agency Officials also to be carried out	
4	<u>Strict Control at Gates</u> a. Strict Control at the Gate/ Banning Entry to Anyone Not Wearing Masks i. Security personnel at the gate may erect a barricade preferably approx. 10 meters from the gate and only allow personnel who are wearing proper masks inside. ii. Public address system may be used to warn any non-compliant visitors iii. Near entry gate, round markers at minimum 1-meter distance to be ensured so that distancing is ensured iv. A hand-wash or hand sanitiser facility is preferable at the gate to allow entry after hand wash or hand sanitisation. These are also to be provided at key locations to enable hand wash / hand sanitisation before starting work, before eating, etc. v. Gutkha, Paan, tobacco etc. to be banned from the site. Spitting to be strictly prohibited. vi. Screening at Gate with Contactless Thermometer & Action on Suspected Cases 1) Security Personnel at the Gate to screen each person entering the premises using a non-contact infrared thermometer, which is duly serial numbered and calibrated. 2) In case any site worker/ official is found to have fever more than 99 Degrees Fahrenheit or found coughing/ sneezing, he/she may be advised rest till recovery and entry to be permitted after obtaining clearance from medical officer/assistance/attendants. b. Any parcel/courier person should be stopped at gate only. Parcel to be collected from gate by concerned person preferably with provision of Special Box (wood/metal/plastic or the like) that can be sanitized daily. A provision of drop box at front of BHEL site office may also be deployed for receiving document like letter/invoice, etc. Parcels to be properly sanitized prior to opening. c. Any construction material received at site, unless properly sanitized, to be kept undisturbed for at least 3 days and to be used only after that period. d. Don't allow any new vehicle without concerned BHEL engineer permission. e. Ensure that number of persons coming inside and going outside is matching, agency wise. f. Visitor entry in site office to be avoided as far as possible.	Security, Agency, BHEL
5	<u>Maintaining Strict Social Distancing during site/office activities – minimum 1 meter distance between any two personnel to be Enforced Strictly</u> a. During meetings, classroom training programmes like induction training and on-the job training, toolbox talks and other gatherings, following precautions may be ensured: i. Preferably, such meetings to be avoided and communication carried out through other means (email, phone, pamphlets etc.) ii. At door, hand sanitizer or soap and water to be ensured for sanitizing hands during entry & exit by each individual iii. Only limited number of personnel to be called in training/ meeting, so as to ensure distance of minimum 1 meters between two participants iv. Each participant to wear mask	Agency/ BHEL



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- v. In case any individual is symptomatic/ coughing/ sneezing, he/ she may be taken to quarantine area by the medical/ first aid personnel, and medical assistance sought from specialized hospital, etc
- vi. Persons may be allowed to attend the induction training/ meeting only after temperature screening if felt necessary.

b. Social Distancing During Toolbox Talks

During Toolbox Talks, minimum 1 meter distance between any two workers to be ensured

c. During site execution activities:

- i. For all site execution activities, social distancing is to be maintained. In case this is not possible due to nature of work, speciality of work, etc, ensure sensitisation of the labour/staff involved and use of appropriate PPEs, especially mandatory face mask. In any case, close working to be allowed only in special circumstances and ensuring these activities are preferably time staggered to the extent possible
- ii. Ensure hand wash / hand sanitisation facility at key places and these are topped up regularly

d. In office premises:

- i. Sharing of items like pens, water bottles etc. in office premises to be avoided
- ii. Seating arrangement to be ensured to ensure minimum 1 meter distance
- iii. Doors preferably to be in open condition to avoid contact
- iv. All common touch points to be regularly disinfected.

6

Mandatory Face Masks for Everyone at All Times

- a. Face masks, and other necessary PPEs to be provided to all workers as per guidelines of Govt/ statutory authorities
- b. Those responsible for sanitation and cleaning of areas to be given coveralls
- c. The Govt of India advisory available at following link gives details on how to prepare, use and clean such masks.

<https://www.mohfw.gov.in/pdf/Advisory&ManualonuseofHomemadeProtectiveCoverforFace&Mouth.pdf>

- i. The workmen/staff may use home-made masks/ "gamchha" (गमछा) provided they are used effectively and constantly.
- ii. All site personnel to wear masks as specified at all times except possibly while having lunch/ tea. During that period, a distance of minimum **2 meters** to be maintained between two persons.
- iii. Minimum two masks to be ensured for each person – one can be used and other washed. Daily washing with detergent is mandatory
- iv. Strict directions for usage, washing of mask to be given to workers and officials. Masks are not to be touched from outside, and are to be put in soap solution on reaching residential quarters.
- v. There must not be a sharing of face covers and a face cover must be used by only one individual
- vi. Regular awareness by way of posters or daily briefing to be provided regarding correct usage, handling, washing, disposal etc of face masks/gamchhas/cloth etc

Concerned Individual/ Supervisor



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d. Types of Masks and Use case scenarios

i. Homemade/ Reusable Face Covers:

- 1) Such home/ self-made face covers may be preferably used by all personnel. In case they can arrange better masks, same may be allowed.
- 2) In any case, no person to be permitted in site premises without a mask.

ii. Triple Layer Surgical Masks

- 1) These are disposable masks to be given to visitors/ used by workers and officials as per requirement.

iii. N95 Masks

- 1) Medical, security, and other officials, who come into contact with large number of people during the course of the day to be given N95 Masks
- 2) In addition, infected personnel and who are suspected of infection to use specialized masks as indicated by doctor

e. Minimum two sets of masks to be ensured with everyone so that one can be used while other is washed

7

Mask cleaning/ disposal

The Govt of India guidelines in above link also give details on how to wash and dispose the masks. Same to be followed.

In addition,

- a. For re-usable masks, in labor colony, separate area for cleaning masks to be identified, wherein all workers to wash the masks using detergent and water
- b. Cleaning of masks and availability of backup to be ensured by officials as well.
- c. **Safe disposal of Masks, Infected clothing, items etc.**
 - i. Each location to have separate bin for collecting used disposable masks and possibly infected items.
 - ii. All these bins to be collected daily and disposed of by trained staff wearing proper PPEs

Concerned Individual, Agency, BHEL

8

Provision of Food & Refreshments

- a. **Workers:** Tea for workers may be avoided. In case necessary, strict social distancing to be ensured, besides hand washing. It is preferable to let the labour bring their own cups/glasses or else use of disposable paper based cups to be encouraged
 - i. Tea cups may be arranged by the server and picked by worker in contactless manner.
 - ii. Food for workers may be served in packets.
 - iii. **Preparation:** Common food preparation to be carried out under strict hygiene with cooks wearing gloves and masks. A guard specifically to monitor the health of the cooks may be deployed, who can warn the management regarding any possible health issues.
 - iv. At tea/ food distribution area, social distancing norms to be ensured
- b. **Officials:** As far as possible, home cooked food to be preferred. In case not possible, packed food to be delivered at each seat, prepared in hygienic fashion as above

Agency/ BHEL



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9

General Precautions in Site Areas

Agency/ BHEL

- a. Workers to be instructed to maintain social distancing of minimum 1 m at all time (tool box meeting, tea time lunch time, gate entry time and drinking/service water area)
- b. Daily Tool Box Meeting to also include awareness about COVID 19 and precautionary measures to prevent spread.
- c. No other group meeting to be conducted preferably.
- d. Contractor to keep their working area clean and hygienic. Disinfectant spray/powders to be applied daily at common places (eating place, drinking water area, service water area and transport vehicles)
- e. All the workers during resting also, to maintain physical distance of at least 1 meter. Subcontractor has to disinfect the rest shelter at regular intervals.
- f. Subcontractor may keep sanitizer/hand wash in sufficient numbers at all common points.
- g. All hanging load must be inspected before starting work. A committee can be formed by each contractor to ensure all these pre start up inspections are done and submit the report to BHEL.
- h. Sanitizer may be kept at stair case entrance, lift entry point etc. Lifts to be avoided to the extent possible, and staircases preferred
- i. If any worker is found with COVID-19 symptom, he/she has to be sent to quarantine chamber immediately by medical personnel and medical assistance sought. Contractor to maintain extra room to keep person with symptom in quarantine.
- j. Workers may be advised to keep separate water bottles. Common water bottles/mugs/glasses to be preferably avoided.
- k. Contact Biometric attendance system is strictly prohibited till such advisory is in place.

l. Regular disinfection of all Areas, Equipment and facilities

- i. Each agency to prepare the disinfecting plan and act accordingly.
 - ii. A dedicated disinfectant gang to be identified for the task by each agency. The disinfectant gang to be provided full body suits for the task.
 - iii. All areas (including office premises, site areas, chairs, tables, furniture etc.), tools & equipment to preferably be disinfected by dedicated gang every day before resumption of work.
 - iv. Common touch points like handrails, lift buttons, door/window knobs or handles, vehicle door handles, taps, conference room & dining hall tables/chairs, common sofas/chairs, visitor sofa/chairs, files & folders, etc to preferably be disinfected regularly at frequent intervals every day.
 - v. Pool vehicles, to be disinfected after every use. Social distancing to be maintained inside the common pool vehicles as per Govt./ statutory body guidelines.
- m. Provision of Disinfectant Spraying Machine and Disinfectant Chemical**
- i. Provision of disinfectant machine may be deployed for faster disinfection of surfaces, premises, offices etc.
The indicative composition of disinfectant chemicals is given in Corp HR Circular No. AA:HR:MR 1 (C) dated 20-03-2020
- n. Disinfecting the operator/driver touch points of Vehicles/cranes, T&Ps etc.**
Disinfection to also be carried out for all Cranes, Vehicles, Equipment, consoles, T&Ps etc. which come into contact with operating personnel.
- o. Mandatory Disinfecting of all PPEs, Tools & Items on daily basis**
All PPEs, Tools & Items to be disinfected mandatorily before use/ issue and also those in stores.



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	p. Posters on COVID-19 q. Sufficient Posters on COVID-19 to be ensured across the site in languages understood by most workers. Contractor to display precautionary measures, 'Do's and Don'ts' at prominent places in languages spoken by their workers. r. Provision of Hand-Hygiene at Site 1) In order to ensure hand-hygiene at site, wash basins with sufficient flowing water (going to drain after washing – not re-usable) to be installed at various locations. Here flowing water means water flowing from any tap or poured from tanker/sump/tank etc. Dipping hands into water in buckets/tanks/sumps etc for the purpose of washing is strictly prohibited as it is counter-productive. 2) Brief guidelines for hand washing are as below: - Soap to be provided at each wash basin and replenished regularly. - Washing with soap for at least 20 seconds is recommended. - As a general guideline, for every 100 workers, 1 wash-basin may be provided at site areas. - Close queue to be avoided near wash-basins and 1-meter distance to be maintained. Round markers at 1-meter distance can be ensured as guidance s. Penalty - To ensure compliance penalty may be imposed in line with district administration norms or higher for not wearing mask or violating social distancing guidelines. - Concerned subcontractor may also be warned of stricter penalties in case of continued negligence	
10	<u>Labor Colony</u> Following guidelines for COVID Prevention in labor colony may be followed: - All relevant guidelines in Corporate HSE Circular BHEL:CO: SOP : COVID-19 : 01 to be followed - HSEOCP No. 61A for Labor Colony. - Any other guidelines issued by applicable Govt/ Statutory authorities	Agency/ BHEL
11	<u>Provision of Quarantine Chambers</u> - In labor colony/ near site, a temporary home quarantine/ isolation chamber may be set up to keep possible infected cases (with cough, cold, fever or other symptoms) until further medical help arrives. Quarantine chamber should be away from labor colony tenements. - Similar arrangement of quarantine chambers may be set up at Site premises. - Necessary arrangements for quarantine shall be as per Govt./ statutory body guidelines	Agency/ BHEL
12	<u>Action in case any individual is suspected of COVID infection or showing symptoms</u> In case any suspected COVID-19 case is found or an individual is showing symptoms like cough/ cold/ fever etc.: - Immediately alert BHEL HQ & Corporate office, Customer, Local authorities/ district administration, etc - Arrange to take the individual to the COVID testing or COVID care facility as per advise of local authorities/district administration - Sanitize and disinfect immediately all the areas where the person would have visited in the Project premises and labour colony etc.	Agency/ BHEL



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	d. Co-operate with the local authorities in identifying and tracing individuals who might have come in close contact with the suspected person. Take immediate action as advised by the local authorities/ district administration, customer, etc including cordoning off or sealing of the area. e. Apprise BHEL offices and customer regularly.	
13	<u>Liaison with Specialty Hospitals for COVID-19</u> a. Liaison with specialty hospitals for COVID-19 test/treatment facility, for timely care to suspected individuals, and advice. b. Information regarding local authorities dealing with COVID to be maintained c. Addresses of COVID centers for possible scenarios to be maintained	BHEL
14	<u>Hazmat Suits and N95 Masks for Medical Personnel</u> Medical Personnel at site to be provided hazmat suits besides N95 masks	BHEL
15	<u>Training/ Awareness regarding COVID-19</u> All site personnel to be given inputs on COVID-19 regularly covering following broad topics: (Workers may be given Pep Talk once a month through Audio-Visual Medium and daily through toolbox talks and officials to be informed in internal meetings as and when they happen. Every meeting to begin with brief discussion on COVID-19 and need to ensure precautions like masks and social distancing). Suggested topics are given below: a. What is COVID-19 & How it spreads through coughing, sneezing and touching mucous membranes like mouth, eyes after touching infected surface b. What are the symptoms of COVID-19, namely coughing accompanied with fever and flu-like symptoms including running nose and sneezing c. The highly infectious spread, Number of infections and fatalities in the world from this disease d. Fatality rate from COVID-19 varies from 1-10% and individuals with preexisting conditions like heart diseases, diabetes, kidney & liver problems, smokers are more vulnerable to have serious effects from Coronavirus infection e. How COVID-19 infected individual can be asymptomatic, but can still infect friends and family members. Infected individual can be immune, but friends and family members can develop serious issues, so it is best to be protected to avoid problems for friends & family and especially elders f. According to studies, Coronavirus can stay on surfaces from few hours to few days, so touching of unknown surfaces to be avoided and hands washed/ sanitized frequently g. There is no cure/ vaccine for this disease so far h. Prevention is the only cure i. Best way to save oneself is to wear mask at all times and not to touch surfaces and protect oneself from infection from respiratory droplets	Agency/ BHEL
16	<u>Keeping Updated on COVID-19 in the Area/ Locality</u> Site to remain vigilant about any reported COVID-19 cases in the vicinity and take appropriate precautions/actions as advised by the local authorities/district administration	Agency/ BHEL



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17	<u>Staggered Shifts to Avoid Contact during Commute</u> - Staggered deployment of labour/staff to be ensured to prevent accumulation of people in work areas as well as in common transport vehicles. Aim is to ensure distance of minimum 1 meter between two occupants - Drivers to also wear protective masks, preferably N95 - Proper air circulation and ventilation to be ensured in vehicles	Agency/ BHEL
18	<u>Air circulation, filtering and ventilation in Office Premises & Training Halls</u> - Air circulation to be ensured in closed areas - Well ventilated areas/rooms preferred to air conditioning, to the extent possible	Agency/ BHEL
19	<u>Guidelines to handle outside papers (eg. At Weigh bridge area, LR copies, gate passes, documents, etc.)</u> - All involved personnel to strictly maintain 1-meter distance and all social distancing and other guidelines - PPES like Face mask and gloves to be necessarily worn by the dealing person. - If required, papers to be handled using long forceps, ironed on both sides using hot iron, and then handled (with gloves) - The driver/ visitor must always wear mask and maintain distance	Agency/ BHEL
20	<u>General/ Other</u> - Shift roster should be followed, - Mass gathering meetings should not be conducted. Communications/meetings to be preferably through telephone, Mail, WhatsApp, Web-ex, etc. Face to face meetings to be preferably avoided. In case of unavoidable situations, social distancing to be maintained. - Canteen to remain closed preferably. - Committee may be formed to monitor implementation of COVID-19 prevention steps besides hygiene and fulfillment of essential needs at labor colony. - Office common areas may be sanitized daily (door handle, pantry, washrooms, common printers and other common areas) - Vehicle seats and door handle to be sanitized daily. - Vehicle arrangement to be made so as to maintain social distancing. Extra persons should not travel in the vehicle. As per Corporate HSE circular, not more than 3 personnel to travel in a single site vehicle (6 seater) at a time - After lock down period, on resumption of work, all office equipment such as PC, Printers, AC, etc. are to be disinfected and started one by one after checking for any wear & tear due to rodent acts during lockdown. Banning animals from site: As per recent reports, Coronavirus is also spreading to animals. Hence, all animals may preferably be expelled from site.	Agency/ BHEL

Note:

- Other precautions as deemed necessary by concerned sites may be ensured in order to ensure strict precautions to prevent even a single case of Coronavirus Infection
- Responsibilities are only indicative – to be decided at Site Level

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Some Useful Links

A. Internet links of Govt and other authoritative sources on COVID-19 and Coronavirus are listed below:

1. MyGov COVID-19-19 Page: <https://www.mygov.in/COVID-19/>
2. Preventive Measures (Advisory) : <https://www.mohfw.gov.in/pdf/PreventivemeasuresDOPT.pdf>
3. Guidelines for Home Quarantine: <https://www.mohfw.gov.in/pdf/Guidelinesforhomequarantine.pdf>
4. Guidelines for COVID-19 Quarantine Facilities: <https://ncdc.gov.in/WriteReadData/l892s/90542653311584546120.pdf>
5. Posters, Dos, Don'ts on COVID-19: <https://www.mohfw.gov.in/>
6. Miscellaneous guidelines and circulars: <https://www.nhp.gov.in/whatsnew>
7. Advisory for Ensuring Safe Drinking Water : <https://www.mohfw.gov.in/pdf/advisorydrinkingwaterpdf.pdf>

B. World Health Organization:

1. Infection Prevention & Control : <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/infection-prevention-and-control>
2. Advice for Public : <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>
3. Points of Entry & Mass Gatherings: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/points-of-entry-and-mass-gatherings>

Coronavirus Self Declaration Form

- 1) Name:
- 2) Age:
- 3) Father's Name:
- 4) Agency:
- 5) Identification Number.....Identification Type.....
- 6) Arriving from:
- 7) Are you arriving from any COVID Hot Spots or Containment Zones? If Yes, please give details:

- 8) Have you come in contact in with relatives/ friends/ people infected, suspected or diagnosed with COVID-19 in last 21 days? If Yes, please provide your relationship with people and your last contact date with them:

- 9) Have you been advised quarantine/ isolation or undergone treatment w.r.t. COVID-19? If Yes, please provide details (date, duration, location, medical report etc.):

- 10) Please state if you have experienced/ are experiencing any of the following symptoms:

Symptom	Yes	No
i) Fever		
ii) Cough		
iii) Shortness of Breath		
iv) Persistent pain in the Chest		

I acknowledge that the information I have given is accurate and complete.

Date:

Place:

Signature:



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Site to follow all the general safety precautions as per this OCP.

In addition, relevant records pertaining to actions taken to be prepared and kept.

Records:

Record Title	Record No.	Location	Responsibility	Retention Period

Verification, Corrective and Preventive Action:

HOD / Site In-charge shall ensure effective implementation of the above procedure. In case of any deviation, shall take suitable corrective and preventive action.

Revision History

Revision Date	Revision No.	Old Text	New Text	Reason	Revised by
18/04/2020	00	-	-	First Issue	As indicated on Page 1
01/06/2020	01	-	Besides general improvements/ corrections, modifications as below: Added (Other clauses shifted by 2): 1. Deployment of COVID Marshalls 2. Directions for newly Joining Workers/ Officials; Addition of Format F1 Edited: 4. Construction material, unless sanitized to be kept undisturbed for 3 days 6. Sanitization staff to be given coveralls 10. Reference to OCP 61A for COVID Prevention in labor colony added	New Govt. guidelines/ general improvements	PSHQ-HSE



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Rev. No.: 00

Rev. Date: 27.04.2020

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OCP No. : 61A

Prevention of COVID-19 Infection in Labor Colony

Purpose	➤ To ensure necessary precautions in Labor Colony in order to prevent spread of Infectious diseases like COVID-19 among residents	Scope	PS Regions
Applicability	➤ This SOP applies to labor colonies at project sites.		
Responsibility	Concerned Site In-charge / Site HSE Head/Package Head		
Performance Criteria	Number of cases of violations from these guidelines. Violations must be recorded and compliances be done for the same immediately/ within a day		
References	➤ HSEOCP:61 and all References therein This OCP is an Annexure to HSEOCP 61)		

Procedures and Controls

S No	Activity	Responsibility
1	General a. Norms for social distancing, training/ awareness, face masks, disinfection, sanitization, gate entry, quarantine, medical, action in case of suspect COVID cases etc. as indicated in HSEOCP:61, Corporate HSE Circular BHEL:CO: SOP: COVID-19 : 01 and Govt. guidelines b. Each labor colony will be secured preferably by a boundary wall and gate, manned by a guard. Only workers with valid ID cards to be let inside c. New workers should not be allowed to enter colony without health checkup.	Agency, BHEL
2	Precautions for Living Rooms & Common Areas in Labor Colony a. Spacing of minimum 2 meters between living areas of workers inside a room may be maintained. Preferably, the living area of each worker may be partitioned using sheet of cloth, plastic etc. b. Rooms to be properly ventilated as far as possible c. Sanitation to be given prime importance and personal hygiene to be promoted d. Outside every common facility, eg. Toilet, washroom, food hall/ canteen etc., provision of washbasin with water (flowing water preferably) and soap (preferably liquid soap) to be ensured e. Round markers with chalk at 1-2 meter distance to prevent crowding at each common facility like toilet, washroom, drinking water point, washing area, mess/ canteen etc. f. Staggered shift planning – In case the capacity of infrastructure and facilities like toilets, washrooms, canteen etc. is not sufficient, workers can be assigned staggered shifts so as to not overwhelm the facilities. A group can depart before the next group starts to get ready. Detailed assessment and planning in this regard is to be carried out by each concerned agency g. Face masks shall be worn by everyone inside the colony premises (Refer 1(a)). h. Sanitisation/Disinfection of all areas to be carried out regularly (Refer 1(a)). i. Spitting of Pan. Gutkha etc. inside the colony and urinating etc. outside the toilets to be strictly avoided j. Regular visits by Doctors to the labor colony can be arranged on non-working day for check-up of all workers k. Banning animals from labor colony: As per recent reports, Coronavirus is also spreading among animals. Hence, all animals to preferably be expelled from labour colony. l. Necessary social distancing to be ensured during cooking and taking food. Separate water bottles, utensils etc to be preferably maintained by each worker to prevent infection. Common cooking to be preferably avoided. In case necessary, adequate care to be taken especially w.r.t. health and well-being of the cook and maintaining proper distance during serving food/ tea etc.	Agency/ BHEL



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Prevention of COVID-19 Infection in Labor Colony

- m. Identification of “COVID Wardens” (CWs) by each agency for maintaining the following:
 - i. Keeping an eye on the health of workers and report any suspected cases of fever, coughing etc. to the management
 - ii. Keeping an eye on the social distancing measures in the labor colony and report any non-conformances to the management.
 - iii. Educate the workers about social distancing and COVID prevention measures.
- n. **Training/ Awareness regarding COVID-19**
 - i. Workers to be instructed to maintain social distancing of minimum 1 m at all time
 - ii. **Posters on COVID-19:** Sufficient Posters on COVID-19 to be ensured across the labor colony in languages understood by most workers.
 - iii. All workers to be instructed to inform any suspected cases of illness (individual or others) to an emergency contact number of CW, The emergency contact numbers and CW contact numbers to be displayed at prominent locations
- o. **Commute to/ from Labor Colony**
 - i. Social distancing precautions and masks to be strictly ensured during commute between labor colony and site. Govt. guidelines on occupancy of the vehicles to be followed.
 - ii. In case vehicles are used, concerned drivers to be instructed to keep a watch on the occupants following the necessary social distancing measures and wearing masks.
- p. **Inspection & Review**
 - i. Daily Inspection by concerned COVID Wardens and reporting to Agency
 - ii. Regular inspection by Agency & BHEL

Note:

1. Other precautions as deemed necessary by concerned sites may be ensured in order to prevent Coronavirus Infections. This OCP suggests minimum requirements. However, Sites may consider alternative actions based on feasibility and circumstances, while adhering to GOI/District Administration/Local Authority guidelines, issued from time to time for social distancing, sanitation, use of face masks, etc
2. Responsibility assignments are only indicative – to be decided at Site Level



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Prevention of COVID-19 Infection in Labor Colony

Site to follow all the general safety precautions as per this OCP.

In addition, relevant records pertaining to actions taken to be prepared and kept.

Records:

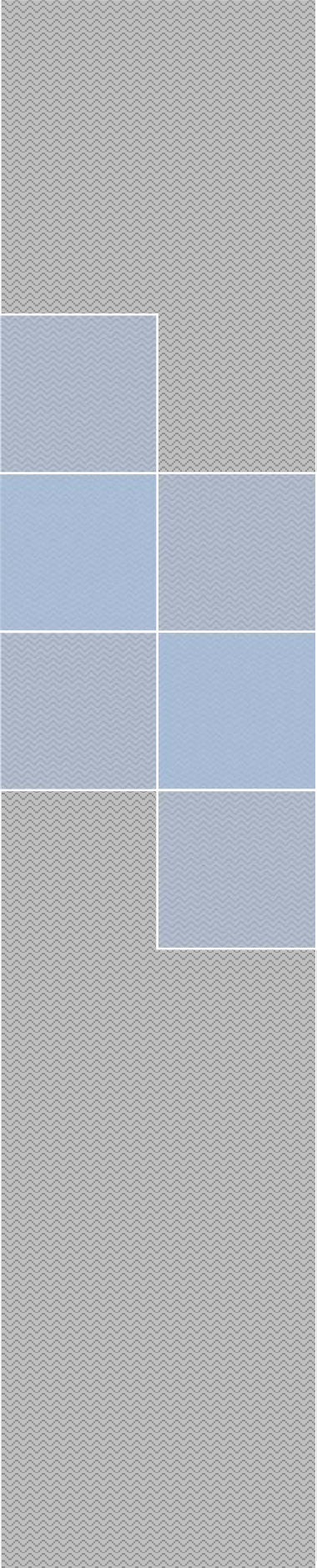
Record Title	Record No.	Location	Responsibility	Retention Period

Verification, Corrective and Preventive Action:

HOD / Site In-charge shall ensure effective implementation of the above procedure. In case of any deviation, shall take suitable corrective and preventive action.

Revision History

Revision Date	Revision No.	Old Text	New Text	Reason	Revised by
27/04/2020	00	-	-	First Issue	PSHQ-HSE



CONTRACT (SCC)

(For Scope of Supply)

“Design, Supply, handling during materials receipt, storage and execution including erection, testing and all associated services for fixing of Borosilicate Glass Block Lining, expansion compensator joints etc. along with providing Expert Supervision services during installation including Wet Stack Flow Model Study for 275 mtr. tall single flue chimney at 1x660 MW Sagardighi Unit#5, Murshidabad, West Bengal.”.

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR EASTERN REGION



SPECIAL CONDITIONS OF CONTRACT (SCC)

(For scope of Supply)

Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

S. No.	Description
Volume-IA	Part-I: Contract specific details
1.	Definitions of Terms
2.	Abbreviations
3.	Price
4.	Evaluation Criteria
5.	Variation of Contract Value
6.	Terms of Payment
7.	Performance Bank Guarantee / Guarantee Deposit
8.	Guarantee / Warranty Period
9.	Inspection
10.	Delivery in execution of scope of work / Liquidated Damages
11.	Tenderer to Inform Himself fully
12.	Other Conditions
13.	Insurance
14.	Circulars
15.	Criteria for quoting as Agent
16.	Agency Commission
17.	Rights of BHEL
18.	Patent Right
19.	Cartel Formation
20.	General Terms
21.	IMTE
22.	TAXES & DUTIES
23.	PRICE VARIATION COMENSATION (PVC)

SPECIAL CONDITIONS OF CONTRACT (SCC)
(For scope of Supply)

Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

24.	OVER RUN CHARGES (ORC)
25.	INTEREST BEARING RECOVERABLE ADVANCE/ MOBILISATION ADVANCE

SPECIAL CONDITIONS OF CONTRACT (SCC)

(For scope of Supply)

Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

1.0	DEFINITION OF TERMS: Throughout the Tender Documents including the Enquiry Letter, the following words shall have the meanings assigned to them herein, unless the subject matter or the context requires otherwise.
1.1	Purchaser shall mean M/s Bharat Heavy Electricals Limited (A Govt. of India Undertaking) incorporated under the Companies Act 1956 acting through its Power Sector Eastern Region (PSER) which expression shall include its successors and assigns. It may also be referred to as BHEL.
1.2	Owner shall mean the Customer or Client for whose project the enquiry is issued by Purchaser and shall include its successors and assigns as well as authorized officer(s)/ representative(s).
1.3	Consultant shall mean the agency appointed by Owner to provide consultancy services for the project and shall include its successors and assigns as well as authorized officer(s)/ representative(s).
1.4	Tenderer shall mean the Firm/ Company/ Organization which quotes against the Tender Enquiry issued by Purchaser. It may also be referred as Bidder or Vendor.
1.5	Order/ Contract shall mean and include the general conditions, bidding conditions, specific conditions, specifications, schedules, drawings, form of tender, covering letters, schedule of prices and quantities, letter of intent/ award of the Purchaser, Integrity Pact (if applicable), special conditions applicable to the project and subsequent amendments mutually agreed upon. It may also be referred as Purchase Order.
1.6	Seller/ Contractor shall mean the Firm/ Company/ Organization with whom the Order/ Contract is made and shall be deemed to include its successors, Representatives, heirs, executors, administrators and permitted assigns, as the case may be. It may also be referred as Supplier.
1.7	Sub-Contractor shall mean the person/ firm/ company/ organization to whom any part of the work has been sub-contracted by Seller/ Contractor, with the written consent of Purchaser, and shall include sub-contractor's heirs, executors, administrators, representatives and assigns.
1.8	Engineer shall mean the authorized officer of Purchaser to act as the engineer on its behalf for the purpose of the Order/ Contract.
1.9	Site shall mean and include the land and place on which the power station and related facilities are to be constructed and any adjacent land which may be

SPECIAL CONDITIONS OF CONTRACT (SCC)

(For scope of Supply)

Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

	allocated or used by Owner or Seller/ Contractor in performance of the Order/ Contract.
1.10	Tests on completion shall mean such tests as prescribed in specifications and/ or tests mutually agreed upon by Purchaser and Seller/ Contractor, to be performed by Seller/ Contractor after erection of equipment to establish its satisfactory operation as per specifications.
1.11	Commissioning shall mean successful completion of Trial Operation and readiness of the contracted/ ordered plant and materials for commercial use. This will include all consumables and inputs required for pre-commissioning.
1.12	Initial Operation or Trial Operation or Reliability Run shall mean continuous integrated operation of the contracted/ ordered plant and materials under varying loads as proof of satisfactory operation for a specified period.
1.13	Inspection Agency (IA) shall mean person(s) authorized by Purchaser / Owner to inspect the stores as per Order/ Contract at Contractor's/ Sub-Contractor's works. Vendors to raise inspection call on BHEL – CQS website.
1.14	Month shall mean calendar month and week shall mean 7 days.
1.15	Consignee shall mean the official(s)/ person(s) to whom the stores are required to be delivered in the manner indicated in the Order/ Contract.
1.16	Plant/ Equipment/ Stores shall mean the goods, machinery, components, parts, spares etc. required to be supplied by Seller/ Contractor as per Order/ Contract.
1.17	Contract Engineer (CE) shall mean the official who signs the Order/ Contract on behalf of Purchaser.
1.18	Site Engineer shall mean officer of Purchaser/ Owner authorized to receive and verify the in-coming stores, and issue Material Receipt Certificate (MRC)/ Stores Receipt Voucher (SRV).
1.19	Site Inspection Agency (Site IA) shall mean person(s) authorized by Purchaser/ Owner to inspect the stores/ works included in Order/ Contract at the Project Site.
1.20	GENERAL The words incorporating singular shall include plural and vice-versa, the words incorporating masculine gender shall include feminine gender and vice-versa, and the words incorporating persons shall include bodies, corporate, limited liability companies, partnership and other legal entities.

SPECIAL CONDITIONS OF CONTRACT (SCC)

Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

2.0 ABBREVIATIONS:

AWB	Airway Bill
BL	Bill of Lading
BOQ	Bill of Quantity
CIF	Cost, Insurance and Freight
CQ	Corporate Quality
CVD	Countervailing Duty
DMS	Document Management System
EMD	Earnest Money Deposit
E&C	Erection and Commissioning
FOR	Freight on Road
GR	Goods Receipt
H1	Bidder quoting highest landed cost to BHEL
IP	Integrity Pact
IEM	Independent External Monitor
L1	Bidder quoting lowest landed cost to BHEL
LC	Letter of Credit
LOI	Letter of Intent
LOA	Letter of Award
LR	Lorry Receipt
MDCC	Material Dispatch Clearance Certificate
MRC	Material Receipt Certificate
MSMED	Micro Small and Medium Enterprises Development
NIT	Notice Inviting Tender
O&M	Operation & Maintenance
PBG	Performance Bank Guarantee
P&ID	Process & Instrumentation Diagram
PO	Purchase Order
PQR	Pre-Qualification Requirement
FGD	Flue Gas Desulfurization

SPECIAL CONDITIONS OF CONTRACT (SCC)

Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

QS	Quality Surveillance
RA	Reverse Auction
RBI	Reserve Bank of India
RFQ	Request for Quotation
RR	Railway Receipt
SCC	Special Conditions of Contract
TCC	Technical Condition of Contract
USD	United States Dollar
INR	Indian National Rupee
LD	Liquidated damages
SBI	State Bank of India
PSER	Power Sector Eastern Region

3.0	Price
	Bidders shall quote their price in Indian Rupee only on FOR destination site basis (Quoted rate shall be excluding GST, applicable Cess and TCS, if any).
4.0	Evaluation Criteria and Ordering Philosophy
	Conditional offers will not be considered. Tenders will be evaluated on the basis of total cost taken into consideration of loadings, if any, and all available financial advantages, including those available from Owner, taxation authorities etc.
5.0	Variation of Contract Value:
5.1	Rates shall remain Firm for any increase or decrease in the Order/ Contract value both for supply and services up to plus or minus 15% (for any amendment) within two years from the date of original PO unless specified otherwise in NIT.
5.2	This tender is a Firm price contract. There is no Price Variation Clause during the currency of the contract.
6.0	TERMS OF PAYMENT
6.1	TERMS OF PAYMENT AGAINST SUPPLY: (i) 10 % of Basic Price of BOQ item No. 1.1 of Rate Schedule, along with 100% taxes and duties (as applicable) shall be paid on supply of Epoxy Primer for the estimated total qty. of Epoxy Primer required for job completion. Epoxy

SPECIAL CONDITIONS OF CONTRACT (SCC)

Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

	Primer shall be supplied within 90 days from the date of written intimation given by BHEL site. Payment shall be made on prorated basis for the receipt qty. of Epoxy Primer on the basis of jointly decided total required qty. for completion of Epoxy primer application job. No extra payment shall be made for wastage qty. Payment shall be made within 45 to 60 days from the date of submission of following documents: a. Original tax invoice with three copies. b. Original LR/RR. c. Packing List in one original and two copies. d. Copy of material dispatch certificate (MDCC) issued by BHEL/Customer. (ii) 80 % of Basic Price of material supplied (except Epoxy Primer) as per BOQ item No. 1.1 of Rate Schedule, along with 100% taxes and duties (as applicable) shall be paid on receipt of materials at site within 45 to 60 days from the date of submission of following documents: a. Original tax invoice with three copies. b. Original LR/RR. c. Packing List in one original and two copies. d. Copy of material dispatch certificate (MDCC) issued by BHEL/Customer. e. Copy of intimation letter to insurance company prior to dispatch of materials. f. Quality certificate in one original and two copies. g. Copy of valid performance Bank Guarantee as specified under clause no. 7.0 of SCC. (iii) 10 % of Basic Price of material supplied as per BOQ item No. 1.1 of Rate Schedule shall be paid on issuance of Material Receipt Certificate within 45 to 60 days from the date of submission of following documents. a. Signed commercial invoice in three originals. b. Material Receipt Certificate (MRC) issued by Site official in one original and two copies.

SPECIAL CONDITIONS OF CONTRACT (SCC)

Project: 1x660 MW Sagardighi TPP, U#5, West Bengal

6.2	<u>PAYMENT FOR WET STACK FLOW MODEL STUDY FOR BOQ ITEM NO. 3:</u> a) 75% Basic Payment (along with 100% Taxes & Duties, as applicable) shall be made after approval of study model report by Customer, WBPDCCL. b) Balance 25% shall be made on completion of application work certified by Project Site Engineer of Owner/ Purchaser within one month from date of completion of application work including submission of following documents: i) All drawings for application of Borosilicate lining works and supply. ii) O&M manual and Instruction Manual iii) Comprehensive QA documentation after the completion of lining process in flue can c) Number of wet stack flow model study indicated in BOQ is tentative only. BHEL may ask bidder to perform Wet Stack Flow Model Study as per requirement. Payment shall be made on actual number of Wet stack flow model study carried by the bidder.
7.0	PERFORMANCE BANK GUARANTEE / GUARANTEE DEPOSIT:
7.1	A. Bidder shall furnish Performance Bank Guarantee of 5% Contract Value excluding taxes and duties against Guarantee Period as per Guarantee/Warranty Clause of Tender TCC. OR B. Supplier shall deposit 5% of Contract Value as Guarantee Deposit amount excluding taxes and duties against Guarantee Period as per Guarantee/Warranty Clause of Tender TCC.
7.2	Performance Bank Guarantee shall be furnished within 15 days from the date of issuing LOI for effecting issue of Order.
7.3	The Bank Guarantee / Guarantee Deposit shall be kept valid till the successful trial operation of the unit and thereafter till the entire Guarantee Period as per Clause no. 8.0 of SCC.
8.0	GUARANTEE / WARRANTY PERIOD
8.1	Ten (10) years warranty for the Borosilicate Glass Block Lining System of the chimney flue shall be provided. Under this warranty, the bidder shall repair or replace the lining system

SPECIAL CONDITIONS OF CONTRACT (SCC)

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	(Both application and material) at his own cost, if the lining system should fail to protect the chimney flue from internal deterioration. The manufacturer/ supplier/ executor of the lining system shall provide a warranty for 10 (Ten) years Borosilicate Glass Block Lining System (Material & workmanship) in a non-judicial stamp paper which shall be duly notarized and registered. The warranty shall include full replacement of materials and FQA supervision and execution of the Borosilicate Glass Block Lining System. Periodical supervision/ monitoring by expert of Borosilicate Glass Block Lining System must be ensured. Necessary repair/ rectification/ replacement of Borosilicate glass Block Lining System have to be taken care of the vendor.
9.0	Inspection:
9.1	Bidder will intimate BHEL after readiness of material at their works along with Manufacturing Test Certificate/Warranty Certificate. BHEL will issue MDCC (Material Dispatch Clearance Certificate) based on Manufacturing Test Certificates.
9.2	Material shall be dispatched only after issuance of MDCC (Material Dispatch Clearance Certificate) by BHEL.
10.0	DELAY IN EXECUTION OF SCOPE OF WORK / LIQUIDATED DAMAGES :
	Timely Supply and Erection completion as stipulated in Order/ Contract shall be the essence of Order/ Contract. If the vendor fails to complete the job within the time period stipulated in Order/ Contract, or within any extension of time granted by Purchaser, it shall be lawful to recover damages from the vendor for breach of Order/ Contract without prejudice to any other rights and/ or remedies provided for, in the Order/ Contract and hereunder:
10.1	LIQUIDATED DAMAGES FOR DELAY: BHEL reserves the right to recover from the Vendor liquidated damages, a sum equivalent to half ($\frac{1}{2}$) percent of the total contract price of BOQ item no. 1.1 of rate schedule per week or part thereof excluding elements of taxes, duties and freight, if the vendor fails to complete supply within the period stipulated in the Order. Similarly liquidated damages, a sum equivalent to half ($\frac{1}{2}$) percent of the total contract price of BOQ item no. 1.2 to 1.4 of rate schedule per week or part thereof excluding

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	elements of taxes, duties and freight, if the vendor fails to complete the erection job for readiness of lining system within the period stipulated in the Order. Deduction of Liquidated damage shall be limited to 10% of the Total contract price for the applicable liquidated damage on supply and erection scope both together. The Seller shall supply and install Borosilicate Glass Block Materials and Expansion Compensator as per order qty. according to the drawing details provided in the tender documents/intimated. Bidder shall intimate quantities as per their design before dispatch clearance. In case of any shortfall in the supplied quantities as per the specifications/area specified as per BOQ item qty., the vendor has to arrange the shortfall qty. in such manner that erection work would be completed within the contractual time schedule. Also bidder has to complete the shortfall quantities without any extra cost to BHEL. However, in case of upward revision in the total quantities of Borosilicate Glass Block Materials and expansion compensator joints as per BOQ item Sl. no 1 due to increase of area in square meters at a later date, appropriate time extension as per mutual agreement shall be provided and the delivery schedule shall also be extended accordingly. In case of delay in supply of additional/enhanced quantities of Borosilicate Glass Materials and expansion compensator joints, the Liquidated Damages shall be applied only on the value of additional quantities of supplies (required due to enhancement/revision in the area) as per amendment to Order. In case of any amendment/ revision, LD shall be linked to the amended/ revised delivery date(s).
10.2	BHEL shall deduct the amount of such compensation from any money due or which may become due to the vendor and/or recover such compensation from the bank guarantees/ security deposit of the vendor. To be entitled to impose such compensation, BHEL will not be required to prove that he has incurred such amount as actual damage.
10.3	BHEL reserve the right to purchase and execute the job from elsewhere on account of and at the risk & cost of the vendor with/without canceling the order/ contract in respect of the equipment/ materials not yet due for delivery.
10.4	BHEL reserve the right to cancel the order/ contract or a portion thereof for the stores not so delivered at the risk & cost of the vendor and the vendor shall be liable to BHEL for any excess costs thereof.

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10.5	The vendor shall continue the performance of the order/ contract under all circumstances, to the extent not cancelled.
10.6	Where action is taken as per above, the vendor shall be liable for any loss, which BHEL may sustain on that account. The vendor shall not be entitled to any gain on such purchase and the manner and the method of such purchase shall be at the discretion of BHEL.
10.7	<u>Liquidated Damages Loading:</u> In case bidder is not accepting the penalty clause for delay, the offer of bidder shall be loaded to the extent to which it is not agreed by the bidder during price bid evaluation.
11.0	TENDERER TO INFORM HIMSELF FULLY: It is the responsibility of tenderer to keep himself informed about all taxes & duties applicable on materials/ services as prevailing at the time of tendering. If the rates assumed by tenderer are less than the tariff rates prevailing at the time of tendering, the tenderer will be himself responsible for such under quotations.
12.0	Other Conditions: A. If there is any shortfall in the requirement of Borosilicate & Expansion Compensator during the currency of the Contract, there shall be no commercial implication on BHEL. B. BHEL may short close the contract at any stage without assigning any reasons C. Material Dispatch Clearance Certificate (MDCC) shall be issued by BHEL/ owner or their authorized representative prior to dispatch. No material shall be dispatched by supplier unless and until Material Dispatch Clearance Certificate (MDCC) issued by BHEL/ owner or their authorized representative prior to dispatch. Payment shall be released against submission of invoice accompanying all related documentations as mentioned elsewhere in the tender. D. Performance Bank Guarantee will be furnished to BHEL PSER-EHQ-Kolkata office. E. Paying authority is BHEL PSER – Sagardighi site.

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13.0	<u>Insurance.</u> BHEL shall arrange comprehensive insurance policy for total supply & services for main equipment/ system covering transit risks & loss, destruction or damage during handling at site, storage, civil works, erection, testing and commissioning up to trial operation/ completion of unit(s) including theft, sabotage, fire, lightning and other natural calamities. Successful bidder shall timely intimate dispatches/ discrepancy during contract operation, to the underwriter. The name of the underwriter and Policy No shall be intimated in due course of time. The successful bidder will take necessary precautions/ due care to protect the material at project site, while in their custody from any damage/ loss till the same is handed over to BHEL/ customer at project site. For lodging/ processing of insurance claim the successful bidder will submit necessary documents. BHEL reserve the right to recover the loss from the successful bidder in case the damage/ loss is due to negligence/ carelessness on the part of the successful bidder. In case of theft of material under successful bidder's custody, the same shall be reported to police by the successful bidder immediately and copy of FIR and subsequently police investigation report shall be submitted to BHEL/ customer for taking up with insurance. However, this will not relieve the successful bidder of their contractual obligation for the materials stored at site. In case the damage/ loss/ theft of materials are attributable to negligence/ failure in discharging the duties and obligations of the successful bidder, the expenses incurred for repair/ replacement of such components in excess of the amount realized from the underwriters, limited to Normal Excess (Deductible Franchise) shall be recovered from the successful bidder. In case the claim is summarily rejected by the underwriters due to WILFUL NEGLIGENCE of the successful bidder, the entire cost of repair/replacement will be recovered from the successful bidder It will be responsibility of the successful bidder to replenish the items lost/ damaged in time without hampering the schedule of work and without waiting for settlement of insurance claim. Amount received from the underwriters on settlement of insurance claim shall be passed on to the successful bidder as and when available. Other conditions of Insurance shall be as per relevant clause of GCC.
14.0	<u>Circulars</u> All circulars issued by Indian Ministries from time to time shall be applicable.
15.0	<u>Criteria for quoting as Agent</u> One Indian agent can represent only one foreign principal and only one offer for the tendered items.

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	<u>Note:</u> In order to maintain sanctity of the tender system, it is mandatory that one Agent cannot represent two Suppliers or quote on their behalf in a particular tender. If any Agent represents more than one Supplier all such offers will be rejected.
16.0	<u>Agency Commission</u> Not payable for this Tender.
17.0	<u>Rights of BHEL</u> a) BHEL does not guarantee ordering of any specific quantity. BHEL reserves the right to negotiate or re-float the tender if the lowest offered price is not found competitive. b) In the event of our customer order covering this tender being cancelled / placed on hold / otherwise modified, BHEL would be constrained to accordingly cancel / hold / modify the tender/PO at any stage.
18.0	<u>Patent Right</u> The Bidder shall at all times, indemnify and keep indemnified the purchaser, free of cost, against all claims which may arise in respect of goods and services to be provided by the supplier under the contract for infringement of any intellectual property rights or any other right protected by patent, registration of designs or trademarks. In the event of any such claim in respect of alleged breach of patent, registered designs, trademarks etc. being made against the purchaser, the purchaser shall notify the supplier of the same and the supplier shall, at his own expenses take care of the same for settlement without any liability to the purchaser.
19.0	<u>Cartel Formation</u> All the firms shall desist from forming cartel as the practice is prohibited under Section 3(3) (a) & (d) of the competition Act 2002. If any such instance is observed during the tender, it will attract disciplinary action as per BHEL policies.
20.0	<u>General Terms</u> a) Offer must be submitted in Two-Part Bid only i.e. techno-commercial bid and price bid separately. Single bid offer shall be liable for rejection.

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	b) Consortium bidding is not allowed for the subject tender c) A person signing (manually or digitally) the tender form or any documents forming part of the contract on behalf of another shall be deemed to warranty that he has authority to bind such other persons and if, on enquiry, it appears that the persons so signing had no authority to do so, the purchaser may, without prejudice to other civil and criminal remedies, cancel the contract and hold the signatory liable for all cost and damages. d) Part offer shall be rejected i.e. bidder must quote for the total tender quantity. e) Offers for Part Quantities on item level basis are not acceptable. Such partial offer would not be considered for evaluation and will be rejected. f) Bidder must quote the price elements mentioned in price schedule, if any element left blank shall be construed as the price is included CIF/ FOR price, as the case may be. g) Bidder shall fill the rates only in the Price format given. Other papers or documents along with the price bid inscribing the rates of material shall be liable for rejection h) If any Bidder attempts to bribe, or pay commission, gift or any advantage or bring in undue influence either by himself or on his behalf any one including a stranger to the tender, in addition to instituting legal proceedings as per the extant laws prevailing, will disqualify the supplier from the tender and all future tenders of BHEL. Decision of the Purchaser would be final in this matter. i) In the event there is a delay by the Bidder in negotiating / submitting the document, any demurrage/ wharfage/ other related charges, arising out of the same shall be to the account of the Supplier and an amount of up to 5% of the invoice value will be retained towards above said charges and the difference if any between actual charges and recovery will be settled separately through supplementary invoice. Also, in such cases, the Supplier shall authorize the Steamer/ Shipping agent/ transporter to freely release the consignment to BHEL by providing a "Surrender Bill of Lading". Over-seas suppliers have to give a No-Objection Certificate to BHEL, authorizing BHEL to get the Delivery order from the Steamer Agent without, producing the Original Bill of Lading. This is required to ensure avoidance of Incidence of Demurrage at Chennai seaport that may arise in case of delayed presentation of documents by the seller.

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	j) In exceptional cases the Bidders may be requested by the Purchaser to extend the validity of their tenders up to a specified period. Such requests and responses thereto shall be conveyed by e-mail. The tenderers, who agree to extend the tender validity, are to extend the same without any Change of modification of their Original tender and they are also to extend the validity period of the EMD (if any) accordingly. A tenderer who may not agree to extend its tender Validity after the expiry of the original order validity period, EMD furnished by them shall be forfeited. k) In case the day up to which the tenders are to remain valid falls on/ subsequently declared a holiday or closed day for the Purchaser, the tender validity shall automatically be extended up to the next working day. l) Any of the terms and conditions not acceptable to Bidder, shall be explicitly mentioned in the Tender. Otherwise, it will be treated as that all terms and conditions as mentioned in the Tender) are acceptable in Toto.
21.0	<u>IMTE:</u> The contractor shall ensure deployment of reliable and calibrated instrument, measuring, and test Equipment (IMTE). The IMTE shall have test calibration certificate from authorized / Govt approved agencies. The contractor shall also keep provision of alternate engagement for such IMTE so that the work does not suffer when a particular IMTE is sent for calibration. Re-testing/ re-calibration shall also be arranged by the contractor at their own cost at regular interval during the period of use as advised by BHEL.
22.0	<u>TAXES AND DUTIES</u>
22.1	All taxes excluding GST & BOCW Cess (as specified elsewhere in the tender) but including, Charges, Royalties, any State or Central Levy and other taxes for materials if any obtained for the work and for execution of the contract shall be borne by successful bidder and shall not be payable extra by BHEL. Any increase of above at any stage during execution of contract, including extension of the contract, shall have to be borne by successful bidder contractor. Bidder's quoted/ accepted rates/ price shall be inclusive of all such requirements.
22.2	GST along with Cess (as applicable) legally leviable & payable by successful bidder as per GST Law shall be paid by BHEL, extra. Hence, bidder shall not include GST along with Cess (as applicable) in their quoted rates/ price.

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22.3	Successful bidder shall furnish proof of GST registration with GSTN Portal covering the services under this contract. Registration should also bear endorsement for the premises from where the billing shall be done by successful bidder on BHEL for this project / work.
22.4	Since GST on output will be paid by BHEL separately as enumerated above, bidder's your quoted rates / price should be after considering the Input Credit under GST law at bidder's end.
22.5	TDS under Income Tax Act shall be deducted as per prevailing IT rules from the bills.
22.6	TDS under GST shall be deducted as per prevailing GST rules from the bills.
22.7.1	You may collect TCS under section 206C(1H) of Income Tax Act, 1961 if applicable.
22.7.2	In case, you collect TCS under section 206C(1H) of Income Tax Act, 1961, following compliance is required.
22.7.2.1	TAN and PAN of vendor should appear in all invoices/claims. Copy of TAN /TCS registration is to be submitted.
22.7.2.2	Amount of TCS and Assessable value on which TCS has been calculated should be specified clearly in the invoice.
22.7.2.3	You shall be required to submit certificate of TCS in Form no. 27D within 15 days from the due date for furnishing the statement of tax collected at the source.
22.3	In case, you do not collect TCS under section 206C(1H) of Income Tax Act, 1961, following declaration is to be submitted alongwith each invoice: - "I/We hereby declare that I/We are not required to collect TCS under section 206C(1H) of Income Tax Act, 1961, on this bill.
22.4	In event of failure to comply with the provisions of the Act, or proper certificate not issued, or if tax collected but not remitted to the Government, or for any other reason and thereby causing loss to BHEL, the same shall be recoverable from the vendor with applicable interest.
22.5	You shall comply with all statutory amendment/notifications in this respect.
23.1	Bidder shall note that GST Tax Invoice complying with GST Invoice Rules (Section 31 of GST Act & Rules referred thereunder) wherein the 'Bill To' details shall encompass following. BHEL GSTN – Refer attached GSTN code table of BHEL. Name - BHARAT HEAVY ELECTRICALS LIMITED

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	Address - Shall be intimated later. Specific details of BHEL GSTN, Name and Address as stated above, have been specified elsewhere in the tender.
23.2	Successful bidder to intimate immediately on the day of removal of goods (in case of any supply of goods) to BHEL along with all relevant details and send a scanned copy of Tax Invoice to BHEL through following communication mode for enabling BHEL to meet its GST related compliances. Portal address. and Email address – Shall be intimated later. Specific details of above shall be intimated to successful bidder by BHEL at appropriate juncture.
23.4	In case of delay in submission of above mentioned documents on the date of despatch, BHEL may incur penalty/ interest for not adhering to Invoicing Rules under GST Law. The same will be liable to be recovered from successful bidder, in case such delay is not attributable to BHEL.
23.5	In case of raising any Supplementary Tax Invoice (Debit / Credit Note), successful bidder shall issue the same containing all the details as referred to in Section 34 read with Section 31 of GST Act & Rules referred there under.
23.6	Successful bidder shall comply with the Time Limit prescribed under the GST Law and rules thereof for raising of the Tax Invoice. If any supply of goods is applicable, successful bidder shall also ensure prompt delivery of goods after despatch.
23.7	Bidder shall note that in case GST credit is delayed / denied to BHEL due to delayed / non receipt of goods and / or Tax Invoice or expiry of the timeline prescribed in GST Law for availing such ITC, or any other reasons, not attributable to BHEL, GST amount shall be recoverable from successful bidder along with interest levied/ leviable on BHEL, as the case may be.
23.8	Successful bidder shall upload the invoices raised on BHEL in GSTR-1 within the prescribed time as given in the GST Act, and the same is available to BHEL in FORM GSTR-2A/2B electronically through the common portal. Bidder shall note that in case of delay in declaring such invoice in your return and GST credit availed by BHEL is denied or reversed subsequently as per GST Law, GST amount paid by BHEL towards such ITC reversal as per GST law shall be recoverable from the successful bidder along with interest levied / leviable on BHEL.
23.9	Way Bill: Successful bidder to arrange for way bill / e-waybill for any transfer of goods for the execution of the contract. Successful bidder has to make their own arrangement at their cost for completing the formalities, if required, with Issuing Authorities, for bringing materials, plants & machinery at site for execution of the works under this

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	contract, Road Permit / Way Bill, if required, shall be arranged by successful bidder and BHEL will not supply any Road Permit/ Way Bill for this purpose.
23.10	Any new taxes & duties, if imposed subsequent to due date of offer submission as per NIT & TCN, by statutory authority during contract period (including extension, if the same is not attributable to you), shall be reimbursed by BHEL on production of relevant supporting document to the satisfaction of BHEL. However, you shall obtain prior approval from BHEL before depositing new taxes and duties.
24.0	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.
25.0	INTEREST BEARING RECOVERABLE ADVANCE/ MOBILISATION ADVANCE
	Not applicable for this tender

CONTRACT (SCC)

(For Scope of Erection)

“Design, Supply, handling during materials receipt, storage and execution including erection, testing and all associated services for fixing of Borosilicate Glass Block Lining, expansion compensator joints etc. along with providing Expert Supervision services during installation including Wet Stack Flow Model Study for 275 mtr. tall single flue chimney at 1x660 MW Sagardighi Unit#5, Murshidabad, West Bengal.”.

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR EASTERN REGION



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This volume shall be construed as part of tender document and shall be read along-with other volumes of tender. Unless otherwise specified, in case of any confusion of any clause/ provision of this volume or any conflict/ inconsistency of any clause/ provision of this volume with that of other volumes, the same shall be brought out by the bidder in writing to BHEL for clarification or during pre-bid discussions, if applicable, failing which most stringent interpretation in favour of BHEL shall be adopted and the same shall be binding to the bidder. Unless otherwise specified, all terms & conditions shall be applicable for entire scope and for each part/ package of tender.

CLAUSE NO	DESCRIPTION
1.0	NAME OF JOB Scope broadly covers receipt, unloading, storage & handling at site, erection, handing over, supervision of erection works etc. in line with drawings/ documents/ test procedures approved by BHEL/ customer, compliance of Guarantee/warranty conditions for the total scope defined in the technical specification and terms & conditions of tender, taking into account all clarifications, confirmations and agreements till date for completion of Borosilicate lining system of Wet Flue Gas Chimney of 1x660 MW, Unit # 5 at WBPDC, Sagardighi, West Bengal.
2.0	BROAD SCOPE OF WORK
2.1	The intent of this erection specification is to provide services for installation Borosilicate glass block lining, expansion compensator joints etc. for readiness of Chimney lining system including preliminary preparatory job for taking up borosilicate installation activities. Job to be executed 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 said lining system shall not relieve the successful bidder of the responsibility of providing such services/ facilities to complete the work awarded to him. The quoted/ accepted rates/ price shall deem to be inclusive of all such contingencies.
2.2	The work to be carried out under scope of this specification covers complete work of handling including receipt of materials at site and storing at stores/ yard located within project premises, collecting materials from the stored locations,

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(For scope of Erection)

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	transportation to site, temporary storage prior to erection, if required, cleaning, preservative painting, erection, etc all required tests during/after erection including supply of spare quantity as per BOQ and finally handing over of lining system to BHEL/ customer. Reconciliation of materials as supplied by the bidder & returning unused materials to BHEL stores/ yard/ places designated by BHEL. The work shall conform to dimensions & tolerances given in various drawings & documents that will be provided during erection. If any portion of works is found to be defective in workmanship & not conforming to drawings/ documents or other stipulations, the successful bidder shall dismantle and redo the work duly replacing the defective materials at their own cost, failing which recoveries, as determined by BHEL, shall be effected from successful bidder's bills.
2.3	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 & 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.
2.4	Omission of specific reference to any erection method, equipment or material necessary for proper & efficient working of the installation job shall not relieve the successful bidder of the responsibility to provide such facilities to complete the work at quoted rates. Any mismatch/ defect found due to mistake in erection shall have to be rectified by successful bidder free of cost. Inspection by BHEL/ customer does not relieve successful bidder of their responsibility of executing quality erection.
2.5	Deleted.
2.6	Following shall be the responsibility of successful bidder and have to be provided within finally accepted rates/ prices.
2.6.1	Provision as required of all types of labour, supervisors, engineers, watch and ward, tools & tackles, calibrated IMTEs (Inspection, measuring and testing equipment) as specified and otherwise required for the work, consumables for erection, testing including material handling.
2.6.2	Proper out-turn as per BHEL plan and commitment.
2.6.3	Completion of work as per BHEL schedule.

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2.6.4	Good quality and accurate workmanship.
2.6.5	Repair and rectification.
2.6.6	Preservation/ re-conservation of all items during storage/ erection/ functional operation till handing over.
2.7	Drawings/ documents submitted along with tender are for guidance purpose only and no claim/ compensation, whatsoever, shall be entertained by BHEL on this account.
3.0	SITE VISIT Bidder should visit site and acquire full knowledge & information about prevailing site conditions and in & around plant premises together with all the statutory, obligatory, mandatory requirements of various authorities before submission of the bid.
4.0	GENERAL TECHNICAL REQUIREMENTS (CODES AND STANDARDS)
4.1	The materials/ equipment shall comply with accepted Standard Specification as mentioned in TCC.
4.2	Where the bidder proposes alternative codes or standards, they shall include in their offer 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 tender.
4.3	In the event of any conflict between the codes & standards referred above, and the requirements of the tender, the requirements which are more stringent shall govern.
4.4	Tools used during erection and testing shall not be accepted except with the specific approval of the engineer.
4.5	Wherever specified or required the materials/ equipment shall conform to various statutory regulations such as Indian Electricity Rules, Factories Act, Environmental norms etc wherever required, obtaining approval for materials/ equipment supplied under the specification from statutory authorities shall be the responsibility of the successful bidder.
5.0	SERVICES TO BE RENDERED BY THE BIDDER

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	Services for preparatory works like: surface preparation, Epoxy painting etc., erection of borosilicate lining & expansion compensator joints etc., testing as well as rendering warranty/guarantee services for the erected lining system after handing over under the contract shall include but not be limited to the following.
5.1	Receipt of materials at site, Unloading, transportation to stores as to be provided by BHEL, assessment of lost/ damaged items in transit/ storage, erection & testing, arranging the Insurance claims and replacement of lost/ damaged items. The successful bidder shall be responsible for making good the losses/ damages for cases for which BHEL is unable to lodge Insurance claim. In case, BHEL is unable to recover the full cost from Insurance company against any claims, the balance including deductible franchise wherever applicable, will be recovered from the successful bidder.
5.2	Collecting materials from store/ open yard as specified earlier from time to time for erection as per the construction programme. They shall be the custodian of all the materials taken out from store/yard till the material/equipment is officially taken over by the owner/ BHEL after complete erection any successful functional checking.
5.3	Transport of material to their respective places of erection and erection of the complete materials & equipment as supplied under this tender.
5.4	Functional checking of the individual equipment/ installed lining system to the satisfaction of owner/ BHEL.
5.5	Deployment of all skilled and unskilled manpower required for erection, supervision of erection, watch & ward, testing and other services to be rendered under this specification.
5.6	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 tender except otherwise specified.
5.7	Supply of all consumables, as well as materials required for temporary supports, scaffolding, etc as necessary for such erection work, unless specified otherwise.
5.8	Providing support services for the successful bidder's erection staff eg, temporary site offices, temporary stores, residential accommodation and transport to work

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	site for erection personnel, watch and ward for security and safety of the materials under the successful bidder's custody, etc, as required.
5.9	Maintaining proper documentation of all the site activities undertaken by the successful bidder as per the proforma mutually agreed with BHEL, submitting monthly progress reports as also any such document as & when desired by BHEL/ owner, taking approval of all statutory authorities (Factory Inspector, Labour Commissioner, etc) as applicable for respective portions of work under the jurisdiction of such statutes of laws.
5.10	All the materials supplied by the bidder shall be reconciled by the bidder and the unused materials have to be returned back to BHEL stores/yard or any other place as specified by BHEL.
5.11	Deleted
5.12	After completion of the completion of erection activity of equipment/ lining systems, the successful bidder shall prepare the test reports which shall include all the relevant information related to various visual and functional checks, tests carried out, any deviations noticed wrt the intended design requirements, sequence of various erection activities as actually adopted vis-à-vis as recommended in the procedures, programme schedule achieved and any other such information as required. These test reports shall be submitted in requisite number of copies to BHEL/ owner/ by the successful bidder.
5.13	Load testing of lifting equipment is to be conducted at site. Required load for the same may be arranged by BHEL. However, successful bidder to organize transport of the loads from BHEL store. Similarly, on completion of load testing, the loads need to be returned to BHEL store by the successful bidder.
5.14	Prior to erection activity all the T&Ps need to be tested & certified by statutory authority for its safe operation. Successful bidder to arrange for such testing and certification within his quoted price.
5.15	Any other service, although not specifically called for but required for a contract of the size and nature indicated in the specification.
6.0	PAYMENT TERMS
6.1	For expert supervision: For the said item of expert supervision as per item sl no. 2.1 of Price Schedule, interim payment shall be limited to 95 % of the gross value of interim bill on item

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	rate basis. The balance 5 % shall be payable along with final bill. However, this 5 %, retained from each RA bill, may be released against submission of a separate bank guarantee as per Performance Bank Guarantee format, to be kept valid till final bill, subject to: (i) Receipt of completion certificate that all works are completed in all respects. (ii) Reconciliation of materials. (iii) Completion of final bill formalities.
6.2	For installation of Borosilicate lining system: For the said item of Borosilicate installation work as per item sl no. 1.2 of Price Schedule, interim payment shall be limited to 95 % of the gross value of interim bill on item rate basis. The balance 5 % shall be payable along with final bill. However, this 5 %, retained from each RA bill, may be released against submission of a separate bank guarantee as per Performance Bank Guarantee format, to be kept valid till final bill, subject to: (i) Receipt of completion certificate that all works are completed in all respects. (ii) Reconciliation of materials. (iii) Completion of final bill formalities.
6.3	For elastomeric expansion compensator supply & erection: A) For supply of spare elastomeric expansion compensator: For the said item of supply of elastomeric expansion compensator as per item sl no. 1.4 of Price Schedule, interim payment shall be limited to 95 % of the gross value of interim bill on item rate basis upon completion of supply & MRC. The balance 5 % shall be payable along with final bill. However, this 5 %, retained from each RA bill, may be released against submission of a separate bank guarantee as per Performance Bank Guarantee format, to be kept valid till final bill, subject to: (i) Receipt of completion certificate that all works are completed in all respects. (ii) Reconciliation of materials and final handing over of the spare item to BHEL/Customer. (iii) Completion of final bill formalities. B) For supply & erection: For the said item of supply of elastomeric expansion compensator as per item sl no. 1.3 of Price Schedule, interim payment shall be limited to 95 % of the gross value of interim bill on item rate basis upon completion of job, however out of total 95% value, 60% will be released against supply &

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	balance 40% will be released after satisfactory completion of erection. The balance 5 % shall be payable along with final bill. However, this 5 %, retained from each RA bill, may be released against submission of a separate bank guarantee as per Performance Bank Guarantee format, to be kept valid till final bill, subject to: (i) Receipt of completion certificate that all works are completed in all respects. (ii) Reconciliation of materials. (iii) Completion of final bill formalities.
7.0	ERECTION SERVICE
7.1	As part of the overall project management activity, the successful bidder shall be responsible for proper co-ordination of erection activities during various phases of execution of the contract. The successful bidder shall identify a person designated as construction manager, with whom BHEL shall interact on matters related to execution of the contract. The construction manager shall be the single point contact person on behalf of the successful bidder. BHEL shall interact with the construction manager only on all matters on co-ordination between BHEL and the successful bidder.
7.2	The successful bidder shall confine all field operations to those works which can be reformed without subjecting the equipment and materials to adverse effects, during inclement weather conditions, like monsoon, storms, etc and during other unfavorable construction conditions. No field activities shall be performed by the successful bidder under conditions which might adversely affect quality & efficiency thereof, unless special precautions or measures are taken by the successful bidder in proper and satisfactory manner in the performance of such works and with the concurrence of the engineer. Such unfavorable construction conditions in no way relieve the successful bidder of their responsibility to perform the works as per the schedule.
7.3	The successful bidder shall supply all skilled workmen like electricians, operator for lifting equipment, experienced workmen and supervisor, instrument machines etc, in addition to other skilled, semi-skilled and unskilled workmen required for all the works of handling and transportation from site store to erection site, erection, testing contemplated under this specification. Only fully trained and competent men with previous experience on the job shall be employed. They shall hold valid certificates wherever necessary. BHEL reserves the right to decide on the suitability

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	of the workers and the other personnel who will be employed by the successful bidder. BHEL reserves the right to insist on removal of any employee of the successful bidder at any time, if they find him unsuitable and the successful bidder shall forthwith remove him.
7.4	The supervisory staff employed by the successful bidder shall be technically qualified and experienced in the area of work. They shall ensure proper out turn of work and discipline on the part of labour put on the job by the successful bidder and in general 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 agencies' of BHEL and BHEL's client/ consultant.
7.5	The successful bidder shall also furnish daily labour report showing by classification the number of employees engaged in various categories of work a progress report of work as required by BHEL engineer.
7.6	The work shall be executed under the usual conditions affecting major power plant construction and in conjunction with numerous other operations at site. The successful bidder and his personnel shall co-operate with other personnel, and other successful bidders, coordinating his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.
7.7	The successful bidder's supervisory staff shall execute the work in the most substantial & workman like manner within stipulated time. Accuracy of work and aesthetic finish are essential part of this contract. The successful bidder shall be responsible to ensure that assembly & workmanship conform to the dimensions & tolerance given in the drawing/ instruction given by BHEL engineer from time to time.
7.8	It is the responsibility of the successful bidder to engage his workman in shifts or on overtime basis for achieving the target set by BHEL during erection and testing period. Bidder's quoted rate shall include all these contingencies.
8.0	HEALTH, SAFETY & ENVIRONMENT
8.1	It is imperative on the part of the successful bidder to join and effectively contribute in joint measures such as tree plantation, environment protection, contributing towards social up-liftment, conversion of packing woods to school furniture, keeping good relation with local populace etc.

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8.2	Round the clock experienced paramedical personnel with first aid facility & one ambulance including driver, fuel, etc, and shall be available at site, being provided by other agency. The above facilities will be shared by various BHEL contractors working at site (actual cost will be distributed among various contractors under BHEL at site proportionally to their contract price). The subject facility will be strengthened as per the requirement during peak work progress at site. Individual contractor may co-ordinate with the supplying/ providing agency in this regard. No medical facility within/ near the site shall be provided by BHEL. In case such facility is not provided by successful bidder, BHEL will recover cost as applicable. Decision of BHEL in this regard shall be final & binding on successful bidder.
8.3	No staff quarter shall be provided by BHEL.
8.4	Deleted.
8.5	Deleted
8.6	The successful bidder shall solely be responsible for the safety, quality, & quantity of the supplied materials and equipment.
8.7	The successful bidder shall ensure the safety of all workmen, materials and equipment either belonging to him or to others working at site. He shall observe safety rules and codes applied by the BHEL at site without exception.
8.8	Deleted
8.9	Safety nets must be used while working at higher elevation.
8.10	Emergency vehicle must be provided & kept separately as stand-by.
8.11	Bidder has to follow the Health, Safety and Environment (HSE) regulations in force at project under the scope of bidder. Refer Document Number: HSEP:14-SGD Rev.: 02, DATE: 01.09.2020, Document Title: Health, Safety and Environment Plan for Site Operation by Subcontractors for Sagardighi.
8.12	Any other nonconformity noticed not listed above will also be fined. The decision of BHEL engineer is final on the above. The amount will be deducted from running bills of the successful bidder. The amount collected on the above will be recognized for giving award to the employee who could avoid accidents by following safety rules. Also, the amount will be spent for improving the safety at site.

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8.13	The successful bidder shall also be responsible for provision of all safety notices and safety equipment required both by the relevant legislation and BHEL, as he may deem necessary.
8.14	The successful bidder will notify well in advance to BHEL of their intention to bring to BHEL any container filled with liquid or gaseous fuel or explosive or petroleum substance or such chemicals, which may involve hazards. BHEL shall have the right to prescribe the conditions, under which such container is to be stored, handled and used during the performance of the works and the successful bidder shall strictly adhere to and comply with such instructions. BHEL shall have the right at their sole discretion to inspect any such container or such construction plant/ equipment for which material in the container is required to be used and if in their opinion, its use is not safe, they may forbid its use. BHEL shall entertain no claim due to such prohibition and BHEL shall not entertain any claim of the successful bidder towards additional safety provisions/ conditions to be provided for/ constructed as per BHEL's instructions.
8.15	Further, any such decision of the BHEL shall not, in any way, absolve the successful bidder of his responsibilities and in case, use of such a container or entry thereof into the site area is forbidden by the BHEL, the successful bidder shall use alternative methods with the approval of the BHEL without any cost implication to BHEL or extension of work schedule.
8.16	Where it is necessary to provide and/or store petroleum products or petroleum mixtures and explosives, the successful bidder shall be responsible for carrying-out such provision and/or storage in accordance with the rules and regulations laid down in Petroleum Act 1934, Explosives Act, 1948, and Petroleum and Carbide of Calcium Manual published by the Chief Inspector of Explosives of India. All such storage shall have prior approval of the BHEL. In case, any approvals are necessary from the Chief Inspector (Explosives) or any statutory authorities, the successful bidder shall be responsible for obtaining the same.
8.17	All equipment used in construction and erection by successful bidder shall meet Indian/ International Standards and where such standards do not exist, the successful bidder shall ensure these to be absolutely safe. All equipments shall be strictly operated and maintained by the successful bidder in accordance with manufacturer's operation Manual & Safety instructions and as per guidelines/ rules of BHEL in this regard.

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8.18	Periodical examinations and all tests for all lifting/ hoisting equipment & tackles shall be carried-out in accordance with relevant provisions of Factories Act 1948, Indian Electricity Act 1910 and associated laws/ rules in force from time to time. A register of such examinations & tests shall be properly maintained by successful bidder and will be promptly produced as & when desired by BHEL or by the person authorized.
8.19	Deleted
8.20	Successful bidder shall provide suitable safety equipment of prescribed standard to all employees and workmen according to the need, as may be directed by BHEL who will also have right to examine these safety equipment to determine their suitability, reliability, acceptability and adaptability.
8.21	Where explosives are to be used, the same shall be used under the direct control and supervision of an expert, experienced, qualified and competent person strictly in accordance with the Code of Practices/ Rules framed under Indian Explosives Act pertaining to handling, storage and use of explosives.
8.22	The successful bidder shall provide safe working conditions to all workmen and employees at the Site including safe means of access, railings, stairs, ladders, scaffoldings etc. The scaffoldings shall be erected under the control and supervision of an experienced and competent person. For erection, the successful bidder only shall use good and standard quality of material.
8.23	The successful bidder shall not interfere or disturb electric fuses, wiring and other electrical equipment belonging to BHEL or other successful bidders under any circumstances, whatsoever, unless expressly permitted in writing by BHEL to handle such fuses, wiring or electrical equipment.
8.24	Before the successful bidder connects any electrical appliances to any plug or socket belonging to the other contractor or BHEL, he shall ensure the following.
8.24.1	Satisfy BHEL that the appliance is in good working condition.
8.24.2	Inform BHEL of the maximum current rating, voltage and phases of the appliances.
8.24.3	Obtain BHEL's permission detailing sockets to which appliances may be connected.
8.25	The BHEL will not grant permission to connect until following are complied with.
8.25.1	The appliance is in good condition and is fitted with suitable plug;

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8.25.2	The appliance is fitted with a suitable cable having two earth conductors, one of which shall be an earthed metal sheath surrounding the cores.
8.26	No electric cable in use by successful bidder/ BHEL will be disturbed without prior permission. No weight of any description will be imposed on any cable and no ladder or similar equipment will rest against or attached to it.
8.27	No repair work shall be carried out on any live equipment. BHEL must declare the equipment safe and a permit to work shall be issued by BHEL before the successful bidder carries out any repair work. While working on electric lines/equipment whether live or dead, suitable type and sufficient quantity of tools will have to be provided by successful bidder to electricians/ workmen/ officers.
8.28	The successful bidders shall employ qualified and experienced electricians to maintain temporary electrical installations.
8.29	The successful bidder shall employ trained safety officer to supervise day to day safety aspects of the equipment and workmen, who will co-ordinate with BHEL safety officer. In case of work being carried out through sub-contractors, sub-contractor's workmen/ employees will also be considered as the successful bidder's employees/ workmen for the above purpose.
8.30	Name & address of safety officer of successful bidder will be promptly informed in writing to BHEL with a copy to safety officer-In charge before he starts work or immediately after any change of the incumbent is made during currency of contract.
8.31	In case any accident occurs during the construction/ erection or other associated activities undertaken by the successful bidder thereby causing any minor or major or fatal injury to his employees due to any reason, whatsoever, it shall be the responsibility of the successful bidder to promptly inform the same to BHEL in prescribed form and also to all the authorities envisaged under the applicable laws.
8.32	BHEL shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and/ or property, and/ or equipment. In such cases, the successful bidder shall be informed in writing about the nature of hazards and possible injury/ accident and he shall comply to remove shortcomings promptly.

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8.33	The successful bidder shall not be entitled for any damages/ compensation for stoppage of work due to safety reasons above and the period of such stoppage of work will not be taken as an extension of time for completion of the facilities and will not be the ground for waiver of levy of penalty.
8.34	The successful bidder shall follow and comply with all safety rules of BHEL, relevant provisions of applicable laws pertaining to the safety of workmen, employees plant and equipment as may be prescribed from time to time without any demur, protest or contest or reservation. In case of any inconformity between statutory requirement and Safety Rules of BHEL referred above, the later shall be binding on successful bidder unless the statutory provisions are more stringent.
8.35	In case BHEL pay such compensation, then the successful bidder are liable to reimburse BHEL such amount in addition to compensation indicated above.
8.36	Insurance covers have to be taken prior to start of work at site and they shall make available the policy to Construction Manager, BHEL for necessary verification prior to commencement of work. However, irrespective of such verification/ acceptance, it's responsibility of successful bidder to maintain adequate insurance cover for their workmen, T&P, assets, etc at all times during the period of contract. Regarding the aforesaid insurance cover, the successful bidder shall directly deal with Insurance Company for all matters regarding the insurance in their scope.
8.37	Deleted
8.38	Successful bidder shall refer to BHEL or customer's safety manual, available at site, and comply with its directives/ stipulations during execution of the job.
9.0	SPECIFIC REQUIREMENTS FOR ISO 9002
9.1	Successful bidders shall ensure that all their staff/ employees are exposed to periodical training programmes conducted by qualified agencies/ personnel on ISO 9002 Standards.
9.2	Successful bidder shall ensure that the quality is maintained in all the works connected with this contract at all stages of the requirement of BHEL.
9.3	Successful bidder shall ensure that all MMDs that are used, whether owned by the successful bidders or used on loan, are calibrated by the authorized agencies and the valid calibration certificate will be available with them for verification by BHEL.

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	A list of such instruments possessed by the successful bidder at site with its calibration status is to be submitted to BHEL Engineer for control.
9.4	Successful bidder shall ensure that fitness certificate of the tools & plants, that are in use, whether owned by successful bidder or issued on loan, are tested by authorised agency and valid fitness certificate is available for verification by BHEL.
9.5	Successful bidders shall arrange for the inspection of the works at various stages as required by BHEL. The successful bidders shall take immediate corrective action for the non-conformances if any, observed and pointed out by BHEL.
10.0	SPECIFIC SAFETY REQUIREMENT FOR THE PROJECT
10.1	The successful bidder shall ensure adherence to the requirement of safety connected with this work. They shall provide necessary safety appliances to their workmen and supervisors and ensure use of the same to prevent loss of human lives, injuries to men engaged and damage to property and environment. Safety guidelines of BHEL/ customer shall be applicable.
10.2	Successful bidder shall obtain necessary work permits from BHEL/ customer prior to taking up any work on the system. He shall arrange for display of due and necessary caution notices/ boards, etc.
10.3	All electrical equipment, connections and wiring for construction power, its distribution and use shall conform to the requirements of Indian electricity act and rules. Only electricians licensed by the appropriate statutory authority shall be employed by the successful bidder to carry out all types of electrical work. All electrical appliances including portable electric tools used by the successful bidder shall have safe plugging system to source of power and be appropriately earthed.
10.4	The successful bidder shall be held responsible for any violation of statutory regulations (local, state or central) and BHEL instructions that may endanger safety of men, equipment, material and environment in his scope of work or another contractors or agencies. Cost of damage, if any, to life & property arising out of such violation of statutory regulations shall be borne by the successful bidder.
10.5	In case of a fatal or disabling injury/ accident to any person at site due to lapse by the successful bidder, the victim and/ or his/ her dependents shall be compensated by the successful bidder as per statutory requirements. However, if considered necessary, BHEL shall have the right to impose appropriate financial

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	penalty on the successful bidder and recover the same from payments due to the successful bidder for suitably compensating the victim and/ or his/ her dependents. Before imposing any such penalty, appropriate enquiry shall be held by BHEL giving opportunity to the successful bidder to present their case.
10.6	In case of any damage to property due to lapses by the successful bidder, BHEL shall have the right to recover cost of such damages from payments due to the successful bidder after holding an appropriate enquiry.
10.7	In case of any delay in the completion of a job due to mishaps attributable to lapses by the successful bidder, BHEL shall have the right to recover cost of such delay from payments due to the successful bidder after notifying the contractor suitably and giving them opportunity to present their case.
10.8	If the successful bidder fail to improve the standards of safety in its operation to the satisfaction of BHEL after being given a reasonable opportunity to do so, and/ or if the successful bidder fail to take appropriate safety precautions or to provide necessary safety devices & equipment or to carry out instruction regarding safety issued by BHEL official, BHEL shall have the right to take corrective steps at the risk and cost of the successful bidder after giving a notice of not less seven days indicating the steps that would be taken by BHEL.
10.9	The successful bidder shall submit report of all accidents, fires and property damage, dangerous occurrences to the BHEL official immediately after such occurrence but in any case not later than twelve hours of the occurrence. Such report shall be furnished in the manner prescribed by BHEL. In addition, periodic reports on safety shall also be submitted by the successful bidder to the authorized BHEL official time to time as prescribed
11.0	LAND
11.1	Land will be provided free of cost by BHEL to the extent available/ considered necessary by BHEL to the successful bidder for their office, store, within plant premises. Availability of land within plant boundary is very limited and the successful bidder have to plan & use existing land considering use of land by other civil/ mechanical/ electrical successful bidders and storage of plant machineries & materials. The existing land shall be shared by all agencies.
11.2	The successful bidder shall arrange at his own cost cleaning and grading of area allotted, construction of their temporary office, stores, godown, fabrication yards etc. and also the watch & ward, etc.

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11.3	The successful bidder will be responsible for handing back all lands, as allotted to them by BHEL/ customer.
12.0	WATER
12.1	BHEL will provide construction as well as potable water at one strategic point within plant premises, free of cost, to the successful bidder for successful bidder's site office, store.
12.2	Further necessary network for construction & drinking water system for construction work shall be arranged by the successful bidder at their own cost.
12.3	BHEL shall not be responsible for any inconvenience or delay caused due to any interruption of water supply and the successful bidder shall claim no compensation for delay in work for such interruption. Successful bidder may make standby arrangement for water for which no separate payment shall be made by BHEL.
12.4	Successful bidder will have to arrange for storage of water to meet day-to-day requirement.
12.5	The availability of water (construction as well as drinking) in project site is limited. Successful bidder shall ensure that no water is wasted and shall take all necessary measure towards preservation of water. In this context, for proper utilisation & to avoid scarcity, successful bidder shall mandatorily construct storage facility of construction & potable water at site (Near work places).
12.6	Successful bidder shall take care of all precautions to avoid any sort of misuse, wastage of water. Any deviation from this shall lead to forthwith withdrawal of the facility.
13.0	ELECTRICITY
13.1	CONSTRUCTION POWER & GENERAL ILLUMINATION NETWORK BHEL will provide construction power free of charges at 415 V level at one strategic point within plant premises. Successful bidder shall make their own distribution arrangement to draw electricity for using at their work areas and site office. General illumination system shall be provided by BHEL. However, provision of suitable temporary lights at different floors/ working areas for execution of the work & safety of workmen shall be provided by the successful bidder, within the

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	accepted rate. The illumination should be such that minimum illumination requirement as specified by Indian standards for general illumination is maintained.
13.2	If any other voltage level (other than normally available) is required, the same shall be arranged by successful bidder from power supply as above. Successful bidder will have to provide at their own cost necessary calibrated energy meters (tamper proof, suitably housed in a weather proof box with lock & key arrangement) at point of power supply along with calibration certificate from authorized/ accredited agency for working out the power consumption. In case of recalibration required for any reason, necessary charges including replacement by calibrated meters is to be borne by the successful bidder. Supply of electricity shall be governed by Indian Electricity Act and Installation Rules and other Rules & Regulation as applicable. The successful bidder shall ensure usage of electricity in an efficient manner and the same may be audited by BHEL time to time. In case of any major deviation from normally accepted norms is observed, BHEL will reserve the right to impose penalty as deemed fit for such cases.
13.3	The successful bidder shall have to provide earth leakage circuit breaker at each point wherever human operated electrical drives/ T&Ps are deployed.
13.4	The power supply will be from the available grid. 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 successful bidder due to such non-supply on the grounds of idle labour, machinery or any other grounds.
13.5	Successful bidder will have to arrange sufficient illumination at their own work areas.
13.6	The successful bidder should ensure that the work in critical areas is not held up in the event of power breakdown. In the event of breakdown in the electric supply, if the progress of work is hampered, it will be the responsibility of the successful bidder to step up the progress of work after restoration of electric supply so that overall progress of work is not affected.
13.7	The successful bidder 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.
14.0	FACILITIES TO BE PROVIDED BY THE SUCCESSFUL BIDDER

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14.1	TOOLS, TACKLES AND SCAFFOLDINGS The successful bidder shall provide all the construction equipment, tools, tackles & scaffoldings required for pre-assembly, erection, testing and associated activities of the scope of work covered under the contract. He shall submit a list of all such materials to BHEL/ customer before the commencement of job at site. These tools & tackles shall not be removed from the site without written permission of BHEL. The T&Ps to be arranged by the successful bidder shall be in proper working condition.
14.2	COMMUNICATION The successful bidder shall be responsible for arranging all communication facilities for himself at site. The successful bidder has to establish independent internet/e-mail facilities with mobile connection for all key site personnel and same shall have to be integrated with BHEL's voice/data network and database systems at site.
14.3	FIRST-AID The successful bidder shall provide necessary first-aid facilities for all their employees, representatives and workmen working at the site. First-aid centre with ambulance facility is established & maintained at site by BHEL/ BHEL's agency. All agencies of BHEL including successful bidder of this package are expected to contribute towards establishing & maintaining the facility and the sum of contributions should be proportionate to their respective contract prices. This may be treated as mandatory stipulation and the bidder should carryout due visioning work with BHEL/ BHEL's agency for smooth running of the first-aid centre and ambulance. In the event of non-compliance of this, BHEL shall be constrained to pay the contribution and recover the cost with 30% overhead from the bill of the successful bidder.
14.4	CLEANLINESS
14.4.1	The successful bidder shall be responsible for keeping the entire area allotted to him clean and free from rubbish, debris etc. during the period of contract. The successful bidder shall employ enough number of special personnel to thoroughly clean his work-area at least once in a day. All such rubbish and scrap material shall be stacked or disposed in a place to be identified by BHEL/ customer. Materials and stores shall be so arranged to permit easy cleaning of the area. In areas where equipment might drip oil and cause damage to the floor surface, a

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	suitable protective cover of a flame resistant, oil proof sheet shall be provided to protect the floor from such damage.
14.4.2	Similarly, the labor colony, the offices and the residential areas of the successful bidder's employees and workmen shall be kept clean and neat to the entire satisfaction of BHEL/ customer. Proper sanitary arrangements shall be provided by the successful bidder, in the work-areas, office and residential areas of the successful bidder.
14.4.3	Bidders to note that following.
14.4.3.1	No staff quarter shall be provided by BHEL.
14.4.3.2	All site execution approaches required for movement of cranes, trailers, trucks, dumpers, etc shall be provided by BHEL. However, if any minor work filling/leveling is required to be done, that shall arranged by the successful bidder at their own cost.
14.4.3.3	The successful bidder shall solely be responsible for the safety, quality, & quantity of material after it is handed over to successful bidder by the BHEL.
14.5	MEDICAL FACILITY BHEL/ authorized agency will set up medical facilities including mobile medical aid in comprehensive manner for total requirement of the project and to fulfill their basic requirement. In such case, total expenditure words setting up and maintain the facilities will be apportioned amongst all agencies of BHEL in proportion to their contract prices.
15.0	PROJECT MANAGEMENT
15.1	The successful bidder shall prepare detail schedule L1/ L-2 and submit within 15 days of LOI for BHEL approval, as per milestone completion schedule given in this document. This schedule must include all milestone and key activities for each package/ subsystems/ components in his scope of work in the areas of mobilization, erection/ testing and handing over.
15.2	CONSTRUCTION SCHEDULE
15.2.1	The successful bidder shall furnish an offer stage master network/ bar chart (L1 schedule) in accordance with the project milestone schedule. The contract master bar chart will be negotiated with the successful bidder.

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15.2.2	The successful bidder shall prepare and maintain the detailed master schedule (L2 network) during the course of the work.
15.2.3	The bidder should also ensure monitoring of all the activities at least on weekly basis to start with and on daily basis whenever required by BHEL.
15.2.4	GENERAL
15.2.4.1	The successful bidder shall be responsible for planning and scheduling the work and reporting its progress in a manner, format and level of detail acceptable to BHEL. These plans shall be in accordance with the intermediate milestones and the completion dates as specified by and agreed in the Contract.
15.2.4.2	The successful bidder shall be responsible for reporting progress to purchaser on a weekly and monthly basis. Progress reports shall be presented in a clear and logical fashion preferably through soft and hard copy.
15.3	PROGRESS MEASUREMENT AND MONITORING
15.3.1	The successful bidder shall measure progress of the work using its own methods and procedures.
15.3.2	Weekly progress review meetings will be held at site during which actual progress during the week vis-à-vis scheduled program shall be discussed and action to be taken for achieving targets will be decided. For discussions, the successful bidder shall present program of subsequent week. The successful bidder shall constantly update/revise his work program to meet the overall requirement.
15.3.3	Periodic progress reviews on the entire activities of execution in respect of engineering, quality, procurement, supply and works in scope of bidder will be held once in a month at Kolkata/ site/ successful bidder's premise/ BHEL/ PEM, Noida or any other convenient premise. These meetings will be attended by reasonably higher officials of the successful bidder along with its sub-vendors & consultant as applicable and will be used as a forum for discussing all areas where progress needs to be speeded up. The successful bidder shall be further responsible for ensuring that suitable steps are taken to meet various targets decided in such meetings.
15.4	REPORTING

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15.4.1	The successful bidder shall submit weekly progress reports to purchaser in the agreed formats submitted in adequate number of signed originals. The report shall include -
15.4.1.1	Brief narrative of work performed during the week.
15.4.1.2	CMS bar chart showing progress at activity level.
15.4.1.3	Updated progress 'S' Curves showing actual progress.
15.4.1.4	Milestones achieved and new activities started.
15.4.1.5	Status of critical activities.
15.4.2	The successful bidder shall submit monthly progress reports to Purchaser in the agreed formats submitted in adequate number of signed originals. The report shall include the weekly report content and shall be supplemented with the following.
15.4.2.1	Engineering status.
15.4.2.2	Procurement status.
15.4.2.3	Manufacturing status.
15.4.2.4	Inspection & dispatch status.
15.4.2.5	Material in transit.
15.4.2.6	Erection status.
15.4.2.7	Safety report.
15.4.2.8	Change order status.
15.4.2.9	Updated L1/L2 schedule indicating status.
15.4.2.10	Executive summary, areas of concern etc.
15.4.2.11	Progress photographs.
15.4.3	Adequate numbers of color photographs (in soft copy) for each area per month of the contract execution period, depicting progress of the work or damages, if any, as directed by BHEL site engineer is to be arranged by the successful bidder.
15.4.4	The progress report shall be compiled in computer and is required to be furnished over e-mail, in addition to hard copies and summary report shall be made 'Web enabled' in agreed format.
15.5	SITE ORGANIZATION

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15.5.1	The successful bidder 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 Site incharge for site operations with sufficient level of authority to take site decisions. The successful bidder will submit organization chart (showing the name of Site Incharge) 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 schedule without any commercial implication to BHEL. The organization chart is to be submitted within 10 days from the date of LOI.
15.5.2	The Site In-charge once approved and posted at site, should not be changed through-out the contract period, without written permission from BHEL.
15.5.3	Manpower for other functions like store/material management, safety, etc. are to be provided as per site requirement.
15.5.4	Further induction of manpower regarding site supervisor & site engineer will be decided at site as per requirement and shall be deployed by successful bidder within the accepted rates.
15.5.5	In the event of failure of the successful bidder to provide manpower for safety supervision for a continuous period of 2 days or more during execution of job, BHEL reserve the right to deduct Rs 40,000 per man-month from RA bills.
15.5.6	BHEL reserve the right to reject or approve the list of personnel proposed by the successful bidder. 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.
16.0	CONSUMABLE
16.1	All consumables, like chemicals, lubricants, erection spares etc required for the job shall be arranged by the successful bidder at his cost unless otherwise specifically mentioned in the contract.
16.2	All consumables to be used for the job shall be approved by BHEL prior to use.
16.3	In the event of failure of successful bidder to bring necessary and sufficient consumables, BHEL may arrange for the same at the risk and cost of the successful

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	bidder. The entire cost towards this along-with overhead shall be paid by the successful bidder or deducted from the successful bidder's bills.
17.0	MMD
17.1	The successful bidder shall ensure deployment of reliable & calibrated measuring and monitoring devices (MMD). The MMDs shall have test calibration certificate from authorized/ Govt approved agencies. The successful bidder shall also keep provision of alternate engagement for such MMDs so that the work does not suffer when a particular IMTE is sent for calibration. Re-testing/ re-calibration shall also be arranged by the successful bidder at their own cost at regular interval during the period of use as advised by BHEL.
17.2	In the event of failure of successful bidder to bring necessary and sufficient MMDs, BHEL may arrange for the same at the risk & cost of the successful bidder. The entire cost towards this along-with overhead shall be paid by the successful bidder or deducted from the successful bidder's bills.
18.0	TEST CERTIFICATE FOR T&P
18.1	All T&P, lifting tackles and pulling devices to be deployed by the successful bidder must bear valid/ latest test certificates for their suitability, and documents shall be preserved at site.
18.2	In case of expiry of validity of any such test certificate during construction, successful bidder shall arrange for revalidation of the same well in advance, so that the construction activities do not suffer on account of non-availability of such Test certificates.
18.3	The successful bidder 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.
19.0	ISSUE OF T&Ps
19.1	Deployment of all T&Ps for this tender shall be successful bidder's responsibility. However, if BHEL issues any T&Ps, the same shall be on chargeable basis as per BHEL norms.
19.2	In the event of BHEL issued T&Ps, measuring instruments etc, successful bidder and BHEL shall maintain joint protocol about the condition of all T&P, instruments etc taken from BHEL's custody and return to BHEL after use. The successful bidder shall

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	not use these equipment for purposes other than the scope of work given in this tender document.
19.3	It is the responsibility of successful bidder to keep these equipment always in working condition and ensure their safe return in working condition to BHEL's store subject to normal wear & tear.
19.4	After use of T&P items issued by BHEL the same shall be returned to BHEL in good working condition subject to normal wear & tear failing which recoveries at the book value of the item or the market rate prevailing at the time of returning the items, whichever is higher shall be made from the payments due to the successful bidder from BHEL from this contract or from any other contract.
20.0	Deleted
21.0	Expert Supervision
	Bidder shall provide Expert supervision by the representative of manufacturer during surface preparation of substrate, application of epoxy primer, mixing of two components of adhesive membranes, application of adhesive membrane, installation of borosilicate glass blocks, expansion compensator joints etc. including required testing at site as applicable. Requirement of Expert supervision will be decided jointly with BHEL site and Bidder has to ensure deployment of Expert personnel as per requirement intimated by BHEL site and the deployment period has to be recorded and got certified by BHEL site authority for claiming service charges as per BOQ item rate.
22.0	RECONCILIATION OF MATERIALS
22.1	Successful bidder shall submit a reconciliation statement of material after completion of job.
22.2	The successful bidder shall return the unused plant materials under their custody to BHEL's store/ yard at their own cost.
23.0	TRAINING OF OWNER'S/ PURCHASER'S PERSONNEL
	The successful bidder shall undertake to train free of cost personnel selected and sent by the owner/ purchaser to the works of successful bidder. The period and nature of training and number of individual personnel shall be agreed upon mutually between the successful bidder and owner/ purchaser. These engineers shall be given special training in the shops where the items shall be manufactured

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	or in any other power plant where manufactured item is under installation or test to enable them to become familiar with the equipment being supplied to the purchaser. In the event of the owner/ purchaser for any reason failing to avail of the training facilities, purchaser shall not be entitled to any rebate whatsoever on this account.
24.0	INSURANCE
24.1	It is the entire responsibility of the successful bidder to insure their workmen against accident and injury while at work as required by the relevant rules and to pay compensation, if any, to their workmen as per workmen's compensation act. The successful bidder shall also insure their staff against accident/ injury.
24.2	The successful bidder shall take insurance cover for all materials, tools & plants, etc, required to be provided & deployed for the job.
24.3	These insurance covers have to be taken prior to start of work and they shall make available the policy to Construction Manager, BHEL for necessary verification before start of work. However, irrespective of such verification/ acceptance, sole responsibility to maintain adequate insurance cover at all times during the period of contract shall lie with the successful bidder. Regarding aforesaid insurance cover, the successful bidder shall directly deal with the insurance company for all matters regarding the insurance in his scope.
24.4	BHEL/ customer shall arrange comprehensive insurance policy for total supply & services for main equipment/ system covering transit risks & loss, destruction or damage during handling at site, storage, civil works, erection, testing and commissioning up to trial operation/ completion of unit(s) including theft, sabotage, fire, lightning and other natural calamities.
24.5	Successful bidder shall timely intimate despatches/ discrepancy during contract operation, to the underwriter. The name of the underwriter and Policy No shall be intimated in due course of time.
24.6	The successful bidder will take necessary precautions/ due care to protect the material at project site, while in their custody from any damage/ loss till the same is handed over to BHEL/ customer at project site. For lodging/ processing of insurance claim the successful bidder will submit necessary documents. BHEL reserve the right to recover the loss from the successful bidder in case the damage/ loss is due to negligence/ carelessness on the part of the successful bidder. In case of theft of material under successful bidder's custody, the same

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	shall be reported to police by the successful bidder immediately and copy of FIR and subsequently police investigation report shall be submitted to BHEL/ customer for taking up with insurance. However this will not relieve the successful bidder of their contractual obligation for the materials in his custody.
24.7	In case the damage/ loss/ theft of materials are attributable to negligence/ failure in discharging the duties and obligations of the successful bidder, the expenses incurred for repair/ replacement of such components in excess of the amount realized from the underwriters, limited to Normal Excess (Deductible Franchise) shall be recovered from the successful bidder.
24.8	In case the claim is summarily rejected by the underwriters due to WILFUL NEGLIGENCE of the successful bidder, the entire cost of repair/replacement will be recovered from the successful bidder.
24.9	It will be responsibility of the successful bidder to replenish the items lost/ damaged in time without hampering the schedule of work and without waiting for settlement of insurance claim. Amount received from the underwriters on settlement of insurance claim shall be passed on to the successful bidder as and when available.
24.10	Other conditions of Insurance shall be as per relevant clause of GCC.
25.0	PERFORMANCE BANK GUARANTEE / GUARANTEE DEPOSIT:
	Refer Clause no. 7.0 of SCC for scope of Supply
26.0	PAYING AUTHORITY
26.1	All issues related to invoicing, payment shall be addressed to following
26.2	Construction Manager, BHEL site office, 1x660 MW Sagardighi TPP, Unit # 5 Sagardighi, Dist. – Murshidabad, West Bengal. Any change of above shall be intimated to the successful bidder accordingly.
27.0	BANKER
	The address of banker for negotiation of documents shall be made available by BHEL site after award of the job.
28.0	BANK CHARGES

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	No interest, whatsoever, shall be payable by purchaser on any bank guarantee submitted or any amount due to the seller/vendor.
29.0	COMPLETION PERIOD The successful bidder shall execute the job in such a manner that entire job gets completed within 03 (Three) months from the date of start of Borosilicate application job. Date of start of Borosilicate application will be recorded through joint protocol with BHEL site and that will be considered as reference of contractual completion period. BHEL site will intimate to bidder through written communication for starting the Borosilicate application job in advance of 01(one) month time accordingly Bidder has to make all necessary arrangements to start the application job as per intimated date. Required surface preparation and application of Epoxy primer on flue can is considered as preparatory job for Borosilicate application which needs to be executed by the bidder at earlier in coordination with the Chimney Civil job agency prior to erection of flue cans. This activity is not covered under the scheduled completion period of Borosilicate application.
30.0	CONSTRUCTION/ EXECUTION SCHEDULE
30.1	Upon receipt of order/ LOI from BHEL, successful bidder shall interact with BHEL site for kick-off meeting to discuss & firm up schedule of erection, testing, and other pre-activities so as to complete the entire job within the stipulated completion period, matching with project schedule.
30.2	Based on the discussion of the kick-off meeting or otherwise, a master schedule shall be drawn, which shall be subject to acceptance/ approval of BHEL.
30.3	On every month, the successful bidder shall submit to Construction Manager, BHEL schedule-wise plan vs actual status of erection, testing along with action plan to make-up delay, if any.
30.4	The project schedule might undergo revision/ modification periodically, for which the successful bidder may have to prepare/ modify schedule periodically in consultation with BHEL, so as to match with revised project milestones.

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30.5	The successful bidder shall ensure monitoring of these activities at least on fortnight basis or at other frequency as mutually agreed with BHEL.
30.6	Successful bidder shall submit daily work program based on above schedule. Deferment of above schedule is not acceptable. Successful bidder will adhere to schedule and resource planning to be augmented to ensure completion as per schedule.
30.7	Progress reviews on entire activities will be held periodically as per direction of BHEL, at Kolkata/ site/ Noida. These meetings will be used as a forum for discussing all areas where progress needs to be expedited. The successful bidder shall be further responsible for ensuring that suitable steps are taken to meet various targets decided upon such meetings.
31.0	EXTENSION OF TIME FOR COMPLETION
31.1	If the completion of work as detailed in the scope of work gets delayed beyond the contract/ completion period, the successful bidder shall request for an extension of the contract and BHEL at its discretion may extend the contract.
31.2	Based on the reviews jointly signed, the works balance at the end of original contract period less the backlog attributable to the successful bidder 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 successful bidder is bound to complete the portion of backlog attributable to the successful bidder. Any further 'Time extension' or 'Time extensions' at the end of the previous extension shall be worked out similarly.
31.3	However, if any 'Time extension' is granted to the successful bidder to facilitate the job and completion of contract, due to backlog attributable to the successful bidder alone, then it shall be without prejudice to the rights of BHEL to impose penalty/ LD for the delays attributable to the successful bidder, in addition to any other actions BHEL may wish to take at the risk and cost of successful bidder.
31.4	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 to be deployed by the successful bidder as per specified format. Review of the programme and record of shortfall shall be done.
31.5	During the period of 'Time extension', successful bidder shall maintain their resources as per mutually agreed program

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31.6	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) Successful bidder, (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 successful bidder and recoverable from the dues payable to the successful bidder.
32.0	TERMS OF PAYMENT
32.1	The successful bidder shall submit their running bill (RA bill) once in a month, at the end of the month, as per billing break-up of this tender
32.2	Along with RA every bill, the successful bidder shall submit plan (w.r.t. L2 Schedule) vs actual status of erection, testing, commissioning.
32.3	Progressive payment shall be made by BHEL against successful bidder's RA bill, complete & correct in all respects accompanied by BHEL engineer's certified/ measurement sheet, jointly signed; requisite statutory certificates, certified by BHEL; within 45 to 60 days of submission of the bill in complete.
32.4	Measurement will be taken as specified in terms & conditions of the contract and certified by the BHEL engineer of actual work.
32.5	Subject to any deduction which BHEL may be authorized to make under the contract, the successful bidder shall on the certification of BHEL engineer at site, be entitled to payment as per billing schedule.
32.6	However no extra payment shall be made in the event of deferment in payment.
32.7	All admissible recovery/ adjustment, etc shall be made from interim payable amount.
33.0	BILLING BREAK-UP
33.1	Progressive payment shall be made as per following billing break-up, in conjunction with terms of payment provision of the tender.
33.2	FOR ERECTION JOB AS PER BOQ ITEM SRL. NO. 1.2, 1.3 AND 1.4

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33.2.1	95 % (Ninety-five percent) of contract price will be released against on pro-rata erection of item/ material, on submission of protocol, duly signed by BHEL site official(s)/ customer, as per BOQ of contract.
33.2.2	5 % (Five percent) of contract price shall be released against - (i) Successful completion of job; (ii) Material reconciliation, liquidation of pending points, etc. and (iii) Handing over of the lining system. In case of delay in completion of above activities, for reasons not attributable to the successful bidder, this amount can be paid on submission of BG of equivalent amount, valid initially for 6 months & to be revalidated till completion of handing over of the erected lining system in chimney, whichever is later. However, successful bidder has to fulfill all formalities for final billing/ contract closing, material reconciliation, liquidation of pending points, certification of work completion by site, prior to drawing this payment.
33.2.3	Above is subject to receipt of goods / service and tax invoice thereof along with vendor declaring invoice in his return and paying GST within timeline prescribed for availing ITC by BHEL.
33.3	FOR EXPERT SUPERVISION (BOQ ITEM SRL. NO. 2.1)
33.3.1	95 % (Ninety-five percent) of contract price will be released against on pro-rata deployed man-days, on submission of deployment details, duly signed by BHEL site official(s)/ customer, as per BOQ of contract.
33.3.2	Balance 5 % of contract price will be released along with final bill.
33.3.2.1	This 5% (Five percent) payment will be released after confirmation of full GST Credit to BHEL. Any Interest if levied thereon, for reasons elaborated in tax & duties clause of the tender and attributable to the bidder, will be recovered from the Final Payment / Retention amount.
33.4	Applicable GST shall be released to the vendor upon compliance of following:
33.4.1	Vendor declaring such Invoice in his GSTR-1
33.4.2	Confirmation of payment of GST thereon by vendor on GSTN Portal
33.4.3	Above is subject to receipt of goods / service and tax invoice thereof along with vendor declaring invoice in his return and paying GST within timeline prescribed for availing ITC by BHEL.

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33.5	BHEL site, at discretion, may further split up the above percentages billing break-up and affect payment to suit the site condition, cash flow requirement, according to the progress.
33.6	The billing break-up is drawn for progressive payment and shall not be construed as the value/ price of corresponding item, unless otherwise decided by BHEL.
34.0	MOBILISATION ADVANCE/ INTEREST BEARING RECOVERABLE ADVANCE
	Not applicable for this tender.
35.0	ESCALATION (PVC)
	Not applicable for this tender.
36.0	OVER RUN COMPENSATION (ORC)/ RATE REVISION
	Not applicable for this tender.
37.0	TAXES, DUTIES, ETC
37.1	All taxes excluding GST & BOCW Cess (as specified elsewhere in the tender) but including, Charges, Royalties, any State or Central Levy and other taxes for materials if any obtained for the work and for execution of the contract shall be borne by successful bidder and shall not be payable extra by BHEL. Any increase of above at any stage during execution of contract, including extension of the contract, shall have to be borne by successful bidder contractor. Bidder's quoted/ accepted rates/ price shall be inclusive of all such requirements.
37.2	GST along with Cess (as applicable) legally leviable & payable by successful bidder as per GST Law shall be paid by BHEL, extra. Hence, bidder shall not include GST along with Cess (as applicable) in their quoted rates/ price.
37.3	Successful bidder shall furnish proof of GST registration with GSTN Portal covering the services under this contract. Registration should also bear endorsement for the premises from where the billing shall be done by successful bidder on BHEL for this project / work.
37.4	Since GST on output will be paid by BHEL separately as enumerated above, bidder's your quoted rates / price should be after considering the Input Credit under GST law at bidder's end.
37.5	TDS under Income Tax Act shall be deducted as per prevailing IT rules from the bills.
37.6	TDS under GST shall be deducted as per prevailing GST rules from the bills.

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37.7.1	You may collect TCS under section 206C(1H) of Income Tax Act, 1961 if applicable.
37.7.2	In case, you collect TCS under section 206C(1H) of Income Tax Act, 1961, following compliance is required.
37.7.2.1	TAN and PAN of vendor should appear in all invoices/claims. Copy of TAN /TCS registration is to be submitted.
37.7.2.2	Amount of TCS and Assessable value on which TCS has been calculated should be specified clearly in the invoice.
37.7.2.3	You shall be required to submit certificate of TCS in Form no. 27D within 15 days from the due date for furnishing the statement of tax collected at the source.
37.8	In case, you do not collect TCS under section 206C(1H) of Income Tax Act, 1961, following declaration is to be submitted alongwith each invoice: - "I/We hereby declare that I/We are not required to collect TCS under section 206C(1H) of Income Tax Act, 1961, on this bill.
37.9	In event of failure to comply with the provisions of the Act, or proper certificate not issued, or if tax collected but not remitted to the Government, or for any other reason and thereby causing loss to BHEL, the same shall be recoverable from the vendor with applicable interest.
37.10	You shall comply with all statutory amendment/notifications in this respect.
37.11	Bidder shall note that GST Tax Invoice complying with GST Invoice Rules (Section 31 of GST Act & Rules referred thereunder) wherein the 'Bill To' details shall encompass following. BHEL GSTN – Refer attached GSTN code table of BHEL. Name - BHARAT HEAVY ELECTRICALS LIMITED Address - Shall be intimated later. Specific details of BHEL GSTN, Name and Address as stated above, have been specified elsewhere in the tender.
37.12	Successful bidder to intimate immediately on the day of removal of goods (in case of any supply of goods) to BHEL along with all relevant details and send a scanned copy of Tax Invoice to BHEL through following communication mode for enabling BHEL to meet its GST related compliances. Portal address. and Email address – Shall be intimated later.

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	Specific details of above shall be intimated to successful bidder by BHEL at appropriate juncture.
37.13	In case of delay in submission of above mentioned documents on the date of despatch, BHEL may incur penalty/ interest for not adhering to Invoicing Rules under GST Law. The same will be liable to be recovered from successful bidder, in case such delay is not attributable to BHEL.
37.14	In case of raising any Supplementary Tax Invoice (Debit / Credit Note), successful bidder shall issue the same containing all the details as referred to in Section 34 read with Section 31 of GST Act & Rules referred there under.
37.15	Successful bidder shall comply with the Time Limit prescribed under the GST Law and rules thereof for raising of the Tax Invoice. If any supply of goods is applicable, successful bidder shall also ensure prompt delivery of goods after despatch.
37.16	Bidder shall note that in case GST credit is delayed / denied to BHEL due to delayed / non receipt of goods and / or Tax Invoice or expiry of the timeline prescribed in GST Law for availing such ITC, or any other reasons, not attributable to BHEL, GST amount shall be recoverable from successful bidder along with interest levied/ leviable on BHEL, as the case may be.
37.17	Successful bidder shall upload the invoices raised on BHEL in GSTR-1 within the prescribed time as given in the GST Act, and the same is available to BHEL in FORM GSTR-2A/2B electronically through the common portal. Bidder shall note that in case of delay in declaring such invoice in your return and GST credit availed by BHEL is denied or reversed subsequently as per GST Law, GST amount paid by BHEL towards such ITC reversal as per GST law shall be recoverable from the successful bidder along with interest levied / leviable on BHEL.
37.18	Way Bill: Successful bidder to arrange for way bill / e-waybill for any transfer of goods for the execution of the contract. Successful bidder has to make their own arrangement at their cost for completing the formalities, if required, with Issuing Authorities, for bringing materials, plants & machinery at site for execution of the works under this contract, Road Permit / Way Bill, if required, shall be arranged by successful bidder and BHEL will not supply any Road Permit/ Way Bill for this purpose.
37.19	Any new taxes & duties, if imposed subsequent to due date of offer submission as per NIT & TCN, by statutory authority during contract period (including extension,

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	if the same is not attributable to you), shall be reimbursed by BHEL on production of relevant supporting document to the satisfaction of BHEL. However, you shall obtain prior approval from BHEL before depositing new taxes and duties.
37.20	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.
38.0	BOCW
38.1	It shall be the sole responsibility of the contractor as employer to ensure compliance of all the statutory obligations under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.
38.2	It shall be sole responsibility of the contractor engaging Building Workers in connection with the building or other construction works in the capacity of employer to apply and obtain registration certificate specifying the scope of work under the relevant provisions of the Building and Other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 from the appropriate Authorities.
38.3	It shall be responsibility of the contractor to furnish a copy of such Registration Certificate within a period of one month from the date of commencement of Work.
38.4	It is responsibility of the contractor to register under the Building and other Construction Workers' Welfare Cess Act, 1996 and deposit the required Cess for the purposes of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 at such rate as the Central Government may , by notification in the Official Gazette, from time to time specify. However, before registering and deposit of Cess under the Building and other Construction Workers' Welfare Cess Act, 1996, the contractor will seek written prior approval from the Construction Manager.
38.5	In case where the contractor has been accorded written approval by the Construction Manager and the contractor is required to furnish information in Form I and deposit the Cess under the Building and other Construction Workers' Welfare Cess Act, 1996, fails to do so, BHEL reserves right to impose penalty at the rate of 30% of Cess Amount.

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38.6	It shall be sole responsibility of the contractor as employer to get registered every Building Worker, who is between the age of 18 to 60 years of age and who has been engaged in any building or other construction work for not less than ninety days during the preceding twelve months as Beneficiary under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996.
38.7	It shall be sole responsibility of the contractor as employer to maintain all the registers, records, notices and submit returns under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.
38.8	It shall be sole responsibility of the contractor as employer to provide notice of poisoning or occupation notifiable diseases, to report of accident and dangerous occurrences to the concerned authorities under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the rules made thereunder and to make payment of all statutory payments & compensation under the Employees' Compensation Act, 1923.
38.9	It shall be responsibility of the Contractor to furnish BHEL on monthly basis, Receipts/ Challans towards Deposit of the Cess under the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder along with following statistics: Number of Building Workers employed during preceding one month. Number of Building workers registered as Beneficiary during preceding one month. Disbursement of Wages made to the Building Workers for preceding wage month. Remittance of Contribution of Beneficiaries made during the preceding month
38.10	BHEL shall reimburse the contractor the Cess amount deposited for the purposes of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 under the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder. However, BHEL shall not reimburse the Fee paid towards the registration of establishment, fees paid towards registration of Beneficiaries and Contribution of Beneficiaries remitted.

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38.11	It shall be responsibility of the Building Worker engaged by the Contractor and registered as a beneficiary under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 to contribute to the Fund at such rate per mensem as may be specified by the State government by notification in the Official Gazette. Where such beneficiary authorizes the contractor being his employer to deduct his contribution from his monthly wages and to remit the same, the contractor shall remit such contribution to the Building and other construction Workers' Welfare Board in such manner as may be directed by the Board, within the fifteen days from such deduction.
38.12	If any point of time during the contract period, non-compliance of the provisions of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder is observed, BHEL reserves the right to withhold a reasonable amount from the payables to discharge any obligations on behalf of Contractors. The reasonable amount shall be decided by the Construction Manager in consultation with Resident Accounts Officer & Head HR and shall be final.
38.13	The contractor shall declare to undertake any liability or claim arising out of employment of building workers and shall indemnify BHEL from all consequences / liabilities / penalties in case of non-compliance of the provisions of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.
39.0	LIQUIDATED DAMAGE AND OTHER PENALTIES
39.1	Shall be applicable as per clause no. 10.0 of SCC for scope of supply.
39.2	Other provision shall be as per the GCC.
40.0	GUARANTEE / WARRANTY PERIOD
	Shall be applicable as per clause no. 10.0 of SCC for scope of supply and other relevant clauses as specified in tender TCC.
41.0	CONTRACT RATE/ PRICE
41.1	Bidder shall quote their price as per the format of price schedule (Latest revision) only.

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41.2	Total price will be considered for evaluation, as per provision of tender,
42.0	OTHER TERMS
	All other term & conditions of this specification shall be governed by the pertinent provisions of GCC and other volumes of this tender, as applicable.